

**Urban Mass
Transportation Abstracts
Cumulative Bibliography
1974-1980
Volume 1: Abstracts**

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1982
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The National Research Council was established by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the academy's purposes of furthering

knowledge and of advising the federal government. The Council operates in accordance with general policies determined by the Academy under the authority of its Congressional charter, which establishes the Academy as a private, nonprofit, self-governing membership corporation. The Council has been the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in the conduct of their services to the government, the public, and the scientific and engineering communities. It is administered jointly by both Academies and the Institute of Medicine.

The National Academy of Sciences was established in 1863 by Act of Congress as a private, nonprofit, self-governing membership corporation for the furtherance of science and technology, required to advise the federal government upon request within its fields of competence. Under its corporate charter, the Academy established the National Research Council in 1916, the National Academy of Engineering in 1964, and the Institute of Medicine in 1970.

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PREFACE

This initial bibliography, produced by the Urban Mass Transportation Research Information Service (UMTRIS) following its establishment in 1981, incorporates 7064 citations from the Transportation Research Information Service (TRIS) data base with publication dates from the early 1970s through 1980. These citations were stored in TRIS between 1974 and the spring of 1981 by the Highway Research Information Service, Railroad Research Information Service, Maritime Research Information Service, and Air Transport Research Information Service. All abstracts deal with some phase of public transit and represent coverage of technical reports, journal articles, technical books, statistical sources, computer programs, and other information useful to operators, designers, researchers, planners and government agencies at all levels. Sources are worldwide, although the majority of references is of U.S. origin.

UMTRIS was developed within the National Research Council, Transportation Research Board (TRB), under contract to the Urban Mass Transportation Administration (UMTA), U.S. Department of Transportation. The UMTRIS computerized data system incorporates information on planning, designing, maintaining, operating, managing, and financing all modes of public transit including bus, trolley bus, light and heavy rail, advanced guideway systems, taxi and vanpool services, ferries, and local air service. The concepts and procedures used by UMTRIS are similar to those of the other TRIS modal operations cited above.

In addition to acquisition and selection, UMTRIS tasks include classification, indexing, storage, retrieval, and dissemination of abstracts. Projected are semiannual abstract publications that will augment the collection in this Bibliography by publishing the new UMTRIS citations added to the data base every six months.

Despite the title of this volume, *Urban Mass Transportation Abstracts—Cumulative Bibliography*, it should not be considered a complete collection of the *Urban Mass Transportation Abstracts* periodicals that have been issued by UMTA. No check has been made to assure that all UMTA citations from its own abstract publications are incorporated herein, but it can be anticipated that a major proportion is included.

The numerical categories in this Bibliography are divided into four major segments: Transit Technology (Categories 11-17); Transit Management (Categories 21-29); Transportation Services (Categories 31-34); and Urban Transportation Concerns (Categories 41-48). Descriptions of these areas follow.

Transit Technology

It is the technology of transit—vehicles and their propulsion, communications and control, stations and fare collection, guideways, tunnels and aerial structures, and other aspects of transit “hardware”—that epitomizes urban transportation to its users and the general public. For a century research

has produced the evolutionary changes in transit equipment that initially made possible the development of modern metropolitan centers throughout the world and then has assured their continued viability. Transit does serve other markets. In addition to fixed-route services, there are demand-responsive operations, which, by taking riders directly from their residences to their destinations, prove especially valuable for handicapped, elderly, and rural-area residents.

The motor bus is the most common mode of transit service in the United States, handling more than 65 percent of all transit riders with approximately 60 000 vehicles. Three types of electrically powered transit vehicles—heavy rail, light rail and trolley coach—provide most of the remaining urban fixed-route service with more than 11 000 vehicles. Commuter rail, either electric self-propelled or locomotive-powered, produces about half the passenger miles of the local electrically powered transit services and about a quarter of the total for motor-bus transit. Commuter rail, because of its substantially longer passenger trips, handles less than 4 percent of total transit riders in almost 4500 vehicles. A very small portion of total transit riders is handled by other modes—urban ferry boat, cable car, inclined plane, aerial tramway, and automated guideway transit. In total, some 75 000 transit vehicles (ranging in size from small automated guideway cars to ferry boats) handled 8.5 billion passengers in the United States in 1980 for a total of 40.6 billion passenger miles at an operating cost of \$7.6 billion and with fare-box revenues of \$3.1 billion.

In addition to the fixed-route services discussed above, there are a growing number of paratransit, or demand-responsive, operations. These include charter and brokerage services, vanpools, taxicabs, jitneys, minibuses, and special vehicles for elderly and handicapped.

Although public streets and highways provide the right-of-way for nearly all bus and other motor-vehicle services, some fixed-route bus operations are conducted over exclusive lanes of certain major traffic arteries or through restricted bus malls in the downtown areas. Some busways, exclusive roadways designed and built solely for transit bus service, are also used.

Steel-wheel on steel-rail transit requires, at a minimum, trackwork in public streets and, for full use of its capabilities, exclusive right-of-way where maximum capacity can be achieved by complete grade separation from other modes. In center cities this grade separation is generally achieved by constructing subways, although some new systems and a number of older systems operate on embankments or elevated structures at least in areas outside downtown. Commuter services operated by railroads usually involve operation in conjunction with freight and intercity passenger trains. Automated guideway systems are operated in a number of configurations with advanced propulsion systems used in a number of cases.

Seven categories (see pages 1-257) have references of special interest to designers and to those responsible for

operating and maintaining the rolling stock and fixed properties of transit systems. These categories and their UMTRIS numerical designations are as follows:

Category 11—Bus & Paratransit Vehicle Technology: Bus design and engineering; power units and propulsion systems; life-cycle procurement; fuels; accessibility; and similar topics.

Category 12—Bus & Paratransit Operations Technology: Automatic vehicle monitoring; computer applications; vehicle communications; busways; dual-mode transit; operating costs; vehicular traffic facilities; electric vehicle systems.

Category 13—Rail Vehicle Technology: Light-rail, rapid transit, and commuter car design and engineering; propulsion systems; traction power systems; track structures; electric power distribution.

Category 14—Rail Operations Technology: Automatic train control and operation; signaling systems; fare collection; train communications.

Category 15—Construction and Tunneling Technology: Subway design and construction; tunneling; elevated structures; transit stations; roadbed and track construction; noise barriers.

Category 16—Maintenance and Rehabilitation Technology: Maintenance and rehabilitation for vehicles, facilities, and equipment.

Category 17—New Systems and Automation Technology: Automated guideway transit; people movers; personal rapid transit; accelerating walkways.

Transit Management

Transit is a labor-intensive business that confronts its managers with great challenges in using people and equipment with maximum effectiveness while simultaneously producing marketable transportation services. As with all transportation, transit services cannot be turned out in advance for stockpiling but must be produced only when customers require them.

With the growth of automobile ownership, transit demand has usually declined in off-peak periods when formerly there was substantial use of bus and rail services; at the same time, loading during peak periods has continued high, or even increased, serving to intensify short-term demands for both vehicle capacity and operating staff. With alternatives to transit available, its managers are also confronted with pricing and marketing challenges much more sophisticated than were traditional for the industry.

Nine categories (see pages 258-370) include references of particular interest to administrators and managers of transit systems. These categories and their UMTRIS numerical designations are as follows:

Category 21—Transit Operations Management: Abstracts in this section include references to routing, scheduling, automated run cutting, headways, equipment utilization, operator assignments, insurance, liability, and similar operational topics.

Category 22—Transit Maintenance Management: Management of maintenance and servicing for vehicles, their com-

ponents, and fixed facilities; preventive maintenance programs.

Category 23—Human Resources Management: Education; training; industrial relations; staggered work hours; part-time labor; working conditions; labor relations; labor negotiations; work stoppages.

Category 24—Productivity and Efficiency: Performance measures; performance audits; productivity; reliability.

Category 25—Fares and Pricing: Fare collection; ticketing; fare structures; fare elasticity; no-fare systems; pricing for parking.

Category 26—Safety and Product Quality: Fire safety; crashworthiness; safety guidelines; accident reporting; product qualification; systems reliability; risk management.

Category 27—Security: Crime, policing, lighting, and surveillance aboard vehicles and on fixed properties.

Category 28—Marketing: Market studies; advertising; publicity and public relations; graphics.

Category 29—Information Services: Public information; service information; timetables; inquiry response; signing; telephone services.

Transportation Services

Provision of some form of public transportation service for both urban and rural areas is an important goal of current transportation planning. With the growth of automobile ownership in the United States, scheduled public service in small cities and rural areas has either declined drastically or disappeared completely. Even in major metropolitan areas with highly developed fixed-route transit systems, the growth of private transportation has had major impacts on ridership and public transportation planning.

Four categories (see pages 371-572) cover general or specific public transportation services and, often, their interrelationships. These include bus, trolley bus, light and heavy rail, commuter rail, taxi and vanpool services, jitneys, ferries, and local air services. Most of the coverage of the so-called demand-responsive services is in this section. The categories and their numerical designations are as follows:

Category 31—Conventional Transportation Services: Fixed-route bus services; rail services; routes; interchanges, waterborne transit; airports and air services; park and ride; and bicycles.

Category 32—Paratransit Systems and Services: Demand-responsive services; ridesharing; vanpools; subscription and charter bus services; taxis; jitneys; and brokerage.

Category 33—Non-Urban and Low-Density Area Transportation: Rural services and systems; local providers; demonstrations; demand-responsive services.

Category 34—Transportation of Special User Groups: Services for elderly and handicapped; travel barriers; accessibility; special vehicles.

Urban Transportation Concerns

The relation of public transit to the community-at-large involves demographics, sociology, economics, politics, finance, energy, and the environment. After 1960 and with the de-

cline of mass transit as a private-enterprise responsibility, transportation planning increasingly has involved public groups and government at all levels.

While transit had long been a governmental function in certain U.S. communities, government for the majority of cities had been involved only with franchising and with the regulation of rates and services. In the past two decades government has become the major provider of U.S. mass transit services. After changes in federal highway funding in the mid-1960s to allow transfer of certain amounts for transit purposes, the federal role increased steadily until 1980. Initially, federal funding covered capital projects and by the early 1970s there also was federal assistance for operating subsidies. Likewise, during this same time regional, state, and local agencies were called on for additional funds for all phases of mass transportation.

Eight categories (see pages 573-925) cover primarily the later phases of this cycle of government involvement with urban transport. These categories and their UMTRIS designations are as follows:

Category 41—Socioeconomics of Passenger Services: Human factors; societal benefits; user needs; citizen participation; economic projections; user needs and surveys.

Category 42—Transit Planning, Policy and Programs: Travel demand, assessment, and impact studies; alternatives; modal choice; cost-benefit analysis; forecasting; regional studies.

Category 43—Transit Financing: Financing methods; audits; fund allocation; grants; multiagency funding; subsidies; taxation; budgeting.

Category 44—Political Processes and Legal Affairs: Legislative regulatory public finance; and tax law; motor vehicle and traffic law; contracts; interagency relations; transit boards.

Category 45—Land Use: Joint development; property values; housing development; urban development and revitalization; value capture; land acquisition.

Category 46—Center City Traffic Restraints: Zoning; pedestrian malls; disincentives for automobile use; fringe parking.

Category 47—Urban Goods Movement: Freight terminals; intracity freight movements.

Category 48—Energy and Environment: Air quality; pollution control; environmental impact; energy conservation; noise abatement; aesthetics.

How to Use This Bibliography

This publication (Volume 1) contains only the abstracts, arranged in 28 categories, and is to be used in conjunction with the separate Key Word Index (Volume 2). Key words in the Index are arranged in alphabetical order, and each is followed by document record numbers that consist of the two-digit category designation and the six-digit TRIS acces-

sion number. Most of the key words are followed by several document record numbers that are arranged in ascending category order; within the categories the accession numbers are also arranged in ascending order.

A few of the abstracts in this Bibliography are reproduced entirely in upper case (capital) letters and other citations completely in italics. No particular significance should be attached to either type face; problems associated with original storage in the TRIS magnetic tape file caused these variations.

Although key words in Volume 2 do give the user a good idea of the terms used for indexing UMTRIS records, other terms will be used as the system expands. A special key-word listing with frequency counts will be available at regular intervals. This reference will be useful to on-line searching and for specifying batch-mode searches by UMTRIS.

The UMTRIS file, maintained on magnetic tape, is available for computer-generated literature searches in response to specific inquiries. The key to searching is the key words, although other data fields, such as author, document country of origin, and date of publication may be used as search parameters. The output of such searches may include abstracts of articles and reports, descriptions of computer programs, and summaries of ongoing research (no ongoing research summaries appear in this Bibliography). The output of such a search is a computer-printed listing similar in format to citations that appear in this publication.

Dialog Online

Information inputted to the TRIS data base is also transmitted at regular intervals to Dialog Information Services, Inc., for inclusion in Dialog File 63 from which it is retrievable by authorized users at established rates. On-line retrieval may be done through any standard telephone if the user has a computer terminal and has established proper entry into Dialog. The 7065 citations included in this Bibliography are not currently tagged as UMTRIS references in Dialog, although all subsequent entries are being so marked. This means that the basis for searching the UMTRIS data base from its earliest references through 1980 will have to be with key words and some of the other parameters noted above. Searching may also be done free-text in Dialog, a system that allows titles and abstracts to be searched for desired words or phrases even though they may not be among the UMTRIS key words.

It is important to note that, with the exception of TRB publications, full-text documents are not available from TRB or UMTRIS. Virtually all the citations include an availability statement indicating where a copy or photocopy of the document may be obtained. A guide to document delivery appears on pages vi-vii.

Additional information on UMTRIS and its publications may be obtained by contacting the UMTRIS Manager.

AVAILABILITY OF DOCUMENTS

An availability statement is included with each abstract. Because a large number of documents are available from a few major sources, space and printing costs have been reduced by abbreviating these and not indicating an address in the abstract. The standard abbreviations used by UMTRIS for availability statements are shown below, along with the complete name and address of each organization. In all other cases the organization from which a document may be ordered and its complete address are given in the availability statement. Copies of reports and articles listed in this publication are not available from UMTRIS. When ordering from any source, give full information about the document

desired. When ordering from the National Technical Information Service, be sure to give the NTIS accession number as well as title and other information. A loan and photocopy service for many of the articles and papers cited is operated by six transportation libraries as explained on page xx. Documents published outside the United States are usually written in the language of the country of origin as indicated at the end of the abstract. If a translation is desired, consult the National Translations Center listed below, which maintains a registry of translations. If the document has never been translated, contact translation services listed in the yellow pages of the telephone book in metropolitan areas.

AAR

Association of American Railroads
1920 L Street, N.W.
Washington, DC 20036
Telephone 202-835-9100

AAR

(For technical reports identified by a report number such as R-253)
Association of American Railroads
Technical Center
3140 South Federal Street
Chicago, IL 60616
Telephone 312-939-0770

AIAA

American Institute of Aeronautics and Astronautics
Technical Information Service
1290 Avenue of the Americas
New York, NY 10104
Telephone 212-581-4300

AREA

American Railway Engineering Association
2000 L Street, N.W.
Washington, DC 20036
Telephone 202-293-3692

ASCE

American Society of Civil Engineers
345 East 47th Street
New York, NY 10017
Telephone 212-644-7671

ASME

American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017
Telephone 212-644-7703

CIGGT

Canadian Institute of Guided Ground Transport
Queen's University
Kingston, Ontario K7L 3N6
Canada
Telephone 613-547-5777

DOTL

U.S. Department of Transportation Library
400 Seventh Street, S.W.
Washington, DC 20590
Telephone 202-426-2565

ECMT

(All documents available through OECD)
European Conference of Ministers of Transport
2 rue André Pascal
Paris 75775, France
Telephone 524-97-22

ESL

Engineering Societies Library
United Engineering Center
345 East 47th Street
New York, NY 10017
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FRA

Federal Railroad Administration
400 Seventh Street, S.W.
Washington, DC 20590
Telephone 202-426-0881

GPO

Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402
Telephone 202-783-3238

IEEE

Institute of Electrical and Electronics Engineers
345 East 47th Street
New York, NY 10017
Telephone 201-981-0060

IPC

IPC (America), Inc.
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PPI

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Telephone 914-592-7700

RPI Railway Progress Institute 700 North Fairfax Street Alexandria, VA 22314 Telephone 703-836-2332	TRB Transportation Research Board Publications Office 2101 Constitution Avenue, N.W. Washington, DC 20418 Telephone 202-334-3218	UITP International Union of Public Transport Avenue de l'Uruguay 19 B-1050, Brussels Belgium Telephone 73-33-25
RTAC Roads and Transportation Association of Canada 875 Carling Avenue Ottawa, Ontario K1S 5A4 Canada Telephone 613-521-4052	TRRL Transport and Road Research Laboratory Crowthorne, Berkshire RG11 6AU England Telephone Crowthorne 3131	UMI University Microfilms International 300 North Zeeb Road Ann Arbor, MI 48106 Telephone 313-761-4700
SAE Society of Automotive Engineers 400 Commonwealth Drive Warrendale, PA 15096 Telephone 412-776-4841	TSC Transportation Systems Center Kendall Square Cambridge, MA 02142 Telephone 617-494-2306	UMTA Urban Mass Transportation Administration 400 Seventh Street, S.W. Washington, DC 20590 Telephone 202-426-4043
SNAME Society of Naval Architects and Marine Engineers One World Trade Center New York, NY 10048 Telephone 212-432-0310	UIC International Union of Railways, BD 14-16 Rue Jean-Rey 75015 Paris France Telephone 273-01-20	

ABBREVIATIONS

AAR	Association of American Railroads	NAS	National Academy of Sciences
AIAA	American Institute of Aeronautics and Astronautics	NHTSA	National Highway Traffic Safety Administration, U.S. Department of Transportation
AREA	American Railway Engineering Association	NRC	National Research Council
ASCE	American Society of Civil Engineers	NTIS	National Technical Information Service
CIGGT	Canadian Institute of Guided Ground Transport	NUTCL	Northwestern University Transportation Center Library
CNR	Canadian National Railways	OECD	Organization for Economic Cooperation and Development
DOT	U.S. Department of Transportation	OST	Office of the Secretary of Transportation
DOTL	U.S. Department of Transportation Library, Washington, D.C.	PB	Prefix identifying an NTIS accession number
ECMT	European Conference of Ministers of Transport	Phot	Photographs
EI	Engineering Index	Ref	References
ESL	Engineering Societies Library	Repr PC	Paper copy of original document
FHWA	Federal Highway Administration, U.S. Department of Transportation	RP	Repository (DOTL)
Fig	Figures	RPI	Railway Progress Institute
FRA	Federal Railroad Administration	Rpt	Report
FY	Fiscal Year	RTAC	Roads and Transportation Association of Canada
GMRL	General Motors Research Laboratories	SAE	Society of Automotive Engineers
GPO	U.S. Government Printing Office	Shaw	Shaw Publishing Company, Ltd.
HRIS	Highway Research Information Service, Transportation Research Board	SNAME	Society of Naval Architects and Marine Engineers
HSRI	Highway Safety Research Institute	SRIS	Safety Research Information Service, National Safety Council
HUD	U.S. Department of Housing and Urban Development	Tab	Tables
IEEE	Institute of Electrical and Electronics Engineers	TRB	Transportation Research Board
IPC	IPC Transport Press, Ltd.	TRRL	Transport and Road Research Laboratory
IRCA	International Railway Congress Association	TSC	Transportation Systems Center
IRF	International Road Federation	UIC	International Union of Railways
IRRD	International Road Research Documentation	UITP	International Union of Public Transport
ITS	Institute of Transportation Studies	UMI	University Microfilms International
JC	Journal Collection (DOTL)	UMTA	Urban Mass Transportation Administration
NAE	National Academy of Engineering		

LOAN AND PHOTOCOPY SERVICES

Full-text versions of many of the citations in the Urban Mass Transportation Research Information Service (UMTRIS) data base are available from a number of sources, some of which are indicated below. Municipal, state, and university libraries may have full-text copies, or may be able to secure them through interlibrary loans. Certain reports and books, as well as photocopies of reports, journal articles and conference papers may be obtained from the specialized transportation libraries that are listed. In addition, commercial and government services can supply photocopies or microfiche of many of the journal articles and technical reports. All such services are subject to copyright guidelines.

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ABSTRACT OF A TECHNICAL PAPER

Document record number	
TRIS accession number	
UMTRIS category	11 301471 AM GENERAL/M.A.N. ARTICULATED BUS. AM General and the main producer of articulated buses in Europe, M.A.N., have jointly introduced this type of bus to the U.S. market. The bus was modified from its originally European configuration to comply with all U. S. regulations and specific customer requirements. Description of the bus and its components are presented in detail, emphasizing the specific aspects of an articulated bus—the under-floor drive train, articulation joint, and braking system. The structure, electrical system, interior and air-conditioning system are also outlined.
Title	
Technical paper	
Abstract	
Author and affiliation	Scharbach, GW (AM General Corporation) Dommandl, H <i>Society of Automotive Engineers Preprints Conf Paper SAE 790304, 1979, 16 p.</i>
Publication Data	
Supplementary Note	From the February 26-March 2, 1979 Meeting.
Source of abstract	ACKNOWLEDGMENT: EI; ORDER FROM: ESL
Availability	

ABSTRACT OF A JOURNAL ARTICLE

Document record number	
TRIS accession number	
UMTRIS category	14 312046 WHAT ARE THE COSTS OF LOW NOISE-LEVEL CONSTRUCTION FOR METROS? [Was kosten laermarme Baueisse beim U-Bahn-Bau?]. Four diagrams are used to define the relation between construction costs and noise evaluation as resulting from a test line, with special reference to achieving values of 65, 70, 75 and 80 dB(A). The "cover-type construction" has particular advantages. A survey of 15 different types of metro construction is given. [German]
English language title (translation)	
Foreign language title	
Journal article abstract	
Language of full-text document	
Authors	Paersch, A Seeling, R. <i>Bauingenieur</i> Vol. 54 No. 11, 1979, pp 415-418, 1 Tab., 2 Phot., 15 Ref.;
Publication data	
Source of abstract	ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL
Availability	

ABSTRACT OF A TECHNICAL REPORT

Document record number	
TRIS accession number	
UMTRIS category	12 305832 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 5: THE IMPACTS OF TECHNOLOGICAL INNOVATION. A number of new technologies have been implemented with or proposed for paratransit systems. As part of the overall IP benefit cost study, the potential impact of two such technologies, digital communications and computer dispatching, have been analyzed in detail and are reported here. In addition, some preliminary analyses have been conducted on the potential impacts of computer-aided dispatching, computer control of radio channels, automated control-to-passenger communications, automated passenger information systems, automatic vehicle monitoring, and a new paratransit vehicle.
Title	
Abstract of report	
Authors/investigators	Flusberg, M Menhard, HR Walker, J Sobel, K ;
Performing agency	Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UM-TA-79-39-5, Sept. 1979, 78 p.; See also Volume 4, PB80-125503 and Volume 6, PB80-125529.
Document and activity data	
Supplementary note	Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; AC-
Source of abstract	KNOWLEDGMENT: NTIS; ORDER FROM: NTIS;
NTIS accession number	PB80-125511
Availability	

Abstracts of Research Reports, Technical Papers, and Journal Articles

11 046231 CALIFORNIA STEAM BUS PROJECT. The California steam bus project was undertaken to evaluate the technical feasibility and public acceptance of the external combustion engine (ECE) as a low-emission, quiet propulsion system, using city buses as demonstration vehicles. Emphasis was placed on the early demonstration of potential, rather than extensive development or technical perfection. The title 'steam bus' was adopted after the choice of Rankine cycle systems to exemplify the ECE. Steam propulsion systems were installed in three 40-foot transit coaches, replacing the original diesel engines. The buses were tested and demonstrated in the metropolitan areas of Oakland, San Francisco, and Los Angeles. The report presents findings on performance, emissions, noise, fuel consumption, operating characteristics, revenue service, and potential for fuel consumption and emissions improvement.

Napuk, K Lane, JA Renner, RA ; Scientific Analysis Corporation, (UMTA-CA-06-0031) Final Rpt Jan. 1973, 32 pp; Paper copy also available from NTIS 4 reports as PB-217 507-SET.; ACKNOWLEDGMENT: NTIS (PB-217508/1); ORDER FROM: NTIS, Repr PC, Microfiche; PB-217508/1

11 046232 CALIFORNIA STEAM BUS PROJECT. The California steam bus project is summarized in a final report on the development and demonstration of Rankine Cycle external combustion propulsion systems for urban transit vehicles. Project history, organization, and financing are summarized in detail. Three contractors were selected to install steam powerplants in conventional motor coaches, replacing the standard diesel engines, each contractor being paired with the transit system in a different city.

Napuk, K ; Scientific Analysis Corporation, (UMTA-CA-06-0031) Final Rpt 1973, 15 pp; Paper copy also available from NTIS 4 reports as PB-217 507-SET.; ACKNOWLEDGMENT: NTIS (PB-217509/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-217509/9

11 046233 CALIFORNIA STEAM BUS PROJECT. Preliminary to a demonstration of Rankine cycle external combustion propulsion systems in urban transit vehicles, survey data were collected to measure the extent of public concern about air pollution and the extent to

which California residents see the need for alternatives in transportation to alleviate or reduce air pollution. Three surveys were conducted. In addition, a survey of patron attitudes on steam and diesel buses was made. Findings are summarized in detail, and data tabulations are appended. Sampling methods for each survey are also discussed.

Stefanich, FJ ; Scientific Analysis Corporation, (UMTA-CA-06-0031) Proj Rpt Phase I, 1973, 51 pp; Paper copy also available from NTIS 4 reports as PB-217 507-SET.; ACKNOWLEDGMENT: NTIS (PB-217510/7); ORDER FROM: NTIS, Repr PC, Microfiche; PB-217510/7

11 046234 CALIFORNIA STEAM BUS PROJECT. Under the California steam bus demonstration project, Rankine cycle external combustion propulsion systems were installed on three conventional motor coaches, replacing the original diesel engines. The report presents survey data collected among bus passengers, transit managers, and bus drivers concerning attitudes toward the steam-powered vehicles. The findings revealed a high public concern for the problems of air pollution and a very favorable response to the steam buses. All drivers expressed a preference for the steam bus.

Scientific Analysis Corporation, (UMTA-CA-06-0031) Final Rpt 1973, 46 pp; Paper copy also available from NTIS 4 reports as PB-217 507-SET.; ACKNOWLEDGMENT: NTIS (PB-217511/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-217511/5

11 054491 EVALUATION OF URBAN TRANSIT BUS MODIFICATION KITS TO REDUCE ENGINE SMOKE, ODOR, NOXIOUS EMISSIONS AND NOISE. The Truck and Coach Division of General Motors Corporation (GMC) has developed a modification kit for the current series of GMC diesel transit buses. The kit, known as the EIP Kit, is designed to reduce toxic emissions, odor, smoke, and noise, and can be installed on all GMC transit buses manufactured since 1959. A two-year field evaluation of this kit has been conducted. Toxic emissions, smoke, and noise from buses equipped with the kit were compared with those from control buses in Washington, D.C.; San Francisco, California; and San Antonio, Texas. Odor emissions were measured from modified and control buses at San Antonio. Records were kept of maintenance costs

and of problems encountered in installation and operation.

Swetnam, GF Willingham, FL ; Mitre Corporation, (UMTA-IT-06-0022) Final Rpt MTR-6413-Rev-1, May 1973, 120p; Contract DOT-UT-10028; ACKNOWLEDGMENT: NTIS (PB-228470/1);

ORDER FROM: NTIS, Repr PC, Microfiche; PB-228470/1

11 080584 THE ROLE OF AN ERGONOMIST IN THE COMMERCIAL VEHICLE INDUSTRY. The author outlines the ergonomist's task of considering all aspects of vehicle design which affect the performance of the driver, and comfort and safety of passengers. The steps that should be taken to insure correct ergonomics and legal compliance are listed, and the types of test which should be undertaken and the methods employed are illustrated by a bus design experiment carried out by British Leyland and the Transport & Road Research Laboratory. Such factors as seat dimensions and position, size and position of handrails and step height were investigated in tests involving elderly and disabled people, as this section of the population are seen to experience most problems with buses in current use. Methods of assessment include analysis of cine film, questionnaires and subjective assessment or comparison. As a result of these trials, the bus will be based upon the requirements and capabilities of the people who will use it, rather than a design resulting from opinion or arbitrary decisions. The value of quick, simple tests, involving only a few subjects, to provide information to aid decision making is also noted.

Brooks, BM (British Leyland) *Journal of Automotive Engineering* Vol. 5 No. 1, Feb. 1974, pp 10-16, 5 Fig., 10 Phot., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 209961)

11 092144 SMALL TRANSIT VEHICLE SURVEY. Small transit vehicles, defined as those vehicles seating 7-25 passengers and intended for public transportation use, are available in a variety of makes and models with markedly different characteristics affecting both operators and users. This report documents the specifications and operating experience of small transit vehicles available in the United States. Despite the fact that the demand for small transit vehicles

has only recently begun to grow there are many more manufacturers of these vehicles than there are of full size transit vehicles. Vehicles are divided into three main categories: vans and van conversions, small buses, and converted motor homes. Operating experience was obtained by sampling from manufacturer provided user lists. Vehicle specifications were obtained directly from the manufacturer. No vehicle has been completely free of problems; no one vehicle is clearly superior to all others, nor is any one category of vehicle clearly superior to any other. A vehicle operator must weigh a number of variables before determining which vehicle is best for a particular application.

Flusberg, M Kullman, B Casey, R ; ECI Systems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-OST-75-17, June 1975, 138 pp; Contract DOT-TS-7769; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243228/4ST

11 092157 PROJECT SUPER BUS: SPECIFICATION FOR AN ARTICULATED TRANSIT BUS. The report is a specification providing a prospective manufacturer with guidelines to develop an articulated bus specifically suited to transit service in the U.S. It specifies the basic physical dimensions, passenger accommodations, and propulsion for a series-built multipassenger public service vehicle designed primarily for urban service but with adaptability to arterial and truck line service. The nominal design capacity is for a vehicle having a single operator and a capacity for 70 or more seated passengers, with state-of-the-art propulsion and human factors design. The specifications meet all applicable U.S. Federal, state, and local safety and performance standards. Chapters discuss vehicle structure, furnishings, driver's station and controls, energy conversion, suspension and guidance (steering), and heating, ventilating, and air conditioning. Appendices contain definitions and abbreviations.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration, National Transportation Center, (UMTA-PA-06-0007) Final Rpt. UMTA-PA-06-0007-74-1, Oct. 1974, 87 pp; Paper copy also available in set of 2 reports as PB-243 691-SET, ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243692/1ST

11 092158 PROJECT SUPER BUS: HIGH-CAPACITY BUS CONCEPTUAL DESIGN STUDY. The purpose of the study was to determine the technical criteria for high-capacity transit buses for U.S. operation. Principal emphasis was placed on the articulated bus concept, because the maneuverability of articulated buses makes them suitable for service on any routes that can be served by a standard 40-foot rigid bus. The double-deck bus concept was also studied because it offers some operating cost advantages, but vertical clearance problems would limit its use to about 30 percent of the high-capacity routes. Design studies were made of a number of specific configurations for the two generic concepts. The objective in the double-deck design studies was to achieve maximum height in the aisle in both decks while maintaining the maximum number of seats in a conventional arrangement. Information is presented on the market potential and production costs for high-capacity buses.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration, National Transportation Center, (UMTA-PA-06-0007) Final Rpt. UMTA-PA-06-0007-74-2, Dec. 1974, 193 pp; Paper copy also available in set of 2 reports as PB-243 691-SET, ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243693/9ST

11 092503 SCHOOL BUS SAFETY IMPROVEMENT PROGRAM. SUMMARY REPORT. The objective of the program was to develop an improved school bus structure and to evaluate safety, driver field of view, acceleration and passing, braking, and handling characteristics of typical school buses. Structural and accident avoidance tests were performed on two Baseline Buses. An Improved Bus was designed and two Improved Buses were fabricated for evaluation. Identical tests on the Improved Bus showed structural improvements of 33 to 57 percent were achieved with a cost increase of only \$500 (4.5 percent) and a weight increase of only 530 pounds (3.9 percent). Acceleration and passing, braking, and handling tests showed that the added weight had not degraded performance in these areas. Based on these results, school bus structural standards and feasible compliance test procedures are recommended. Other recommendations are made for improved emergency egress, driver field of view, and handling test procedures.

Boulay, P Davis, S ; Ultrasytems, Incorporated, National Highway Traffic Safety Administration Final Rpt. DS-2310-74-138A, DOT-HS-801-615, June 1975, 34 pp; See also: Volume I, 189 pages, PB-244850/4ST; Volume II, 418 pages, PB-244851/2ST.; Contract DOT-HS-046-3-694; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245031/0ST

11 092698 VIBRATIONS TRANSMITTED TO HUMAN SUBJECTS THROUGH PASSENGER SEATS AND CONSIDERATIONS OF PASSENGER COMFORT. An experimental study was conducted to determine the vertical and lateral vibration-transmission characteristics of several types of transport vehicle seats (two aircraft and one bus) to obtain preliminary estimates and comparisons of the ride acceptability of the various seat types. Results of this investigation indicate that from the standpoint of human comfort the seats exhibit undesirable dynamic response characteristics. Amplification of floor vibrations occurred at the frequencies known to be most critical for human comfort in both vertical and lateral axes. An average transmissibility function for aircraft seats was tabulated together with the associated variability for use by designers who incorporate similar types of seats in their vehicles. The acceptability of vibrations resulting from floor inputs of 0.10g and 0.15g was low over a broad range of frequencies for both axes and all seat types, and was especially low at frequencies where the input was being amplified. (Author)

Leatherwood, J ; Langley Research Center NASA-TN-D-7929, June 1975, 56 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; N75-25582/8ST, DOTL NTIS

11 095602 A NEW STRUCTURAL PERFORMANCE STANDARD FOR SCHOOL BUS BODIES. A comprehensive structural performance standard for school bus superstructures is being developed by a special task force on school bus safety organized by the School Bus Manufacturers Institute. This paper presents a progress report on the standard. Included is a review of the main features: the basic philosophy that the bus body must be capable of safe, controlled energy absorption in the event of a crash; the establishment of a statically equivalent test through the use of energy absorption as a simulation parameter; and detailed specifications for simulated crash modes. As a specific example, the rollover simulation test specification is presented in its entirety and a critical assessment is provided. /SAE/ Jahsman, WE (Colorado University, Denver) ; Society of Automotive Engineers, (SASI 74-2609) SAE #741145, Nov. 1974, 6 pp

11 099305 TRANSPORTATION FOR THE HANDICAPPED--AN EQUAL OPPORTUNITY TO TRAVEL. Regulations, and the establishment of requirements on the subject of transportation services for elderly and handicapped persons are reviewed, and vehicle design to meet the needs of such persons is described. A specially designed Twin Coach bus features an electrically-actuated hydraulic lift for wheelchairs and an extendable step at the front entrance. Twelve buses in Denver were designed with a low floor, low step and a hydraulically operated elevator. Provision is made for seating the blind, the deaf and a seeing eye dog. A demonstration program to provide personalized transit services, and a design contest for vehicles to accommodate the elderly and the handicapped are outlined. A specialized dial-ride service for the handicapped in Milwaukee is described. Three divisions of the para-transit system provide more than 3,200 trips each day for the elderly, handicapped and special education passengers.

Mandel, LL *Metropolitan* Vol. 71 No. 3, May 1975, pp 14-17, 6 Phot.

11 099481 SILENT RIDER--A PROJECT FOR CITY CENTER TRANSPORT. In order to evaluate the energy conversion efficiencies of a full size battery-powered bus, the Chloride Group in conjunction with the Greater Manchester Passenger Transport Executive has developed a prototype 50 passenger, 40 mph battery-powered vehicle named Silent Rider. During test programs on the prototype it has been found that the overall efficiency of the vehicle can be increased from 60% to 72% by the addition of regenerative braking facilities. Several areas requiring further development have been clearly defined resulting from preliminary testing of Silent Rider. /GMRL/ Morris, C (Chloride Technical Limited) ; Society of Automotive Engineers, (SASI 75-1043) Proceeding SAE #750192, Feb. 1975, 9 pp

11 126127 ELECTRIC VEHICLE RESEARCH, DEVELOPMENT, AND DEMONSTRATION ACT OF 1975. This section of the Congressional Record considers bill H.R. 8800, the Electric Vehicle Research, Development, and Demonstration Act of 1975, which establishes a 5-year, 160 million dollar program under the Energy Research and Development Administration (ERDA). The primary goal of the project is to demonstrate the feasibility of electric vehicles,

including the evaluation and demonstration of more than 7,500 vehicles over the next 5 years. The initial objective is the development of "second" cars and specialized delivery vans. Energy conservation is anticipated with the electric vehicles through their use on short (less than 5 miles) trips and in heavy traffic. It is also pointed out that electric vehicles are charged during the night, increasing the efficiency of the electric utility system since this is an off-peak time. Six studies conducted previously on electric vehicle technology and utilization are briefly summarized. These include a report of the Panel on Electrically Powered Vehicles, a symposium on Power Systems for Electric Vehicles, an Energy Task Force Report, a study of the impact of the future use of electric cars in the Los Angeles region, an evaluation of alternative power sources for low-emission automobiles by the Committee on Motor Vehicle Emissions of the National Academy of Sciences, and a report prepared by NSF on the role for Federal Research and Development on alternative automotive power systems. The heart of the present bill is considered to be the demonstration program, which will be carried out in three stages. The first stage involves a few hundred electric vehicles at the present state-of-the-art for in-use demonstration and evaluation. The second stage includes 2,500 vehicles which meet initial performance standards and criteria. The third stage involves 5,000 electric vehicles having advanced components and designs, and meeting appropriately advanced revised standards and criteria. ERDA will arrange to introduce the vehicles into Federal, State, and local government fleets, will undertake demonstration maintenance, and will disseminate safety and operating characteristics and data to appropriate consumer affairs groups. In considering appropriations, a summary of the funding history of electric vehicle research and development is presented. A list is included of electric vehicle manufacturers in the United States. Following this presentation, the bill was discussed by the Committee of the Whole.

Congressional Record Sept. 1975, 8 pp, 5 Tab., Refs. ORDER FROM: GPO, Orig. PC

11 126173 EQUIPMENT AND MAINTENANCE OF DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 5. Comments are made (based on discussions and surveys made in the parcel, light air cargo, and passenger demand-responsive transportation systems) on the need for, and the design and use of a diversified-use vehicle (DUV). The DUV is a vehicle that can be used for the ground transportation of one or more of the following: able-bodied passengers, handicapped persons, local parcel delivery, and light air-cargo parcels. The desirable vehicle design was identified as a van type vehicle that had the driver in front, a luggage and cargo carriage in the rear compartment over a rear-mounted power plant and transmission. To these must be added the safety dictates of the U.S. Department of Transportation. The vehicle will incorporate the following basic points; unitized construction; 116-in. wheel base; front-wheel power steering; free-float suspension on all 4 wheels of a 4-wheeled vehicle; conventional oil over air suspension; 4-doors; power disc brakes for all 4 wheels and 12-in. rotors; 15-in. steel wheels and medium profile tires; 6-cylinder gaso-

line engine coupled to a 3-speed automatic transmission; bolt-on panels where possible and none if unitized construction; capacity for a maximum of driver and 6 forward-facing passengers; capacity for at least 500 lb of cargo in addition to passengers; and rear-mounted power plant and transmission.

Davidson, JH (Yellow Cab Company) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 79-81; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

11 129690 EVS-THE FUTURE? Battery-powered electric vehicles (ev) have been in use for more than 60 years, but little attempt has been made to develop them for public road transport until recently. The article describes recent designs of electric vans, buses, and cars. The major barrier to progress is shown to be the low energy storage density of batteries. Electric power is ideally suited to buses since their average speed during peak periods in cities is 8.5 mile/h, and 90 percent cover less than 40 miles in that 3-3.5 hour period. Batteries could be charged overnight and between peak periods. The ultimate energy density of lead-acid cells is such that they can only provide electric vehicles with a short range compared with those powered by the internal combustion engine. New types of cell are being investigated, but all have some technical faults; the solution may be to use a small efficient engine running at a constant speed to recharge the batteries until a high energy density battery is available. The major advantage of the electric vehicle is that by using energy from the national grid system the electric car could theoretically travel 100 miles on the same amount of crude oil used to make one gallon of petrol. /TRRL/

Smith, WS (Chrysler, UK Limited) *Chartered Mechanical Engineer* Vol. 22 No. 2, Feb. 1975, pp 75-78, 2 Fig., 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 216061)

11 129909 THE DESIGN OF A STEAM POWERED PARATRANSIT VEHICLE. The design of a new concept in urban transportation, the steam powered paratransit vehicle (PTV), is described. The vehicle incorporates the following features: an external combustion engine (ECE) power system, a unique aluminum chassis and body structure whose primary elements are bonded honeycomb sandwich panels, an automatic passenger door and loading ramp system capable of accommodating a wheel chair seated passenger without assistance, a roof-mounted condenser system, an all-independent suspension system incorporating torsion bar springs and self-leveling shock absorbers, and a near-center driver's station isolated from passengers by a bullet resistant partition. /GMRL/

Norton, DD (Steam Power Systems, Incorporated); Society of Automotive Engineers, (SAE 75-1577) SAE #75-0736, Aug. 1975, 9 pp

11 130666 UNITED STATES TRANSIT BUS DEMAND. First, this paper describes the probable service life characteristics of transit buses in

the United States. This description takes the form of an actuarial survivor curve derived from bus purchase data since 1950; age distribution surveys for 1970, 1972 and 1973; and theoretical curves developed at the Iowa State Engineering Experiment Station. The thrust of the paper is the service-retirement model, which estimates the demand for new transit buses as a function of fleet size and service life. Based on the derived survivor curve, this model compares the survivors of buses installed since World War II to a fleet size established by policy. The difference is the number of buses which must be installed in service by the end of each analysis year to satisfy the policy. This installation requirement represents the demand for buses. A new installation record is created by adding one year to the age of each bus and entering the analysis year's installation as age one. Repeated applications of the survivor curve to this "aging" historical file simulates the service-retirement cycle of a fleet of buses. Lastly the paper tests some hypothetical policies to demonstrate the use of the service-retirement model to estimate transit bus demand. Included with these illustrations is a "best estimate" of the U.S. demand through 1990. /Author/

Heightchew, RE, Jr; Highway Users Federation for Safety and Mobility Tech. Memo No. 12, June 1975, 32 pp, 5 Fig., 9 Tab., 9 Ref.; ORDER FROM: Highway Users Federation for Safety and Mobility, 1776 Massachusetts Avenue, NW, Washington, D.C., 20036 Repr. PC

11 131332 CREDIBILITY OF DIESEL OVER GASOLINE FUEL ECONOMY CLAIMS BY ASSOCIATION. Current and proposed legislation regarding gaseous emissions has adversely affected the fuel economy of certain gasoline engines. Recent economic and environmental developments such as the fossil fuel shortage have improved the potential for the use of diesel engines as the power plant for small commercial vehicles and possibly certain passenger cars. Many variables affect fuel economy comparisons. Most of these variables can be associated with either the vehicle design or operation. The objectives of this paper are to relate fuel economy claims with a variety of cycles and to show how some of these claims can be justified, and to show how some of the more impressive diesel over gasoline economy claims relate more to the real world than comparisons based on EPA and SAE cycles. EPA originally started with one cycle and later split it into city and highway driving, to better cover the real world. SAE now has three cycles which represent a broader range of habits and requirements. There is still room for improvements at the low speed, short trip in cold weather, end of the scale. Also, the high volume of small commercial vehicles such as pick-ups, vans, taxis, etc. need attention. To appreciate the significance of comparing the real world to SAE cycles, we must be familiar with "typical vehicle fuel economy as influenced by trip length", "fuel savings potentials in short trip cold weather service", and "other published statistics" that have SAE level research and credibility. These papers show the results of surveys describing how up to 80% of trips and 50% of the auto fuel consumed are associated with trips of 10 miles or less.

Schultz, WJ Miesiak, CE Hamiltan, AE Larkinson, DE (Perkins Engines, Incorporated); Society of Automotive Engineers SAE #760047, 1976, 12 pp, Figs., Tabs., 12 Ref.; Automotive Engi-

neering Congress and EXposition, 23-27 Feb. 1976, Detroit, Mich.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-33799)

11 131336 A STUDY OF THE ENERGY UTILIZATION OF GASOLINE AND BATTERY-ELECTRIC POWERED SPECIAL PURPOSE VEHICLES. The depletion of the supply of liquid hydrocarbon fuels in the predictable future has accelerated interest in vehicles powered by different forms of energy. The battery is one form of energy storage that has successfully found application in special-purpose vehicles for nearly three-quarters of a century. Heavy duty lift-trucks and tugs, golf carts and delivery vehicles are among the vehicle types powered by battery-electric systems. Personal transportation needs have been served to only a limited extent by electric vehicles because of the low power, limited range and lack of durability provided by the energy availability picture have necessitated re-consideration of the electric vehicle. In order to compare the efficiency of utilization of the Earth's fossil energy resources (petroleum and coal) by battery-electric and gasoline powered special-purpose urban vehicles, an analytic study was conducted. The guidelines of this study restricted it to three special-purpose cars that are smaller and have lower performance than conventional subcompact cars and a delivery van. The vehicle power train components represent demonstrated current technology. The most important guide-line of the study required the performance levels and load carrying capacity of the gasoline and electric-powered vehicles to be the same. The results of the study indicate that a lead-acid battery powered, two-passenger shopper vehicle with a 40 km range consumed about 90% more petroleum per kilometer of driving than does its spark ignition engine powered counterpart. With coal as the prime source, they consume about the same amount of energy. increases in desired range, performance and vehicle size beyond that of the shopper increase the electric vehicle energy consumption with respect to the gasoline powered version. The position of the electric vehicle is improved with respect to the gasoline vehicle by the development of advanced batteries, increased electric component efficiencies and an actual electric vehicle mass less than assumed due to a reduced mass compounding factor. An aspect related to the conventionally powered vehicle that tends to reduce the advantage over the electric is a potential efficiency penalty of the spark ignition engine due to its small size. Incorporation of these considerations into the study produce results more favorable for the electric version. The energy consumption of a nickel-zinc battery powered shopper is only about 30 percent more than its spark ignition engine powered counterpart considering petroleum as the prime source of energy. With coal as the prime source, the advanced technology electric vehicle consumes about 30 percent less than the spark ignition engine powered version.

Sheridan, DC Bush, JJ Kuziak, WR, Jr (General Motors Corporation) ; Society of Automotive Engineers SAE #760119, 16 pp, Figs., Tabs., 17 Ref.; Automotive Engineering Congress and Exposition, 23-27 Feb. 1976, Detroit, Michigan.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-33833)

11 131337 A PURPOSE-BUILT ELECTRIC TAXI. Lucas Industries awarded a contract to David Ogle Limited as part of their electric vehicle development programme to develop and build a purpose-built electric vehicle. This paper describes the design and development as well as the deciding factors which made the choice of vehicle a taxi rather than any other vehicle configuration.

Warner, P (Ogle, (David) Limited) ; Society of Automotive Engineers SAE #760124, 1976, 5 pp, Figs., Photos., 2 Ref.; Automotive Engineering Congress and Exposition, 23-27 Feb. 1976, Detroit, Michigan.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-33827)

11 131338 HIGH PERFORMANCE ELECTRIC COMMERCIAL VEHICLES FOR CITY USE. Lucas Industries Limited commissioned work on electric vehicles some seven years ago in order to provide test beds for batteries which were under development. During the past three years the battery development work has been concentrated on lightweight lead acid batteries and work on the vehicles themselves has been stepped up. A comprehensive electric vehicle development program is now being undertaken. During the last 18 months this has led to the production of fifteen 1 ton payload vans, a personnel carrier, a 34-passenger city bus and two city taxis. All these vehicles will be used by operators in service for extended periods in order that they can be evaluated from operational, engineering and financial points of view. /HSRI/ Harding, GG (Lucas, (Joseph) Limited) ; Society of Automotive Engineers SAE #760073, 1976, 13 pp, Tab., Photos., 3 Ref.; Automotive Engineering Congress and Exposition, 23-27 Feb. 1976, Detroit, Mich.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-33765)

11 131660 FLEET USE OFFERS NICHE FOR ELECTRIC VEHICLES. Lucas Industries, A U.K.-based automotive and electrical equipment conglomerate, has developed an elect vehicle for urban commercial applications. The vehicle is a taxi weighing 2250 kb. 40% of which is the weight of a replaceable pack of 36 6-volt lead-acid batteries. Top speed is about 60 km/hr and range is about 160 km. Another firm, the Copper Development Association, has commissioned the development of an electric "town car", considered to be more applicable than the electric taxi in the U.S. The subcompact town car weighs 1330 kb and has a pack of 18 6-volt lead-acid batteries. It carries two passengers with reasonable space and comfort. Top speed is about 100 km/hr and range is about 120 km. In spite of these developments, however, an ERDA study has found that electric vehicles are not the ultimate remedy for energy and environmental problems. They appear to render useful service only where petroleum conservation is the important factor. Air quality would be little affected, and travel costs would be higher.

Chemical and Engineering News Vol. 54 No. 10, Mar. 1976, pp 19-20

11 131713 ELECTRICS SUITED FOR COMMERCIAL USE. Technology has been developed for an electric taxicab and a gasoline-electric hybrid car, and the annual production (in England) is predicted of 10,000 electric taxicabs for the home market and 40,00 (in a few years) for

other European markets. The transmission of the taxi which is front-wheel drive has low loss double-reduction Morse Hyvo chain, and the road wheels are carried on new low-loss SKF bearings. The design will allow batteries to be changed as quickly as a gasoline fill-up is performed. Market studies have indicated that the major electric vehicle market is for light commercial vehicles with payloads of 1/2 to 3/4 ton. To be a viable investment, an electric vehicle would have to be operated 80 or 100 miles a day. A hybrid car where the electric motor is used as an assist to the internal combustion engine and will reduce gasoline consumption by 50 percent in city applications is also described. Laboratory dynamo tests have corroborated a computer analysis which showed fuel economy improvements of 30 to 100 percent for various vehicle configurations of a new prototype engine with electric drive train.

Bohn, JJ *Automotive News* Vol. 51 No. 4587, Apr. 1976, 1 p

11 132063 TRANSBUS-TESTING AND PUBLIC EVALUATION (AROUND THE COUNTRY IN 80 DAYS). This paper describes the test and evaluation phases of the Rohr Transbus program which was initiated by the Department of Transportation in 1972: Vehicle testing was conducted both by Rohr Industries and by the prime contractor, Booz-Allen Applied Research. This report details the scope of this effort made to analyze the integrity and other qualities of these new buses. An extensive program was conducted to evaluate the public and transit authority acceptance of the new designs incorporated in the Transbuses. This paper describes this program and details some basic information gathered as a result of this evaluation. /Author/

Atkins, JF (Rohr Industries, Incorporated) ; Society of Automotive Engineers SAE 750735, 1975, 7 pp, Tabs., Photos., 8 Ref.; Proceedings of the Society of Automotive Engineers Conference, West Coast Meeting, 11-14 August, 1975, Seattle, Washington.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-32753)

11 132295 HOW THE ELECTRIC TAXI WORKS. A description is given of the electric taxi developed by Lucas. It will carry the same number of passengers as a London taxi, and has the same turning circle, although it is a front wheel drive vehicle; it has a shorter external length. The 50 bhp, 216 volt cav motor is located transversely at the front of the vehicle, level with the floor of the driving compartment. The complete front drive unit assembly is carried on a sub-frame which can be detached as a unit from the vehicle. The control system, developed by Lucas, is of the scr chopper type. The battery pack can be charged in situ or exchanged for a new pack in the time taken to refuel a commercial vehicle. Lightweight, high energy density lead-acid batteries are used. A regenerative braking system is employed. /TRRL/

Surveyor - Public Authority Technology Vol. 146 No. 4351, Oct. 1975, p 24, 1 Fig., 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD-216230)

11 132309 THE 10 YEAR CAR? This article discusses the various economic factors which determine the desirable service life of a vehicle and its components. The author considers two

basic design concepts, i.e., a vehicle intended to last only five years and a vehicle designed for a life of twenty years. The former would be of light weight construction and require less fuel to propel it, but, any savings must be offset against the more frequent replacement of worn out components. Such a vehicle designed for about 80,000 miles would not be attractive to the taxi driver or high mileage motorist, whilst the earlier onset of corrosion would need government legislation against the continued use of a vehicle beyond its intended service life-span. The twenty year vehicle is estimated to cost some 30 to 40 % extra and the author doubts whether many buyers would wish to pay this, to keep the same car for 15 years or more. The article concludes that manufacturers should aim to produce cars and components having an economic life of not less than ten years. /TRRL/

Engineering Vol. 215 No. 8, Aug. 1975, pp 638-641, 5 Phot. ACKNOWLEDGMENT: TRRL (IRRD-215422)

11 132341 THE BUS AND COACH INDUSTRY: ITS ECONOMICS AND ORGANIZATION. The author outlines the development of the coach and bus industry from 1896 to the present time, its social and economic impact, administration, and its function. A detailed study is conducted of infrastructure costs, economies of scale, changing policy under monopoly and in competition, problem of insufficient demand, and that of competition and integration. The future of the coach and bus industry is examined in detail, and proposals for the amendment of the Road Traffic Act, 1960, designed to remove discriminatory provisions from the act, are appended. /TRRL/

Hibbs, J (City of Birmingham Polytechnic, England); Dent (JM) and Sons Limited 1975, 224 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-215243); ORDER FROM: Dent (JM) and Sons Limited, Aldine House, Albermarle Street, London, England

11 133312 TRANSBUS PUBLIC TESTING AND EVALUATION PROGRAM. The report describes the public testing and evaluation component of the overall Transbus test program. Three manufacturers--AM General, GMC and ROHR Industries each built three prototype Transbuses. The No. 3 prototype from each manufacturer was evaluated by the public in Miami, New York, Kansas City and Seattle during the period October 1974 -April 1975. Reactions were obtained from the general public (riders and non-riders), the operating personnel and the handicapped. Reaction of all three groups was favorable toward the inherent features of the Transbus--low steps for boarding and alighting, big windows, wide doors. Bus drivers were favorable toward the handling and braking of all three buses and the driver seat comfort and visibility from the seat. The handicapped, including those in wheel chairs were able to board by means of a ramp (ROHR), a lift device (GMC) or by level boarding from a sidewalk platform (AMG). Reactions of the handicapped to these devices are included in the report. Other measurements made during the program included the time wear, fuel consumption and incidence of failure.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0025-76-1, Jan. 1976, 246 pp

Prepared by Simpson and Curtin, Philadelphia, Pa.; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251882/7ST

11 133425 BUS INTERIOR DESIGN FOR IMPROVING SAFETY. The report describes a project of testing and analysis directed at finding solutions to the problem of on-board accidents on transit buses which was conducted as part of the Transbus program. Accident statistics are discussed with respect to the on-board accident problem, the on-board accident scenario, interior hazards and potential design changes, and the deceleration problem. A comparison of the risk of on-board accidents to other everyday human risks is presented. An on-board accident test procedure was developed based upon knowledge gained from the accident data analysis. This human factors test procedure is described in detail, in terms of the following: test objectives, detailed test procedures, data analysis procedures. The general test results, a comparison of the test results for the Transbus prototypes, and significant conclusions for urban transit bus safety are presented.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0029) Final Rpt. BAA-RINC-TR-76-001, UMTA-IT-06-0029-76-1, Apr. 1976, 58 pp; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-252253/OST

11 133678 QUIET BUS. The cost of reducing noise emission from 89 to 86dba for a 1975 double deck bus is claimed to be at least \$1000; the cost must be borne by the fare paying passengers who gain least benefit from the noise reduction. The modification consists of the encapsulation of the power pack, mounting the radiator outside the capsule to achieve adequate cooling. Quiet packs for single deck buses are more difficult to design because of the limited space between the top and the floor underside. There is evidence to show that near mounted longintal engines work in stagnant air conditions making ventilation of the quiet pack essential, an added complication since space in the engine compartment is already limited. The author suggests that should legislation require further reduction in noise levels the cost of introducing quiet packs should be shown separately in price schedules to demonstrate the impact of noise reduction on investment and operating costs. More parts will be involved and it is to be hoped that adequate servicing ability will accompany their introduction. /TRRL/

Wyke, TS (National Bus Company) *Transport Engineer* No. 68, Nov. 1975, p 17; ACKNOWLEDGMENT: TRRL (IRRD 216791)

11 133702 EXPERIMENTAL DISC BRAKES FOR URBAN BUSES. PART 1 [Freni sperimentali a disco per autobus urbani. Prima parte]. The first part of this article contains 4 sections as follows: 1, generality; 2, modifications to the rear brakes (including bench tests and tests on the vehicle); 3, front brake problems (including noise and the characteristics of disc brakes); and 4, experimental disc brakes for the rear axle. The results of the test program have been so satisfactory that integral disc brakes are proposed for all Lancia 718.441 buses and all future Fiat 421

buses. The second part of this article will be published in the next issue of this journal. /TRRL/ [Italian]

Menafoglio, GM *Rivista della Strada* Vol. 44 No. 411, Oct. 1975, 19 pp, 14 Fig., 3 Tab., 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-217016)

11 134253 EXPERIMENTAL DISC BRAKES FOR AN URBAN BUS. PART 2 [Freni sperimentali a disco per autobus urbani]. This is the second and final part of the article, the first part having been published in the previous issue of the journal. Here the assembly of ventilated disc brakes to the four front wheels of a single deck bus with twin front axles, is described and illustrated. Details are given of laboratory tests and of field tests carried out under real working conditions in Milan. Though the cost factor was not greatly considered in this article, it was concluded that the experiments had proved the technical possibilities of the wider use of disc brakes on this type of vehicle. See also IRRD abstract no 217016. /TRRL/ [Italian]

Menafoglio, GM *Rivista della Strada* Vol. 44 No. 411, Nov. 1975, pp 1093-16, 37 Fig., 9 Tab., 23 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-217535)

11 136818 VALLEY TRANSIT DISTRICT: OPERATIONS, FARE SYSTEM AND VEHICLE DESIGN. The Valley Transit District (VTD) demonstration project is located in an area in southwestern Connecticut which consists of the four towns of Ansonia, Derby, Seymour, and Shelton. Among the accomplishments of the VTD project are: Demand bus operation over a 56 square mile area; investigation of dispatching for wide area demand systems; incorporation of new features for the handicapped; testing of the attractiveness of small vehicles with luxury interior; provision of a unified transport system for regional health and social services; establishment of a new transit district law in Connecticut; and a flexible multi-service operational system. Another feature is the demonstration of a computer-processed credit card fare system called FAIRTRAN which has: deferred billing; a provision for any complexity of fare structure; a cost accountable, selective, user subsidy feature called FARESHARE; and comprehensive ride and demographic data collection capabilities. Chapters specifically address: (1) system operations, which includes sections on marketing, energy, financial analysis, handicapped demand, the dispatching system, and a survey; (2) the fare system; and (3) vehicle design.

RRC International, Incorporated, Urban Mass Transportation Administration, Valley Transit District, (UMTA-CT-06-0003) Intrim Rpt. UMTA-CT-06-0003-75-1, Sept. 1975, 298 pp; Contract CT-06-0003; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-252668/9ST

11 137484 TOUGH ENOUGH FOR LONDON? A brief account is given of the reshaping of bus services in London since 1964, and of the introduction of one-man operated single decker buses. This change has led to unpredictable and unreliable services, and details are given of a prototype double-decker bus designed by British Leyland, in close co-operation with London transport. Special attention has been given to the conditions affecting operation, driving, passenger

usage, and maintenance of buses in London. In addition, the prototype bus will operate in actual service conditions for 18 months before production commences at the end of 1977. It is envisaged that this bus will go into service as a fully proved, reliable and advanced bus. /TRRL/

Hayman, M *Design* Vol. N No. 25, Jan. 1976, pp 32-35, 4 Fig., 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 218776)

11 137496 TROLLEY BUSES RUN OFF THE LINES. Details are given of an experimental bus which has been operating in Esslingen, Germany, since 1975. The bus has nearly 3 tonnes of batteries and can run up to 10 km off the wire. The batteries and electric motor of the trolley bus are in parallel, so that the batteries can be recharged while the bus is running on the wire. There is regenerative braking to save up to 20% of the energy, thus extending off-wire mileage. The trolley poles can be automatically raised and lowered; when the driver presses a button to indicate whether the wire is above, to the right or to the left of the bus. The pole automatically raises and shifts to the correct side until a special sensor touches the wire. The sensor aligns the electrical contact shoe of the pole on the wire. The entire operation takes 15 seconds and can be done while the bus is picking up passengers. This leads to an important saving in the wiring at junctions, which is the most unsightly and expensive part of a trolley bus system to maintain. With the German bus no junctions are needed, the poles are lowered before the bus leaves one set of wires and are raised again at the next stop. /TRRL/ *New Scientist* Vol. 69 No. 988, Feb. 1976, P 395, 1 Fig. ACKNOWLEDGMENT: TRRL (IRRD 218795)

11 138456 FUTURE VEHICLES FOR PARATRANSIT: A DESCRIPTION OF THE GOVERNMENT ROLE. These comments on the modification of existing vehicles and the development of new vehicles, suggests that the most productive role of government in realizing a new vehicle for paratransit service may be achieved through support of design, development, testing and demonstration of vehicles whose concepts are derived from valid vehicle requirements. These requirements must reflect understanding of the service application characteristics for the time period in the future when the vehicle is to be in production and operating in service. A paratransit service vehicle requires an optimum mix of vehicle characteristics. The development was authorized by congress of a small, urban, low-pollution, fuel-efficient paratransit vehicle with the specification that wheelchair passengers be able to board, alight and secure themselves without assistance when using these vehicles. If vehicle capabilities are unavailable in present vehicles, and are not derivable from them, a new vehicle development program will be considered by UMTA. A design competition involving 3 or more contractors is suggested. The importance is emphasized of maintaining, exercising and responding to coordination activities with manufacturers, operators and service users.

Morgan, PH (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 164, 1976, pp 163-165; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the

Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

11 141005 CONVERTING A SMALL CAR TO LNG: WHAT ARE THE PROBLEMS AND WHAT CAN IT DO FOR ECONOMY AND EMISSIONS? A two litre compact car originally designed to run on gasoline has been converted to run on LNG. Comparative measurements of fuel economy and exhaust emissions were made for the same car running on each fuel under normal on-the-road and simulated taxi service. When tuned to its maximum economy configuration the LNG car gave significant improvements in fuel economy when expressed on an energy basis. For inter-urban journeys the savings would be of the order of 5% and for taxi type service in excess of 20%. Whether or not these savings would justify fleet conversion would depend on local fuel cost and taxation conditions. When set for maximum economy the LNG car gave significantly lower emissions of CO and hydrocarbons than its gasoline counterpart. Emissions of NO sub x were, however, higher with LNG than with gasoline. A tenfold reduction in NO sub x emissions could be obtained by re-tuning the LNG engine to run at air/fuel ratios up to 30:1. Hydrocarbon emissions with this configuration were, however, quite high and would require supplementary means of control. When tuned to operate at very weak mixtures the car remained quite driveable but was 10 to 15% less economical than when tuned for maximum economy. Although technically practical, the use of LNG is likely to be restricted by supply and distribution limitations to fleet operators and other high mileage users who could refuel from centralized points where trained staff would be available.

Affleck, WS Harrow, GA Mills, WD (Shell Research Limited); Society of Automotive Engineers SAE #760376, 1976, 15 pp, Figs., Tabs., Photos., 20 Ref.; Proceedings of the Automotive Engineering Congress and Exposition, February 23-27, 1976; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-34434), Highway Safety Research Institute (HSRI-34434)

11 141301 REDESIGNING THE TAXI FOR A NEW ROLE. In order to render the conventional taxi more serviceable and fuel efficient, a new design seems inevitable. UMTA supplied funds on a contract bid to two American firms to design prototypes of a low polluting taxi. Design specifications included reduction of lateral dimensions, optimization for use by 2 to 3 passengers while retaining load capacity for 4, above average comfort, and upgraded turning radius and maneuverability. Volvo and Volkswagen also submitted prototypes. Both designs presented by the American Machine Foundry and Steam Power Systems were steam-driven versions. Both also have built in ramps for wheelchairs in order to accommodate the transportation needs of the elderly and handicapped. The structure of both these vehicles is described in detail. Volvo designed a diesel taxi, and Volkswagen a hybrid vehicle (both electric and galoline engine). The design of these prototypes is also described. The changes needed in paratransit to provide a transportation bridge between route-bound mass transit and private vehicles will require more than then the city taxi, but this one step at least is a beginning in offering wider modal choices.

Gottesman, CA; Chilton Corporation Vol. 155 No. 2, Aug. 1976, pp 35-37, 1 Fig., 3 Phot.

11 142135 A STUDY OF NOISE, TEMPERATURE AND LIGHTING LEVELS ON URBAN BUSES. A survey was made during the summer months on urban buses on tyneside. The temperature and light level were measured at three positions on each of four single-deck buses and at six positions on each of four double-deck buses. The temperature inside the bus was shown to correlate with that outside the bus as expected and light intensities were found to vary by amounts small enough to be hardly noticeable by the average eye. The noise climates inside two single-deck and two double-deck buses were assessed and the character of the noise was shown not to be the same for all four buses. (A) /TRRL/

Bell, MC; Newcastle-Upon-Tyne University, England, (0306-3402) Monograph Torg Paper16, Feb. 1976, 17 pp, 7 Fig., 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 220722);

11 143981 DEVELOPMENT OF A UNITIZED SCHOOL BUS. VOLUME I. SUMMARY REPORT. The development of new design concepts for school bus body structures and for passively restraining school bus passengers were the major objectives of the program. Passenger protection in front and rear rigid barrier impacts and in a side impact with a rigid pole-all at a 30 mph impact velocity-were the design goals. A unitized bus configuration was specified wherein the body and chassis frame are a single integrated structure in contrast to the typical school bus configuration where the body is bolted onto a chassis frame. Analyses and development tests indicated the feasibility of providing a uniform level of protection to seated occupants, ranging in size from a 6 year old child to a 50th percentile adult male in the front and rear impacts. In the side impact with a rigid pole at 30 mph, the hazard zone existing in the vicinity of the impacted area precludes uniform levels of protection for all occupants. Design layouts of 55-passenger operational school bus incorporating the unitized body structure and passive restraint systems were prepared.

Adams, L Khadijkar, A Pauls, L Rup, W; AMF Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-802-004, Aug. 1976, 33 pp; Contract DOT-HS-4-00969; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257654/4ST

11 144003 DEVELOPMENT OF A UNITIZED SCHOOL BUS. VOLUME II. TECHNICAL REPORT. The development of new design concepts for school bus body structures and for passively restraining school bus passengers were the major objectives of this program. Passenger protection in front and rear rigid barrier impacts and in a side impact with a rigid pole-all at a 30 mph impact velocity-were the design goals. A unitized bus configuration was specified wherein the body and chassis frame are a single integrated structure in contrast to the typical school bus configuration where the body is bolted onto a chassis frame. Analyses and development tests indicated the feasibility of providing a uniform level of protection to seated occupants, ranging in size from a 6 year old child to a 50th percentile adult male in the front and rear impacts. In the

side impact with a rigid pole at 30 mph, the hazard zone existing in the vicinity of the impacted area precludes uniform levels of protection for all occupants. Design layouts of 55-passenger operational school bus incorporating the unitized body structure and passive restraint systems were prepared.

Adams, L Kadilkar, A Pauls, L Rup, W ; AMF Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-802-005, Aug. 1976, 558 pp; See also Volume 1, PB-257 654 and Volume 3, PB-258 421.; Contract DOT-HS-4-00969; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258301/1ST

11 145207 BUS DESIGN FOR THE ELDERLY AND THE HANDICAPPED. This paper focuses on the design problems associated with accommodating the ambulatory elderly and handicapped as well as individuals in a wheelchair on full-size urban transit buses. The results of research activities during the development, testing, and public demonstrations of advanced prototype transit buses is presented. The focus of the paper is on the technical feasibility of bus design features. /GMRL/

Black, TL (Rohr Industries, Incorporated) Mateyka, JA (Booz-Allen Applied Research, Incorporated) ; Society of Automotive Engineers SAE #760082, Feb. 1976, 15 pp

11 145239 THE CARTER SYSTEM-PRELIMINARY TEST RESULTS OF SECOND GENERATION STEAM ENGINE. A second generation Carter Steam Engine has been built. It is now undergoing bench testing. Results to date confirm that the goal of very low emissions is being attained. Engine test data has been used in conjunction with a computer simulation of the steam engine in the Paratransit Vehicle. Projected fuel consumption over the Federal City Driving Cycle is 17.5 mpg and over the combined city/highway cycle is 18.9 mpg. The 100 hp engine is capable of vehicle acceleration from 0-45 mph in 11 seconds. /GMRL/

Carter, JW, Jr (Carter (Jay) Enterprises, Incorporated) Wingenbach, WJ (AMF Incorporated) ; Society of Automotive Engineers SAE 760341, Feb. 1976, 8 pp

11 145805 UTILIZATION OF BRAKE ENERGY IN INDIVIDUAL VEHICLES FOR REDUCTION OF CONSUMPTION AND EXHAUST EMISSION NUTZUNG DER BREMSENERGIE IN INDIVIDUALFAHRZEUGEN ZUR VERBRAUCHSUND ABGASEMISSIONSMINDERUNG. The possibilities of hybrid drives for brake energy utilization are explained in view of the energy shortage. Expenditure for and utility of the brake energy utilization are compared by means of selected drives and appropriate vehicles based on the principles of driving mechanics as well as of storage and conversion techniques. Despite an undeniable reduction of consumption, economical reasons oppose the general introduction of this system into series production. In special applications, such as taxis and buses etc., the regenerative brake may be useful. (Author)

Hartig, F Hofmann, R ; Porsche (Ferdinand) AG Final Rpt. BNFT-FB-T-75-38, Dec. 1975, 187 pp; Subm-Sponsored by Bundesmin. Fuer Forsch. U. Technol. In German; English Sum-

mary.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N76-28113/8ST

11 148008 TOMORROW'S BATTERY TODAY. The author traces the historical background and development of batteries and of battery electric vehicles. The design, construction and performance of a sodium-sulphur traction battery having a solid state electrolyte of beta aluminium hydroxide and operating in the temperature range 300-350 degrees C are described. Road tests have shown that the sodium-sulphur battery-powered 18 CWT Bedford Van has a range between 60 and 100 miles depending on road and driving conditions. The reduction in cost which would result from large scale production is expected to make the use of the battery feasible and the author forecasts that such a battery might be in use within the next ten years for small vans used by fleets and for multiple modules in public transport such as the "silent rider". /TRRL/

Churchman, AT (Electricity Council Research Centre) *Royal Society of Arts Journal Analytic* Vol. 123 No. 5228, July 1975, pp 459-471, 1 Fig., 6 Tab., 4 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 222606)

11 148140 TAXIS: A LOOK AT THE FUTURE. Taxis, probably the most popular vehicles of the para-transit group, are receiving more and more notice these days by urban transportation planners. Since the taxi serves so many people without private transportation or access to buses, it should be adapted to provide better service to handicapped persons and people with packages or groceries, and to accommodate more passengers at one time. The Museum of Modern Art in New York City organized an exhibition of taxi designs for the future in order to demonstrate the potential of taxicabs for offering better service. The museum was supported by UMTA, long a backer of better taxi designs. The exhibit featured five prototype vehicles, and UMTA awarded \$1 million contracts to AMF, Inc. and Steam Power Systems. The results are being evaluated for their suitability for widespread use. Besides a new design for taxis, however, ways must be found for their more efficient use. Variations on conventional taxi service include dial-a-ride, jitneys, and car pools. The ideas are not new; it is the renewed interest of urban planners and the willingness of UMTA to provide research funds that is new. In the past 2 years UMTA has spent more than \$18 million and plans to continue support. Demonstrations of para-transit are currently being sponsored by UMTA in various cities across the country, with the results yet to be seen. It seems, though, that the era of more efficient taxis is not far off in the future.

Taylor, R *Transportation USA* Vol. 3 No. 1, 1976, pp 4-7, 10 Phot.

11 149058 A BUS FOR AMERICA-GM'S RTS. In an effort to regain the public's faith in the bus as a mode of transport, the US DOT has placed contracts for the construction of advanced prototype buses with GM, AM General and Rohr Industries. One such design, the 47 seater RTS-2 offered by GM, uses a welded stainless steel integral structure with extruded GRP side cladding. An unusual feature is the use of 12.7 mm acrylic sheet for the windows for the material's

vandal-proof properties. Based on a 5 ft module the bus has an overall length of 35 ft, each module consisting of box-section hoops with steel side panels and a double-skin roof. Although initial versions will use a Detroit diesel type 8V-71 engine, it is intended that this will be replaced by a 280 bhp gas turbine to reduce noise level below 80 dba although the gas turbine has a higher fuel consumption than the diesel engine. It is thought significant that the bus is some 1000 lb heavier than current GM buses and 4500 lb heavier than the 37 ft long Leyland National bus. /TRRL/

Hartley, J *Automotive Engineer Analytic* Vol. 1 No. 6, Aug. 1976, pp 48-50, 4 Fig., 1 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 223342)

11 149071 PROTOTYPE BUS BY NEOPLAN. The article discusses a number of design features of the neoplan prototype low-floor city service bus developed by G. Auwaerter AG of Stuttgart. The design uses a Mercedes-Benz rear engine/transmission pack mounted in an integral structure. A floor boarding height of only 300 mm has been obtained by the use of air-suspension and low-profile tyres of 416 mm free-radius. Panelling in grp is used in the body construction although 30 per cent stainless steel cladding is used. All side windows use 5 mm polycarbonate glazing claimed to be crash-and vandell-proof. The 39-seater prototype bus also incorporates the firestone help (high energy level pneumatic) elastomer bumper system which uses air at atmospheric pressure for energy absorption. /TRRL/

Godwin, W *Journal of Automotive Engineering Analytic* Vol. 1 No. 6, Aug. 1976, pp 52-53, 2 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 223340)

11 149189 BRING BACK THE TROLLEY BUS? This paper discusses the major results of the electric trolley bus study undertaken in Portland, Oregon for the Tri-County Metropolitan Transportation District (Tri-Met). The basic purpose of the study was to assemble factual data and conduct analysis needed to assess the desirability of incorporating trolley buses within the Tri-Met system, given Tri-Met's desire to optimize mass transit to present and potential passengers and to provide service in an economic background of the trolley buses at a viable and attractive background of the trolley buses as a viable and attractive transportation system to the introduction of the internal combustion engine and the diesel engine is described. Portland's experience with trolley buses are examined with respect to comparable vehicle designs, which capital costs, power system capital costs, operating costs and energy costs. Results of the study indicate that an introduction of trolley buses into a fleet currently consisting exclusively of diesel buses will almost certainly result in additional capital and operating costs. The use of trolley buses will result in reduction of diesel oil consumption, be supportive of national energy goals, and lessen dependence on petroleum based fuels whose future supply and costs are uncertain.

Metro Vol. 73 No. 1, Feb. 1977, pp 15-18, 1 Fig., 1 Phot., 6 Ref. This article is condensed from a paper by Walter Kudlick, "Improving Downtown Circulation & Environment-Bring Back the Trolley Bus", presented at the ASCE Annual Meeting, 1 October 1976.; ACKNOWLEDGMENT:

11 149240 DUAL-MODE TRANSIT CONCEPT OF ROHR INDUSTRIES. Under contract to the Urban Mass Transportation Administration, Rohr Industries developed a concept for a dual-mode transit system that combines the advantages of a flexible bus distribution system with an efficient line-haul system. Because dual mode can combine systems in this manner, it can improve transit throughout an urban area in a way that separate systems cannot. By offering scheduled service, subscription service, and door-to-door demand service, dual mode can provide convenience for the rider nearly comparable to that of the automobile. The combination of flexible schedules and routes and high-speed line-haul capabilities with automatic dispatching and control results in high system use and efficiency. An advanced new vehicle design results in excellent ride quality with minimum pollution and noise. The design objective was to develop a system that would make significant improvements in transit service for cities of varying size and would thereby reduce congestion and improve personal mobility. A second objective was to design a system along modular lines. The third objective was to design a system that is technically feasible and economically sound.

Marden, WH, Jr (Rohr Industries, Incorporated) *Transportation Research Board Special Reports* No. 170, 1976, pp 52-54, 8 Fig.; This paper appears in Dual Mode Transportation, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974; ORDER FROM: TRB Publications Off

11 149266 MAINTAINABILITY AND RELIABILITY CONSIDERATIONS FOR DUAL-MODE VEHICLES IN OFF-GUIDEWAY OPERATION. Analyses were made of the reliability and maintainability of current urban buses and were conducted in support of the Transbus program. The paper presents the results and discusses the off-guideway operating environment of dual mode vehicles, particularly street conditions, traffic accidents, and vandalism. Design implications related in maintainability and reliability of dual-mode vehicles in off-guideway operation are presented. /Author/

Ross, R Mateyka, J (Booz-Allen Applied Research, Incorporated) *Transportation Research Board Special Reports* No. 170, 1976, p 115; ORDER FROM: TRB Publications Off

11 149674 HOW TO BE SEEN AND NOT HEARD. QUIET, POLLUTION-FREE URBAN DELIVERY VAN. This pamphlet describes the silent carrier, a prototype 35 CWT battery-powered van designed by Chloride, Chrysler and the National Freight Corporation. It has a maximum speed of 64 kph and its acceleration is comparable to that of petrol and diesel engine vehicles of the same type. The basic cost of early production silent carrier models will be somewhat higher than that of the internal combustion engine alternatives but running costs will be far lower. Details are given of the design, braking, steering and electrical system of the van. The first silent carriers will have a range of 35-40 miles on a stop-start typical urban daily schedule. In open country, its range will be nearly doubled. Stage 2 will see the introduction of a new chloride high-performance lead-acid battery which will increase the range of the van. A totally

new battery concept is under development. It uses Sodium and Sulphur as Electrodes, is far lighter than and can store many times the energy of the lead-acid battery. /TRRL/

National Carriers Limited Monograph No Date, 9 pp, Figs.; ACKNOWLEDGMENT: TRRL (IRRD-223917)

11 149722 ELECTRIC VEHICLES. CURRENT SITUATION AND FUTURE TRENDS [Vehicules electriques. Situation actuelle et perspectives]. The experimental use of electric vehicles in urban areas has proved successful, and the author describes their advantages as regards the improvement they bring in the quality of urban life. Current performance ensures a level of service for public and private transport similar to that provided by thermal-engine vehicles; the disadvantages of electric vehicles are that they can only be used over short distances and for very specific purposes. The use of electric vehicles should increase so that, during the ten-year period 1980-1990, they should take over a large part of the vehicle market. /TRRL/ [French]

Gallot, J *Journal de la SIA Analytic* No. 3/4, Mar. 1975, pp 86-89; ACKNOWLEDGMENT: Road Safety Study and Research Fund, Belgium (FESR25066E), Central Laboratory of Bridges & Highways, France, TRRL (IRRD 103550)

11 149805 THE TAXI PROJECT: REALISTIC SOLUTIONS FOR TODAY. The Museum of Modern Art in New York, through its Department of Architecture and Design, sponsored the Taxi Project, a plan to engage the automobile industry in producing working prototypes of a vehicle which would more adequately serve the needs of the taxi industry and the urban public. UMTA made funds available through an open-bid competition, and two American companies, American Machine and Foundry, Inc., and Steam Power Systems, Inc. won contracts to create a low-pollution taxi. In addition, two European companies, Volvo and Volkswagen, also joined the competition. The vehicle had to be designed according to the specifications set out in the Design Specifications Manual. Those prototypes developed would consume less energy, reduce air pollution, limit traffic congestion, and provide better and safer accommodations for passengers and luggage. UMTA is also considering public transit possibilities offered by paratransit, and has implemented the Para Transit Vehicle Project toward achieving this end. Each prototype vehicle developed is described and illustrated, and the Design Specifications Manual is included. Historical and critical essays complete the report.

Ambasz, E Georgano, GN Richards, B Wohl, M New York Museum of Modern Art 1976, 160 pp, Figs., Photos.

11 150495 THE GENERAL MOTORS TRANSBUS. VOLUME 2. The report is a summary of the final vehicle design (vol. 1) and the program effort (vol. 2) that went into the building of the GM TRANSBUS. The GM TRANSBUS, designed and built as part of a program of the Urban Mass Transportation Administration, features a number of design departures from present production coaches including a significantly lower floor; an independent front suspension; a special kneeling feature;

a U-shaped lounge; improved air-conditioning, heating, and exhaust systems to provide a year-round, fume-free, temperature-controlled internal environment. This GM TRANSBUS is powered by a Detroit Diesel Allison gas turbine.

Booz-Allen Applied Research, Incorporated, General Motors Corporation, Urban Mass Transportation Administration Final Rpt. BARR9073055582GL1214, UMTA-IT-06-0025-76-3, May 1975, 104 pp; Prepared by General Motors Corp., Pontiac, Mich. GMC Truck and Coach Div. See also Volume 1, PB-262 638.; Contract DOT-UT-1008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262639/8ST

11 150496 THE GENERAL MOTORS TRANSBUS. VOLUME 3. The GM TRANSBUS, designed and built as part of a program of the Urban Mass Transportation Administration, features a number of design departures from present production coaches including a significantly lower floor; an independent front suspension; a special kneeling feature; a U-shaped lounge; improved air-conditioning, heating, and exhaust systems to provide a year-round, fume-free, temperature-controlled internal environment. This GM TRANSBUS is powered by a Detroit Diesel Allison gas turbine. Volume 3 is the Appendix. (Portions of this document are not fully legible.)

Booz-Allen Applied Research, Incorporated, General Motors Corporation, Urban Mass Transportation Administration Final Rpt. BAAR9073055582GL1214, UMTA-IT-06-0025-76-4, May 1975, 322 pp; Prepared by General Motors Corp., Pontiac, Mich. GMC Truck and Coach Div. See also Volume 2, PB-262 639.; Contract DOT-UT-1008; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-262640/6ST

11 151845 A STUDY RELATING TO SEAT BELTS FOR USE IN BUSES. This program involved a study of farm labor buses, school buses and transit buses in and for the state of California with respect to the installation and use of seat belts in these various categories of new and used buses. The study included visits, inspections and in-depth discussions with bus owners, operators, maintenance personnel, seat manufacturers, belt manufacturers, and bus manufacturers for the purpose of including all of the required aspects and viewpoints of bus design (including seats and seat belts), production, fabrication, purchase, operation and maintenance because of the impact of these items on both new and used buses. Research on seat belts in automobiles and aircraft has proven that the entire seating system must be considered as a unit to afford the maximum protection for the passenger.

Ursell, CR ; Southwest Research Institute, National Highway Traffic Safety Administration, California Highway Patrol Final Rpt. DOT-HS-802-253, Jan. 1977, 135 pp; Sponsored in part by California Highway Patrol, Sacramento.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264369/OST

11 152355 NEW STANDARD BUS EQUIPMENT. This report focuses on the hardware aspects of developing improved transit buses, gives a short history of transit bus improvement and comparative data on different types of buses.

The specific issue of a low-floor (22). Transbus is discussed and its advantages and disadvantages are pointed out. The costs and benefits of developing a new bus are discussed, and the pros and cons of standardization are noted. Special design features for elderly and handicapped persons are described. It is noted that innovation and product improvement, initiated and financed by the bus manufactureres, can be anticipated only if the bus market stays at an untypically high level and some form of effective competition exists among manufacturers. A design study is reported which identified a U.S. market for a high-capacity bus-the Superbus-which would provide at least 50 percent more usable floor area than the medium-size, 40 foot bus. Small buses and vans and advanced concepts in bus design are also discussed. Current federal programs relating to buses for use in urban mass transportation services are noted. An annotated bibliography which gives a sampling of available literature on this topic is included.

Public Technology, Incorporated Oct. 1976, 25 pp, 1 Tab.; This report is a product of the activities of the Transportation Task Force of the Urban Consortium for Technology Initiatives, to which Public Technology, Incorporated is the Secretariat. The work has been supported by DOT; Office of the Secretary, Urban Mass Transportation.

11 153960 ROHR INDUSTRIES TRANSBUS. PART I. THE ROHR TRANSBUS. PART II. PROGRAM SUMMARY. PART III. SPECIFICATIONS, ANALYSIS, STUDIES AND TEST RESULTS. Under the Transbus Program three manufacturers each designed and fabricated bus prototypes with design goals that included low floors, wide doors, and other features to improve accessibility and to speed loading and unloading. Rohr built three coaches with a seventeen-inch floor height. This report describes and analyzes the bus design and program effort involved in developing these prototypes. This document consists of three parts: Part 1 is a brief description of the Rohr Transbus that includes summary description of vehicle characteristics and functional elements. Part 2 is a program summary that includes an accounting of design reviews and interim reports shown with a historical milestone chart, as well as discussions on design specification packages, quality assurance, test programs, and technical problems encountered. Part 3 (Appendix to report) consists of detailed voluminous specifications, analyses, studies, and test results. Part 3 is not included in NTIS distribution.

Rohr Industries, Incorporated, Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0025) Final Rpt. UMTA-IT-06-0025-77-1, June 1975, 152 pp; Prepared by Booz-Allen Applied Research, Inc., Bethesda, Md.; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264612/3ST

11 156119 UMTA'S PARATRANSIT VEHICLE PROJECT. The Paratransit Vehicle Project was undertaken to produce a design for an improved paratransit vehicle that would be accessible to wheelchair passengers. Two steam-powered vehicles are currently being tested to evaluate their performance characteristics and suitability for taxicab service. /Author/

Raithel, W (Urban Mass Transportation Administration) *Transportation Research Record* No. 608, 1976, pp 98-99; ORDER FROM: TRB Publications Off

11 156120 DURABILITY OF VEHICLES: WHAT IS THAT? This paper seeks to describe the type of vehicle or vehicles that are required for paratransit services in terms of features and specifications, with emphasis on durability. /Author/

Walker, FW, Jr (General Motors Corporation) *Transportation Research Record* No. 608, 1976, pp 100-101; ORDER FROM: TRB Publications Off

11 156383 EFFORTS TO REDUCE TRUCK AND BUS OPERATOR HAZARDS. Pressures from government legislation (OSHA), organized labor, government regulatory bodies, and litigation are forcing designers to consider more carefully the driver's exposure to hazards. Noise, vibration, heat, carbon monoxide, and fatigue are the performance stressors discussed. Safety considerations, such as visibility, workspace comfort, entry-exit, and crash worthiness, are also presented from the perspective of what standards, practices, or information are available or required for truck and bus cab interior design.

Miller, JM (Michigan University, Ann Arbor) *Human Factors* Vol. 18 No. 6, Dec. 1976, pp 533-550, 38 Ref.; ACKNOWLEDGMENT: EI (EIX770400171); ORDER FROM: ESL

11 156473 MOTORBUS AND MAN. In a discussion of the report of the international commission for the study of motorbuses, it is stressed that physical and psychological conditions and also requirements of passengers should be considered when designing public transport vehicles. Such considerations give rise to construction and design requirements relating to vehicle body, interior design, cleaning and safety. Although power units such as the stirling engine are being examined, the diesel engine is likely to be the principal bus propulsion unit. Attention should be paid to reducing engine noise as well as improving exhaust gas limit values to prevent toxicity. /TRRL/

Schultz, OWO ; International Union of Public Transport Analytic 1975, pp 104-116, 7 Fig., 2 Tab. 4, Phot.; ACKNOWLEDGMENT: TRRL (IRRD 225106)

11 157388 CONSUMER PREFERENCES IN URBAN BUSES AND BUS SERVICES PART A, MAIN REPORT. This main report analyses the results of a survey conducted in Perth Australia during August and September 1974. The survey was conducted in two parts: by the use of an onboard and a household questionnaire. Details of the individual results are given in supplementary reports b and C. Questionnaires were designed to obtain a ranking of bus design and bus service/travel characteristics. The respondents were found to be strongly in favour of measures which would improve comfort and trip convenience; the level of fares charged was considered much less important. Seating comfort during the journey was considered the most important bus characteristic, cleanliness and riding comfort were more important than the colour or exterior style of the bus. The most important feature of the service was considered to be its

frequency. Safety and reliability was rated more highly than seat availability and distance to bus stops. /TRRL/

Department of Transport, Australia Monograph Dec. 1975, 39 pp, Figs, Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 225162)

11 158142 ASSESSMENT OF SERVICE REQUIREMENTS AND DESIGN CHARACTERISTICS OF PRESENT AND FUTURE PARATRANSIT VEHICLES. The objective of this research project is to provide an assessment of present and future paratransit vehicles, their design characteristics and service requirements from the viewpoint of the passenger, the community, and the driver. This assessment includes comfort, safety, and assessibility of all occupants with particular attention to the special driver problems associated with paratransit service; it focuses on the problems of the elderly and handicapped; and it identifies relevant aspects of the operating environment, namely, pedestrian safety. Shortcomings of vehicles now in service and new prototype vehicles are identified, and strategies are described to remedy them with minor and low cost modifications. The scope of this study includes vehicles designed for the Museum of Modern Art (MOMA) Taxi Project, including two paratransit vehicles designed to specifications of UMTA.

Adams, R ; Adams (Ronald), Research Consultant, (NY-06-0058) Final Rpt. UMTA-NY-06-0058-77-1, Apr. 1977, 116 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract PT-TO-00095; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-267574

11 158356 TOWNOBILE--THE PEOPLE MOVER. A brief description is given of an inner-city type bus developed by L. Roy Leembruggen, an Australian consulting engineer and two major Australian companies, Dunlop Australia Ltd., and John Lysaght (Australia) Ltd. The Townobile carries 116 passengers (48 seated, 68 standing) at speeds up to 60 km/hr. Driven by two electric motors powered by dual half-tonne banks of Dunlop traction batteries, the bus has an operating range of between three and four hours. Battery changeover time is said to be five minutes and recharging can be accomplished in three to four hours. Using two sets of batteries, the bus need be off the road, therefore, for only about 45 minutes in every 24-hour working period. Other design features of the Townobile include contoured, fibre glass perimeter seating which allows plenty of leg room; vandal-proof seating and fittings; one step entry; completely flat flooring and two wide 25-inch aisles divided by stainless steel handrails and stanchions; inside headroom of 6ft. 6in. A feasibility study carried out by Mr. Leembruggen indicates that the system, using 10 such buses running over a circular, three-mile, inner-city route, would call at bus stops every three minutes.

Electric Vehicles for Industry Vol. 62 No. 3, Sept. 1976, pp 4-5ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 158381 LOW-FLOOR ARTICULATED BUS WITH SPECIAL ADVANTAGES FOR SHORT-DISTANCE TRANSPORT. The low-floor articulated bus embodies numerous technical improvements for urban and suburban

transport. The principal improvement is the particularly low floor, which is intended primarily to facilitate boarding and alighting for school children, disabled and elderly persons. This means shorter travelling times and greater comfort for the passengers, and shorter stopping times, speedier turn-round of vehicles and reduced vehicle requirements for the transport undertakings: in short, increased attractiveness at a lower cost. /GMRL/

Schultz, OWO *UITP Revue* Vol. 25 Feb. 1976, pp 134-137; ACKNOWLEDGMENT:

11 159374 SMALL TRANSIT BUS REQUIREMENTS STUDY. OPERATIONS OF SMALL BUSES IN URBAN TRANSIT SERVICE IN THE UNITED STATES. No abstract available.

RRC International, Inc., Latham, N.Y., Transportation and Community Systems Div.*Urban, Mass Transportation Administration, Washington, D.C. 1977, 610p-in 6v; Set includes PB-269 393 thru PB-269 398; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269392-SET/ST

11 159375 SMALL TRANSIT BUS REQUIREMENTS STUDY. OPERATIONS OF SMALL BUSES IN URBAN TRANSIT SERVICE IN THE UNITED STATES. The report investigates the operating environment of small buses in the U.S. and relates them to vehicle requirements.

RRC International, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0074) Intrm Rpt. UMTA-IT-06-0074-77-1, July 1975, 153 pp; Also available in set of 6 reports PC E12, PB-269 392-SET.; Contract DOT-UT-50006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269393/5ST

11 159376 SMALL TRANSIT BUS REQUIREMENTS STUDY. BUS CHARACTERISTICS NEEDED FOR ELDERLY AND HANDICAPPED IN URBAN TRAVEL. Constraints imposed on bus design by the elderly and handicapped are outlined.

RRC International, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0074) Intrm Rpt. UMTA-I-06-0074-77-2, Mar. 1976, 79 pp; See also Interim rept. no. 1, PB-269 393. Also available in set of 6 reports PC E12, PB-269 392-SET.; Contract DOT-UT-50006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269394/3ST

11 159377 SMALL TRANSIT BUS REQUIREMENTS STUDY. OPERATING PROFILES AND SMALL BUS PERFORMANCE REQUIREMENTS IN URBAN TRANSIT SERVICE. The report develops a set of operating profiles and service requirements as the basis for specifications for a new small urban transit bus to meet the identified operational needs.

RRC International, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0074) Intrm Rpt. UMTA-IT-06-0074-77-3, Dec. 1976, 41 pp; Report on Operating Profile and Performance Requirements for Small Buses. See also Interim rept. no. 2, PB-269 394. Also available in set of 6 reports PC E12, PB-269 392-SET.; Contract DOT-UT-40015; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269395/OST

11 159378 SMALL TRANSIT BUS REQUIREMENTS STUDY. GUIDELINES FOR THE DESIGN OF FUTURE SMALL TRANSIT BUSES AND BUS STOPS TO ACCOMMODATE THE ELDERLY AND HANDICAPPED. The report presents scenarios for the future uses and market of small buses, as well as the conceptual design for three vehicle configurations to assess the feasibility of meeting design requirements.

RRC International, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0074) Intrm Rpt. UMTA-IT-6-0074-7704, Jan. 1977, 64 pp; See also Interim rept. no. 3, PB-269 395. Also available in set of 6 reports PC E12, PB-269 392-SET.; Contract DOT-UT-40015; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269396/8ST

11 159379 SMALL TRANSIT BUS REQUIREMENTS STUDY. GENERAL AND PERFORMANCE SPECIFICATIONS FOR A SMALL URBAN TRANSIT BUS. The report investigates the requirements for an advanced design coach which may be used for both demand-responsive and general service on urban arterial streets.

RRC International, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0074) Intrm Rpt. UMTA-IT-06-0074-77-5, Dec. 1976, 148 pp; See also Interim rept. no. 4, PB-269 396. Also available in set of 6 reports PC E12, PB-269 392-SET.; Contract DOT-UT-40015; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269397/6ST

11 159380 SMALL TRANSIT BUS REQUIREMENTS STUDY. PERFORMANCE SPECIFICATIONS FOR ADVANCED DESIGN: SMALL URBAN TRANSIT BUS. The overall objective of the Small Bus Project is the development of a general and performance specification for an advanced small urban transit bus. It is a six-phase program designed to insure that final vehicle specifications would evolve from a comprehensive analysis of all aspects of the operating environment and thus have a broad applicability.

RRC International, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0074) Final Rpt. UMTA-IT-06-0074-77-6, Mar. 1977, 125 pp; See also Interim rept. no. 5, PB-269 397. Also available in set of 6 reports PC E12, PB-269 392-SET.; Contract DOT-UT-40015; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269398/4ST

11 163826 AERODYNAMIC AND REPAIRABILITY CONSIDERATIONS IN TRUCK CAB AND BUS BODY DESIGN. The main factors affected by aerodynamic performance are operating costs and vehicle safety. Scale models have been used in wind tunnel tests to ensure that good aerodynamic performance is obtained without significant conflict with other areas of design. Drag, which is proportional to the square of the velocity, is the critical factor affecting operating speed. Major changes in drag result from the different airflow characteristics around the cab shape. It was found that the most efficient cab shape allowed the airflow to remain attached to the cab surface. Tests showed that the roof flow had the most significant effect and could add 40 per cent to the drag coefficient. Other factors investigated included the shape of the cab sides

and the valance. Drag features of different load types and vehicle builds were studied to assess the effect of cab design on the vehicle as a whole. Different results were given for low and high loads. A combination of good cab shape and a deflector were needed for high loads. Recommended design shapes are discussed. The author shows how relatively small design changes could give significant cost savings in repairs. The repair of a severely damaged Leyland national bus is given as an example. /TRRL/

Lowe, WT (British Leyland Limited) *Transport Engineer* Analytic May 1977, pp 19-23, 1 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-227225)

11 163866 ELECTRIC VEHICLES-THE CLEAN MACHINES. The publication discusses the available range of electric vehicles and their special features which make them suitable for house-to-house delivery applications. Advances in power unit design and electronic control systems give electric vehicles the opportunity to compete with internal combustion engine vehicles in urban traffic situations. The report also describes the various types of electric vehicles used in different applications—electric commercial vehicles, electric vehicles in the public service, industrial trucks, and, electric passenger-carrying vehicles. Tables show comparisons of capital and operating costs with comparable petrol-and diesel-engined vehicles. UK manufacturers of electric vehicles, batteries and operating equipment are also listed. /TRRL/

Electric Vehicle Association of Great Britain Monograph No Date, 21 pp, Figs., 3 Tab., 3 Photos.; ACKNOWLEDGMENT: TRRL (IRRD-226702)

11 163994 THE "CLEAN AIR" BUS. A FURTHER REPORT ON THE OPERATION OF THE COUNTRY'S FIRST LPG POWERED BUS COVERING THE PERIOD OF OPERATION FROM 1ST APRIL 1974 TO 31ST MARCH 1976. The report is an account of the operational and mechanical problems associated with the liquefied propane gas powered bus. Also included in appendices are a road test report by commercial motor and weekly records of fuel and oil consumption over the period. Changes in the type of fluid flywheel fitted have improved vehicle performance but the fuel consumption remains high at an average of 3.5 miles per gallon. It was not possible to make direct comparisons of efficiency although the propane gas is cheaper than diesel oil. The power unit was very smooth and quiet in operation. Apart from the unexplained fracture of an oil pipe the system has been very reliable. The Rolls Royce B81 power unit mounted in a vertical, rear, transverse position has been shown to be reliable under urban operating conditions. Its acceleration is superior but its higher fuel consumption makes it uneconomical although it is hoped that the recent relaxation of fuel tax grant for propane powered vehicles will make it more competitive. /TRRL/

Holland, WR; Cleveland Transit Monograph No Date, 6 Tab., 9 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-225685)

11 165134 ELECTRIC BUS ENGINEERED IN AUSTRALIA. An electric-powered passenger bus has been developed for use in central business

districts. The "Townobile" bus, developed in Australia, uses normal industrial lead acid batteries to operate from three to four hours at speeds up to 30 mph. Models with up to 68-passenger capacity are planned. Elroy Engineering of Australia started work on the project in 1970 and production is scheduled to begin in July. "Townobile" can use overhead wires or self-contained batteries for a power supply. It can operate at half the cost of conventional diesel transit buses and involves one-fifteenth the capital outlay of an equivalent tramway system, according to inventor Roy Leembrugger. /GMRL/

Metro Vol. 73 No. 3, June 1977, 7 pp
ACKNOWLEDGMENT:

11 165135 FITTING "PERCENTILE MAN" GOAL OF SEAT MANUFACTURERS. The mass transit seating industry offers a wide variety of products from firms constantly developing new products. Cantilever seats are now being marketed by manufacturers seeking to expand their line of products. As the importance of mass transit grows, the industry will continue to produce innovative products that are functional in design, durable in construction and aesthetic in appearance. /GMRL/

Metro Vol. 73 No. 3, June 1977, pp 26-29
ACKNOWLEDGMENT:

11 165144 THE IMPORTANCE OF SEAT BELTS IN THE TOTAL SCHOOL BUS SAFETY PICTURE. Private contractors and others in the school bus industry believe that safety equipment such as cross-over mirrors, seat belts for the driver, and more and better driver training programs will prevent accidents and injuries as well as save some lives. Their feeling is that most accidents are the type in which more padding on the hand rails and seat backs, etc., not seat belts, would reduce injuries. Lack of usage, or improper usage, by students in test programs, and problems in releasing some seat belts are given as reasons for not favoring seat belts. Recommendations for more and improved driver training programs, and additional testing and evaluation of new safety devices and construction methods are made. /MSA/GMRL/

Reynolds, WV; National School Transportation Association Oct. 1974, 13 pp, 7 Ref.; ACKNOWLEDGMENT: National Safety Council, Safety Research Info Serv (770434R)

11 165730 A STUDY OF WHEELCHAIR ACCESS TO THE CURRENT TRANSIT BUS DESIGN. Public debate currently exists on the best way to improve and increase use of public transit equipment by the elderly and handicapped. This document is the result of a study conducted by AM General under a contract with the Department of Transportation, Urban Mass Transportation Administration, to investigate the feasibility and practicality of incorporating a wheelchair lift platform (level change) device for the standard 40-foot transit bus that would provide safe ingress and egress for wheelchair-bound passengers. This report describes the background and conceptual design of incorporating into the current 40-foot bus a level change device to board such passengers. In addition, it also covers seating, wheelchair positioning, and securing the wheelchair once on board. The recommended lift design for use on the standard bus is controlled by the driver by a set of electric

switches. This lift is under control of the seated driver at all times. It is powered by hydraulics from either an existing power steering pump or a separate pump. The platform folds into a normal step and stepwell configuration when in the stowed position and has no effect on normal bus operations. It adds approximately 400 pounds to the weight of the bus and has a recommended platform load capacity of 1,000 pounds. The estimated costs of a wheelchair lift and restraint system option are in the range of \$6,000 to \$8,000 per bus. No major design problems are anticipated for the installation of such a device on any current design 40-foot transit use. /UMTA/

AM General Corporation, (MI-06-0017) Final Rpt. UMTA-MI-06-0017-77-1, Apr. 1977, 61 pp
Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-UT-60002; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-270101/9ST

11 165736 ASSESSMENT OF BATTERY BUSES. This report presents a comprehensive assessment/survey of the performance of electric battery buses operating in passenger-carrying services in the United States, Europe, Japan, and Australia. The survey assessed 16 different systems from 15 suppliers, operating under 18 public transit authorities. These operations varied from single demonstration vehicles to a fleet of 20 buses which provide all the transit service on three routes. The status of electric battery bus development is reflected in the fact that 57 buses have accumulated more than 3.4 million kilometers (2.1 million miles) in passenger-carrying service. The scope of this report includes visiting the operating organization, description of buses and propulsion systems, operational profiles, operating experience, and analysis of data and conclusions about the problems and constraints in the procurement and operation of electric buses. This study also addresses hybrid propulsion systems such as trolley-battery and diesel-battery hybrids. Hybrid bus systems assessed included the Dornier Duo-Bus, the Mercedes-Benz OE305, and the Tokyo Transportation Bureau models built by Kawasaki. This assessment was accomplished through on-site data collection and data analyses. Data analysis included translating the information and reducing the data on performance and technical features to common terms for comparison. The Appendices contain a listing of the contributors to the Electric Battery Bus Assessment as well as a Bibliography. /UMTA/

Trans Systems Corporation, (TS-102 VA-06-0044) Final Rpt. UMTA-VA-06-0044-77-1, July 1977, 156 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-UT-70056; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-271321

11 165754 GENERAL AND PERFORMANCE SPECIFICATIONS FOR A SMALL URBAN TRANSIT BUS. The overall objective of the Small Bus Project is the development of a general and performance specification for an advanced small urban transit bus. It is a six-phase program designed to insure that final vehicle specifications would evolve from a comprehensive analysis of all aspects of the operating environment and thus have a broad applicability. The Small Bus Project is presented in six separate reports: 1) Operations of Small Buses in Urban Transit Service in the

United States. This report investigates the operating environment of small buses in the U.S. and relates them to vehicle requirements; 2) Bus Characteristics Needed for Elderly and Handicapped in Urban Travel. Constraints imposed on bus design by the elderly and handicapped are outlined; 3) Operating Profiles and Small Bus Performance Requirements in Urban Transit Service. This report develops a set of operating profiles and service requirements as the basis for specifications for a new small urban transit bus to meet the identified operational needs; 4) Guidelines for the Design of Future Small Transit Buses and Bus Stops to Accommodate the Elderly and Handicapped. This report presents scenarios for the future uses and market of small buses, as well as the conceptual design for three vehicle configurations to assess the feasibility of meeting design requirements; 5) General and Performance Specifications for a Small Urban Transit Bus. Requirements for an advanced design coach which may be used for both demand-responsive and general service on urban arterial streets are presented; 6) Small Transit Bus Requirements Study. This report summarizes the findings presented in the five project reports. /FHWA/

RRC International, Incorporated, (IT-06-0074) Intrm Rpt. UMTA-IT-06-0074-77-5, Dec. 1976, 148 pp; Sponsored by the Urban Mass Transportation Administration, DOT.; Contract DOT-UT-50006; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-269397

11 165771 OPERATING PROFILES AND SMALL BUS PERFORMANCE REQUIREMENTS IN URBAN TRANSIT SERVICE. The overall objective of the Small Bus Project is the development of a general and performance specification for an advanced small urban transit bus. It is a six-phase program designed to insure that final vehicle specifications would evolve from a comprehensive analysis of all aspects of the operating environment and thus have a broad applicability. The Small Bus Project is presented in six separate reports: 1) Operations of Small Buses in Urban Transit Service in the United States. This report investigates the operating environment of small buses in the U.S. and relates them to vehicle requirements; 2) Bus Characteristics Needed for Elderly and Handicapped in Urban Travel. Constraints imposed on bus design by the elderly and handicapped are outlined; 3) Operating Profiles and Small Bus Performance Requirements in Urban Transit Service. This report develops a set of operating profiles and service requirements as the basis for specifications for a new small urban transit bus to meet the identified operational needs; 4) Guidelines for the Design of Future Small Transit Buses and Bus Stops to Accommodate the Elderly and Handicapped. This report presents scenarios for the future uses and market of small buses, as well as the conceptual design for three vehicle configurations to assess the feasibility of meeting design requirements; 5) General and Performance Specifications for a Small Urban Transit Bus. Requirements for an advanced design coach which may be used for both demand-responsive and general service on urban arterial streets are presented; 6) Small Transit Bus Requirements Study. This report summarizes the findings presented in the five project reports. /FHWA/

RRC International, Incorporated, (IT-06-0074) Intrm Rpt. UMTA-IT-06-0074-73-3, Dec. 1976, 41 pp; Contract DOT-UT-50006; ACKNOWLEDGMENT:

MENT: UMTA, NTIS; ORDER FROM: NTIS; PB-269395

11 166170 ELECTRIC AUTOMOBILES. VOLUME 1. 1970-1974 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). Citations from worldwide research cover the design of electric automobiles, vans, buses, and hybrid vehicles. Studies are included on lead-acid, zinc-air, lithium-sulfur, and nickel-cadmium batteries; fuel cells; drive trains; and chassis construction. (This updated bibliography contains 191 abstracts, none of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service Aug. 1977, 198 pp; See also NTIS/PS-77/0635; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0636/9ST

11 166198 RESULTS OF BASELINE TESTS OF THE EVA METRO SEDAN, CITI-CAR, JET INDUSTRIES ELECTRA-VAN, CDA TOWN CAR, AND OTIS P-500 VAN. Five electric vehicles were tested at vehicle test tracks using the SAE. The tests provide range data at steady speeds and for several driving cycles. Most tests were conducted with lead-acid traction batteries. The Otis Van and the Copper Electric Town Car were also tested with lead-acid and nickel-zinc batteries. The tests showed a range increase of from 82 to 101 percent depending on vehicle, speed, and test cycle.

Stenger, FJ Bozek, JM Soltis, RF ; National Aeronautics and Space Administration NASA-TM-X-73638, Oct. 1976, 78 pp; Contract E(49-28)-1011; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N77-21549/9ST

11 166431 ENERGY ABSORBING BUMPERS FOR TRANSIT BUSES: TRANSBUS PROGRAM. The report describes the results of a program to test and evaluate the potential benefits of energy absorbing bumpers for transit buses. The objective of the program is to determine, through controlled tests, the capabilities/limitations of six new design energy absorbing bumper systems. Principal emphasis is placed upon the bumper system performance under simulated in-service tests with respect to its effectiveness in protecting the bus from minor accident hazards encountered during revenue service. The economic benefits of energy absorbing bumpers are discussed with respect to life-cycle accident costs. The test facilities, each type of bumper system tested, and the test procedure is described in detail, in terms of the objectives of the tests, equipment and methodology used for testing, and functional descriptions of each bumper system. The detailed test results for each bumper system are presented in table format, indicating energy absorbing performance at various impact velocities, maximum impact capability, and other attendant characteristics. Conclusions concerning the results of the tests including projected benefits of energy absorbing bumpers are delineated. Significant factors relating to bumper weight, cost, durability, etc., are summarized.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration UMTA-IT-06-0025-77-4, Transbus-TR-76-003, May 1976, 49 pp; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269405/7ST

11 166599 EUROPEAN DEVELOPMENTS IN THE NA/S HIGH TEMPERATURE BATTERY FOR AUTOMOBILE PROPULSION AND ENERGY STORAGE. The sodium-sulfur battery is a leading candidate for future use in the propulsion of automobiles, vans, buses, and trains and for energy storage and load-leveling by electrical utilities. This report presents a brief description of the fundamentals of the operation of the battery, with indication of some considerations which control its development into an important technological system. The status of the battery development in England, France and Germany is then reviewed. (Author)

Sosin, A ; Office of Naval Research London (England) ONRL-R-5-77, June 1977, 11p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A042541/3ST

11 167285 TECHNOLOGY DELIVERY FOR A NEW PARATRANSIT VEHICLE. The report reflects the view that a number of technological opportunities are available for solving the long-standing American transportation need—a large, comfortable taxicab/paratransit vehicle, and that the success of the paratransit program may depend on the technology delivery process. The report highlights the need to take the existing state-of-the-art vehicle technology and to convert it into a disseminated vehicle in the marketplace so that it would be profitable to manufacturers, operators, and users. It focuses specifically on the barriers to delivering a new paratransit vehicle to the industry; it identifies the key issues which will become relevant in the future, as innovators attempt to market a vehicle, and its concomitant services, to the riding public. The report outlines UMTA's role with delivering this new technology into the marketplace for paratransit services through the sponsorship of a demonstration project for approximately 200 vehicles, that is, a demonstration that reflects the real world of revenue service of this vehicle. (Portions of this document are not fully legible)

Price, JP Kornhauser, A Phillips, J ; Gellman Research Associates, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-PA-06-0039-77-1, July 1977, 99 pp; Contract DOT-UT-70038; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272128/0ST

11 167340 GAS TURBINE ENGINE APPLICATION IN TRANSIT COACHES [Final rept]. This report presents an investigation of gas turbine engine application in transit coaches that was conducted as part of the Transbus Program to determine the viability of the gas turbine engine as a potential power source for transit coaches. The state of development of the gas turbine engine as a vehicular power source is described. An in-depth survey and evaluation was conducted of gas turbine engine manufacturers to determine the suitability of these engines for installation in transit coaches. Only one product is developed to a state where volume production can be seriously considered. This engine is described in detail and a comprehensive cost/benefit analysis was performed of this engine installed in a contemporary transit coach fleet. The results of the analysis and evaluation indicate that while current engines are not economically justifiable the gas turbine engine is potentially superior to the diesel engine when fully developed with planned improvements

scheduled for the near time frame. Recommendations are also presented to demonstrate early production turbine engines in a small fleet of transit coaches in revenue service.

Booz-Allen and Hamilton, Inc., Bethesda, Md., Transportation Consulting Div.*Urban Mass Transportation Administration, Washington, D.C., Bus Projects Div. Transbus-TR-77-001, UMTA-IT-09-0025-77-5, Mar. 1977, 81p; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272608/1ST

11 167871 A TRANSIT OPERATOR VIEWS TRANSBUS. An overview of the Transbus history is presented as well as the implications of the transbus decision for transit operators and the transit industry. The rigid design and performance standards for Transbus, as specified by the Department of Transportation, conflicted with other goals equally important in the design and operation of transit vehicles. The most controversial feature of the Transbus is its 22-inch floor height which cannot be achieved without incurring higher capital and operating costs. The following points highlight the major drawbacks of the Transbus. Reduced operating capability can be expected as a result of lower bus floors which not only lowers the underbody clearance but creates severe operating problems. The new components of the Transbus will ultimately drive up the purchase price for the new vehicle. The added weight, the increased number and complexity of mechanical components, and the smaller tires will result in overall higher operating costs. A lower floor design significantly reduces the possible number of seats in the bus. While the Transbus does represent an improvement in transit service accessibility it does so at an exceptionally high cost. It is noted that UMTA has spent over \$27 million in developing and testing an accessible bus, a bus that will create more operating problems than it will ever solve. Future UMTA research and development efforts should focus on devising service solutions to transit problems, not more hardware solutions which are really not solutions at all. Finally, it is noted that the key to increased transit riding is improved service, not merely new vehicles.

Whitten, C *Motor Coach Age* Vol. 29 No. 9, Sept. 1977, pp 9-16, 7 Phot.; This report was presented at the 5th International Conference on Automotive Safety, July 11, 1977.

11 169787 TRANSBUS ENGINEERING TEST PROGRAM. This report summarizes the engineering tests that were performed in support of the Transbus Program implemented in June 1971. Transbus prototypes built by three manufacturers were subjected to a series of tests. The objectives of the engineering tests were to obtain evaluation data to determine the degree of compliance with the Transbus specification, to assess the design improvements over current production buses, to identify product improvements required for production designs, and to provide overall technical assessments of the designs for a government decision regarding a production phase for Transbus. This report presents an overview of the entire test program—the test articles, procedures and facilities used for the development tests, acceptance tests, and independent engineering tests. It also presents a summary of the data obtained in each individual portion of the testing program.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0025) Final Rpt. UMTA-IT-06-0025-78-1, TRANSBUS-TR-77-003, Dec. 1977, 289 pp; See also report dated 7 Jul 76, PB-269 911.; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276196/3ST

11 170308 THE STEYR "CITY-BUS" [Der steyr "city-bus"]. The steyr "city-bus s" is designed to be used as follows: on bus routes, as a city-bus on bus routes, by transport authorities, for park and ride systems, in demand bus systems or group taxis, as a mini-bus, for special applications, etc. Following a listing of the individual alterations required in the conversion from the slower conventional bus to the faster "city-bus s", the main mechanical components are described: engine, transmission, wheel suspension, braking system and steering and the driver's cab and passenger cabin. The steyr "city-bus s" because of its mature technical concept, possesses possibilities for the solution of a variety of traffic problems in a range of applications. Its introduction in times of light traffic, instead of the larger buses optimises maintenance and repairs of the large buses making it possible to supply a denser service at peak periods or to reduce the parking facilities required, and to obtain increased financial savings for investment. The technical data for the bus are presented. /TRRL/ [German]

Kraemer, H *Automobil Technische Zeitschrift* Vol. 78 No. 5, May 1976, pp 197-200, 3 Fig., 6 Phot., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-304926), Federal Institute of Road Research, West Germany

11 172042 FLYWHEEL PROPULSION SIMULATION. Development of a bus propelled by a flywheel instead of by an engine or storage battery has long interested urban transportation planners. The kinetic energy stored in a flywheel supplants the need for petroleum-derived fuels and minimizes negative environmental impacts. This report was prepared in support of the Urban Mass Transportation Administration's program in flywheel energy storage. It can be considered both an evaluation tool and a design tool. This report develops and describes the analytical models and digital computer simulations that can be used for the evaluation of flywheel-electric propulsion systems employed with urban transit vehicles operating over specified routes and with predetermined velocity profiles. The computer simulation is divided into two sections. The first section simulates the dynamic behavior of the vehicle enroute, computes the energy and power requirements, and the power losses of each of the propulsion system components. The second section utilizes thermal models to compute the temperature rises of each of the propulsion system components. The simulations can be used to determine the suitability of a given flywheel-electric propulsion system for an intended mission. The simulation method can be applied to electric-drive systems for battery and flywheel energy-storage vehicles, to hybrid vehicles, and to vehicles operating from wayside power. The Appendices contain Mathematical Models, Input Constants for Computer Program, Parameter Listing for Computer Program, Tabular Outputs for Sample Run, Manufacturers' Data for Major Components, and Report of Inventions. /Author/

King, CM Kusko, A ; Kusko (Alexander) Incorporated, (DOT-TSC-UMTA-77-15) Final Rpt. UMTA-MA-06-0044-77-1, May 1977, 194 pp; Sponsored by the Department of Transportation, Federal Highway Administration, and performed under contract to Transportation System Center, DOT.; Contract DOT-TSC-1180; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-272259

11 172074 BUSES FOR HANDICAPPED, ELDERLY ABOUT READY FOR OPERATION. There will be two new specially equipped buses on Topeka streets about May 1. The buses will be operated by Intracity Transit and are adapted for use of the handicapped and elderly. Services by the two buses will be door to door. /QMRL/

Kansas Department of Transportation. Hilites Vol. 37 No. 3, Apr. 1976, 10 pp

11 174095 FIRST RESULTS OF TESTS WITH ELECTRIC TRANSPORTATION CARS [Erste ergebnisse des probetriebes mit elektrisch angetriebenen transportern]. For a number of electrically driven vans with lead batteries used by German distribution the experience to date is discussed. The vehicles are of normal type designed for use with the internal combustion engine which have been modified for electric drive. Study of failures and improvements resulted in better service. /TRRL/ [German]

Stracke, KH *Elektrotechnik* Vol. 55 No. 9, Sept. 1977, pp 620-624, 2 Fig., 3 Tab.; ACKNOWLEDGMENT: Trade News Limited (IRRD 231118), Institute for Road Safety Research

11 174733 TRANSIT BUS PROPULSION SYSTEMS ALTERNATE POWER PLANT INSTALLATIONS. This report describes the survey and evaluation that was made of U.S. heavy-duty automotive engine manufacturers who could offer engines to power TRANSBUS during its production life which is expected to run to the 1990's. TRANSBUS is the heavy-duty, 35-to 40-foot long transit coach developed under this contract, and it incorporates the best available technology for improvement of mass transit transportation in urban U.S.A. Installation characteristics of the most suitable engines for each of the three prototype TRANSBUS designs (constructed by AM General, General Motors, and Rohr Industries) are presented herein. Listed and illustrated in this report are: (1) the engine compartments of the three prototype TRANSBUS designs; (2) the candidate engines; and (3) the candidate engines fitted into the three prototypes. The results presented herein show that two engine types, the 4-cycle diesel engine and the gas turbine engine, may challenge the Detroit Diesel 2-cycle diesel engine for the transit coach market. Only one gas turbine engine was identified as a possible alternative to the diesel--the Allison GT-404.

Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0025-78-2, Transbus-TR-73-009, Sept. 1977, 42 pp; See also PB-272 608.; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-276612/9ST

11 175235 DETERMINATION OF THE EFFECTIVENESS AND FEASIBILITY OF REGENERATIVE BRAKING SYSTEMS ON ELECTRIC AND OTHER AUTOMOBILES. VOLUME I. SUMMARY. A report is given of a study conducted by Lawrence Livermore Laboratory in which a determination of the effectiveness and feasibility of regenerative braking systems on electric and other automobiles was made. Regenerative braking concepts applicable to autos utilizing electric, hybrid, or heat engine power systems were evaluated to determine performance improvement, energy savings, and cost effectiveness. Two major conclusions were reached pertaining to privately owned autos driven 16,100 km/yr in an urban environment: (1) regenerative braking is cost effective and is recommended for use on electric and hybrid-powered automobiles, and (2) the addition of a regenerative braking system to the standard heat-engine-powered auto was not found to be cost effective. However, the regenerative system can be cost effective for heat engine powered commercial vehicles such as taxis, city buses, or delivery vans that see high annual usage under stop-and-go conditions. (ERA citation 03:008748)

Davis, DD Renner, RA Younger, FC Epps, RC Lerner, SS ; California University, Livermore, Energy Research and Development Administration Final Rpt. Sept. 1977, 77 pp; Contract W-7405-ENG-48; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCRL-52306/1

11 175768 BASELINE TESTS OF THE ZAGATO ELCAR ELECTRIC PASSENGER VEHICLE. The Elcar vehicle performance test results are presented. The Elcar Model 2000 is a two-passenger vehicle with a reinforced fiberglass body. It is powered by eight 12-volt batteries. The batteries are connected to the motor through an arrangement of contactors operated from a foot pedal in conjunction with a hand-operated switch. These contactors change the voltage applied to the 2-kilowatt motor. Acceleration tests, operating characteristics, and instrumentation are described.

Sargent, NB Maslowski, EA Slavick, RJ Soltis, RF ; National Aeronautics and Space Administration NASA-TM-73764, CONS/1011-9, Oct. 1977, 36 pp; Contract EC-77-A-31-1011; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-17934/8ST

11 176136 STATE-OF-THE-ART ASSESSMENT OF ELECTRIC VEHICLES AND HYBRID VEHICLES. The Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976 (PL 94-413) requires that data be developed to characterize the state of the art of vehicles powered by an electric motor and those propelled by a combination of an electric motor and an internal combustion engine or other power sources. Data obtained from controlled tests of a representative number of sample vehicles, from information supplied by manufacturers or contained in the literature, and from surveys of fleet operators of individual owners of electric vehicles is discussed. The results of track and dynamometer tests conducted by NASA on 22 electric, 2 hybrid, and 5 conventional vehicles, as well as on 5 spark-ignition-engine-powered vehicles, the conventional counterparts of 5 of the vehicles, are presented.

National Aeronautics and Space Administration NASA-TM-73756, Sept. 1977, 595 pp; Contract EC-77-A-31-1011; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-18988/3ST

11 177347 SCENARIO FOR MULTI-MODAL-MAN. The present slow change in the built environment presents a reason for considering the transport properties of the electric car before its future possible use for mass travel, for without further change, the infrastructure for the ice (internal combustion engine) vehicle will be that inherited by the electric car. The flexibility of the present-day car gives a personal modal dominance which is questioned in the context of the electric vehicle. Increased energy cost, a different second-hand market structure as well as range limitations are likely to result in a different car-user relationship. The transport system possible in the future is one in which the type of transport is tailored to the type of journey made in which the traveller is described as the multi-modal-man. /TRRL/

Cousins, S *Built Environment* Vol. 3 No. 4, Dec. 1977, pp 291-293, 1 Fig., 1 Tab., 1 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 231770)

11 178096 LARGE BUSES AND THE TOWNOBILE ELECTRIC CITY TRANSIT SYSTEM. A variety of urban transit modes are compared with one another with respect to passenger capacity per hour, speed, fuel type, cost and several other considerations. A further comparison of diesel and electric buses points up the desirability of electric coaches in terms of maintenance cost reductions and reduced infrastructure.

Leembruggen, LR ; Society of Automotive Engineers Preprint SAE 780293, 1978, 11 pp; Preprint for meeting held February 27-March 3, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 178586 CART-BEFORE-HORSE PRINCIPLE FOR ARTIC PUSHES BUS. Demonstrations of a Danish-built Leyland/Dab articulated bus to public transport authorities in the UK have been designed to show that this type of vehicle, with steering on the trailer axle, can be more manoeuvrable than rigid vehicles. An articulated 160-seater bus of this type introduced by Daimler-Benz has an underfloor rear-mounted power unit driving a single axle of the rear section. The vehicle is based on two shortened German standard bus modules jointed by a concertina coupling. This coupling unit incorporates an electro-hydraulic device to prevent jack-knifing and also to facilitate steering. It is this feature of the design which makes the rear powered 'pusher' articulated bus feasible against initial arguments against its development. /TRRL/

Automotive Engineer Vol. 2 No. 5, Oct. 1977, pp 83-84, 1 Fig., 1 Tab., 4 Phot. ACKNOWLEDGMENT: TRRL (IRRD-232691)

11 178621 AN INVESTIGATION OF A BATTERY-TROLLEY BUS SYSTEM. A feasibility study of a combined battery and trolley bus system has been carried out. The double-decked 80-passenger electric bus has a performance compatible with modern traffic. It is powered from overhead wires for only part of its route. For the remainder of its journey, it uses lead-acid batteries which are re-charged from the overhead supply when the bus next reaches a powered route

section. The likely cost and weight of the bus components were investigated and possible technical, environmental, and safety problems were considered. Systems studies were carried out for two urban areas. It was concluded that the system could be made to work satisfactorily in most towns which now have an urban bus system, without significant changes to existing timetables. There would be some improvement in air pollution and noise over diesel buses, but no saving in primary energy or running costs. The capital cost of the system would be much higher than that for a diesel bus fleet.(a) /TRRL/

Weeks, R ; Transport and Road Research Laboratory Monograph TRRL Lab. Rpt. 823, 1978, 21 pp, 4 Fig., 10 Tab., 7 Ref.; ACKNOWLEDGMENT: NTIS (IRRD-232307); ORDER FROM: NTIS; PB-284366/2ST

11 178832 FUTURE TRANSIT BUS DESIGNS. This paper describes recent trends in transit bus design in the United States and Western Europe. It discusses the basic legal, regulatory, and operational constraints that historically have guided the design of full-size transit buses specifically addressing the implications of the constraint that fare payment must occur on-board the transit bus and be monitored by the driver. Future bus design concepts are presented which demonstrate the improvements that would be possible in service characteristics if this constraint were removed. The material presented is based in part upon research conducted for the Urban Mass Transportation Administration on the impact of fare collection on transit bus design.

Daniels, CJ (Urban Mass Transportation Administration) Holcombe, HJ Mateyka, JA ; Society of Automotive Engineers Preprint SAE 780058, Mar. 1978, 20 pp, 12 Ref.; This paper was presented at the SAE Meeting, Detroit, Michigan, February 27-March 3, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 179869 STUDY OF FLYWHEEL ENERGY STORAGE-VOLUME 1, EXECUTIVE SUMMARY; VOLUME 2, SYSTEMS ANALYSIS; VOLUME 3, SYSTEM MECHANIZATION; VOLUME 4, LIFE-CYCLE COSTS; VOLUME 5, VEHICLE TESTS. In 1976, the Urban Mass Transportation Administration established the present program--Study of Flywheel Energy Storage--to determine the practicality and viability of flywheel propulsion systems for urban mass transit vehicles. The study began with a review of the U.S. transit properties requirements, which showed that the most suitable vehicle for deployment of flywheel propulsion is the full-size transit bus. Several propulsion concepts were hypothesized and subjected to comparative analysis with present diesel buses, trolley coaches, and battery buses in regard to performance and life-cycle economics. This screening resulted in the establishment of the following basic concepts that can provide various types of high quality transit service: Pure flywheel propelled bus; Flywheel/diesel engine hybrid bus; Flywheel-augmented trolley coach; and Flywheel/battery hybrid bus. The design studies that were conducted for the four propulsion configurations showed a high degree of commonality of components among the four concepts. Final life-cycle cost analyses showed all four concepts to be in a competitive range with present transit vehicles. Plans were

made for a Phase II development program that will result in the design, fabrication, and testing of all four propulsion configurations in full-size buses within 36 months. Volume 1 presents the summary of the results of the Study of Flywheel Energy Storage. The study has shown the viability of flywheel-propelled buses, and a set of plans for successful deployment of these new vehicles has been prepared. The study recommends that the Phase II program leading to the development of prototype vehicles be promptly initiated. Volume 2 reviews, identifies, and defines the requirements for improved rubber-tired urban transit vehicles. It includes the quantification of three baseline vehicles: a 40-ft diesel bus, a trolley coach, and a battery bus. It discusses the requirement needs of 11 transit properties. Volume 3 describes the results of the system mechanization for the four flywheel propulsion configurations that scored highest in the screening: Pure flywheel drive; Flywheel/battery hybrid drive; Flywheel/diesel engine hybrid drive; and Flywheel-augmented trolley coach drive. Volume 4 describes the methodology developed to guide the life-cycle cost analysis of the flywheel propelled vehicles as compared with the three baseline vehicles. Volume 5 presents the major results of the tests performed on a 40-foot diesel bus and a trolley coach as related to the program methodology. It includes the test data from the 20-vehicle M.A.N. Electrobus demonstration program in Germany. Details of the tests, test data, and other test results are included in Appendixes A, B, and C of this report. /UMTA/

Lawson, LJ Smith, AK Davis, GD ; AiResearch Manufacturing Company, (CA-06-0106) Final Rpt. UMTA-CA-06-0106-77-1, Sept. 1977, 725 pp; See also Vols. 2 through 5, NTIS PB-282653 through PB-282656 respectively, also available in set of 5 reports PC E14, PB-282651-SET.; Contract DOT-UT-60097T; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282652/7ST

11 179870 A STUDY OF FLYWHEEL ENERGY STORAGE FOR URBAN TRANSIT VEHICLES, PHASE I. This report documents the Phase I results of a program--Study of Flywheel Energy Storage--investigating the use of flywheel storage as applied to fixed-route, multistop, rubber-tired, urban transit vehicles. This program, established by the Urban Mass Transportation Administration in 1976, has an ultimate objective of hastening the changeover to electric propulsion from today's petroleum-powered transit vehicles. The objective of Phase I was to evaluate the application of flywheel energy storage to a broad spectrum of electrically powered urban transit vehicles and to identify the systems which could meet the established mission requirements. This document is the final report for Phase I of this flywheel storage program, and it summarizes the results of each of the six tasks of Phase I: Requirements Study; System Concept Study; Supporting Engineering Design and Analysis; Life-Cycle Cost; Development Plan for Phase II; and Technological Advancements. Charts, tables, major conclusions and recommendations are provided. The Appendixes (A-L) chart out such items as system requirements; flywheel/motor energy storage packages; life-cycle cost analysis, methodology, and worksheets; modularity in design; and a list of references. This report concludes that flywheel energy storage is a promising technique for reducing dependence upon

petroleum fuels by urban transit buses as well as offering environmental improvement potentials to transit operators. The study recommends that a hardware development program be initiated for propulsion systems applicable to urban vehicles. /FHWA/

General Electric Corporate Research & Development, (NY-06-0062) Final Rpt. UMTA-NY-06-0062-77-1, Sept. 1977, 210 pp; Contract DOT-UT-60096T; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-282929

11 180597 EVALUATION OF SELECTED DRIVE COMPONENTS FOR A FLYWHEEL POWERED COMMUTER VEHICLE. PHASE I. FINAL REPORT. The results of tests performed to evaluate the performance of selected high-speed flywheel bearings and shaft seals are reported, and work performed on the development of a high-speed composite flywheel rotor is described. The overall program objective is to develop a composite flywheel system for primary energy storage in a flywheel powered vehicle. These initial tests were intended to evaluate the performance of full-size composite rotor elements, high-speed bearings and shaft seals for that system under conditions simulating as closely as possible those anticipated in a finished vehicle. Performance of the angular contact ball bearings is reported to be satisfactory at all speeds; a simplified lubrication system is recommended for second generation hardware. Performance of the ferrofluidic shaft seals is reported to be marginal, as they failed to hold a hard vacuum at the maximum design speed. Several concepts for improved seals are offered for second generation hardware. The test objectives for the high-speed composite flywheel rotor were not achieved due to dynamic instability problems with the test hardware. Recommendations are offered for the design of second generation hardware, and a scope of activities is proposed for the second phase of this program. (ERA citation 03:021858)

LMC Corporation, Department of Energy June 1977, 67 pp; Contract EY-76-C-03-1164; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SAN/1164-1

11 180785 EMPIRICAL CRASH INJURY MODELING AND VEHICLE-SIZE MIX. Crash injury prediction models were developed using data from the CPIR file for crashes which occurred since January 1, 1970, involving 1969 or newer cars, vans, and pickup trucks. Hostile and protective effects of vehicle size were separated in addition to injury severity increases with age, front seating position, and lack of restraints. Differences by crash configuration were also isolated. Elasticity of injury with respect to average vehicle weight change was computed using these models. Fuel cost decreases were compared with injury cost increases as vehicle weight decreases. Fuel cost savings exceed injury cost increases as vehicle weight is reduced. The conclusion assumes no change in the relationship between vehicle volume and vehicle weight. Injury reduction from larger and lighter vehicles and from improved vehicle design could increase the difference even more.

Carlson, WL ; National Highway Traffic Safety Administration DOT-HS-803 349, May 1978, 33 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282103/1ST

11 180884 STUDY OF FLYWHEEL ENERGY STORAGE. No Abstract.

AiResearch Manufacturing Company, Urban Mass Transportation Administration 5 Volumes, Sept. 1977, 725 pp; Set includes PB-282652 thru PB-282656.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282651-SET/ST

11 183013 ADVANCED DESIGN TRANSIT BUS GOES INTO PRODUCTION AT GM. Nearly \$50-million has been allocated by GM for facilities, equipment and tooling to produce the Rapid Transit Series (RTS) bus, the first completely new production transit bus since 1959. /SASI/

Metro Vol. 73 No. 5, Oct. 1977, pp 24-25
ACKNOWLEDGMENT:

11 183094 THE ORIGIN AND USES OF THE ECONOMY VAN. The economy van has evolved through three generations of design changes. From a full-forward control, primarily commercial vehicle first introduced in the U.S. in 1954, it has grown into a semi-forward control vehicle that is now used in a wide range of business and personal applications. Sales will exceed 700,000 units in 1977. The versatility of the original compact closed body design has been enhanced by higher GVW's, larger engines, and improved driver environment to meet growing customer requirements. The future challenge will be to preserve essential functional characteristics while significantly improving fuel economy. /SASI/

Englehart, JE (Ford Motor Company) ; Society of Automotive Engineers SAE 780237, Feb. 1978, 9 pp; ACKNOWLEDGMENT:

11 183106 GREYHOUND OFFERS SMALL BUS HEAVY-DUTY TRANSIT USE. Transit properties forced to use large-capacity transit buses on low-patronage routes will be able to increase efficiency as a result of a new vehicle recently introduced. Greyhound Lines has unveiled a compact, 30-foot bus designed from the ground up for transit applications. Powered by a diesel engine, the "Citycruiser" is a domestically-built bus engineered for heavy-duty service. /GMRL/

Metro Vol. 74 No. 3, May 1978, 37 pp
ACKNOWLEDGMENT:

11 183128 THE SMALL BUS QUESTION. The small bus industry is at a crossroads waiting for the federal government to decide whether a mandated small Transbus is the answer to current needs for a heavy duty small bus. /GMRL/

Wiese, NA *Mass Transit* Vol. 5 May 1978, pp 20-25; ACKNOWLEDGMENT:

11 184019 BUSES TODAY AND TOMORROW [L'Autobus aujourd'hui et demain]. The whole issue of this journal deals with urban buses and contains the following articles: 11 years with the conventional RATP-UTPUR bus, Malterre, P; A standard bus, which is not as standard as all that; Study of a new generation of buses in France, Robin, M; Twenty years of rear-engine buses, Fournier, L; Small buses and mini buses: Force of a myth, Malterre, P, Van Straaten, C; The articulated bus, Billion, C; The bus in its exclusive right of way, Midgley, P and Bigey, M. /TRRL/ [French]

Transports Urbains No. 34, Jan. 1976, pp 7-44, Figs., Tabs., Photos. GETUM: Groupement pour l'Etude des Transports Urbains Modernes.; ACKNOWLEDGMENT: TRRL (IRRD-105146), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

11 184081 EXPERIENCES FROM LARGE SCALE TESTS WITH AN ELECTRIC BUS [Erfahrungen aus dem grossversuch mit einem elektrobus]. In a full scale test, twenty battery driven electric buses have been put into operation, half of which have been equipped with externally excited or series motors. This report covers the experience gained since the end of 1974 on the vehicle itself, its drive system and batteries. Up to the end of 1975, 825000 km were driven by these buses. /TRRL/ [German]

Hagen, H Zelinka, R (Maschinenfabrik Augsburg-Nuernberg (Man) Ag) *Elektrotechnische Zeitschrift, Ausgabe B* Vol. 98 No. 1, 1977, pp 54-60, 2 Fig., 4 Tab., 2 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 3068665), Federal Institute of Road Research, West Germany

11 184146 VEHICLES SUITABLE FOR CITY TRAFFIC. SAFETY-COMBUSTION ENGINES-ELECTRIC PROPULSION. PART A: RESEARCH RESULTS [Stadtgerechte Kraftfahrzeuge. Sicherheit-Verbrennungsmotor -Elektroantrieb. Teil A: Ergebnisband.]. The problems of moving and stationary traffic cannot be solved by improvements in vehicle technology alone. In contrast, noise emissions can be lessened by vehicle modifications. Furthermore, exhaust emission problems can be reduced by implementation of existing and planned (vehicle) requirements. Four separately discussed problem areas are important in relation to active safety. For the experimental study of structural deformations in connection with the protection of (vehicle) occupants, a test facility was developed for the quasi-statistical simulation of progressive deformation in a collision. In addition, the behaviour of electric and hybrid propulsion units arranged in series was investigated by computer simulation. Other chapters deal with: the possibilities of parallel arrangements of combustion motors and electric drives with lead/acid batteries; the development of methods for predicting the nox emissions of combustion motors, with a view to reducing these harmful substances; problems of carburation and combustion in hybrid motors; problems of electric propulsion for road vehicles. The final chapter deals with the total concept of vehicles suitable for city traffic-passenger cars, goods vehicles and taxis-taking account of the results of the above investigations. The advantages and disadvantages of different types of motive power are compared. /TRRL/ [German]

Technical University of Braunschweig, West Germany Monograph June 1976, 360 p., Fig., Tabs., Photos., 125 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 306685), Federal Institute of Road Research, West Germany

11 184244 A CHARTER FOR THE BUS INDUSTRY-MATTERS THAT NEED ATTENTION. At a time when the UK bus industry is finding it increasingly difficult to operate profitably, and at the same time maintain an adequate service, the article considers a number of aspects of bus design and operation. Although vehicle

comfort and style are of some importance it is suggested that only frequency and time-keeping really matter to a user. In order to achieve better vehicle utilisation, buses should be designed for either crew or one-man operation with either front or under-floor engine location for reliability and ease of maintenance. Greater use should be made of weight-saving integral construction for buses instead of a chassis requiring a separately manufactured body. Other aspects of efficient bus transport operations such as staggered working hours and bus-lanes could be further developed. /TRRL/

Buses Vol. 29 No. 279, June 1978, pp 249-50
ACKNOWLEDGMENT: TRRL (IRRD 233449)

11 184314 A BUS FOR ALL SEASONS. This short article comments on a research report recently issued by Daimler-Benz AG makers of Mercedes-Benz buses. The report suggests that the conventional bus will continue to remain the basic element of any public transport system-enjoying the advantage of combining flexibility with low investment costs. With the adoption of special guidance systems which enable it to follow a pre-arranged path, the bus could fulfil a new role using 'o-bahns' or busways. Automatic guidance would enable the bus to take up less road space than when manually steered. Thus it could fit into smaller tunnels than would otherwise be needed or could have its own separate track alongside existing roads. Such buses could continue to run normally as required and special tunnels and guideways could be progressively built and the costs spread over a period. The 3 forms of guidance which have been developed are briefly described; two are manual and one is fully automatic. /TRRL/

Coaching Journal and Bus Review Vol. 46 No. 6, Apr. 1978, p 58, 3 Phot. ACKNOWLEDGMENT: TRRL (IRRD 232990)

11 184494 ELECTRIC VEHICLES-THE STATE OF THE GAME. A report is presented on the second international conference of the British-based electric vehicle development group which was held in Sheffield at the end of May. The author suggests that the results of the conference gave every indication that high-performance battery-electric vehicles might yet become a potent force in the road transport industry. Speakers at the conference discussed the problems of oil versus electricity for vehicle use, the political decisions that will be necessary when dealing with the complex relationships between supply and demand when researching new transport methods, the experience gained from the operation of different types of battery bus vehicle, battery-electric goods vehicle development, and proposals for the operation of public transport vehicles combining battery and mains electric systems. Reference is made to existing operational systems in the United Kingdom and in West Germany. Information is provided on electric vehicle research around the world-especially in the USA. It is suggested that, with manufacturers now able to offer vehicles which could be shown to be usable, that the drive to save fuel was coupled with an international move to revive inner city areas, where electric vehicles could be especially beneficial. /TRRL/

Rowlands, P *Transport Engineer* July 1978, pp 24-26, 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-235293)

16

11 184580 ATLANTA WHEELCHAIR ACCESSIBLE BUS STUDY. This document describes the implementation and operation of the Metropolitan Atlanta Rapid Transit Authority's fixed-route, subscription service for handicapped individuals. It is based on a site visit and discussions with several individuals in the Atlanta area. Operational characteristics including the early months of service are presented, as well as pictures/charts depicting the MARTA L-BUS vehicle, floor layout, lift design, lift operation, safety features, wheelchair securement, and problem areas. The subscription service, initiated in May 1977, began with a single bus operating three daily routes and has grown to seven buses operating 27 daily and two weekly routes. The buses are all lift equipped and most have 4 wheelchair positions and seventeen seats. As of May 1978, ridership has increased from 41 to 270 passenger trips per week. New routes are established by grouping trip origin and destination requests into vehicle tours. At least four handicapped passengers must be able to be served in a single tour before that route is incorporated into the system. The dispersion of the desired trip origins and destinations has resulted in low productivities and in high passenger trip costs. The net direct operating cost, excluding the extra deadheading due to special garaging requirements, was \$12.54 per passenger trip for the first seven weeks of service with only very light reductions since that time. The major difficulty that users experience with the lift equipment has been getting onto the lift platform unaided. However, with the driver/others to assist them, their usage of the system has not been restricted. Mechanically, the lift equipment has performed better than the Authority's maintenance staff expected. /UMTA/

Paul, G Casey, R ; Transportation Systems Center Final Rpt. UMTA-MA-06-0049-7810, DOT-TSC-UMTA-78-36, Aug. 1978, 56 p.; Related report: San Diego Wheelchair Accessible Bus Study, Transportation Systems Center, September 1977, UMTA-MA-06-0049-77-8 (PB 281-087, A03); Contract UMTA-MA-06-0049; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-285938

11 184904 U.S.A.: EQUIPMENT DESIGN FOR ELDERLY AND HANDICAPPED TRANSPORTATION SERVICES. There is general agreement in the U.S. that the equipment, particularly vehicles, in service specifically to elderly and handicapped clients is less than satisfactory in design and durability. The problem is examined in its various aspects: a highly varied market in which small systems with limited funds, subsidized ridership and low levels of utilization predominate; current production models and their uses; and perceptions by suppliers of insufficient incentive in a limited market for the redesign and tooling necessary to develop a heavy-duty vehicle specifically for public transit paratransit purposes. The range of adaptations in use to improve vehicle accessibility and suitability are reviewed; and U.S. experience with lifts for the wheelchair bound is reported including commentary on reliability, the reported impact on line-haul operations, and the problems of wheelchair securement within moving vehicles. Research and development initiatives, primarily at the federal level, are noted, as well as problems

outside the vehicle environment which impact equipment upgrading. /Author/

Revis, BD (Institute of Public Administration) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministere d'Equipment (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

11 186200 A SURVEY OF LONGITUDINAL ACCELERATION COMFORT STUDIES IN GROUND TRANSPORTATION VEHICLES. Experimental studies of objective and subjective passenger response to various fore-and-aft, or longitudinal, vehicle acceleration transients are reviewed. It is found that the wide variability in type of study and form of results does not allow conclusive statements to be made regarding passenger acceptability of any specific acceleration-jerk profile in a given transportation system.

Hoberock, LL ; Texas University, Austin, Department of Transportation Res Rpt. RR-40, DOT/TST-76/110, July 1976, 51 p.; Contract DOT-OS-30093; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287404/8ST, DOTL NTIS

11 189584 THE LEYLAND TITAN. The paper describes the result of the decision to replace the existing fleetline and Atlantean chassis by one integral double deck bus to cover the requirements for high bridge operation in the UK in the 1980's. The objectives, design, and development of the leyland titan are included. Details of body structure, power train, transmission, suspension, vehicle systems, and noise levels are given, together with a summary of technical data. /TRRL/

Bretherton, K Heath, BK Platt, E (British Leyland Limited) *Institution of Mechanical Engineers Proceedings* Vol. 192 June 1978, pp 105-124, 14 Fig., 16 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 237084)

11 190008 U.K. ELECTRIC VEHICLE DEVELOPMENT PROGRAMMES. Two aspects of electric vehicle development in the UK are discussed; vehicle chassis, hardware and battery development and operational experience. Electric delivery vans of the one to two ton payload range in the Lucas and Chloride programmes are discussed. The improving prospects for molten sodium sulphur battery in large vans and buses is examined. The GLC "London Goes Electric" scheme for placing up to 62 vehicles in service in Central London is covered in addition to the Electricity Council trial of 60 Enfield city cars. /SAE/

Samuel, JMG (Advance Vehicle Systems Limited) ; Society of Automotive Engineers SAE 780088, Feb. 1978, 7 p.

11 190103 MINI-BUS PROFILE-SELECTED TRANSPORTATION TOPICS. This document profiles small transit vehicles which were available in 1974-1975 for application to demand responsive or low-volume, conventional (fixed route, fixed schedule) transportation systems.

The particular models of small transit vehicles included in this document are commonly referred to as "mini-buses". These mini-buses are multi-characteristics vehicles having a passenger carrying capacity varying from 7 to 30 people in normal seating arrangements. Regular station wagons and small school buses are excluded.

Transportation Systems Center 1977, 41 p.;

11 190276 EVALUATION OF THE RIDE QUALITY IN VEHICLES AND A SUGGESTION FOR AN INTERNATIONAL PARAMETER FOR URBAN TRANSPORT. The results of a study conducted in the Federal Republic of Germany are discussed and show that while travelling in vehicles the human body suffers from mechanical vibrations which may impair its well-being, proficiency and possibly even health safety. The amount of impairment depends on the actual acceleration, frequency, exposure time to the vibration, and direction of the vibration with respect to the body.

Becker, K. *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 73-85; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 190277 APPLICATIONS OF KINETIC ENERGY STORAGE TO TRANSPORTATION SYSTEMS. The recent rediscovery of the flywheel as an effective energy storage system, coupled with the growing public and government awareness of the need for energy-efficient passenger vehicles, has led to a resurgence of development activity in kinetic energy storage systems. Programs are currently underway by UMTA and DOE which will make use of pure flywheel and flywheel-assisted propulsion for a wide range of vehicles including subway cars, commuter trains, transit buses, passenger automobiles, and postal vans. The background and status of these ongoing activities is described, along with other planned flywheel applications, such as the recuperation of braking energy from freight trains on long downgrades.

Lawson, LJ (AiResearch Manufacturing Company) *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 1-27, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 190373 ENERGY SAVINGS WITH MULTIGRADED DIESEL LUBRICANTS--AN EXPERIMENTAL TEST DESIGN IN WINTER, URBAN OPERATION. This paper illustrates how experimental design techniques can be employed to obtain an accurate assessment of multigrade Heavy Duty (HD) performance in the field. Compared to monograde (SAE 40) oil, the use of SAE 15W/40 oil was found to improve vehicle fuel mileage (MPG) as well as oil economy (MPQ). The demonstration, conducted in two groups of 10 city buses each in regular service, was structured to dampen out the effect of numerous incidental variables. Statistical data analysis indicate a "most probable" improvement in fuel mileage of 2.7% as well as a 47% increase on multigraded oil economy.

Farnsworth, GR Bachman, HE (Exxon Chemical Company) Overton, R (Imperial Oil Enterprises, Limited); Society of Automotive Engineers SAE 780371, 1978, pp 25-35; From: The Relationship Between Engine Oil...Part III.

11 190988 PROTOTYPE PARATRANSIT VEHICLE AS DESIGNED BY STEAM POWER SYSTEMS, INC. The report discusses a prototype low pollution paratransit vehicle (PTV) designed and constructed for evaluation by the U.S. Department of Transportation. Special features of this PTV include a large comfortable interior which would accommodate five passengers, an automated door and ramp system that would provide convenient ingress/egress for a wheelchair passenger, and low pollution Rankine cycle (steam) engine. This type of vehicle aims to provide transportation for the infirm, handicapped, and elderly in either a Dial-A-Ride, jitney, or taxicab service. The PTV was completed, acceptance tested, and delivered to the U.S. Department of Transportation in June 1976. The vehicle was displayed as part of a taxi design exhibition (summer 1976) at the Museum of Modern Art in New York City. Following the exhibition, the PTV was scheduled for dynamic testing by an independent contractor. This report concludes that the steam engine propulsion system has the potential for low exhaust emissions, but needs considerable improvement in both efficiency and reliability before it is ready for installation in motor vehicles.

Schneider, PH Norton, DD ; Steam Power Systems, Incorporated, Urban Mass Transportation Administration, (UMTA-CA-06-0079) Final Rpt. UMTA-CA-06-0079-78-1, Aug. 1976, 89 p.; Contract DOT-UT-50019; ACKNOWLEDGMENT: NTIS; ORDER FROM: National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia, 22161; PB-291277/2ST

11 191881 LITHIUM/IRON SULFIDE BATTERIES FOR ELECTRIC VEHICLES. Recent progress in the development of LiAl/FeS/sub x/ batteries for electric vehicles has indicated the possibility of near-term commercialization of a version of the battery that utilizes monosulfide (FeS) positive electrodes in conjunction with low-cost, iron-alloy current collectors. Eagle-Picher Industries, Inc., was awarded a one-year contract to fabricate a 40-kWh battery of this type, which will be tested in a van at ANL in 1979. Multiple-electrode cells having a specific energy of about 100 Wh/kg are now under test. Conceptual design problems for a compact insulating jacket, which will maintain the battery temperature at 450 deg C, appear to have been solved. With such a jacket, the energy efficiency of the battery would be decreased by only 3 to 5% as a result of heat losses if the temperature of the battery is permitted to fluctuate by 20 to 50 deg C. A commercial prototype of the FeS-type battery that could be developed by 1981 to 1983, depending on the rate of funding available, would be expected to have a specific energy of about 100 Wh/kg, an energy density of 200 Wh/liter at a 4-h discharge rate (including the weight and volume of the jacket and hardware), and a specific power of 100 to 125 W/kg. Work is also underway on a version of the battery that would utilize FeS sub 2 positive electrodes, which use molybdenum current collectors at present and may require the future development of less expensive current collectors to be commercially attractive. These batteries would ultimately have about 30 to 40% higher specific energy and 50 to 75% higher specific power than the FeS-type batteries.

Nelson, PA Chilenskas, AA Steunenberg, RK ; Argonne National Laboratories, Department of

Energy 1978, 24 p., 7 Fig., 4 Tab., 78; Symposium on electric vehicle, Philadelphia, PA, USA, 2 Oct 1978.; Contract W-31-109-ENG-38; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; CONF-781006-2

11 191905 THREE STATE-OF-THE-ART INDIVIDUAL ELECTRIC AND HYBRID VEHICLE TEST REPORTS. VOLUME II. The survey characterizes present electric vehicles and does not represent any particular vehicle technology. Vehicles selected for test and evaluation were picked to provide a representation of the current state-of-the-art. Selection was based on ready availability of a vehicle and its technical representation and the apparent maturity of its construction. The test vehicles are: Fiat 850T Electric Van; Ripp Electric Passenger car; and Volkswagen Taxi Hybrid Passenger Vehicle. A previous report, "Twelve State-of-the-Art Individual Electric and Hybrid Vehicle Test Reports," Volume I, July 1978, is also available.

Jet Propulsion Laboratory, Department of Energy Nov. 1978, 526 p.; Contract EX-76-A-31-1011; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HCP/M1011-03/2

11 193706 REQUIREMENTS FOR PARATRANSIT VEHICLES. The current state of the art of paratransit vehicles--the sizes the types used, the operating constraints, guidelines for size selection, a vehicle-tender selection process, current trends, and forecasts of the evolution of vehicle design over the next 10 years--is discussed. Action is suggested to reduce uncertainty over individual vehicles performance and improve utilization and design. Vans and integrally designed small buses have proven more reliable than other types of vehicles; their use in Canada and the United States is discussed. The selection process described is used to analyze four theoretical vehicles being reviewed for procurement. The analysis shows that the most cost-effective vehicle could be a bus with the highest initial cost or a low-cost van. /Author/

Atkinson, WG (Lea (ND) and Associates, Vancouver) *Transportation Research Board Special Report* No. 184, 1979, pp 91-95, 1 Tab., 18 Ref.

This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

11 195276 CHILDLINER--A NEW LOGISTICS CONCEPT FOR URBAN-SUBURBAN COMMUTING. This paper presents a totally new concept for a mass transit system for urban-suburban commuters. Its principal features are a new jumbo size double decker bus which consists of compartments entered direct from a double-deck terminal dock. The bus would have no center aisle and would be longer than present vehicles thus vastly increasing the passenger carrying capacity and reducing loading and unloading time. The mainliners would be confined to super highways and terminals. The terminals would also be served by small feeder buses from outlying communities.

Child, JM ; Society of Logistic Engineering 1978, p 1; Proceedings of Society of Logistic Engineering, International Logistic Symposium, St. Louis, Mo. August 22-24, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 195437 THE COST OF QUIETER BUSES ON TOWN AND COUNTRY ROUTES [Kostenberekeningen met betrekking tot stillere bussen in stads-en streekvervoer]. This is a study of the financial effects of using three types of quieter buses for public transport services in urban and rural areas: buses with encapsulated diesel engines, buses with engines converted to liquified gas (lpg) and trolley-buses. Because of the limited experience of lpg buses and uncertainty about some costs associated with trolley-buses the observations are extremely provisional and the figures given should be regarded as approximate. All costs in the report refer to 1976 price levels. Gradual introduction of encapsulation, i.e. buying new buses with encapsulated engines, would increase costs on both urban and rural services by 0.3-0.4%. Use of lpg would increase the costs depending on fuel consumption, which is not yet known precisely by 1.2-2.1% on urban services and 1.9-4.0% on rural services. The increase in cost resulting from a switchover to trolley-buses would depend on the frequency of the services in relation to the costs of the network. They would not therefore seem to be a viable financial proposition on rural services. In urban areas, with their frequent services, the result of switching fifty per cent of bus kilometres (the busiest routes) to trolley-bus operation would be to increase the cost of that part of the network by 6%. /Author/TRRL/ [Dutch]

Eygenbrood, WH Hilferink, PBD Vanferink, PB Ministerie van Volksgezondheid in Milieuhygiene Monograph July 1978, 62 p., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 240214), Institute for Road Safety Research

11 195457 TECHNICAL AND ENVIRONMENTAL ASPECTS OF BUSES FOR USE IN URBAN AND RURAL AREAS [Technische en milieuhygenische aspecten van bussen voor stadsvervoer en streekvervoer]. The aim of this study is to consider the possibilities of making buses used for public transport services quieter. Most consideration has been given to the "encapsulation" of present-day diesel buses and their conversion to liquified gas operation. Encapsulation could be employed relatively soon, and retrofill of present-day buses is also a possibility. There are reservations about converting buses to run on liquified gas on account of the safety aspects involved in storing the fuel. Another interesting possibility is the trolley bus. Alternatives, such as the "silent" diesel engine and the stirring engine, afford only long-term prospects. /TRRL/ [Dutch]

Vanferink, P Gerretsen, E; Ministerie van Volksgezondheid en Milieuhygiene Monograph VL-H, July 1978, 40 p., 1 Fig., 12 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240215), Institute for Road Safety Research

11 196691 ADVANCED BATTERY DESIGN. The three important aspects in battery design for "on the road" electric vehicles are minimum cost, maximum energy density and maximum life. The virtues of new forms of electrochemical couples have been acclaimed in the world press, but to-date, no system has been proven to achieve more than two of these objectives together. The alternative couples to lead/lead dioxide are examined. Most do not appear commercially viable. The sodium sulphur system appears to be the most promising but, without a major break-

through, batteries will not be commercially available this decade so that lead/lead dioxide currently is unrivalled from the cost-effective point of view. /TRRL/

Potter, DE (Bateries Australia Limited); Australian Government Publishing Service, (0 642 01790 5) 1975, pp 327-244, 5 Fig.; From: Electric Cars-Their Future Role in Urban Transport, Congerence Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236969), Australian Road Research Board

11 196692 ADVANCED MOTOR DESIGN. The paper summarises the development of the electric rotating machine since its origin over 100 years ago, and the improvements which have taken place in motor power/weight ration during the last 50 years. The wide range of electric motors available today is investigated, with comparison of their original and present day applications. Choosing a motor type for traction application involves the consideration of a number of design factors which are dealt with in this paper. Present day design and manufacture of electric motors is discussed with regard to economic considerations, design methods, and the role of new materials. The paper concludes with a look at possible future developments in rotating machines. /Author/TRRL/

Australian Government Publishing Service, (0 642 01790 5) 1975, pp 275-294, 4 Fig.; From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236963), Australian Road Research Board

11 196698 BATTERY DEVELOPMENTS. This paper presents a brief review of the history of batteries from Volta to Plante and Faure. Following the development of lead acid and alkaline batteries, the former divide into three main streams-automotive starting, lighting and ignition, stationary and motive power batteries. The various elements of battery design, the manner and reason for the incorporation of various improvements are discussed briefly. Charging and discharge and the influence of various techniques on battery performance are also discussed. /Author/TRRL/

Howlett, JC (Dunlop Batteries Australia); Australian Government Publishing Service, (0 642 01790 5) 1975, pp 315-326, 1 Fig., 1 Tab.; From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236976), Australian Road Research Board

11 196707 CONTROL SYSTEMS FOR ELECTRIC VEHICLES. Recent development activity overseas has shown that effective control engineering of electric cars for urban transport is within the scope of contemporary technology. Control systems have been developed from the established and reliable methods of control applied to other types of battery-powered vehicles, from golf carts to industrial vehicles, of which hundreds of thousands are in use. A wealth of valuable and relevant experience is therefore already available for application to the specific requirements of electric cars. Control system choice is influenced by such factors as cost, simplicity and reliability. Efficient energy conversion within the car is also a prime engineering

objective, both from the performance aspect and the viewpoint of resources conservation. /Author/TRRL/

Munns, MG (Lansing Bagnall (Australia) Proprietary Limited); Australian Government Publishing Service 1975, pp 295-313, 7 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 236961), Australian Road Research Board

11 196781 ELECTRIC COMMERCIAL VEHICLES:PRESENT AND FUTURE. On-board energy storage electric vehicles have been in steady production for 70 years. Current on-road and special purpose vehicles are broadly described. Future Australian city needs and hardware specifications are discussed. In conjunction with economic and other factors justifying increasing use of electrics. Possible Australian technical developments during the next five years forecast, and the opportunity for the local manufacturing industry to meet is identified /Author/TRRL/

Leembruggen, LR (Leembruggen (L Roy) and Associates); Australian Government Publishing Service, (0 642 01790 5) 1975, pp 75-90, 11 Ref.

From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236956), Australian Road Research Board

11 196782 ELECTRICITY GENERATION AND SUPPLY. The paper reviews the reserves of fossil, nuclear and other sources of primary energy available for future use and the current consumption rates. Reference is made to the increasing conversion of abundant coal and nuclear fuels into electricity for delivery of energy and the saving of more scarce direct burning fuels (such as oil and gas) that can be achieved, particularly by greater use of electricity for transportation. The resources of the Australian electricity authorities are discussed to illustrate that they could readily cope with a substantial increase in load from battery electric vehicles and electric traction within their normal growth patterns. /Author/TRRL/

Chapman, RG (Victoria State Electricity Commission, Australia); Australian Government Publishing Service, (0 642 01790 5) 1975, pp 133-150, 3 Fig., 2 Tab.; From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236958), Australian Road Research Board

11 196783 ELECTROCHEMICAL POWER SOURCES FOR CARS: PHILOSOPHY AND DEVELOPMENT. This paper discusses the following: a) a general survey of electrochemically oriented aspects of electric cars b) the importance of the power source and the comparison of emerging power sources with lead acid batteries, and the most likely new battery c) fuel cell possibilities, hybrids and their function d) present research position in batteries e) relation of hydrogen to motive power for cars in the 1980's. /TRRL/

Bockris, JOM (Flinders University, Australia); Australian Government Publishing Service, (0 642 01790 5) 1975, pp 401-436, 8 Fig., 2 Tab.

From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236962), Australian Road Research Board

11 196793 FLINDERS UNIVERSITY ELECTRIC RESEARCH VEHICLE. The Flinders electric vehicle was designed to meet the urgent requirement for a functional electrical vehicle in the urban environment. Conventional electric vehicles have proved unable to meet requirements for an urban commuter vehicle. Vehicles presently available are excessively heavy, due to the battery requirement, and their range in stop-start city traffic is low. The Flinders concept differs radically from the conventional electric vehicle. The battery current requirements are greatly reduced, resulting in a much lighter, more efficient battery. No electrical control is used to govern either power as the printed-armature motor determines its own requirement from the battery when used in this concept. /Author/TRRL/

Whitford, DR Atkinson, DA Rush, VA (Flinders University, Australia) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 259-288, 13 Fig., 2 Phot.; From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236967), Australian Road Research Board

11 196858 VEHICLE DESIGN: GENERAL DESIGN FEATURES. The author examines briefly the historical environment from which electrics grew and its apparent inhibiting influence on design and development. The paper discusses how performance can be improved marginally by coupling the power source to varying designs of driving motors, drivers and controllers, whilst gains can also be achieved by recovery of deceleration power. In the final analysis, performance will always be a function of the ability of the charger to refuel without undue loss of vehicle availability and battery deterioration. Finally, the advantages of complex electronics and accessories are weighed against basic simplicity, coupled with acknowledgement of the excellent work being undertaken in private experimentation. /TRRL/

Bush, AR (Electrodrive Proprietary Limited) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 345-358; From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236968), Australian Road Research Board

11 197217 HIGH-CAPACITY ARTICULATED BUS DEBUTS. AM General Corp. and M. A. N. (Maschinenfabrik Augsburg-Nurnberg AG) have adapted the articulated bus to specific requirements of the U. S. market. Dimensional changes were made, as well as modifications to comply with all regulations and safety requirements. Redesign of the electrical system was necessary, as was integration of an air conditioning system. The rear portion of the bus is self-steering, controlled from the front unit. All vehicles are either 55 or 60 ft long with either two or three doors on the right side and with or without air conditioning. They consist of a two-axle motor unit with a single axle trailer permanently attached to its rear so as to permit full flexing while assuring full passage for passengers between the units. The motor unit is practically a standard bus with its rear section cut away and its engine and transmission mounted under-floor between front and drive axles. The

trailer is like the rear section of a standard bus, minus an engine. Segments are of identical cross section with a flexible bellows in the hinge area. All three axles have air suspension with automatic floor leveling control. Front and rear axles have independent wheel suspension. The drive (middle) axle is linked to the chassis via a swinging fork and air bellows.

Automotive Engineering Vol. 87 No. 2, Feb. 1979, pp 60-66ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 197356 FLYWHEEL/DIESEL HYBRID POWER DRIVE: URBAN BUS VEHICLE SIMULATION. This report describes the results of a Transportation Systems Center investigation conducted under Urban Mass Transportation Administration sponsorship, of the practicality of a flywheel/diesel hybrid power drive for urban transit bus propulsion. The program is based on the use of a systems approach to develop propulsion design concepts consistent with environmental, safety, operational, and economic objectives. A simulation model, developed in the program, was the major tool used in the investigation and is described in detail in the report. This model should be useful in further studies of flywheel/heat engine analyses for vehicle propulsion application over various drive cycles. The hybrid used continuously variable ratio transmissions (CVRT) and a control subsystem to optimize fuel consumption in an 'on-off' mode of engine operation. The system is projected to have a reduction in fuel consumption of at least 50% (in gallons per mile) below the diesel-alone fuel consumption for urban bus driving cycles having more than 4 stops per mile. Regenerative braking is used, contributing to fuel consumption improvement.

Larson, GS Zuckerberg, H ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-78-10, UMTA-MA-06-0044-78-1, May 1978, 222 p.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-294778/6ST

11 197369 VIBRATION TESTS ON TRANSIT BUSES. The objective of this vibration measurement program was to quantify the vibration environment which would be experienced by Automatic Vehicle Monitoring (AVM) equipment when installed on buses during typical city route service operations. Two buses were utilized in this measurement program: a General Motors Corporation Model 3100 provided by the Southern California Rapid Transit District, and a Flexible Corporation Model 207 provided by the City Transit of Fort Worth, Texas. The approach taken involved instrumenting the buses and representative electronic hardware on the buses with calibrated accelerometers and recording the output of these accelerometers while driving the buses over selected test routes at specified speeds. In general, the tests have provided a definition of the vibration environment typical of transit buses used in city route service. Vibration amplitudes of the levels measured in the program do not pose a threat to the satisfactory operation of equipment produced according to industrial equipment design practice and fabrication methods. The data measurement system used in this program provided data of sufficient detail to accomplish the basic objectives. In evaluating this program, the authors stated that more accurate and more extensive comparisons of the data would have

been made possible by a continuous correlation of calibrated bus speed with data signals. It is recommended that this be incorporated into any future tests of this nature.

Anderson, J Thomas, H ; Gould Information Identification, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0041) Final Rpt. UMTA-MA-06-0041-79-6, Mar. 1979, 56 p.; See also report dated February 1979, PB-294200.; Contract DOT-TSC-1237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295091/3ST

11 197504 PARATRANSIT VEHICLE TEST AND EVALUATION. No abstract available.

Dynamic Science, Inc., Phoenix, AZ. Urban Mass, Transportation Administration, Washington, DC., Office of Technology Development and Deployment. Transportation Systems Center, Cambridge, MA. June 1978, 607p-in 5v; ñSet includes PB-295 475 thru PB-295 479. ñ; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295474-SET/ST

11 198428 HIGH-PERFORMANCE BATTERIES FOR ELECTRIC-VEHICLE PROPULSION AND STATIONARY ENERGY STORAGE. PROGRESS REPORT, OCTOBER 1977--SEPTEMBER 1978. The research, development, and management activities of the programs at Argonne National Laboratory (ANL) and at industrial subcontractors' laboratories on high-temperature batteries during the period October 1977--September 1978 are reported. These batteries are being developed for electric-vehicle propulsion and for stationary-energy-storage applications. The present cells, which operate at 400 to 500 deg C, are of a vertically oriented, prismatic design with one or more inner positive electrodes of FeS or FeS sub 2 , facing electrodes of lithium-aluminum alloy, and molten LiCl-KCl electrolyte. During this fiscal year, cell and battery development work continued at ANL, Eagle-Picher Industries, Inc., the Energy Systems Group of Rockwell International, and Gould Inc. Related work was also in progress at the Carborundum Co., General Motors Research Laboratories, and various other organizations. A major event was the initiation of a subcontract with Eagle-Picher Industries to develop, design, and fabricate a 40-kWh battery (Mark IA) for testing in an electric van. Conceptual design studies on a 100-MWh stationary-energy-storage module were conducted as a joint effort between ANL and Rockwell International. A significant technical advance was the development of multiplate cells, which are capable of higher performance than bicells. 89 figures, 57 tables. (ERA citation 04:036555)

Nelson, PA Barney, DL Steunenberg, RK ; Argonne National Laboratories, Department of Energy Nov. 1978, 246 p.; Contract W-31-109-ENG-38; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; ANL-78-94

11 198465 AERODYNAMIC RESISTANCE REDUCTION OF ELECTRIC AND HYBRID VEHICLES. PROGRESS REPORT, SEPTEMBER 1978. The objectives, approach, and FY'78 progress and results of the Aerodynamic Resistance Reduction work element of the Electric and Hybrid Vehicle System R and D Project are described. The generation of an EHV aerody-

dynamic data base was initiated by conducting full-scale wind tunnel tests on 16 vehicles. Zero-yaw drag coefficients ranged from a high of 0.58 for a boxey delivery van and an open roadster to a low of about 0.34 for a current 4-passenger prototype automobile which was designed with aerodynamics as an integrated parameter. A subscale investigation was performed in order to identify any characteristic effects of aspect ratio or fineness ratio which might appear if electric vehicle shape proportions were to vary significantly from current automobiles. Some preliminary results are presented which indicate a 5 to 10% variation in drag over the range of interest. A rigorous procedure was developed in order to determine effective drag coefficient wind-weighting factors over J227a driving cycles in the presence of annual mean wind fields. The applications of this procedure allows a user to accurately account for statistical wind effects in computer simulations by means of a modified constant-drag coefficient. Such coefficients, when properly weighted, were found to be from 5 to 65% greater than the zero-yaw drag coefficient in the cases presented. In order to guide preliminary design work, a review of the general principles of the aerodynamic design of automobiles is presented along with several drag-estimating procedures and commentary. Also included is a vehicle aerodynamics bibliography of over 160 entries, in six general categories.

Jet Propulsion Laboratory, Department of Energy Apr. 1979, 85 p.; Contract EM-78-1-01-4209; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HCP/M5030-274

11 260977 BATTERY ELECTRIC BUS PROJECT. Details are given of the general design of the Department of Trade and Industry's prototype electric bus, and of its testing and operation. The design aspects considered are floor height, cab layout, seating, color, traction system and chassis. Instrumentation for recording data on speed, motor current and motor voltage is briefly mentioned, and details of maintenance and energy consumption are given. Reliability of the prototype vehicle is discussed, and indications of potential reliability and maintenance requirements for a production vehicle are appended, together with a table of vehicle parameters. /TRRL/

Department of Trade and Industry, England Intrm Rpt. 35 pp, 16 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 207409)

11 260978 A PROMISING START FOR BATTERY BUSES IN THE HIGH STREET. The experimental operation of two prototype battery-powered electric buses on passenger service in seven city centers, is examined. After one year and nine months service respectively, overall reliability in terms of mileage achieved, compared to scheduled mileage, was 82.5%. Improvements during the later stages of operation showed that a reliability of 97% was possible. Maintenance time on the prototype vehicles is high, but corresponding work on a production vehicle would be much less since data recording would not be required as in the experimental project, and battery maintenance has been deliberately generous on the prototypes. Routine maintenance of the whole electrical system is not expected to exceed 3-4 man hours per quarter, and mainte-

nance for the entire traction systems is estimated at about 1 man hour per week. Unscheduled maintenance is expected to add another 82 man hours a year. /TRRL/

Beaston, C *Engineer* Vol. 237 No. 6128, 1973, 2 pp, 1 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 206702)

11 262463 FEASIBILITY STUDY OF NOISE CONTROL MODIFICATION FOR AN URBAN TRANSIT BUS. An investigation has been conducted to determine the feasibility of reducing exterior acoustic noise produced by an urban transit bus. The noise characteristics of the bus were studied and a number of noise-reducing modifications were designed to attack the principal sources. The modifications included an experimental radiator fan, muffling devices for the engine air inlet and exhaust systems, and a partial enclosure for the engine compartment. Noise tests were performed on the unmodified bus and on the bus equipped with all modifications. Several tests were made with one modification removed each time to determine its individual contribution. A-weighted sound level measurements and octave-band frequency plots are presented to show the effect of the individual noise-reducing modifications. /Author/

Murray, WS Swetnam, GFJ; Mitre Corporation Final Rpt. MTR-6272-Rev-2, Jan. 1973, 3 pp; ACKNOWLEDGMENT: NTIS (PB-220364/4); ORDER FROM: NTIS, Repr. PC; PB-220364/4

11 262965 SILENT RIDER TAKES ON MANCHESTER. THE ELECTRIC BUS BUILT BY CHLORIDE GOES INTO SERVICE IN THE SELNEC PTA AREA.. THIS ARTICLE DESCRIBES THE SILENT RIDER-A BATTERY-POWERED BUS. THE 165-CELL LEAD-ACID BATTERY PRODUCES 330V SUPPLY WHICH IS FED TO THE 72KW TRACTION MOTOR. BATTERIES HAVE AN AUTOMATIC TOPPING-UP SYSTEM. THEY CAN BE RECHARGED IN 3 1/2 HOURS AND HAVE A LIFE OF 750 WORKING DAYS. A 24V BATTERY RUNS THE TRACTION MOTORS IN AN EMERGENCY. SILENT RIDER HAS A RANGE OF 65KM, A MAXIMUM SPEED OF 65KM/HR, AN ACCELERATION OF 1M/S2 ON THE LEVEL AND IT CAN COPE WITH GRADIENTS OF 1 IN 8. IT CAN CARRY 41 SEATED PASSENGERS AND IT WILL BE USED AT PEAK HOURS IN MANCHESTER. THE SILENT RIDER, WHICH HAS REGENERATIVE BRAKING, IS QUIET AND FREE FROM EXHAUST POLLUTION. ALTHOUGH SILENT RIDER'S INITIAL COSTS ARE HIGH, ITS RUNNING AND MAINTENANCE COSTS ARE LOW. A FLEET OF 20 MK IT VEHICLES IS PLANNED. /TRRL/

Journal of Automotive Engineering Vol. 5 No. 2, Apr. 1974, pp 33, 1 Fig., 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 209900)

11 263062 INTERIOR LIGHTING OF PUBLIC CONVEYANCES—ROAD AND RAIL. The present publication is a complete revision of the 1951 report, "Transportation Lighting" and is the result of a continuing study of current practice, standards and existing installations. It contains current illumination recommendations,

a discussion of the basic light sources in use today, maintenance of lighting systems, and a section on typical design methods for lighting specific visual tasks in road and rail conveyances. Since Emergency Lighting is common to all public conveyances, it has been considered as an inherent part of the report itself and, also, as a detailed summary in Appendix A. Electric systems for operating fluorescent lamps in public conveyances and a glossary of lighting terms are included in appendices.

Illuminating Engineering Society, Journal of Vol. 3 No. 4, July 1974, pp 381-396 This article was written by the Committee on Interior Lighting for Public Conveyances.

11 263246 NEW SCHOOL BUS, FEATURES STRENGTHENED BODY TO PROVIDE CRASH PROTECTION FOR PASSENGERS. Details are given of a new school bus, The Lifeguard, designed by the Wayne Corp., Richmond, Ind, in which the multiple side and roof seams have been eliminated inside and outside. Outside, a one-piece shield extends from window to floor along the outer length of the passenger compartment. Further protection is provided by one-piece full-length guard rails applied over the outer panelling and bolted through heavy gauge frame members. On the roof, three full-length panels cover the bus from front to back. Six panels line the interior of the bus where protruding parts have been eliminated. At both front and rear corners strength has been added by means of double-post construction. The new bus has safety fasteners which have more grip strength than rivets or welds. The windows, one-third larger than one conventional buses, provide a larger escape opening beside each seat. /TRRL/

Traffic Safety Vol. 73 No. 4, Apr. 1973, p 26, 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD 206114)

11 263576 DEMAND-RESPONSIVE TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. In this discussion of demand-responsive transportation for the elderly, the panelists first described the activities in which they were involved, and then responded to prepared questions. The transit program of the Valley Region in Connecticut is described in some detail. The need of this group of riders are discussed, including economics, community services which are available but inaccessible, safety, and design features. The Transbus Program is mentioned, and several of the specific design features for handicapped and elderly persons are discussed. Among these are special handrails, ramps to the curb, skid-free floors, large windows, and wider doors. Specific services provided by these various demand-responsive systems are enumerated.

Sobey, AJ (Booz-Allen Applied Research, Incorporated) *Transportation Research Board Special Reports* No. 147, 1974, pp 25-31; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

11 264110 ELECTROBUS—REVIEWS OF 9000 MILES OF CITY TRANSIT DEMONSTRATIONS.. A simple, battery-operated, long life, low maintenance, city transit electric bus has

been developed with low pollution and low noise emission features. Performance and power measurements have been taken from demonstrations at several typical urban center city bus service operations. From test results detailed in this paper, it is shown that the electric bus obtains 11.5 miles/gal of fuel compared to 3.5 and 6.0 miles/gal for equivalent sized gasoline and diesel engine buses in similar urban transit service.

Borisoff, B ; Society of Automotive Engineers, (SASI 74-318) SAE Paper No. 740170, Feb. 1974, 11 pp

11 264772 BUS MODIFICATION TO IMPROVE SAFETY, COMFORT, AND HUMAN RELIABILITY. The MITRE Corporation has made a preliminary analysis of the needs of bus patrons, with emphasis on the needs of the disabled. This analysis, based on observations and consultation with specialists was used to derive human performance requirements for average, aged and disabled patrons, and for the driver. The bus modification kits described are intended to increase human reliability and safety. To accomplish this the kits should improve: Information on the identification of buses, routes, and destinations; access, equilibrium, and egress for the disabled, exits; nighttime visual access for drivers and patrons; familiarity with vehicle accessories; and safety under mobile or emergency conditions. Modification kits are evaluated on the basis of effectiveness, and costs of research, development, production, and installation. Since it may be impractical to install all kits immediately, they are recommended for implementation on the basis of effect on utility of transportation for the aged and disabled. The following kits meet this criterion: Public Address, Route Identification, Handrails, Stanchions, Raised Seat, and Extended Step.

Stewart, C (Mitre Corporation) ; Human Factors Society Oct. 1974, 5 pp, 1 Fig., 1 Tab., 11 Ref. Proceedings of the 18th Annual Meeting of the Human Factors Society, Santa Monica, October, 1974.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI 30534)

11 265266 CALTECH SEMINAR SERIES ON ENERGY CONSUMPTION IN PRIVATE TRANSPORTATION. The Caltech Seminar Series was concerned primarily with means of reducing the huge amount of valuable oil burned in private cars. Topics discussed include means to produce vehicles that have: Lower weight with adequate space and safety; efficient, low pollution engines; better suspension and lower-loss tires; reduced power loss in accessories at high speeds; reduced air drag; more efficient transmission; and efficient operation with a shorter warmup period. Other courses discussed that could have a useful effect on oil consumption in the near future are: Computerized traffic control; carpools, vanpools, and commuter buses; demand-responsive transit; and improved fixed-route transit. Hybrid cars, electric cars, personal rapid transit, telecommunications, and legislative changes in the field of taxation are covered. Portions of this document are not fully legible.

Pierce, JR ; Department of Transportation, California Institute of Technology Final Rpt. June 1974, 330 pp; See also PB-235 349.; Contract DOT-OS-30119; ACKNOWLEDGMENT: NTIS (PB-235348/0); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235348/0

11 300709 BUYING THE BUS, OR LESSONS IN EQUIPMENT SELECTION. ABRIDGMENT. Some useful steps in equipping a public transit system are described. The definition of terminology such as bus and van is discussed, and a brief comparison of the characteristics of vehicle types that have 30-passenger capacities is tabulated. It is noted that information on the experience of other users with different types of vehicles and different modifications to standard types of equipment would be most useful for the rural transportation operator. It is recommended that rural planners should have a person who would research information from state DOT's, federal managers and rural project managers for data on equipment manufacturers, vehicle operating problems, passenger-related experience, and driver experience. A main thrust in the project planning process is the development of information for use in evaluating equipment needs. Requirements relating to size and number of vehicles must be determined in the project planning process. It is noted that in rural systems, site-specific and client-specific research is important. The number of vehicles requiring wheel chair accessibility must be determined and package racks may be important if shopping trips are an important function of the system. Suggestions made by experienced operators of rural transportation systems are listed.

Revis, BD (Institute of Public Administration) *Transportation Research Record* No. 696, 1978, pp 77-79, 2 Tab.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

11 301471 AM GENERAL/M.A.N. ARTICULATED BUS. AM General and the main producer of articulated buses in Europe, M.A.N., have jointly introduced this type of bus to the U.S. market. The bus was modified from its originally European configuration to comply with all U. S. regulations and specific customer requirements. Description of the bus and its components are presented in detail, emphasizing the specific aspects of an articulated bus--the under-floor drive train, articulation joint, and braking system. The structure, electrical system, interior and air-conditioning system are also outlined.

Scharbach, GW (AM General Corporation) Dornand, H *Society of Automotive Engineers Preprints* Conf Paper SAE 790304, 1979, 16 p.; From the February 26-March 2, 1979 Meeting.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 301680 CLINICAL CASE REVIEWS OF LIGHT TRUCK AND VAN CRASHES. This paper reviews some clinical case studies taken from field investigations conducted by the authors of actual crashes involving light trucks and vans. An attempt is made to indicate where Federal Motor Vehicle Safety Standards might possibly be applicable and to compare cases where vehicle design changes apparently reduced the severity of injuries. In particular, cases are shown where occupants were restrained and where steering column energy absorbing and rearward displacement systems have been installed.

Sherman, HW (Highway Safety Research Institute) Hvelke, DF *Society of Automotive Engineers Preprints* SAE 790377, 1979, 27 p., 6 Ref.; From the February 26-March 2, 1979 Meeting.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 301919 NEW POLYCARBONATE MAY REPLACE AUTOGLASS. It is claimed that a major obstacle to the use of polycarbonate sheet for automotive glazing applications has been overcome with the development of Margard, a new silicone-coated polycarbonate which is nearly as abrasion resistant as glass. The key to the silicone-coating process is a primer which makes possible the bonding of the silicone to the substrate. The new material is already finding uses in other transportation equipment. A major maker of off-highway equipment has replaced wire-reinforced safety glass with Margard. Amtrak has specified the silicone-coated material for the side windows of 1800 new passenger cars. The Milwaukee transit system, in addition to specifying Margard for new buses, eventually will use it to replace first-generation plastic glazing in older buses.

Chemical and Engineering News Vol. 57 No. 40, Oct. 1979, p 8

11 301939 THE POTENTIAL FOR HIGH CAPACITY BUSES IN CANADA. This working paper presents the conclusions of a study on the potential for high capacity articulated and double-deck transit buses in Canada as well as a review of the state-of-the-art in high capacity buses in North America and Europe. Comparative information is given on standard, articulated and double-deck buses including vehicle maintenance, operating and capital costs. Methods of introducing high capacity buses in place of standard buses are discussed as well as their potential as an alternative to other technologies used for urban transit service. The options available in supplying articulated buses to meet the domestic market and the capability of the bus industry to meet these requirements are also discussed. /TRRL/

Department of Transport, Canada, De Leuw Cather, Canada, Limited Monograph Mar. 1979, 86 p., 5 Fig., 7 Tab., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241551), Roads and Transportation Association of Canada

11 301940 POTENTIAL OF ELECTRIC VEHICLES IN THE PUBLIC-TRANSPORT SECTOR-THE VIEW OF THE OPERATOR. Public transport in South Yorkshire is the responsibility of the South Yorkshire Passenger Transport Executive, and it is considered that this Executive, in developing future policies must take account of the changing national economic position, eg, the availability of fuel in the future. The development of alternative traction technologies is discussed related to the selection of any possible segregated public transport system in South Yorkshire. The author suggests that there are three basic classes of electric road passenger traction which can apply either to the urban bus or to segregated public transport systems. These three groups of vehicles are described as those vehicles which have no 'on-board' energy-storage capacity and are totally dependent for their power supply on fixed overhead catenary systems; hybrid vehicles depending on a limited on-board energy-storage capacity and external power supplies providing a replenishment of energy, or the diesel-electric bus; and battery electric systems operating independently of 'on-street' power infrastructure. Examples of vehicles in each group are provided. The advantages and disadvantages

of battery electric traction, related to the public-transport section, are discussed in respect of the research programmes undertaken in South Yorkshire which are considered to have been encouragingly successful. /TRRL/

Jordan, J (South Yorkshire Transport Executive, Sheffield) *Electric Vehicle Developments* No. N1, Mar. 1979, p 7-9, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241235)

11 302100 IEEE VEHICULAR TECHNOLOGY CONFERENCE, 29TH, 1979. This conference proceedings contains 71 papers of which 6 appear in abstract form only. 65 papers are indexed separately. Topics dealt with include mobile communications, transportation, automotive electronics, and automatic vehicle locating and monitoring.

Institute of Electrical and Electronics Engineers Conf Paper 79CH1378-9VT, 1979, 407 p.; Prepared for IEEE Vehicular Technology Conference, 29th, Conf Rec of Pap, Arlington Heights, Illinois, March 27-30, 1979. Also Available from IEEE Service Center, Piscataway, New Jersey; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 302109 SIMULATION OF AN URBAN BATTERY BUS VEHICLE. This report describes the computer simulation of a battery-powered bus as it traverses an arbitrary mission profile of specified acceleration, roadway grade, and headwind. The battery-bus system components comprise a DC shunt motor, solid-state power conditioning unit with regeneration capability, and a battery source consisting of a multi-unit lead acid battery. The computer model determines vehicle tractive effort and power consumption and computes actual vehicle speed for a given mission profile. The program output data is tabulated in a form which allows easy recognition of the various operational modes and power-limited regimes. The computer model uses a "modularization" format which facilitates the simulation of alternate propulsion systems involving the interchange of one system component for another. The model is applied to simulate the propulsion characteristics of a typical bus operating over a specified drive cycle. The results of this study demonstrate the applicability of the battery bus model for predicting bus propulsion characteristics under simulated drive conditions. This report provides charts depicting the plotting program, input data required by the Battery Bus Performance Program, Fortran source listings and data files, as well as a Glossary of Program Constants and Variables. /UMTA/

Stickler, JJ ; Transportation Systems Center, (DOT-TSC-UMTA-79-15) Final Rpt. UMTA-MA-06-0093-79-1, July 1979, 89 p.; ORDER FROM: NTIS; PB-300306

11 302267 IMPACT OF FARE COLLECTION ON BUS DESIGN APPENDICES A THROUGH G. The primary objectives of this study are: to investigate and evaluate the nature of new bus designs which better accommodate the primary functions of public transit, if the fundamental constraint of on-board driver monitored, fare collection were removed; to postulate and assess new off-board fare collection methods that would complement such bus designs; and to assess the potential synergistic effects of new buses/new fare collection systems that serve to improve transit efficiency and productivity, and

overall service to the riding public. The design concept effort was focused on the standard 40-foot transit bus, although potentially relevant to other sizes of buses. The appendixes in this report contain detailed information on transit bus fare collection systems operations and costs in the United States. Also included is an examination of Swiss experience with total off-board fare collection systems. European transit bus design trends and fare collection systems are surveyed. Drawings of a number of new bus design concepts compatible with off-board fare collection systems are presented. A discussion of technical, design, and operating cost issues related to bus design and off-board fare collection is presented. A very extensive bibliography on fare collection and transit bus design trends is included. (UMTA)

Magro, W Matelyka, J Mundle, S ; Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration, (9073-074) Final Rpt. UMTA-IT-06-0132-79-2, Apr. 1979, 359 p.; The companion report is "Impact of Fare Collection on Bus Design." UMTA-IT-06-0132-79-1.; Contract DOT-UT-60010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300664/OST

11 302268 IMPACT OF FARE COLLECTION ON BUS DESIGN. The primary objectives of this study are: to investigate and evaluate the nature of new bus designs which better accommodate the primary functions of public transit, if the fundamental constraint of on-board, driver monitored, fare collection were removed; to postulate and assess new off-board fare collection methods that would complement such bus designs; and to assess the potential synergistic effects of new buses/new fare collection systems that serve to improve transit efficiency and productivity, and overall service to the riding public. The design concept effort was focused on the standard 40-foot transit bus, although potentially relevant to other sizes of buses. This report examines the potential impact on transit bus design of freeing the bus designer from the constraint that fares must be collected and monitored on-board the bus by the driver. Conceptual transit bus designs are developed, which offer the potential for operating cost reductions and substantial improvements in passenger service characteristics. Current U.S. fare collection costs and total bus operating costs are assessed and compared to those possible with new buses and compatible off-board fare collection systems. The report contains considerable information on both bus design and fare collection system trends in the U.S. and Western Europe. Although this study focused on the standard 40-foot transit bus, results herein indicate that operational benefits of off-board fare collection become greater on high capacity vehicles rather than on 40-foot transit buses.

Holcombe, H Magro, W Matelyka, J ; Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration, (9073-074) Final Rpt. UMTA-IT-06-0132-79-1, Apr. 1979, 54 p.; The companion report is "Impact of Fare Collection on Bus Design, Appendices A through G," UMTA-IT-06-0132-79-2.; Contract DOT-UT-60010; ORDER FROM: NTIS; PB-300663

11 302276 LOW-FLOOR ARTICULATED BUS DEMONSTRATION. This report is documentation of a program to demonstrate the

stability and anti-jackknifing capabilities of a low-floor articulated bus to the transit industry. This demonstration intended to show that a high passenger capacity Transbus configuration could be developed embodying the low-floor concept by incorporating anti-jackknifing capabilities in the design and thus, maintain coach stability. For the demonstration program a prototype coach built by the firm of Hamburg-Consult of the Federal Republic of West Germany was demonstrated and evaluated at five sites in the U.S.: the U.S. Department of Transportation in Washington, DC; the Southeastern Michigan Transportation Authority in Detroit, Michigan; the Port Authority of Allegheny County in Pittsburgh, Pennsylvania; and the Mass Transit Administration of Maryland in Baltimore, Maryland. Additional testing and evaluation was conducted at the Transportation Research Center of Ohio in East Liberty, Ohio. Representatives from United States and Canadian governments, transit authorities, vehicle and component manufacturers, the news media, and the general public observed and rode in the bus during the demonstration period. Data on performance, reactions of drivers, maintenance and management personnel, and on public relations (news media) were collected. The demonstration showed that the low-floor concept, seen in the prototype, is an improvement over current articulated vehicle designs. The low floor allows faster and easier boarding, thus increasing productivity, and offering an advantage to elderly and handicapped persons. The performance and the industry's favorable reaction to the technology at all five sites is evidence of the prototype's demonstrated stability and anti-jackknifing capabilities of a low-floor articulated bus.

Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration, (BP 79-001) Final Rpt. UMTA-MD-06-0024-79., Sept. 1979, 45 p.; Contract UMTA-9073-077; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300497/AS

11 303768 THE GOETEBORG GHOST BUS [Goeteborger Geisterbus]. The report concerns a bus developed by Volvo, which has automatic steering and braking by means of an electronic guidance system for distances of 50 M before and up to 15 M after each stopping point. The paper provides a general review of the technical operation of this bus traffic system, of costs and the internal layout and equipment of the vehicle which will come into service in Goeteborg during the summer of 1978. /TRRL/ [German]

Omnibus-Revue Vol. 28 No. 5, May 1977, pp 238-239, 4 Phot. ACKNOWLEDGMENT: TRRL (IRRD 307983), Federal Institute of Road Research, West Germany

11 303805 NEW TECHNOLOGY FOR URBAN TRANSPORT. Current technical development in road-vehicle power and in automated public-transport systems are reviewed. In the latter area, the most cost effective innovations are found in West Germany and Japan. The author concludes by examining the institutional, economic and other obstacles to the wider introduction of advanced urban transport technologies. (TRRL)

Loder, JL (Loder & Bayly) *Search* Vol. 10 No. 1/2, Jan. 1979, pp 35-41, 7 Fig., 5 Phot., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239299), Australian Road Research Board

11 303912 PARATRANSIT DEVELOPMENT; CURRENT CONDITIONS. The conference reported here was organized to synthesize and evaluate the many significant paratransit services occurring across the U.S. and Canada. The conference assessed the outcomes as well as implications of the various projects and considered their relevance for other communities. The Conference Advisory Committee believed that careful evaluation was needed of the planning, operation and performance issues that have arisen during the implementation of a variety of paratransit projects. Such analyses would aid in the further development of paratransit systems and services. The Conference was planned in expectation of the release of a final paratransit policy of the Urban Mass Transportation Administration (UMTA), and was organized to provide results that should help UMTA to understand the problems and potentials of paratransit more fully. Comprehensive resource papers were presented on six and labor standards; appropriate institutional framework for paratransit development; evaluation and measurement of service effectiveness; competitive opportunities in paratransit; coordination of social-service-agency transportation; and technology requirements. Each of these papers are briefly reviewed.

Rosenbloom, S (Texas University, Austin) *Transportation Research Board Special Report No. 186, 1979, pp 1-2*; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

11 304714 SCHOOL BUS PASSENGER SEAT AND LAP BELT SLED TESTS. Responses received relating to proposed rulemaking action on school bus passenger seat crash protection indicated a need to obtain additional research data using several test variables. A sled test program was conducted for route school bus and activity bus occupant seats using the variables of seat spacing, test velocity, lap belts and no lap belts, differing dummy sizes, and seats from different manufacturers.

Bayer, ARJ Pauls, LS ; National Highway Traffic Safety Administration Final Rpt. RD 678/2, DOT/HS-804 985, Dec. 1978, 150 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301310/95T

11 304763 THE TROLLEY COACH DEVELOPMENT AND STATE OF THE ART: TASK I REPORT FOR THE ELECTRIC TROLLEY BUS FEASIBILITY STUDY. Trolley coaches achieved their greatest level of use in the early 1950's when over 6500 vehicles were employed on 54 systems in North America. However, from the early 1950's through the early 1970's, the trolley coach (TC) disappeared as fast as it had appeared in the previous twenty years. By 1975, only ten systems in North America still retained TC operations. In the U.S. these included Boston, Philadelphia, Dayton, Seattle, and San Francisco; in Canada, Toronto, Hamilton, Edmonton, and Vancouver; and in Mexico, Mexico City. These systems are discussed herein, as well as the reasons for the TC demise. This report presents a brief history of TC operation in North America and a description of currently operating TC systems. TC technology is described and illustrated, including vehicles, propulsion and control systems and overhead wire and fittings. Opera-

tional characteristics of the TC are also described, including its suitability for application in various situations and requirements for trolley coach system design. Environmental effects of TC operation are analyzed, as are user impacts. This report describes and contrasts trolley coaches and TC facilities now in use in North America and Europe.

Wilkins, JD Schwartz, A Parkinson, TE ; Chase, Rosen and Wallace, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0193) Final Rpt. UMTA-IT-06-0193-79-1, Oct. 1979, 269 p.; Contract DOT-UT-80037; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-104870

11 305086 ELECTRIC AUTOMOBILES. VOLUME 2. 1975-AUGUST, 1979 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). Citations from worldwide research cover the design of electric automobiles, vans, buses, and hybrid vehicles. Studies are included on lead-acid, zinc-air, lithium-sulfur, and nickel-cadmium batteries; fuel cells; drive trains; and chassis construction.

Hundemann, AS ; National Technical Information Service Bibliog. Sept. 1979, 286 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0991/4ST

11 305136 AERODYNAMIC CHARACTERISTICS OF SIXTEEN ELECTRIC, HYBRID, AND SUBCOMPACT VEHICLES. An elementary electric and hybrid vehicle aerodynamic data base was developed using data obtained on sixteen electric, hybrid, and sub-compact production vehicles tested in the Lockheed-Georgia low-speed wind tunnel. Zero-yaw drag coefficients ranged from a high of 0.58 for a boxey delivery van and an open roadster to a low of about 0.34 for a current four-passenger proto-type automobile which was designed with aerodynamics as an integrated parameter. Vehicles were tested at yaw angles up to 40 degrees and a wing weighting analysis is presented which yields a vehicle's effective drag coefficient as a function of wing velocity and driving cycle. Other parameters investigated included the effects of windows open and closed, radiators open and sealed, and pop-up headlights. Complete six-component force and moment data are presented in both tabular and graphical formats. Only limited commentary is offered since, by its very nature, a data base should consist of unrefined reference material. A justification for pursuing efficient aerodynamic design of EHVs is presented.

Kurtz, DW ; Jet Propulsion Laboratory NASA-CR-158814, JPL-PUB-79-59, June 1979, 96 p.; Prepared for NASA and the Department of Energy.; Contract NAS7-100; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N79-29107/65T

11 305809 AUTOMATED MIXED TRAFFIC VEHICLE STUDY AT WASHINGTON NATIONAL AIRPORT. Passenger-carrying automated mixed traffic vehicles (AMTV) development has recently demonstrated successful automated vehicle operation in both pedestrian and limited automobile traffic. Passenger-carrying AMTV's are intended to provide the advantages of automation to that segment of the transit market that handles a

moderate demand level over short distances at low speeds. This study examines the site and passenger demand characteristics at Washington National Airport and analyzes the application feasibility of providing AMTV service between the air terminals and the long term and satellite parking lots. The AMTV system analyzed includes three separate routes; all routes use 8-passenger AMTV vehicles. Route 1 operates between the air terminals and the satellite parking lots. Routes 2 and 3, operating in conjunction with a hypothetical accelerating walkway system operating between the Metro Rapid Rail Station and the Main Terminal, provide service between the Main Terminal and Long Term Parking Lots. The AMTV system analyzed herein includes a single lane loop, a single lane shuttle, and a double lane route. Route fleet size requirements range from 1 to 4 vehicles. The entire National Airport AMTV System would cost approximately \$600,000 to build and \$343,000 a year to operate and maintain (O&M). On a route-by-route basis, the AMTV routes studied compare favorably with several other alternative modes in terms of both level of service and costs. Although the AMTV has higher capital costs than the existing shuttle bus system and the upgraded exclusive right-of-way bus system, the AMTV offers significant savings in annual and O&M costs.

Chung, CC ; MITRE Corp., McLean, VA. METREK Div.*Urban Mass, Transportation Administration, Washington, DC. MTR-79W00307, UMTA-VA-06-0056-79-1, Nov. 1979, 72p; nSee also PB-264 527. n; Contract DOT-UT-90063; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-121148

11 308049 GARRETT STARTS WORK ON FLYWHEEL. A contract has been awarded to develop a propulsion system which uses a spinning flywheel to load-level a small diesel engine to recover, store, and reuse the braking energy normally lost when a bus comes to a stop. The system will be capable of saving nearly half the fuel used by today's diesel-powered intra-urban transit buses. Under the contract, a standard 40-foot Grumman-Flexible Model 870 transit bus will be modified to incorporate a flywheel-assisted diesel engine/electric propulsion system. Even though the diesel engine power rating is reduced by more than two-thirds, there will be no sacrifice in vehicle performance, acceleration, gradeability or top speed. No compromise in passenger amenities is envisioned for the flywheel bus since both air-conditioning and heating will be provided for passenger comfort. Normal bus lighting and accessory systems will be incorporated using energy from the diesel engine. It is expected that the prototype flywheel diesel bus will be demonstrated in approximately three years.

Electric Vehicle News Vol. 8 No. 3, Aug. 1979, p 22, 1 Phot.

11 308077 THE ELECTRIC TROLLEY BUS--REVISITED. The electric trolley bus (ETB) potential which is now being re-evaluated, combines reliability, passenger-carrying capacity, quiet, pollution-free transit operation with passenger comfort, use of existing streets, and the sense of permanence given by overhead wires. The ETB plays only a minor role in the U.S. with 675 vehicles in service and just over 200 route-miles in five urban areas. In the 1970s there

has been ETB fleet replacement and expansion. Recent conversions to ETBs have taken place in Toronto and Edmonton and are being planned in Seattle and San Francisco. ETB is being used also as an intermediate mode between diesel buses and light rail transit or rail rapid transit. The physical components of an ETB system include revenue service vehicles, electric power distribution systems, electric power generation/conversion equipment, maintenance facilities and facilities for system operation. It is noted that the design of a bus body structure need not limit the types of propulsion units that may be installed in it, and that flexibility of design with regard to bus capacity may be achieved concurrently with standardization of major vehicle subsystems and individual components. Comments are also made on electric power generation/conversion, off-wire systems, network operations, aesthetics, pollution, energy consumption and joint development.

Schumann, JW (Sacramento Regional Transit District, California) Hanson, BJ (Klauder (Louis) and Associates) *Traffic Quarterly* Vol. 33 No. 4, Oct. 1979, pp 577-588, 1 Fig., 1 Tab.

11 308130 NEEDED: MORE BUSES FAST. Articulated buses (artics)-high capacity transit vehicles-are introduced by public agencies as a way to save costs, carry more passengers and lure new riders. These buses first went into service in Los Angeles. The Los Angeles RTD and the San Diego Transit Corp. are among 11 transit properties which formed a nationwide consortium to order and purchase 325 articulated buses in 1976. The buses are hybrids, a mixture of foreign and domestic design, engineering and craftsmanship. The buses are considered successful products although they have some major problems. Despite air-conditioning breakdowns and other problems, the artics have many advantages because of their size. The larger coaches have a seating capacity of 65 with room for 60 standees. No uniformity is noted in the way various members of the consortium have deployed artics. The service patterns in Los Angeles, Phoenix and Chicago are briefly discussed.

Mass Transit Vol. 6 No. 12, Dec. 1979, p 8
ORDER FROM: Mass Transit, 555 National Press Building, Washington, D.C., 20004

11 308888 THE EFFECTS AT STOPS OF THE MAN ARTICULATED BUS. This note describes the results of boarding trials held on the man articulated bus at Chiswick in February 1978. It assesses the likely effects on average stop time of crew and operation of the man together with the effects on operability at stops and compares them with existing bus types. Although the marginal boarding and alighting times of the man are fast, the time taken to open and close the doors is slow. For an average boarding and alighting movement existing bus types are, as a result, quicker at stops. The length of the bus is likely to cause operability problems at stops, garage manoeuvrability problems and garage capacity difficulties, even if service frequencies were reduced. (a) (TRRL)

Holding, DG Wren, MB ; London Transport Executive Monograph Res Mem M343, Apr. 1978, 6 p., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 244184)

11 310143 TOWNOBILE ELECTRIC CITY TRANSIT SYSTEM-THE AFFORDABLE, ADAPTABLE ALTERNATIVE. Electric passenger transport systems tend to require expensive and inflexible infrastructure and hence can normally only be economically justified in densely-populated urban regions. Civil engineering cost and time escalations are steadily reducing the range of viable applications for fixed rail systems, while energy and ecology constraints are similarly reducing viability and desirability of petroleum-fuelled bus operations in cities. The timely development and local availability of such non-polluting, energy-conserving, passenger-pleasing operationally flexible road-borne public transit equipment as the townobile battery, trolley and dual-mode battery-trolley coach systems may well fill the technological gap during the next 20 years for urban passenger transport. The systems and their applications are described and compared with other modes, and in particular their role in integrating all city transport modes is described. (TRRL)

Leembruggen, LR (Elroy Engineering Propriety Limited) ; Institution of Engineers, Australia Conf Paper 79/2, 1979, pp 66-70, 6 Fig., 2 Tab.

Preprints from the Electric Energy Conference, Brisbane, 17-18 May 1979; ACKNOWLEDGMENT: TRRL (IRRD 239556), Australian Road Research Board

11 310443 NEW CITY BUS FOR BETTER PUBLIC TRANSPORT [Ny stadsbuss foer bättre kollektivtrafik]. The aim has been to design a bus based on alternative solutions. In a fullscale model is presented how it is possible to make the improvements. Integrated body with air suspension on all wheels gives a floor level of 430 mm free of steps at exit and entrance. The total length of 9.50 M and a wheelbase of 5.05 M makes the bus light and easy handled. Rear entrance with a large platform allows quick embarkment; in connection with a ticket machine this will bring down the standing time at bus stops. In the research is found advantages in gas and trolley drive. Regenerative braking with flywheel or gas accumulation to store retardation energy brings down fuel costs. Hydrostatic drive on all wheels gives advantages such as low weight, retardation control and no bulky mechanical components under the floor. (TRRL) [Swedish]

Nygren, G Larssvall, J ; Swedish State College of Arts and Design Monograph 1979, 55 p., Figs., 1 Tab., 21 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243214), National Swedish Road & Traffic Research Institute

11 310446 NON-POLLUTING CITY BUS IS WORKED BY BATTERY [Miljoevaenliga stadsbussar gaar paa batteri]. The battery bus is described concerning design of battery, energy consumption, costs, reach, weight, battery weight etc. Different kinds of batteries, like nickel/zinc, iron/nickel, lead, metal/air, are described. The battery bus can be produced in two ways, partly by reconstruction of diesel buses and trolleybuses and partly by new construction on terms of the electricity. The advantages of the battery bus compared with the diesel bus are less air pollution, longer life time and less noise. The costs are about the same. (TRRL) [Swedish]

Lindstroem, O *Svensk Lokaltrafik* Vol. 31 No. 3, 1979, pp 25-28, 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 243213), National Swedish Road & Traffic Research Institute

11 311754 INTERNATIONAL AUTOMOTIVE TECHNICAL REGULATIONS, USA. VOLUME 1. MOTOR VEHICLE CONSTRUCTION AND USE REGULATIONS. This volume describes the five year plan for motor vehicle safety and fuel economy rule making and contains standards on: control, location, identification and illumination; controls and displays; transmission shift lever sequence, starter interlock and transmission braking effect; windshield defrosting and defogging systems; windshield wiping and washing systems; hydraulic service brake, emergency and parking brake systems; hydraulic brake systems; hydraulic brake hoses; reflecting surfaces; lamps, reflective devices and associated equipment; new pneumatic tyres; tyre selection and rims; rear view mirrors; headlamp concealment devices; hood latch system; theft protection; vehicle identification number; motor vehicle brake fluids; retreaded pneumatic tyres; power operated window systems; new pneumatic tyres for vehicles other than passenger cars; tyre selection and rims for motor vehicles other than passenger cars; air brake systems; motor cycle brake systems; motor cycle controls and displays; accelerator control systems; warning devices; truck camper loading; speedometers and odometers; occupant protection in interior impact; head restraints; impact protection steering control; steering control rearward displacement; glazing materials; door locks and door retention components; seating systems; occupant crash protection; seat belt assembly; seat belt assembly anchorages; wheel nuts, wheel discs and hub caps; windshield mounting; child seating systems; side door strength; exterior protection; roof crush resistance; bus window retention and release; motor cycle helmets; windshield zone intrusion; school bus rollover-protection; school bus body joint strength; school bus passenger seating and crash protection; fuel system integrity; flammability of interior materials; bumper standard. Proposed rule making to some of the motor vehicle safety standards listed in this volume is appended. (TRRL)

Intereurope Regulations Limited Monograph No Date, n.p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 245440)

11 311798 REAR ENGINES LEAD ARTIC BUS PROGRESS. The aim of developing an energy-efficient means of transporting passengers has attracted manufacturers to develop the 'pusher type' articulated bus. Examples of such vehicles produced by Leyland and associated company Dad A/S of Denmark, are being used in a full-scale evaluation project in South Yorkshire. Benefits of operating articulated buses include better staff utilisation during peak periods, lower cost per passenger and availability of more seats in off-peak hours. Compared with double-deck buses the articulated bus can cause problems at stopping places but has an advantage where headroom is limited. Alternative transmission layouts are discussed from designs by Daimler-Benz, Magirus-Dentz, Man, Berliet, Scania and Vetter. (TRRL)

Godwin, W *Automotive Engineer* Vol. 4 No. 6, Dec. 1979, pp 71-72, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 245085)

11 312307 COMMERCIAL VEHICLE BRAKING. The book is designed to give a working knowledge and an understanding of the brakes

and braking systems on vans, light trucks, heavy goods vehicles, public service vehicles and off-highway vehicles. Besides dealing with the brakes themselves details are given of various auxiliary brakes that are designed to reduce the load on the main braking system. There are also comments on maintenance and servicing. Braking systems are described in the following chapters: basic principles; legislation; hydraulic systems; air systems-general principles; air systems-rigid vehicles; air systems-articulated vehicles and trailers; psv brake systems; brakes for off-highway vehicles; retarders; anti-lock mechanisms; testing and maintenance; and, braking and the driver. (TRRL)

Newcomb, TB (Loughborough University of Technology, England) Spurr, RT (Ferodo Limited); Newnes-Butterworths Monograph 1979, 144p, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 245100)

11 313651 IDENTIFICATION OF SUPERIOR ENERGY-ABSORBING MATERIALS FOR SCHOOL BUS INTERIORS. VOLUME II: TECHNICAL REPORT [Final rept. 3 Aug 77-30 Jun 79]. The report documents a study in school bus crashworthiness and is concerned primarily with the design of interior crash padding systems and the identification and selection of outstanding padding materials for this design application.

Pauls, LS; ASL Engineering, Inc., Santa Barbara, CA. *National, Highway Traffic Safety Administration, Washington, DC. DOT-HS-805-271, Jan. 1980, 106p; nSee also Volume 1, PB80-165269. n; Contract DOT-HS-7-01664; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-165277

11 314847 BUS BUILDERS HANG IN SUSPENDED INNOVATION. In 1967 the National Academy of Engineering recommended certain specifications for transit buses. In 1971, the Urban Mass Transportation Administration (UMTA) followed up those recommendations and subcontracted GMC, Flexible and AM General to build three buses apiece which would increase ridership with safer, quieter and cleaner buses. Features to help the elderly and handicapped would be incorporated. When the prototypes were delivered, they went through tours of U. S. cities and endurance tests. The Volpe administration of the Department of Transportation (DOT) then mandated Transbus, incorporating the best features of each manufacturer. But a few years later, under a new administration, UMTA scrapped the mandate and allowed the manufacturers to build interim buses called Advance Design Buses (ADB's). They were allowed because transit operators needed new buses and Transbus simply was not ready. Later administrative changes at DOT have resulted in new pressure for Transbus, which has been resisted by the manufacturers in various ways. Meanwhile, any city wanting to buy a transit bus (with UMTA funding 80% of the purchase) has a choice between two interim buses: GM's RTS II and Flexible's 870. These buses represent a marked departure from the construction techniques of their predecessors, and actually contain over 80% of the Transbus requirements. Detailed descriptions of the GMC RTS II and the Flexible 870 are given.

McElroy, J *Automotive Industries* Vol. 158 No. 18, Dec. 1978, pp 42-47; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

11 315202 THE VOEV BUS II-THE URBAN VEHICLE OF THE EIGHTIES [Der voev-bus II-das Stadtfahrzeug der Achtziger Jahre]. Hamburg consult, together with the association of public transport operators and the firm falckenried worked on the bus prototype voev-bus 2. The object was to introduce further improvements and avoid the drawbacks of voev-bus 1. Features of the new bus are: different seating arrangement, producing a vehicle which is 250 mm longer, smaller wheels due to the floor being lower, greater availability of seats, and improvements in doors and the driver's cab. The engine gives off less exhaust fumes and is encapsulated to reduce noise, and there is automatic transmission with a hydraulic retarder. The vehicle is simpler to produce, due in particular to the extensive use of adhesion techniques. (TRRL) [German]

Schultz, OWO *Verkehr und Technik* Vol. 29 No. 5, 1976, pp 177-183, 7 Fig., 1 Tab., 4 Phot., 6 Ref.; ACKNOWLEDGMENT: United Aircraft Corporation (IRRD 311426), Federal Institute of Road Research, West Germany

11 316501 THE BERLIET TROLLEYBUS-TCO ER 100, SYMBOL OF RENEWAL [Les trolleybus berliet-tco er 100, symbole d'une renouveau]. The appearance of the New trolley-buses on the Lyon network at the same time as their introduction on a route which had hitherto been served by buses, provides a practical example of the change in orientation in favour of this mode of transport. The paper examines successively the reasons for this reversal, the principles which have guided the design of new equipment, the first results obtained and the future of the development of the trolleybus, firstly at Lyon and then in general. (TRRL) [French]

Malterre, P *Revue des Transports Publics Urbain et Regionaux* No. 755, Nov. 1978, pp 9-15, 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105669), Central Laboratory of Bridges & Highways, France

11 318506 EFFECTS OF RECENT VEHICLE DESIGN CHANGES ON SAFETY PERFORMANCE, EXECUTIVE SUMMARY. Design changes in 1974-1977 model year passenger cars have been identified and a preliminary evaluation has been made of the safety effects of design changes inspired by fuel economy requirements. The 1977 General Motors full-size cars and the Volkswagen Rabbit were found to be the only significant design change vehicles. These vehicles do not demonstrate significantly higher risks of fatality in accidents than do other vehicles of similar weight or roominess. Little change is observed in the aggregate characteristics of the 1974-1977 vehicle fleets, although the effects of the 1977 General Motors downsizing are observable. Methodologies have been implemented for the identification of vehicle design changes, for the calculation of observed fatality rates by make and model, and for the projection of future fatality and injury experience based on perceived trends in vehicle design and sales. There are a number of recommendations for further investigation of the effects of vehicle design on safety and for extension of the work to include 1978 and 1979 model year cars, light trucks and vans.

Redmond, D Schmitz, B Friedman, K ; Kinetic Research, National Highway Traffic Safety Administration Final Rpt. DOT-HS-805-377, Mar. 1979, 7p; Contract DOT-HS-7-01759; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-204035

11 318696 HYBRID VEHICLE POTENTIAL ASSESSMENT. VOLUME 7: HYBRID VEHICLE REVIEW. Review of hybrid vehicles built during the past ten years or planned to be built in the near future is presented. An attempt is made to classify and analyze these vehicles to get an overall picture of their key characteristics. The review includes onroad hybrid passenger cars, trucks, vans, and buses.

Leschly, KO ; Jet Propulsion Laboratory, National Aeronautics and Space Administration NASA-CR-163298, CONS-4209-T1-V-7, Sept. 1979, 44p; Sponosred by NASA.; Contract EM-78-1-01-4209; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N80-27231/3

11 318917 LIFE-CYCLE COST PROCUREMENT PROCEDURES FOR ADVANCED-DESIGN BUSES (DEVELOPMENT AND TEST APPLICATION). The report reflects UMTS's efforts to assist the grantees to comply with the DOT FY 1980 Appropriations Act requirement that contracts for the acquisition of rolling stock, including urban buses, and that be awarded only after consideration of performance, standardization, life-cycle costs, etc., in addition to initial capital costs. A key to this assistance is presented in this report, namely--a set of acceptable, workable life-cycle costing procedures and guidelines to be used by the bus manufacturers and the grantees in life-cycle procurements. The study develops the life-cycle cost tools, guidelines, and procedures applicable to the bus industry and to apply the principles of life-cycle costing to the real-life environment of Advanced Design Bus (ADB) purchases. Tests were conducted by two transit properties--Phoenix Transit Authority (Phoenix, Arizona), and the Regional Transportation authority (Chicago, Illinois). The parallel, nonbinding life-cycle cost procurements of ADB by the two transit operators demonstrated that life-cycle costing, when used as a procurement tool, is a viable alternative to the current low-bid acquisition of urban buses. The tests further showed that life-cycle cost procurement provides the grantees with the data necessary to make a more cost-effective purchase; it also provides the manufacturers an incentive to modify their bus designs to achieve better quality at a lower total cost of ownership.

Kain, HR Marks, GJ Hall, FM ; Advance Management Systems, Incorporated, Urban Mass Transportation Administration, (UMTA-VA-06-0045) Final Rpt. UMTA-VA-06-0045-80-1, May 1980, 70p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-209026

11 319742 VAN FRAME STRUCTURAL EVALUATION. This paper describes the structural evaluation of a van production chassis frame, a light weight frame design and four other modified production frames. Static structural properties were determined by a combination of laboratory joint stiffness measurements and a finite element model incorporating empirical stiff-

ness values. The finite element analysis results are compared to laboratory frame bending and torsion measurements.

Hull, FH (Budd Company) ; Society of Automotive Engineers SAE 790988, Oct. 1979, pp 169-176; From International Conference on Vehicle Structural Mechanics, 3rd Proceedings, October 1979.; ACKNOWLEDGMENT:

11 322652 A BUYER'S GUIDE TO BIG AND NOT SO BIG BUS-INESS. This paper offers suggestions and advice for purchasing transit vehicles. The following key issues should be addressed: the importance of matching the equipment selected to the requirements of the service for which it will be used; the importance of providing a fleet which will support the development of solid basic service before specialized equipment is added for diversifying the services; the importance of providing a strong positive image for transit through equipment selection; and the importance of balancing capital and operating costs. Four categories of transit buses according to size and need are listed: heavy duty full sized transit buses--Advanced Design 870's or RTS-II-s, "new look" buses, and a new 35 foot City Cruiser; heavy duty medium sized transit buses--City Cruiser, Bluebird; heavy small transit buses--Chance; and small body on truck chassis buses--Wayne Transette, Coach and Equipment. A 15 year capital cost comparison of the aforementioned buses is included--which list their length, capacity, unit purchase price, life expectancy, number of repurchases, and fifteen year capital cost. As an example, a discussion of the Citifare Transit System in Nevada--which is currently reviewing equipment options to meet the requirements of an expanded service plan--is also included in the paper.

Hunkins, L *Transitions* 1980, pp 41-52, 2 Tab., Photos.

11 323141 NOISE REDUCTION RETROFIT FOR A "NEW LOOK" FLEXIBLE TRANSIT BUS; SERVICE BULLETIN. This document presents instructions on how to apply a

noise treatment to a contemporary city transit bus without extensive structural alteration. Baseline bus configuration, noise ratings, and performance benchmarks are presented for a Flexible 111DC-D061 transit bus powered by a Detroit Diesel 8V-71N engine. The concepts and much of the hardware described in this report are transferable to similar buses. The information presented herein is of interest primarily to transit bus operators wanting to reduce noise by practical means, and to government agencies, manufacturers, and planners concerned with reducing the noise of buses in service at a moderate cost. In this report instructions are given on how to retrofit the engine with a turbocharger and ancillary hardware. Acoustic benefits and performance side-effects are given. One beneficial side-effect, because of turbocharging, is reduced harmful exhaust emissions. Another, because of smaller injectors and reduced exhaust back pressure, is fuel conservation. The instructions in this report are complete with sources for manufactured components and raw materials, and with mechanical drawings for components to be locally fabricated. Illustrations and text direct installation as well as effects of noise ratings and performance side-effects are also presented. In this report practical application is coupled with theoretical explanation throughout. (UMTA)

Kaye, MC ; Tri-County Metropolitan Transportation District, Urban Mass Transportation Administration, (DOT-TSC-UMTA-8-16) Final Rpt. UMTA-OR-06-0005-80-1, Sept. 1980, 66p; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB80-226103

11 326944 THIRD INTERIM REPORT ON STATUS OF GAS TURBINE TRANSIT BUS DEMONSTRATION PROGRAM. Progress in a program for demonstrating the use of gas turbines in city buses is reported. Five prototype gas turbine engines, Model GT-40404, manufactured by the Detroit Diesel Allison Division of General Motors Corporation, are being inte-

grated into five RTS-II model transit coaches, manufactured by General Motors Corporation and supplied by the Mass Transit Administration (MTA) of Baltimore, Maryland. They will be acceptance tested at the Transportation Research Center proving grounds in Ohio, where one gas turbine coach will also be performance and mileage tested against a diesel RTS-II coach. The first diesel-to-turbine engine conversion is done. The second conversion is almost completed. The demonstration plan for the 5 gas turbine coaches has been finalized. (ERA citation 05:030836)

Booz-Allen and Hamilton, Inc., Bethesda, MD., Transportation Consulting Div.*Department of Energy, Washington, DC. Apr. 1980, 15p; Symposium on automotive propulsion systems, Dearborn, MI, USA, 14 Apr 1980.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; CONF-800419-4

11 342501 EXPERIENCES WITH REMOVAL OF BARRIERS TO ELDERLY AND HANDICAPPED USE OF BUS TRANSIT AND RELATED HIGHWAY SERVICES. This study synthesizes prior research and findings concerning efforts to remove barriers to the elderly and handicapped in their use of bus transit. Special emphasis is placed on wheelchair-lift equipment on buses in urban transit, including implementation issues, operating problems, ridership response, cost and effectiveness. In a review of all barriers and experience with solutions, the point is made that, to date, accessibility for wheelchair-users has received by far the most attention in the transit community. The report recommends not only design improvements for wheelchair-lifts but also increased attention to other countermeasures, especially available features such as bus-kneeling, and to training of both operators and users.

Rosenbloom, S ; National Cooperative Highway Research Program Draft Rpt. Oct. 1980, n.p.; ORDER FROM: National Cooperative Highway Research Program, 2101 Constitution Avenue, NW, Washington, D.C., 20418

12 051474 A STUDY OF LOW COST ALTERNATIVES TO INCREASE THE EFFECTIVENESS OF EXISTING TRANSPORTATION FACILITIES. VOLUME II. RESULTS OF CASE STUDIES AND ANALYSIS OF BUSWAY APPLICATION IN THE UNITED STATES. Volume II details the results of case study investigations and analyses of seven operating exclusive bus lanes. Three of the exclusive bus lanes operate as contraflow facilities on freeways, three as contraflow bus lanes on arterial streets, and one as a specially constructed bus lane. The study found that exclusive bus lanes were capable of processing large volumes of passengers often with substantial time savings over competing modes. Findings indicate that busways offer the potential for substantial gain in total capacity to move people. There is strong evidence that commuters are attracted to public transportation such as can be provided via an exclusive bus lane if travel time saving is achieved. Bus lanes can be made operable in a matter of weeks at a cost that can often be absorbed within operating budgets. A variety of technical, institutional and operating experiences associated with the various bus lanes now operational are detailed. In addition, the potential for bus lanes in five diverse urban environments is analyzed. Data are provided on Federal funding appropriate to establishing bus lanes.

Dupree, JH Pratt, RH ; Pratt (RH) Associates, Incorporated Jan. 1973, 185p; See also PB-223 197.; Contract DOT-OS-20034; ACKNOWLEDGMENT: NTIS (PB-223922/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223922/6

12 072216 DISTINCTIVE MARKINGS AND REGISTRATION OF SERVICE VEHICLES TERMINALS AND BUS STATIONS [Otlíčitel'nye znaki i ofornimlie podvizhnogo sostava avtomobil'nogo transporta, ostanovochnykh punktov i avtobuchykh stantsii]. This standard applies to the distribution, content, and dimensions of the markings on rolling stock, terminals, and bus stations. This is GOST 18857-75. It contains charts which show the form and design of the markings, and a section on technical requirements which include language (i.e., both the national and the Russian languages must be used); material (e.g., plastic, plexiglass, galvanized steel, etc.); size of the letters, etc. The appendices indicate the distribution of signs on the autobus. This is followed by GOST 18858-73, which is concerned with stop signs for passenger transport vehicles. The section on distribution and content provides a description of stopping points (e.g., initial, inter, and final) in the city and inter-city transportation lines of both buses and taxis. There are charts to show the form and design of the markings. The technical requirements are concerned with the type of steel used for the markings, the colors, sizes of the letters, etc. The next standard is GOST 18859-73, which provides schematics and reference tables for bus stations. Again there are reference to the language and dimension variations. The appendix has a schematic for inter-city and suburban autobus lines. The final standard is GOST 18860-73, which pertains to the representation dimensions, and distribution of markings for light and route taxis. The technical requirements include mention of colors and the appendix provides examples of distribution of markings light and route taxis, including stencils, decals.

Council of Ministers of the Union of USSR GOST 18857,18860-73, 1973, 47 pp, Figs.; ACKNOWLEDGMENT: TSC

12 080307 CONTROL OF PAIRING OF VEHICLES ON A PUBLIC TRANSPORTATION ROUTE, TWO VEHICLES, ONE CONTROL POINT. If the time required for a vehicle (particularly buses or elevators) to load passengers is an increasing function of the number of passengers loaded, then, on a route served by more than one vehicle, the vehicles tend to form pairs. If a vehicle runs behind (ahead of) schedule, it typically will pick up more (less) passengers and get even further behind (ahead of) schedule. The following is concerned with a shuttle type of route having just two vehicles and serving passengers who arrive at a constant rate. There is one control point at which vehicles can be intentionally delayed. The object is to devise a strategy of control that will minimize the average waiting time of the passengers. The strategy must correct for random fluctuations in trip time so that the headways will not become sufficiently unequal as to initiate effects of pairing. An approximate solution of the optimization problem suggests that the optimal control involves sufficiently tight control that the pairing effect has little influence on the waiting times.

Newell, GF (California University, Berkeley) *Transportation Science* Vol. 8 No. 3, Aug. 1974, pp 248-264, 7 Ref.; ACKNOWLEDGMENT: Transportation Science; ORDER FROM: ESL, Repr. PC, Microfilm

12 083079 LOS ANGELES PIONEERS EXCLUSIVE BUSWAY. The Southern California Rapid Transit District has constructed a grade-separated bus transit system extending 11 miles through the San Gabriel Valley corridor. This Busway has the potential for even greater passenger capacity since the lanes could be easily converted to rail rapid transit at a relatively minor cost as future patronage and environmental needs warrant. Southern Pacific right-of-way adjacent to a major freeway provided space for the Busway, and relocation and elevation of the railroad was a major part of the overall project. Five years of negotiations and cooperation between a multitude of agencies and government bodies preceded the construction.

Gallagher, R (Southern California Rapid Transit District) *ASCE Civil Engineering* Vol. 45 No. 1, Jan. 1975, pp 64-67, 3 Fig.; ORDER FROM: XUM, Repr. PC

12 083260 OPTIMISING BUS SYSTEMS IN URBAN AREAS. A SEMINAR ON "THEORETICAL MODELS FOR FIXED SCHEDULED AND ACTUATED BUS ROUTING IN URBAN AREAS" TOOK PLACE AT LINKÖPING UNIVERSITY, DEPARTMENT OF MATHEMATICS, MAY 1973. THESE PROCEEDINGS CONTAIN MOST OF THE PAPERS PRESENTED. THE FOLLOWING PAPERS ARE INCLUDED IN THIS PUBLICATION (1) ANDERSON,AE, INTEGRATED TRANSPORTATION AND LOCATION THEORY AND POLICY. (2) ANDREASON,S, EVALUATING BUS COMFORT BY PREFERENCE. (3) BJELKAAKER,S & SCHEELE,S, OPTIMIZATION METHODS FOR BUS SYSTEMS IN

URBAN AREAS-A LITERATURE REVIEW. (4) BLY,PH, OPTIMIZATION OF A FIXED ROUTE BUS NETWORK. (5) HANSEN,S, A SURVEY OF TRAFFIC MODELS WITH EMPHASIS ON BEHAVIOURAL ASSUMPTIONS. (6) HANSEN,S, THE TRANSLOOK MODEL AND THE PROBLEMS OF IDENTIFICATION. (7) HANER,E, SOME TRADE OFF RELATIONSHIPS IN PUBLIC TRANSPORTATION. (8) HOLM,J, A MODEL FOR ALLOCATION OF BUSES IN A ROUTE NETWORK. (9) HOLMBERG,B, A MODEL FOR DESCRIBING TRAVEL TIME, COMFORT AND CONVENIENCE IN A PUBLIC TRANSPORTATION SYSTEM. (10) LILJENBERG,S, A COMPUTER SYSTEM FOR PUBLIC TRANSPORT ANALYSIS. (11) MARTIN-LOEF,A, A BRANCH-AND-BOUND ALGORITHM FOR DETERMINING THE MINIMAL FLEET SIZE OF A TRANSPORTATION SYSTEM.

Erlander, S ; Linköping University, Sweden Proceeding 1974, 296 pp, Figs., 4 Tab., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (IRRD 211173), TRRL

12 083964 AFTERMATH OF THE EXCLUSIVE BUS LANE. The New Jersey I-495 exclusive bus lane (XBL) was the first and most successful contraflow freeway XBL. Its success sparked similar projects and greatly facilitated the other elements of Tri-state's Urban Corridor Demonstration Program. These non and low capital projects were set in perspective by a report on the status, plans, and programs for such projects throughout the Tri-State Region. This report was prepared as part of the National Transportation Study and drew considerable interest. Tri-State's XBL and other experiences with non and low capital alternatives proved very helpful during the early part of 1974. As part of the response to the energy crisis, an Energy Saving Transportation Plan was prepared by Tri-State with participation by county, city, state, federal, public authority, and transit personnel in meetings held throughout the Region on two way, closed circuit television. The plan contains transit, highway, and job site incentives as well as a financing/pricing element. Highway incentives include (on freeways) exclusive bus lanes, priority roadways (no single occupant autos), priority lanes (buses and carpools), and a elimination of bus restrictions, rationalized and priority tolls for bridges and tunnels, increased fringe parking, and bicycle lanes for streets throughout the Region. Financing, to be confined to the transport sector, would include changes (both increases and decreases) to bridge and tunnel tolls, changes in Manhattan CBD parking charges and taxes, a 10 percent additional gasoline tax increasing at one percent annually to be spent in the county in which collected, and a graduated annual registration fee to discourage purchase of oversize cars. Beyond the one-time efforts of the bus lane and these other projects, several continuing changes are underway. Non and low capital alternatives are now a regular part of Tri-State's annual work programs. Applications for federal-aid (highway and transit) will increasingly have to demonstrate the need for capital projects, why low capital approaches would be inadequate. Energy and air quality will be just two of several assessments made of all plans. /Author/

Horn, M *Institute of Traffic Engineers, Proceedings* No. 44, Sept. 1974, pp 130-144, 6 Fig., 21 Tab.

12 084750 A ROUTE COST MODEL FOR BUS. In this report, a cost model is developed for calculating total variable cost, by route, for a bus system. The model is designed to predict the total variable cost, by route, as a function of three variables: (1) vehicles; (2) vehicle-miles; and (3) operation days. The financial statements of the system under study are analyzed and the various costs are allocated to the variable with which they vary. The purpose of the model is to provide transit managers and transportation planners with a more rational framework for comparison of costs of alternative plans or operating policies than is being used at present. Also, the model will provide for the calculation of marginal cost fares, by route. The type of pricing will, according to the authors, insure that the transit company covers its costs at any particular level of service. /UMTA/

Talvitte, A Neal, A ; Oklahoma University, National Highway Traffic Safety Administration, (OK-11-0016) UMTA-OK-11-0016-74-1, Nov. 1974, 39 pp; Sponsored by Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239833/AS

12 090022 A COMPARISON OF THE DUAL MODE TRANSIT SYSTEM AND VARIOUS OTHER TRANSIT BUS OPTIONS. The annual costs and level of service of a Dual Mode Transit System (DMTS) are compared with those of Exclusive Busway Bus (EBB), Exclusive Busway Bus with Small Bus Feeder (EBB/SBF), Expressway Bus (EB), and Conventional Bus (CB) systems. Large and small-bus versions are studied. The systems, defined for Milwaukee in 1990, all provide the same capacity and routes. UMTA Milwaukee Dual Mode Study baseline data are used. Trip time and transfer characteristics are used as measures of level of service. Construction of busways and creation of reserved lanes increase vehicle speed that, in turn, increases driver/vehicle productivity and decreases travel time. The use of small buses allows for shorter headways, more privacy, and demand-responsive service. But small-bus operations are not economical unless automated operations are used. Transfers may have an unacceptable effect on EBB/SBF ridership.

Lieb, JG ; Mitre Corporation, Urban Mass Transportation Administration Final Rpt. MTR-6697, June 1974, 126p; Contract DOT-UT-10028; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238038/4ST

12 090512 THE SHIRLEY HIGHWAY EXPRESS-BUS-ON-FREEWAY DEMONSTRATION PROJECT/A STUDY OF REVERSE COMMUTE SERVICE. Bus-on-freeway operations generally provide peak period commuter transit service to persons traveling from suburban residences through congested corridors to jobs in the major employment centers of metropolitan areas. In a few cases, peak period reverse commute operations may provide service to persons traveling from residences near the downtown employment centers to jobs in the suburbs. In early 1973, two major Shirley Highway Ex-

press-Bus-on-Freeway Demonstration Project reverse commute routes began service to office buildings in Northern Virginia. An analysis of this reverse commute service revealed that it was a successful operation because it provided considerable benefits to its patrons and was slightly profitable to the bus operator on an incremental cost basis.

Waksman, R ; National Bureau of Standards, Urban Mass Transportation Administration, (NBS-434552) Intrm Rpt. NBSIR-74-624, UMTA-IT-060024-74-1, Dec. 1974, 40 pp; See also report dated Jun 73, COM-73-11453, and report dated May 73, PB-222 675.; Contract DOT-AT-40018; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; COM-75-10412/5ST

12 092352 CRANSTON TRANSVAN. This is the final report of the Cranston TRANSVAN, a demonstration program of low-cost, demand-responsive transportation for the elderly and the handicapped of Cranston, Rhode Island, a suburban community of over 75,000 population. This report covers activities from Sept. '72 through Dec. '74. TRANSVAN'S unique and innovative scheduling provides a combination of services to maximize the utilization of the systems 3 buses to best serve subscriber demands. Fixed and flexible routes, variable fixed schedule and dial-a-ride, all door-to-door and on demand, operate in concert. Transportation services offered have been: Mon. through Fri., personal trips for medical services, grocery and retail shopping, senior club meetings, personal business, and charters and connections; Sat. group recreational trips; and Fri. evening and Sun. worship service. This report presents a picture of the project in terms of planning, organization and operation and includes data, maps and statistics. Drawings and pictures of the 19-passenger buses as redesigned for the program are included. One of the three buses has a special elevator to allow easy access for passengers in wheelchairs.

Duffy and Shanley, Incorporated, Urban Mass Transportation Administration, (UMTA-RI-06-0006) Final Rpt. UMTA-RI-06-0006-75-1, Feb. 1975, 42p; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244639/1ST

12 093361 RAPID COMMUTER TRANSIT FOR MEDIUM SIZED URBAN AREAS. The approach to the problem took into account present and future travel, public attitudes and preferences available on-site facilities and state-of-the-art equipment, and the interest of local businessmen, financial agencies, and government officials in solving the problem prior to its continued development. Chapters include: An inventory of existing conditions in the Corridor; models and forecasts (1995) of planning and travel data; alternative transit concepts such as priority lanes and ramp metering; detailed analyses of the most promising transit alternatives; recommendations for the provision of high quality transit service in medium-sized urban areas; and the extent of applicability of these recommendations to medium-sized urban areas throughout the U.S.

Hajj, HM ; South Carolina University, Columbia, Urban Mass Transportation Administration, (UMTA-SC-11-0002) UMTA-SC-11-0002-75-1, Jan. 1975, 318 pp; Contract DOT-UT-419; Ac-

KNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245625/9ST

12 094040 POTENTIAL FOR FLEXICAB SERVICES: INNOVATIVE USES OF TAXIS AND JITNEYS FOR PUBLIC TRANSPORTATION. Taxis and jitneys can be significant urban transportation resource. Used innovatively to provide public transit services, they can offer mobility in low density areas where mass transit is not feasible, supplement mass transit economically to improve the overall level of service, promote ridership of regional rapid rail and commuter rail systems and express bus services to reduce the use of private vehicles. The term flexicab has been coined to refer to the range of demand-responsive and fixed-route services that can be offered as extensions of existing taxi/jitney operations. The taxi industry, with its experience in small vehicles, dispatching and flexible routing is particularly suited to flexicab operations. Opportunities for profit exist, particularly when several types of flexicab services are offered by the same operator, permitting him to make maximum use of his labor force and equipment. Three examples of multi-service flexicab systems are presented in the form of scenarios set in hypothetical urban areas (small, medium, and large). The examples include the calculation of revenues, operating costs, and net earnings. The report also reviews the present status of the taxi and jitney industry and makes policy and research recommendations. A bibliography and a list of contacts are included in appendixes.

Remak, R ; Interplan Corporation, Transportation Systems Center Final Rpt. DOT-TSC-OST-75-52, DOT-TSC-OST-75-52, Dec. 1975, 155 pp; Contract DOT-TSC-748; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248783/3ST

12 094170 FULL COSTS OF URBAN TRANSPORT. PART I. ECONOMIC EFFICIENCY IN BUS OPERATIONS; PRELIMINARY INTERMODAL COST COMPARISONS AND POLICY IMPLICATIONS. Contents: Derivation of unit costs; Structure for assessing the short and long run costs of bus service; Long run equilibria and system capacity; Integrated bus service and inter-modal cost comparisons. Portions of this document are not fully legible.

Keeler, TE Merewitz, LA Fisher, P Viton, P ; California University, Berkeley, National Science Foundation Monograph-19, NSF/RA/S-75-069A, Dec. 1974, 156 pp; See also PB-248 146.; Grant NSF-GI-37181; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248145/5ST, DOTL NTIS

12 094181 VOLVO B-58 ARTICULATED BUS DEMONSTRATION SURVEY RESULTS. The document is a tabulation and summary of questionnaires given to 1235 riders, 51 transit drivers and 8 transit maintenance personnel in the six west coast cities that participated in the 1974 demonstration of a Volvo three-axle articulated motor bus from Stockholm Transit. The bus was leased by the Municipality of Metropolitan Seattle, (METRO), demonstrated in Seattle, and was then demonstrated by B.C. Hydro, Vancouver, British Columbia; AC Transit, Oakland, Golden Gate Transit, San Rafael; Southern California Rapid Transit District, Los Angeles; and San

Diego Transit. The questionnaires for riders were directed at their evaluation of the characteristics of the bus, their transportation habits and their demographic characteristics. Bus drivers were asked their reaction to the features on this bus and its driving characteristics. Maintenance supervisors were asked their comments on servicing this bus compared to standard transit buses and the use of present shops for the longer articulated bus. Overall, the report concludes that the European articulated bus, with some modifications, should perform well in U.S. and Canadian transit service.

Seattle, City of, Booz-Allen Applied Research, Incorporated Final Rpt. MMS/Transit-75/0001, June 1975, 79 pp; Prepared by Booz-Allen Applied Research, Inc., Bethesda, Md. Participating Transit Properties; B. C. Hydro, Vancouver, Seattle Metro Transit, AC Transit, Golden Gate Transit, Southern California Rapid Transit District, (SCRTD), San Diego Transit.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247894/9ST

12 095301 BUS RAPID TRANSIT OPTIONS FOR DENSELY DEVELOPED AREAS. This report describes and evaluates alternative bus rapid transit systems in densely developed urban areas. It reviews the state-of-the-art, identifies significant options and technologies, and assesses their cost, service, and community impacts. It is intended as a guide for community leaders and transportation planners interested in providing fast, reliable metropolitan bus rapid transit service. Bus rapid transit is feasible from operational, capacity and environmental points of view. Service can be provided on-street where land-use and traffic conditions permit. Contra-flow curb bus lanes on one-way streets, or lanes in the median of a wide street, are more effective than reserved curb lanes in the normal traffic flow direction. The bus-only street, where it can be implemented, is the most effective surface rapid transit option. Bus subways are technically feasible and should be developed where on-street service cannot provide the desired schedule reliability and the needed capacity to attract passengers.

Smith (Wilbur) and Associates Feb. 1975, 187 pp; ORDER FROM: GPO, Orig. PC; S/N 050-001-00089

12 096832 THE MODELLING OF BUS JOURNEY TIMES FOR AREA TRAFFIC CONTROL. TRANSYT 5, the latest version of the TRRL's program for designing the offsets between traffic signals in an area control system, allows for buses to be considered as a separate network. This is an important development in the light of world oil prices and the current desire to assist public transport in town centres. The model used for bus movement between signals is a modification of that used previously for general traffic, but, as buses are fewer in number and less predictable, the authors felt the need for further examination. Data on bus flow were obtained from a number of sites in Manchester, the model tested and some suggestions made for improvement. (A) /TRRL/

Leake, GR Doherty, A (Leeds University, England) *Traffic Engineering and Control* Vol. 15 No. 14, June 1974, pp 652-5, 3 Fig., 4 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 211612);

ORDER FROM: ESL, Repr. PC, Microfilm

12 097476 BUS PRIORITY IN INNER LONDON 1. COMPARISON OF ALTERNATIVE BUS PRIORITY STRATEGIES. This article reports an exercise to determine the best way of deploying bus priority measures in inner London. A computer model is used to predict the effects of three types of bus priority measure: bus lanes (short lanes at points of delay and a network of continuous lanes); a restricting cordon controlling the volume of non-bus traffic entering the central area; a series of bus-and taxi-only streets. The methods are evaluated in terms of the costs and benefits to bus passengers and other road users. The concluding section discusses some of the assumptions of the model and further considers the advantages and disadvantages of the measures. It is pointed out that the cost effectiveness of all the measures would be enhanced by improvements to the bus services. /TRRL/

Buchanan, CM Coombe, RD Hewing, RB (Greater London Council) *Traffic Engineering and Control* Vol. 15 No. 10/1, Feb. 1974, pp 480-486, 5 Fig., 2 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 211605)

12 097853 STANDARD CODING OF VEHICLE INFORMATION [Standaardcodering van Voertuiginformatie]. Vehicle identification can be by means of selective vehicle detection. Efficient processing of information demands a uniform framework for coding. The article deals with the application of a vehicle identification system, an analysis of the information needed, information sources and demands for use. Attention is paid to the organizational structure with regard to the application and current technical possibilities and restrictions. Finally a standard code is given. /TRRL/ [Dutch]

Hakkesteeft, P Kanters, E *Verkeerskunde* Vol. 26 No. 1, Jan. 1975, pp 18-21; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 211878)

12 099742 TELECOMMUNICATION AND TRANSPORTATION. Automatic vehicle monitoring (AVM) and its application to municipal mass transit, taxis, trains, and general highway systems is briefly discussed. This technically feasible (although expensive) system with great potential social benefits is designed to determine on a periodic basis and without human intervention, the location and status of every vehicle in the system. Random environmental and human factors can cause change in planned headways in urban bus operations. An AVM system with its frequent automatic interrogations and updates could adjust routes and schedules in real time to compensate for unpredictable variations. The system also permits the accumulation of data such as mileage, fuel consumption, and travel time for off-line analysis. Based on a 100-bus fleet, it has been estimated that the annual benefits achievable through improved scheduling and reduced manpower and fleet costs amount to about \$1333 per vehicle. An AVM system that makes use of radio-location technique could function most effectively with police car fleets. An AVM system that offers moderate accuracy for locating vehicles can improve the service, efficiency and revenue of taxi fleets. Taxi dispatching services could be considerably improved by com-

puterized systems. A variety of techniques are being developed to meet the needs of train communications; the techniques range from inductive track circuits to radiating transmission lines and may have the potential for on-board public address systems and passenger telephone service. The benefits derived from an AVM system will depend in large measure, on the information that can be acquired and the manner in which it is processed and used.

Kodis, RD (Transportation Systems Center) *American Society for Information Science, Bulletin* Vol. 2 No. 1, June 1975, 3 pp

12 126151 DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS & SERVICES. INTRODUCTION. Significant, unresolved issues which will impact the future of demand-responsive transportation (DRT) are the focus of this International Conference on Demand-Responsive Transportation Systems. The integration of demand-responsive and fixed route services is of utmost importance in large metropolitan areas. Some area-wide approaches are being implemented in Ann Arbor, Rochester, Orange County, Toronto and other areas. The question of whether door-to-door service for the elderly and handicapped should be combined with the more general service was addressed, and the role of computers in automated dispatching systems was discussed. The conference also addressed the role of taxicab companies in DRT operations as well as the more general issues of taxicabs companies. The Committee on (Urban Transport Service Innovations) paratransit, which organized this conference, recognizes that DRT involves many different groups (transit, taxi, labor, government) who must cooperate with each other and coordinate their work. The Committee recognizes that several unresolved issues such as ride-sharing, vehicle design and institutional problems are common to the different paratransit concepts. It is also recognized that a successful urban transportation system should consist of integrated paratransit and transit services rather than independent uncoordinated services.

Roos, D (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 1-2; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126153 STATE OF THE ART OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 2. Demand-responsive transportation (DRT) provides effective suburban services which should be an integral part of metropolitan transit systems and closely coordinated with fixed-route, line-haul services. Operating economics will be realized by such a comprehensive service. Integrating DRT service into a larger system provides management flexibility. Fixed-route drivers can be used on DRT vehicles in off-peak hours to reduce total system costs. DRT service has been effective in raising local funds for transit operations. Origin-destination data collected as a by-product of DRT operations, particularly computer based operations, can contribute to a better

use of vehicles and drivers in both types of services. Such data, which is useful in transit planning, can replace information now collected in surveys. A diversity of DRT scheduling methods have been identified and studies are now in progress to determine the best combination of scheduling methods under a variety of operating circumstances.

Ziegler, EW (Urban Mass Transportation Administration) *Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 5-7*

Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126154 STATE OF THE ART OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 3.

The clarification of the overall role of the taxi industry in the urban transportation system is identified as the major issue facing the industry today. Taxis are a major element in the urban transportation system; they serve more than 3,400 communities. Taxicabs carry more than 27 percent of the urban public transportation market. The taxi is considered the most flexible and efficient for demand-responsive service and shared use of the taxi in coordination with buses is the best short-range solution to urban transportation problems. It could also be the best long-range solution provided it continues to offer flexibility at favorable overall cost. The need for a flexible public passenger transportation system and the coincidental responsibility of making capital grants and fare subsidies is recognized. The need is indicated for subsidies and for monies to fulfill the need for equipment replacement, research and design of vehicles, and automatic identification-dispatch systems that would increase productivity 20 to 30 percent. The whole area of taxi regulation needs to be examined by the industry and government. There is a need for subsidized rides. A change of legal status is also necessary if the industry is to receive help on a continuing basis from local or federal sources. It is proposed that the taxicab industry and UMTA open discussion on eligibility for grants and the subsidization of particular groups of riders. The discussions should initially center on 4 areas: finance; service standards; entry into the industry and exit of the market; and equitable and consistent rate-making policies.

Boynton, C (Salt Lake City Taxicab Association) *Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 7-13*; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126155 PLANNING FOR NEW AND INTEGRATED DEMAND-RESPONSIVE SYSTEMS. SPEAKER 1.

North American data are presented that indicate a small but rapidly grow-

ing market for demand-responsive transportation (DRT). Systems are proliferating at the rate of 2 to 3 per month and indications are that it will continue. It is shown that except for taxi operations, fleets usually have fewer than 10 vehicles and fares are typically 50 cents or lower. The size of area served by DRT is usually smaller than 13 sq. miles. The DRT services implemented to date differ from each other in 3 ways: technical design of the system; markets served by the service; and funding sources for the service. Tailoring the service offered to the market served is the most important consideration in implementing successful DRT services. The commuter market is a major market; DRT services have sometimes been substituted for unprofitable fixed routes, and sometimes serve as feeders to rail rapid systems. It is noted that commuting patterns have been changing during the past decade. Groups with special mobility needs (elderly, handicapped, and the economically disadvantaged) is a second market. Patrons needing local transportation within a particular area are a third market. A recent survey revealed that of 22 reporting systems, all but 3 required subsidy. Of more than 49 operating services, more than half were funded from a single source. Among the range of options for funding DRT services are: local taxes; fares; receipts from package delivery and sale of marketing space; federal subsidies (in Canada); and UMTA grants. In an effort to disseminate basic information to planners and operators, DOT has devised a method to synthesize the substantial array of available literature on DRT services into a state-of-the-art document and to validate the document (prior to its dissemination) at a workshop where experts and local transit operators and planners would comment on the accuracy and relevancy of the material.

O'Leary, K (Department of Transportation) *Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 14-20, 6 Fig., 2 Tab., 3 Ref.*; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126156 PLANNING FOR NEW AND INTEGRATED DEMAND-RESPONSIVE SYSTEMS. SPEAKER 2.

Key elements of demand-responsive transportation (DRT) planning are discussed and common pitfalls are identified. Three fundamental items are necessary for the achievement of comprehensive DRT planning: (1) work statements which define the scope of each task to accomplish program objectives; (2) schedules of tasks laid out chronologically in logical sequence of events presented in the form of a bar chart or as a task interrelationship network; (3) budgets containing costs (or applications of funds) to accomplish the tasks-the status of each task is indicated by the relation of funds or person-hours expended to data versus those budgeted. For effective implementation control certain other key elements must be incorporated such as the arrangement of plans to fall into natural phases. Also, resources that must be considered include personnel, sources of funding, facilities and equipment, management, and intan-

gibles such as political support. Contingency plans should be prepared for each element of the plan, and the program should be controlled on the basis of work accomplished, costs incurred, and schedule. Estimates of ridership are important in planning and a sector model has recently been developed. Recently developed supply models are outlined, and economic planning, the required level of technology, and operator selection and personnel are briefly reviewed. Contingency planning must cover aspects such as legal issues arising from competition with other forms of transportation, modifications that must be made to standard equipment, the startup overload, radio license, critical paths in DR schedules (vehicles and radios), and the choosing of the mix of services (many-to-many, may-to-one, subscription, parcel delivery etc.).

Wilson, RJ Simpson, AU (DAVE Systems, Incorporated) *Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 20-27, 3 Fig., 3 Ref.*; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126159 IMPLEMENTATION AND OPERATION OF NEW DEMAND-RESPONSIVE SERVICES. SPEAKER 1.

The major steps in the process of starting a demand-responsive transportation (DRT) system are highlighted and the problems and potentials of such a system are reviewed. The initial step in DRT planning is the identification of the needs of the area for which it is considered, followed by planning to accommodate those needs. Demographic and geographic characteristics, peak demand, and seasonal variations are some of the factors to be considered. An overall evaluation of land use is also essential. Determination of the financial plan will be the second step. Modifications to fit available funding, and the need for subsidies must be considered. The marketing and advertising of the service is important and money invested in this area will be returned with dividends. Employees can either make or break a DRT operation and care must be expended in the selection and training of personnel. The importance is emphasized of equipment selection and maintenance planning. Vehicle selection must be based on the requirements of the service and the ability of the operator to purchase and to maintain the equipment. In high-demand areas, digital communication may be necessary to minimize air time. Sound accounting and reporting procedures must be developed to prevent losses and to monitor system efficiency. Computer control must be avoided unless it is needed. If a computer is needed, evolution of the system from a manual system is advised. Fast expansion must be avoided. Initial sources of a small system may lead to over extension of the service. Needs must be identified, opportunities for service must be inventoried, potential markets surveyed, funding capabilities evaluated, and financial sources found before actual expansion. Operators may be contracted to operate the system. Professional help may be needed to achieve the DRT planning, implementation and operation objectives.

Shilling, DR (Orange County Transit District, California) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 33-39, 6 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126160 IMPLEMENTATION AND OPERATION OF NEW DEMAND-RESPONSIVE SERVICES. SPEAKER 2. The essential features of demand-responsive transportation (DRT) are reviewed. The first step in implementing a DRT system is to establish goals and objectives. Goals should be specific and objectives should be set to measure goal achievement. Program management is extremely important, and the program manager should be at a high level in the organization, able to make decisions and able to report directly to the transit agency, community, city council or the mayor. Planning design must be considered a part of system design which also includes determination of hours of service, fare collection methods, type of control system, location of the control center, and areas of high ridership potential. Point-to-point travel times must be determined. Topographic features (hilliness) and accessibility will determine the level of service (design of the system and number of vehicles). Funding sources should be explored before a DRT service is started. Capital costs of most DRT systems are covered by matching grants. Local business managers, taxi operators and private transit operators should be included in discussions of DRT from the outset. Public support must be maintained during the laps between the time the decision is made and the time the DRT system begins service. During the implementation phase, marketing and sales promotion are important. Also during this phase, phase control procedures must be carried out and control personnel selected and trained. Spatial perception tests are useful in the selection of employees.

Helsing, RG (LEX Systems, Incorporated) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 39-41; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126161 IMPLEMENTATION AND OPERATION OF NEW DEMAND-RESPONSIVE SERVICES. SPEAKER 3. Various ways of obtaining federal money for use in implementing a demand-responsive transportation (DRT) system are briefly reviewed. Eligible communities may obtain 80 percent of the funds for all capital equipment and facilities from the capital grants program of the Urban Mass Transportation Administration (UMTA). Funds for capital equipment may also be obtained from the Highway Trust Fund from monies allocated for the Interstate Highway System-if the community decides it no longer wants the Interstate High-

way. Communities may borrow capital funds from the Mass Transit Assistance Act (1974) for use as operating funds. Applications to the UMTA involve submission of a preapplication briefly describing the program and the money needed. If this is successful, a more detailed application is made. UMTA must also be given a 5-year financial plan that includes a 5-year capital improvement program. An environmental impact statement must also accompany the grant application. Before submission of the application, however, a public hearing must be held 30 days after posting a notice of the hearing. A copy of the preapplication is sent to the U.S. Department of Labor, since the UMTA cannot grant money to a community in which those funds would adversely affect labor.

Zobrak, M (DAVE Systems, Incorporated) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, p 41; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126162 IMPLEMENTATION AND OPERATION OF NEW DEMAND-RESPONSIVE SERVICES. SPEAKER 4. The transportation agencies of the states of Michigan, Oregon, Wisconsin and Florida are the most involved in demand-responsive transportation (DRT) and active in aiding local communities or transit district with planning, guidance and funding. New Jersey has funded the Haddonfield project, and California has made available funds (from sales tax on gasoline) through the Transportation Development Act (1971) as local option money. The California Division of Mass Transportation provides technical service and identifies the potential for new services after the local decision-making body has established evidence of interest in a public transportation program. California also provides assistance in marketing, information systems, equipment specifications and special services in areas where DRT already exists. The Santa Clara County DRT project which has 325 Program funding (Transportation Development Act of 1971) is noteworthy.

Gray, G (California Department of Transportation) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, p 42; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126163 IMPLEMENTATION AND OPERATION OF NEW DEMAND-RESPONSIVE SERVICES. SPEAKER 5. The demand-responsive transportation (DRT) service in La Mirada, California is briefly discussed, and certain unique qualities are noted. The system which was marketed not as just transit but an innovative service in a progressive city, was found to have been

oversold prior to start of operations. The system anticipated carrying 50,000 passengers per year, but found that it carried 110,000 during the first year. The system has since been reevaluated and its philosophy is changed. The DRT system has been used as a patrol system and operator reports are a worthwhile service to the community. Public Services such as charter service, free rides to the swimming pool and contacts with shopping center are also offered. A radio communication system and a sophisticated FM paging system are other features of the DRT Service. This DRT Service has contributed considerably to the community image.

Klug, CJ (La Mirada, City of, California) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 42-43; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126164 IMPLEMENTATION AND OPERATION OF NEW DEMAND-RESPONSIVE SERVICES. SPEAKER 6. Comments are made which are based on personal experience and the experience of personnel in the supervision of demand-responsive services. Communication is effected via telephone (by the patron) and radio (between vehicles and the communication center, and possible between vehicles). The telephone equipment must be simple at the start. Sophisticated Automatic Call Distribution System may be used with expansion. Call counters on the lines to indicate incoming flow was found to be useful, as was also the linear recording device to show when the call was answered. A tape system to record all incoming calls and all radio conversations helps eliminate problems between dispatcher and driver, and provides a tool for analyzing and responding to complaints. Radio equipment must also be simple. If DRT is operated by a municipality or transit district, cooperation from the FCC is better if the radio frequency used is from the public safety or transit bus frequency blocks. If a private operator is to operate the system, the use of assigned taxicab frequencies will expediate the initiation of the service. Publicity prior to inauguration of a service is important.

Davidson, JH (Yellow Cab Company) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 43-44; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126165 IMPLEMENTATION AND OPERATION OF INTEGRATED TRANSIT SERVICES. SPEAKER 1. The significant aspects of a short range plan in Orange County, California are reviewed, the preliminary system design is outlined, and the implementation is detailed of a demand-responsive transportation (DRT) in Orange County, California. Initially, 27 feasible

DRT service areas were defined (the criteria are listed), followed by screening the 27 manually controlled areas to determine those most in need of additional service. In the third stage, five criteria were used to rank the candidate areas according to the need for and effectiveness of public transportation. The system design involved establishment of a DRT fare by 50 cents, establishment of service hours the integration of DRT with existing fixed-route services, and the encouragement of commuter services between and within service areas. The preliminary implementation schedule consists of 3 phases; expansion in selected areas, automation, and countrywide expansion. The process, however, requires several projects from designing equipment specifications to locating sites for the storage of vehicles and fuel. Specifications were drawn up covering vehicles, communications equipment, fare boxes, tow trucks, service trucks etc. The system will initially use 2 mountain-top UHF base stations, 1 centrally located UHF base station, 3 microwave terminals and 1 microwave repeater. Each city involved in the expansion program has been asked to contribute 1/3 of the operating deficit of the system operating in the city. Four or more operators will operate the 8 service areas. A common computerized area will be used to avoid duplication of control room space and personnel. A personnel training program is planned which will consist of an aptitude and general intelligence test. An evaluation program is planned which will consist of a monthly overview of each operation and detailed analysis of a day's operation. A management review will take place monthly. A promotional campaign (which avoids overselling) is planned.

Fielding, GJ Grant, SB (Orange County Transit District, California) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 48-55, 2 Fig., 3 Tab., 1 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126166 IMPLEMENTATION AND OPERATION OF INTEGRATED TRANSIT SERVICES. SPEAKER 2. The major control functions (of considerable importance to integrated demand-responsive transportation (DRT) and conventional transit systems) are reviewed, and alternatives being implemented or are realistic possibilities for the future are presented. Control functions are composed of information transfer (related to service requests and vehicle activities), and decision-making (related to operation of DRT vehicles) functions. The service request option for the customer is the telephone system. For integrated systems, another option is receiving the request from the driver of a fixed-route bus (establishing direct communication between the control center and the driver of any route interfacing with DRT). Although the majority of DRT operations now use voice communication for driver instructions, digital communication will become the usual option for large integrated systems. In the Santa Clara integrated DRT and fixed-route system, digital

communications will be used in conjunction with mobile displays and an automatic interface with a computer used for dispatching. Information for driver progress from the driver to dispatcher may be digital or voice communication system. The decision process in integrated DRT and conventional systems can be divided into 3 functional categories: (1) control of simple DRT-the basic issues of a desirable control system are manual or automatic decision making, extent of future planning and commitment, and decentralization of decision making; (2) control of the conventional system; (3) control of transfer trips-the best issues for analyzing this function are (a) the extent of information pertinent to one subsystem, and (b) the extent of dependence of one subsystem on another.

Wilson, NHM Higonnet, BT (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 55-60; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126169 EQUIPMENT AND MAINTENANCE OF DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 1. When the Ottawa Transportation Commission converted (1958) from streetcars, trolley coaches and buses to an all-bus operation, specifications were prepared and tenders were requested for 107 buses. The tenders received were evaluated on the basis of initial cost, availability (downtime), reliability (road calls), and operating and maintenance cost. Bus appearance, comfort, driver and passenger appeal, service and delivery were considered as important intangibles. Data, conditions and circumstances that had to be satisfied by acceptable tenders are listed and 3 fictitious tenders are used as illustrative examples. All tenders must be analyzed to consider what has been included or excluded in the buses offered, and the initial cost adjusted accordingly. The calculation of availability and road calls is described. The calculation of availability and road calls is described. In the calculation of maintenance costs, the standard procedure was to plot the maintenance cost of buses in cents per mile against the number of years in operation. The plot falls on a straight line which increases at the rate of 1.2 cents/mile/year. This represents the maintenance cost standard for own property and the bus that has been standardized on. Project cost curves are illustrated and the establishment of relative costs is explained.

Chaput, H (Ottawa-Carleton Regional Transit Commission, Can) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 69-75, 3 Fig., 1 Tab.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126170 EQUIPMENT AND MAINTENANCE OF DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 2. The criteria developed for the selection of demand-responsive transportation (DRT) vehicles, the minibuses that were bought, the innovative design features and the mechanical problems that were encountered are briefly described. The minibus had low steps, was sturdy, and ecologically acceptable (it had a dual fuel system which used natural gas as the regular fuel and gasoline as a backup fuel). The minibus had disc brakes which were an improvement over the standard drum brakes. Innovative features included an exit door at the extreme rear of the right cantilever, perimeter fiber glass seats, no seat legs in the aisle area, removal of tripping hazards, and storage area under the seats. Some of the mechanical problems (short life of brake linings) were the result of crowding 50 people into a 21-seat bus (at noon). Problems were also encountered with the dual fuel engine; stalling, low fuel mileage overheating and radiator troubles were frequent. A preventive maintenance program has been developed: lubricating, oil change, and normal fluid collection and engine check are done every 3,000 miles, and major inspection is performed every 6,000 miles. Specifications have now been developed which provide for substantially larger, heavy duty brake systems and fuel systems for propane gas or other nonfossil fuels.

Heinle, GW (Southern California Rapid Transit District) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 75-76; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126171 EQUIPMENT AND MAINTENANCE OF DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 3. Experience in vehicle operation and maintenance in the demand-responsive transportation (DRT) system in Batavia, New York is briefly described. The system uses four 23-passenger Flexible Flexettes, and one 10-passenger Ford Courier each of which travel 600 miles per week during the busy season and totals 23,000 miles per year. The operation's preventive maintenance program requires a maintenance check every 1,000 miles. The cost of maintenance (including interior and exterior washing) for a total of 76,383 miles was 10.6 cents/mile. Maintenance costs and an analysis of maintenance and repair jobs are tabulated. Heavy and frequent use of brakes in DRT service cause excessive wear, and break adjustments, relining etc., have contributed significantly to vehicle downtime. Brakes must be relined every 5,000 miles and brake drums replaced each 10,000 miles. Valve failure is the principal weakness in the automobile type of gasoline engines used in most of the small vehicles. DRT service also requires a better system for the cooling of the transmission oil. The recommendation has been made for a replacement program that calls for new vehicles after 75,000 miles or 3 years of service. The program establishes the life of the body as 6 years, and the bodies are remounted on new chassis.

Aex, RP (Rochester-Genesee Regional Transportation Auth) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 77-78, 2 Tab.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126172 EQUIPMENT AND MAINTENANCE OF DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 4. The maintenance and operating costs of 3 fleets of buses is briefly discussed and the efforts towards development of specifications for small buses is outlined. The total maintenance cost is 34.71 cents/mile for the fleet of small vehicles, 7.54 cents/mile for the 1968 fleet of large 40-ft. diesel-powered vehicles, and 4.23 cents/mile for the fleet of full-sized 1972 vehicles. A Small Bus Specification Subcommittee was formed which consulted with manufacturers in the development of specifications. The response from people interested in these specifications has been encouraging. The evaluation of bus bids on the basis of more than low price, will provide the incentive to bus manufacturers to provide competitive, high-quality, reliable, small buses for the market.

Schnell, JB (American Public Transit Association) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 78-79; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

12 126190 EVALUATING DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. PANEL DISCUSSION. In the panel discussion following the presentation of papers on the evaluation of demand-responsive transportation (DRT) systems, comments were invited on the evaluation process. Experience in Washington, D.C. leads one to the view that for the same fixed of dollars, it is possible to provide a much higher level of service by making adjustment in the mix of the service. In the evaluation of DRT as a mode in comparison to other modes, factors considered are the incremental costs of ridership productivity of one mode against another mode under the same circumstances. Taxicabs are identified as a form of DRT and the comment is made that in the industry, measurement is made on a vehicle-per-mile basis whereas most discussions at the conference centered on a vehicle-per-hour measurements. The need is also indicated for a vehicle designed for the handicapped, elderly and children. The importance is emphasized of the study and discussion of DRT system failures as an aid to the better understanding of these systems. It is noted that the study of other transit modes is important as a means to determine under what conditions DRT is an effective strategy. DRT is seen as a means of transportation uniquely suited to the aged, the handicapped, and the young.

Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 153-156 Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off

12 126857 THE SUCCESS OF THE EL MONTE-LOS ANGELES BUSWAY. The success of this Southern California rapid transit line is considered to prove that involved public agencies can come together to accomplish major transportation improvements, and that given a decent alternative choice, the public will ride public transit. The objectives and development are outlined of the 11-mile busway which cost \$56 million to build. The fan-shaped bus routing system is described, and marketing goals and busway patronage aspects are noted.

McDonald, GL (Southern California Rapid Transit District) *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 39-44, 1 Fig.

12 129345 EVALUATION OF A NATIONAL EXPERIMENT IN BUS RAPID TRANSIT. An extensive evaluation is being performed of a bus rapid transit system in Los Angeles that uses exclusive bus lanes in the median strip of a freeway. This national experiment is currently quite successful. Operational feasibility has been demonstrated, and the number of busway system riders has continuously grown over the first 18 months of operation even though the facility is only partially operational. The new riders are former automobile users, and their socioeconomic profiles are more similar to automobile commuters than to bus commuters. Assuming that car occupancy is only 1.3 persons/vehicle, the busway system has at least a tenfold greater capacity (per traffic lane) than the highway system. However, the busway lanes during peak periods currently carry only about half of the person trips that are carried by a freeway lane but are catching up fast. The principal causes for travelers switching from automobile to busway commuting, based on survey results, are to save travel time and to avoid the frustration of the stop-and-go characteristics of a congested freeway.

Crain, JL (Bigelow-Crain Associates) *Transportation Research Record* No. 546, 1975, pp 22-29, 5 Fig., 2 Tab.; ORDER FROM: TRB Publications Off, Orig. PC

12 129371 A TEMPORARY CARPOOL LANE. Carpool use of an exclusive bus lane during a 10-week strike at the Southern California Rapid Transit District, provided the opportunity to study the effect on traffic of carpool use of the lane, and to compare the fuel efficiency between carpool and bus operation on the lane. Comparison of travel times on the special lane with travel times on the mainline freeway showed that carpools were saving up to 20 to 30 minutes one way. The busway lane enabled carpools to bypass several bottleneck locations and considerable congestion. Opening the busway to carpools caused an improvement in travel time of about six minutes in the regular freeway lanes. Using a figure of 5 miles per gallon and an average of 34

passengers, a fuel efficiency of 85 passenger miles per gallon was computed for buses. Using an average fuel economy of 13 miles per gallon and average occupancy of 3.3, the fuel efficiency of carpools is 44 passenger miles per gallon.

Gallagher, MP (California Department of Transportation) *Traffic Engineering* Vol. 45 No. 11, Nov. 1975, pp 36-38, 1 Fig., 2 Phot.

12 129498 RAPID BUSWAYS: A CHRONOLOGICAL BIBLIOGRAPHY. This bibliography contains more than one hundred references on rapid busways. They date from 1967 to 1975. Included are such topics as demonstration projects, exclusive bus lanes, feasibility studies, freeway priority system operation, impact on traffic congestion, environmental impact on traffic signs, costs, planning and design guidelines, and contraflow bus lanes.

Starbuck, JC ; Council of Planning Librarians Bibliog No. 966, Jan. 1976, 9 pp, 112 Ref.; ORDER FROM: Council of Planning Librarians, P.O. Box 229, Monticello, Illinois, 61856 Orig. PC

12 130769 ALTERNATE USES OF A BUS STOP AT A MODAL TRANSFER POINT. In theory, urban bus stops are for the exclusive use of buses. Practice shows that many different vehicles use the bus stop for a variety of purposes. This project examines the nature of these alternate uses and their effects on bus and traffic operations. The method used was the limited case study. A single, busy bus stop in Brooklyn, New York, was observed during both peak and off-peak periods. It is along a major arterial with commercial strip development where parking is allowed. The bus stop is at a rail rapid transit station that is a link to the Manhattan central business district. Data were collected by means of time-lapse photography. The findings indicate that the alternate uses of the bus stop increase the efficiency of the use of the curb. Bus operations benefit through the reduction of bus dwell times, and the increase of delay to traffic is minimal. The nature of alternate operations does not tend to be inherently unsafe.

Skaliotis, GU Crowley, KW (Polytechnic Institute of New York) Alter, CH, Discussor *Transportation Research Record* No. 557, 1975, pp 21-32, 4 Fig., 4 Tab.; ORDER FROM: TRB Publications Off, Orig. PC

12 131349 AUTOMOBILES USED AS MINIBUSES: HELP FOR HARRIED COMMUTERS. A concept has been developed that is based on the idea that some commuter automobiles may be turned into minibuses that pick up and discharge passengers on relatively fixed routes. In this Community Auto Rapid Transit System (CARTS), drivers wishing to participate are investigated for their safety record and insurability and issued a color-coded decal card for identification. During a 1-pass cruise in a designated pickup route, passengers flag cars heading for their destination. Fares are paid directly and fixed by a regulatory agency. Benefits that could be derived can include gasoline conservation, reduction of traffic congestion and air pollution, lower capital expenditure for the local public transportation system and the provision of feeder service for public transit. However limitations exist: CARTS will have to serve a minimum

population of 20,000 and a central business district or employment center. Crime could also pose a problem.

Transportation Research News No. 61, 1975, pp 9-11, 2 Fig., 1 Phot. ORDER FROM: TRB Publications Off, Orig. PC

12 134699 RESULTS OF THE BUS-ON METERED FREEWAY EVALUATION-I35W, MINNEAPOLIS. Evaluation results of an Urban Corridor Demonstration Program sponsored by UMTA, the I-35W Bus-on-metered Freeway System concept are presented in this article. The concept featured the meeting of an urban radial freeway, a real-time traffic management system, an express bus service, priority bus access to the freeway via ramps, and the provision of bus shelters, signs, and parking facilities in the corridor. In addition to the goals of the comprehensive Urban Corridor Demonstration Program, the specific objectives of the I-35W demonstration program; A. improve corridor level of service by metering traffic entering the freeway; B. increase the modal shift of auto drivers and passengers to express bus service; C. improve reliability of the freeway operation through accident reduction and an efficient traffic management system; D. improve transit system performance through decreased travel times and unit costs; E. obtain user acceptance through an advertising program; F. obtain a positive environmental impact through reduced noise and air pollution; G. implement the bus-on-metered freeway system in a cost-effective way. The evaluation of the project, which was divided into three phases, was designed to assess the impact of the project on the corridor and make these observations available to other urban areas. Detailed conclusions for each specific objective are described, with the overall conclusion being that the bus-on-metered freeway concept is a viable solution to medium density radial corridor congestion problems. The concept can be applied where freeway ramp metering can provide a high level of service, where there is a market for express bus service, where freeway ramps can permit rapid access for buses, and where other roads exist for alternate routes.

Carlson, GC (Minnesota Department of Highways) Wolsfeld, RP, Jr (Bather-Ringrose-Wolsfeld, Incorporated) Penke, RJ (Minnesota Department of Highways) *Traffic Engineering* Vol. 46 No. 3, Mar. 1976, pp 17-23, 3 Fig., 3 Tab., 5 Phot., 2 Ref.

12 138442 DEMAND-RESPONSIVE TRANSIT: AN OVERVIEW OF INTEGRATED SYSTEMS. A propositional inventory is presented pertaining to definitions, cost, automation, and attitudes of transit managers, unions and taxicab companies. The proposition is considered that demand responsive transportation (DRT) will obtain an increasing share of the transportation market as public officials respond to the transit demands of multinucleated metropolitan areas. The cost of DRT and fixed-route transportation (FRT), the benefits of zonal increments, and the recommendation for critical path method of incremental development (with regard to equipment) are discussed. The demand for DRT is restricted by the inability of operators to supply an acceptable level of service. Automated scheduling and information processing can increase efficiency; a fully integrated DRT cannot be

achieved without automation. Integrated DRT systems which link flexible-route and fixed-route transit are considered and it is pointed out that it is a mix of systems acting cooperatively, and not necessarily under single ownership, that adapts to demand. Computer systems are needed for the control and management of an integrated DRT system, but they lead to unforeseeable complexities. It is noted that institutional attitudes rather than technical problems restrain expansion of DRT, and that taxi companies should be more actively involved as operators if integrated DRT is to expand. The successful projects in Ann Arbor, Michigan, Rochester, New York, the stalled program in Orange County, California, and the unsuccessful experiment in Santa Clara county are considered as illustrations.

Fielding, GJ (California University, Irvine) *Transportation Research Board Special Reports* No. 164, 1976, pp 45-54, 20 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

12 138812 VEHICLE-SELECTIVE DETECTION-TECHNIQUES AND THE LEVEL OF SERVICE OF PUBLIC TRANSPORT [Voertuigselectieve Detectietechnieken en de Afwikkeling van Het Openbaar Vervoer]. In order to improve public transport great attention must be paid to the quality of the service. Regularity and punctuality must be improved. Before a central processing control can be introduced a favourable traffic situation must be brought about. Free lanes must be constructed and traffic controls related to public transport must be given priority. In a later phase, vehicle-selective detection will be essential for the achievement of a system of control of regularity. [Dutch]

Zeevenhooven, EC ; Wyt and Zonen B.V. Vol. 28 N Feb. 1976, 82-87 pp, 5 Fig., 1 Tab., 3 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219710), Institute for Road Safety Research

12 142144 PROCEEDINGS OF SEMINAR 5 ON PUBLIC TRANSPORT HELD ON 7-9 JULY 1975, SESSION 2: BUSES IN TRAFFIC. The papers presented at session 2 of the seminar are as follows: the justification and assessment of bus priorities, rapson,gh; public transport priority and environmental improvement: can the same management measures serve twin objectives?; donnison,r; w3 bus route study, trevelyan,p and wright,l; express buses in Curitiba, Brazil, scurfield,rg; bus priorities and traffic management, levinson,hs. For the covering abstract of the seminar, see IRRD abstract no. 220828. /TRRL/

Rapson, GH (Doe) Donnison, R (Colin Buchanan & Partners) Trevelyan, P (Freeman Fox & Associates) Wright, L (London Borough of Haringey) Seurfield, RG (SOCIETE CIVILE FREEMAN FOX, FRANCE) Levinson, HS (Wilburn Smith & Associates) ; Planning and Transport Res and Computation Co Ltd Proceeding, COLLECTION P126, July 1975, pp 23-75, Figs, Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 220830)

12 142145 PROCEEDINGS OF SEMINAR 5 ON PUBLIC TRANSPORT HELD ON 7-9 JULY 1975, SESSION 3: "NEW OFF THE GROUND". Session 3 contains the following papers: dial-a-bus: London transport experience, symonds,aas and day,dj; (some preliminary research of harlow dial-a-bus experiment, mitchell,cgb and martin,ph (for abstract of this paper, see IRRD abstract no. 220832); some implications of fare concessions for the elderly, jenkins,ia and skelton,ng; potential methods of improving bus operations-some pointers from the bradford bus study, skinner,rj; the Scottish postbus network, trodden,cw. For the covering abstract of the seminar, see IRRD abstract no. 220828. /TRRL/

Symonds, AAS Day, DJ (London Transport Executive) Mitchell, CGB Martin, PH (Transport and Road Research Laboratory) Jenkins, IA Skelton, NG (University of Newcastle Upon Tyne) Skinner, RJ (L. Travers Morgan and Partners) ; Planning and Transport Res and Computation Co Ltd Proceeding P126, July 1975, pp 76-87, 2 Fig., 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 220831)

12 145315 VETAG-TEST [Vetag-Proef]. In Amsterdam a continuous test is carried out of selective vehicle detection at a junction using the so called vetag-test. The name vetag is derived from vehicle-tagging, which can be described as equipment for selective detection, identification and localization of vehicles. The vetag system consists of an interrogator, a detection loop and a transponder. A three-day comparative test was carried out, with the aid of a time recorder, by which the functioning of traffic with and without the priority principle was studied. The main purpose was to test the electronic possibilities of the vetag system. The conclusions are presented and discussed. /TRRL/ [Dutch]

Middleham, F ; Verkeersbureau, Sector Verkeerslichten VA-1, Jan. 1976, 26 pp, 8 Fig., 7 Tab.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 223189)

12 147302 LORAN-C FEASIBILITY DEMONSTRATION PLAN. The report sets forth the following objectives of demonstrating terrestrial applications of LORAN-C, a radio navigation system, operated and maintained by the U.S. Coast Guard to determine the: (a) need for and costs of calibrating and of converting LORAN-C time difference values to other site location forms; (b) control display requirements as a function of system application; (c) costs and problems involved in training users; (d) steps required to implement a LORAN-C system in each of the application areas; (e) operational difficulties and to (f) document costs of implementation of a LORAN-C system. The report details demonstration scope, fiscal, temporal, evaluative criteria, and manpower requirements. Applications to be demonstrated are among those detailed in preceding report under this contract entitled, 'LORAN-C Conceptual Analysis.' Applications are distributed in three major categories: Automatic Vehicle Monitoring (AMV), Automatic Vehicle Location (AVL) or Dispatch, and Site Registration.

New York State Department of Motor Vehicles, Polhemus Navigation Sciences, Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-802-057, Oct. 1976, 45 pp Prepared in cooperation with Polhemus Naviga-

tion Sciences, Inc., Burlington, Vt.; Contract DOT-HS-5-01234; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-260675/4ST

12 148448 THE ROLE OF ADVANCED ELECTRONIC COMPONENTS IN COMMUNICATING WITH MOVING VEHICLES.

The viability of methods of communicating to and from moving vehicles depends on the availability of inexpensive and reliable electronic components of advanced performance. If suitable components are available, a variety of sophisticated schemes for managing private, commercial, and public transport becomes feasible economically and technically (if not politically); possibilities include the transmission of route or hazard information to vehicles, the extraction of data from vehicles (identity, axle loading, etc.), and two-way communication for public-transport vehicles. This paper surveys the roles which may exist in traffic management for modern solid-state components such as advanced silicon integrated circuits, charge-transfer devices, surface-acoustic-wave structures, and microwave sources. Special emphasis is given to the basic problems of, firstly, establishing localized regions for propagation on a space-division-multiplex basis and, secondly, providing structures which operate, store, and detect complex codes or messages.

Hooper, DE (LaTrobe University, Victoria, Australia) *Australian Road Research Board Conference Proc* Vol. 8 Aug. 1976, pp 1-6, 7 Fig.; Proceedings of the Eighth Conference, August 23-27, 1976, held at the University of Western Australia.

12 148717 PRINCIPLES FOR DEVELOPMENT OF AUTOMATED CONTROL SYSTEMS FOR URBAN TRANSPORTATION AND THE METHODS USED [Printsiy sozdaniya avtomatizirovannykh sistem upravleniya dvizheniem gorodskogo obshestvennogo transporta i kharakteristika ispol'zuemykh tekhnicheskikh sredstv].

The main goal of controlling urban passenger transportation is satisfying travel needs while utilizing resources with maximum efficiency. Three stages of automated control are evolutionary. Initially dispatcher communications is followed by information display and then the stage which has been achieved: Automated systems of traffic control for individual types of urban transport. The ASSDY-A automated system of control for buses and the ASDY-3 for electrified city transport, streetcars and trolleybuses, can be developed into the ASDY-MT automated system of dispatcher control for routed transport. A separate system for control of taxis also exists. At present the automated system of dispatcher control is being implemented in various USSR cities. [Russian]

USSR Ministry of Housebuilding & Communal Economy No Date, 21 pp; Complete translation is available for reference. Contact Technology Planning Office, Office of Research and Development, Federal Railroad Administration, U.S. DOT.; ACKNOWLEDGMENT: FRA; ORDER FROM: USSR Ministry of Housebuilding & Communal Economy, Moscow, USSR

12 149069 PLANNING AND ROAD DESIGN FOR BUS SERVICES. PARTS 1, 2 AND 3.

This paper which appeared in 3 parts in consecutive issues of the journal comprises the following

chapters: principles of design (county policy, design principles, application of the principles, recommendations); strategic design (development of the network, physical characteristics of routes, development of routes, integration of public transport and development, basic layout principles, pedestrian routes and bus stop siting, guidance for developers); bus rapid transit (the system, geometric design of exclusive busways, operation, non-exclusive busways, implementation); bus priority measures (importance, effects on other traffic, assessment of priority schemes, with-flow bus lanes, contra-flow bus lanes, bus links, transponders, miscellaneous measures); providing for buses in highway design (importance of bus provision, design considerations, effects of road schemes on bus services, highway design standards); buses in pedestrian streets (pedestrianisation, passenger accessibility, efficiency of operation, environmental problems, design and operation of bus streets, examination of schemes); assessment of schemes (return on investment, assessment of benefit to buses, assessment of benefit to passengers, and effect on other traffic). /TRRL/

Ball, RR Brooks, RJ (West Midlands CC) *Institution of Municipal Engineers, Journal of Analytic* Vol. 103 No. 7/8, July 1976, 9 pp, Figs., 6 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 223637)

12 151147 AUTOMATIC VEHICLE MONITORING SYSTEMS.

Automatic Vehicle Monitoring (AVM) systems, which provide the location of fleet vehicles automatically determined and made available at a central office, have been the subject of study for many years. This report examines a variety of techniques proposed for AVM applications, as well as, the efforts made in the related field of Automatic Vehicle Identification (AVI). Technologies for locating urban fleet vehicles are discussed and classified under four broad categories: Dead-reckoning, Radio Time-of-Arrival, Proximity, and Triangulation techniques. AVM offers the potential of increasing the efficiency of several types of fleet operation, including mass transit, police, taxi, and other fleet systems, while simultaneously improving the security on board these vehicles. AVM also offers a high potential for commercial users in urban areas, namely, package delivery services, private maintenance services, and truck delivery systems.

Scales, WC ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0027) M75-9, UMTA-VA-06-0027-74-1, Oct. 1974, 69 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-262469/0ST

12 156096 HIGH-PERFORMANCE BUS RAPID TRANSIT SYSTEMS: A DESIGN-PROCESS EXPERIMENT.

This paper evaluates an experimental approach for designing a bus rapid transit system. The particular system was to serve a single large destination, the University of Washington, and to meet desired levels of performance within a series of constraints regarding its physical characteristics. Five groups of students were given this design problem and asked to find satisfactory solutions using the Urban Transit Analysis System (UTRANS), an interactive graphic system, within a 10-week period. The experimental definition included a large and complex network, a demand

set, a cost-benefit framework that includes 23 performance measures, a group-determined set of weights of relative importance for the performance measures, acceptable and ideal standards for the performance measures, a group-determined set of parameters for the modal-split model contained in UTRANS, and a set of upper limits on the size of the system. The five teams generated and evaluated 82 alternative designs and finally recommended 7, all of which had acceptable levels of performance for all 23 objectives. These 7 final designs were compared in physical and performance terms and found to be similar. The design strategies used are discussed briefly, and the experience of one team that processed 28 design alternatives is illustrated. All final designs were quite conventional; no unusual designs having a high level of performance were discovered. The major finding was that inexperienced persons could solve this complex problem in a relatively short time with the aid of the UTRANS systems. /Author/

Schneider, JB Clark, JW (Washington University, Seattle) *Transportation Research Record* No. 606, 1976, pp 30-36, 7 Fig., 1 Tab., 8 Ref.; ORDER FROM: TRB Publications Off

12 156099 BUS AND SHARED-RIDE TAXI USE IN TWO SMALL URBAN AREAS.

The demand for publicly owned fixed-route, fixed-schedule bus service was compared with the demand for privately owned shared-ride taxi service in Davenport, Iowa, and Hicksville, New York, through on-board surveys and cab company dispatch records and driver logs. The bus and shared-ride taxi systems in Davenport competed for the off-peak-period travel market. During off-peak hours, the taxi tended to attract social-recreation, medical, and personal business trips between widely scattered origins and destinations, while the buses tended to attract shopping and personal business trips to the CBD. The shared-ride taxi system in Hicksville, in addition to providing many-to-many service, competed with the countywide bus system as a feeder system to the Long Island commuter railroad network. In each study area, the markets of each mode of public transportation were similar. There were no statistically significant differences between bus and shared-ride taxi users in Davenport relative to ability to drive, household income, employment status, number of automobiles available to the household, and physical capabilities. Bus and shared-ride taxi users in Hicksville differed slightly in age, household income, number of automobiles available to the household, and distance from home to bus stop. In general, a major portion of the market of both shared-ride and taxi systems were of people likely to be dependent on some form of public transportation for some of their trips. /Author/

Middendorf, DP (Peat, Marwick, Mitchell and Company) Heathington, KW (Tennessee University, Memphis) *Transportation Research Record* No. 606, 1976, pp 48-53, 2 Tab., 8 Ref.; ORDER FROM: TRB Publications Off

12 156320 AUTOMATION FOR BUS OPERATION IN PARIS.

For several years the Paris Transport Authority has been automating operations aiming to adapt bus traffic to demand or to improve bus control. The various aspects of the system are data collection on bus running and

passenger flow, assignment of buses and establishing of bus scheduling and crew duty rosters, real-time tracking of bus movement and its perturbations, traffic control, passenger control and information. The paper discusses the various devices and processes involved in the systems that are under study, under experimentation or in operational use. As far as possible, the results and progress of the projects or of evaluations in process are given.

Perrin, J (Paris Transportation Authority, France); International Federation of Automatic Control Proceeding 1976, pp 67-72; Proceedings of the International Federation of Automatic Control/International Foundation for Information Process/International Federation of Oper Research Society International. Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI (EIX770400449); ORDER FROM: ESL

12 156414 AUTOMATIC VEHICLE LOCATION--AN OVERVIEW. Automatic vehicle location (AVL) techniques have the potential for improving urban vehicle fleet operations. Various approaches to AVL are discussed and an introductory overview of the current state of the art in AVL technology is presented.

Riter, S (Texas A&M University) McCoy, J *IEEE Transactions on Vehicular Technology* Vol. 26 No. 1, Feb. 1977, pp 7-11; ACKNOWLEDGMENT: EI (EIX770400186); ORDER FROM: ESL

12 159007 MANAGEMENT OF VEHICULAR TRAFFIC FACILITIES FOR BETTER TRANSIT MOVEMENT: SOME ASPECTS. This report represents the completion of a project which deals with the analysis and management of transportation facilities. The purpose is to contribute to the management of transportation systems and to provide a better environment for people movement via transit and paratransit. This report discusses bus stop utilization and impact of bus stop location; the conflict between user and system-oriented assignments of traffic to a network; the expected travel time assignment (ETTA) model; the importance of freeway incidents in shifting traffic assignments; and the response to incidents on limited access facilities. The method of study is the limited case study. Data in some cases were collected by time lapse photography and then further processed by computer programs.

McShane, WR Crowley, KW Shaw, L; Polytechnic Institute of New York, Urban Mass Transportation Administration UMTA-NY-11-0009-77-1, 91 pp; Contract UMTA-NY-11-0009; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267942/1ST

12 159026 VEHICLE DETECTION-PHASE III. PASSIVE BUS DETECTOR/INTERSECTION PRIORITY SYSTEM DEVELOPMENT. VOLUME I. PROJECT OVERVIEW AND TECHNICAL DISCUSSION. The Passive Bus Detector/Intersection Priority System was developed under this project. The system functions as a fully independent traffic controller with completely passive bus detection capability using inductive-loop detectors (ILD) placed in the roadway. Bus detection is based on ILD signal processing (classifier) techniques, thereby eliminating need for any modifications or additions to the bus. Passive bus detection hardware

includes special ILD electronics, a high-speed programmable processor, and a microprocessor. Using the same microprocessor, plus programming panel, stored programs, and switching and safety units, the system design is sufficient to exercise bus priority control at urban intersections containing up to 23 signal circuits and 16 ILD transducers. In addition, the system has capability of commanding the traffic signals in either one of three fixed timing patterns, selected at the system by the traffic engineer or controlled by a loop master.

Anderson, P Larson, R Lubke, R Putnam, G Wick, D; Honeywell, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-76-66, Dec. 1975, 212 pp; Paper copy also available in set of 4 reports PC E16, PB-268 878-SET.; RESPONSIBLE INDIVIDUAL: Mammano, FJ; Contract DOT-FH-11-8149; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268879/4ST

12 159027 VEHICLE DETECTION-PHASE III. PASSIVE BUS DETECTOR/INTERSECTION PRIORITY SYSTEM DEVELOPMENT. VOLUME II. PART 1. APPENDIXES A, B, AND C-COMPUTER PROGRAM DOCUMENTATION. The volume contains the description of the software developed for the Passive Bus Detector/Intersection Priority System. The program documentation is formatted according to the Program Documentation section of the FHWA Documentation Standards. The computer program documentation is referenced in other volumes of this report as the following appendices: Appendix A. Fortran IV Version of the Vehicle Classification Algorithm; Appendix B. BPCU Program for Minneapolis Installation; Appendix C. BPCU Program for Washington Installation. Appendix C is to be treated as an addendum to Appendix B and contains documentation of only those modules which are different from the Minneapolis Installation program in Appendix B. Appendix D, Software and Computer Printouts, is presented separately as Part II of this volume.

Anderson, P Larson, R Lubke, R Putnam, G Wick, D; Honeywell, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-76-67, 2551-40274-V-2-Pt-1, Dec. 1975, 319 pp; See also Volume 1, PB-268 879. Paper copy also available in set of 4 reports PC E16, PB-268 878-SET.; Contract DOT-FH-11-8149; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268880/2ST

12 159028 VEHICLE DETECTION. PHASE III. PASSIVE BUS DETECTOR/INTERSECTION PRIORITY SYSTEM DEVELOPMENT. VOLUME II, PART II. APPENDIX D. COMPUTER PROGRAM LISTINGS. This volume contains the description of the software developed for the Passive Bus Detector/Intersection Priority System. The program documentation is formatted according to the Program Documentation section of the FHWA Documentation Standards. Appendix D, Software and Computer Printouts, is presented. (Portions of this document are not fully legible.)

Anderson, P Larson, R Lubke, R Putnam, G Wick, D; Honeywell, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-76-68, 2551-40274-V-2-Pt-2, Dec. 1975, 413 pp; See also Volume 2, Part 2, PB-268

880. Paper copy also available in set of 4 reports PC E16, PB-268 878-SET.; RESPONSIBLE INDIVIDUAL: Whitby, WR; Contract DOT-FH-11-8149; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268881/OST

12 159029 VEHICLE DETECTION. PHASE III. PASSIVE BUS DETECTOR/INTERSECTION PRIORITY SYSTEM DEVELOPMENT. VOLUME III. VEHICLE SIGNATURE ACQUISITION. Analysis and design of a successful passive bus detector cannot even begin until the characteristic features of the bus and other vehicles are known. These characteristic features are contained in the time history signals (signatures) detected by transducers located in the pavement. Three transducers were candidates for the passive bus detector: the inductive loop detector (ILD), the magnetic-gradient vehicle detector (MGVD), and the magnetometer. Early analysis eliminated the magnetometer from the candidate list. A total of 450 signatures were acquired from the ILD and MGVD from various vehicle types and test conditions. These signatures depicted all necessary feature data for the vehicles and test conditions, and allowed for subsequent analysis, design, and demonstration of a successful passive bus detector.

Lubke, R Wick, D; Honeywell, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-76-69, 2551-40274-Vol-3, Dec. 1975, 435 pp; See also Volume 2, Part 2, PB-268 881. Paper copy also available in set of 4 reports PC E16, PB-268 878-SET.; Contract DOT-FH-11-8149; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268882/8ST

12 159394 TRANSBUS OPERATIONAL, PASSENGER, AND COST IMPACTS: TRANSBUS PROGRAM. The report assesses the impact that the introduction of Transbus would have on motor coach operations in the U.S. Information from the Transbus demonstration and engineering test programs which involved the use of nine prototype Transbus coaches is analyzed in this report, along with substantial background information on U.S. transit operations.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0025-77-3, Transbus-TR-75-002, July 1976, 114 pp; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269911/4ST

12 163130 EXPERIMENTS IN BUS SERVICE CONTROL USING AN INTERACTIVE MODEL OF A TYPICAL BUS ROUTE. An interactive computer model of a bus route, developed by GEC-Marconi Electronics, has been used by TRRL to investigate the effectiveness of 3 types of operational control when applied to a London service route. The control systems considered were: a roadside inspector system, a voice radio system and an Automatic Bus Location (ABL) system. Results showed that operational control improved passenger waiting time on a simulated route by an average of about 11% for roadside control, 14% for voice radio control and 16% for ABL control. The use of these methods also resulted in a reduction of operating crew overtime payments due to more journeys being completed on time. This particular benefit was

slight compared with the community benefit represented by the reduction in passenger waiting time. /TRRL/

Jackson, RL (Transport and Road Research Laboratory) Stone, D ; Newcastle-Upon-Tyne University, England Proceeding 1975, pp 68-82, 3 Fig., 4 Tab., 5 Ref.; Proceedings of a symposium--Operating Public Transport, University of Newcastle Upon Tyne, England.; ACKNOWLEDGMENT: TRRL (IRRD-225702)

12 163592 CRITERIA FOR BUS RAPID TRANSIT SYSTEMS IN URBAN CORRIDORS: SOME EXPERIMENTS WITH AN INTERACTIVE GRAPHIC DESIGN SYSTEM. A man-computer interactive graphic system, developed at the University of Washington, is applied to a series of experiments designed to identify the characteristics of high-performance bus rapid transit systems for CBD-bound riders who reside in ageneralized suburban corridor. The solution spaces of each of 12 problem cases, derived from the combination of several trip demand densities, highway network characteristics, and trip-making behaviors, are explored in an interactive graphic search process. The purpose of the search is to identify optimal solutions using two operator objectives, one maximizing profit and the other maximizing patronage within a given subsidy constraint. Furthermore, the search is aimed at identifying solutions that cannot be dominated in terms of any combination of patronage and profit, thus forming an envelope in the patronage versus profit-deficit space. From a comparison of these envelopes some general relationships between bus rapid transit operating characteristics and external conditions are developed. Similarly, relationships between system characteristics and external conditions are derived from a comparison of the penoptimal solutions. Finally it is shown that the penoptimal solutions may violate some of the environmental, social, or political constraints commonly imposed on public transit systems, and it is also demonstrated that, by complying with such constraints, the operator may incur significant losses. /Author/

Rapp, MH (State University of Lausanne, Switzerland) Gehner, CD (Washington University, Seattle) *Highway Research Record* No. 455, 1973, pp 36-48, 9 Fig., 2 Tab., 7 Ref.; This article appeared in Highway Research Record Application of Interactive Graphics to Transportation Systems Planning.; ORDER FROM: TRB Publications Off

12 163924 BUSWAY VERSUS RAIL BRANCH: ANALYSIS OF ATLANTA'S TUCKER-NORTH DEKALB CORRIDOR (ABRIDGMENT). The purpose of this study was to evaluate comprehensively the costs, operational effects, and patronage aspects of busway versus rail rapid transit in the Tucker-North Dekalb (T/ND) corridor in Atlanta. Two transportation alternatives were considered: a rail branch providing direct, no transfer service and operating as a separate radial line; and a busway alternative operating a feeder service route. A discussion of passenger attraction, capital costs, operating cost, and quality of service factors for both the rail and busway alternatives is included. It is concluded that for the study corridor, capital costs of busways will be lower than those for rail branches; rail service into a branch corridor will

invariably be of a higher quality than will a busway feeding a main rail line; and operating costs will not be as costly to operate as a busway feeder system. For these reasons, a rail branch will attract a substantially greater number of riders than will be busway alternative.

Stanger, R Padron, M (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 619, 1976, pp 8-10, 1 Fig., 1 Tab.; This article appeared in Transportation Research Record No. 619, Innovations in Transportation System Planning.; ORDER FROM: TRB Publications Off

12 163989 THE OPERATION OF URBAN BUS ROUTES. 1. BACKGROUND AND PRELIMINARY ANALYSIS. This is the first in a series of three articles which present the findings of an investigation into the operation of urban bus routes. The operation is studied in terms of the times taken by passengers and buses in different stages of their journeys. This article introduces the subject area and the framework for assessing route performance, and describes an analysis of factors affecting average bus speeds. The two subsequent articles deal with sources of irregularity and other, wider, aspects.(a) /TRRL/

Chapman, RA Gault, HE Jenkins, IA (Newcastle-Upon-Tyne University, England) *Traffic Engineering and Control Analytic* Vol. 18 No. 6, June 1977, pp 294-298, 1 Fig., 3 Tab., 12 Ref.; ACKNOWLEDGMENT: 1 (TRRL67260E)

12 164404 THE ECONOMIC PERFORMANCE OF AN EXPRESS BUS SYSTEM. The first phase is reported of a 2-phase project to implement, operate and evaluate various strategies for providing high standard bus and car pool service through a transportation corridor of North Dade County, Miami. The priority techniques studied included the following: exclusive, reversible bus lane in the center of the roadway; bus preemption of traffic signals; and progression on traffic signals. These were tested in different combinations. Two primary measures of effectiveness were used: operating costs and revenues. It was found that relatively low bus usage along with the high percentages of vehicle-miles and vehicle-hours expended in nonrevenue producing travel resulted in an operating cost which was about 3 times the income. Further findings relating to the feeder route service, success of the various routes, times of service and the fare structure are presented. Recommendations for reducing the operating deficits are offered.

Wallace, CE (Florida University, Gainesville) *Transportation Engineering* Vol. 47 No. 9, Sept. 1977, pp 27-31, 3 Fig., 2 Tab., 3 Ref.; The preparation of this report was financed in part by DOT, Urban Mass Transportation Administration.

12 165192 INCREASING THE TAXIS' ROLE IN URBAN AMERICA. The solutions now being offered to the public transportation problem (such as BART and METRO), however fast (once you get on them) and pretty, are nothing more than 1970 versions of 1870 commuter railroads that tied together the suburbs and the downtowns. They lack the accessibility and central-city coverage afforded by earlier rail rapid transit, and they fail to provide easy-to-reach, door-to-door service for most would-be users--

-especially for people without automobiles, for people who are physically infirm, and for people who live within central cities, close to downtown. Given some reasoned tinkering with regulation, pricing, and operation, taxicabs might very well have a profound and lasting impact on transit patronage and lead to reduced automobile commuting. It is also possible to think of ways in which taxis would better serve some urban groups who are served poorly or not at all by existing transit systems.

Wohl, M (Carnegie-Mellon University) *Technology Review* Vol. 78 No. 8, Aug. 1976, pp 44-53; ACKNOWLEDGMENT: EI; ORDER FROM: ESL *

12 165751 EXPERIMENTS ON FOUR DIFFERENT TECHNIQUES FOR AUTOMATICALLY LOCATING LAND VEHICLES: A SUMMARY OF RESULTS. In 1975, to further the development and to refine and demonstrate multiuser Automatic Vehicle Monitoring (AVM) application, the Urban Mass Transportation Administration and the Transportation Systems Center (TSC) initiated a two-phase program. Phase I of this AVM program was completed in March 1977. The Phase I objective was to formally test four different vehicle-location concepts against a technical performance specification prepared by TSC. Phase II of the AVM program will involve the selection of one of the tested location methods, the detailed design of an overall AVM system, and its deployment in a major urban area for test and evaluation in bus-transit and police operations. During the winter of 1976-1977, four different technical methods for automatically locating surface vehicles were tested in both high and low-rise regions in Philadelphia, Pennsylvania. The tests were designed to evaluate the methods for their applicability as location subsystems of AVM systems. Two "signpost" concepts, one utilizing semi-passive transponders and the other active transmitters as well as two "area-coverage" concepts, one employing Loran-C and the other a pulse trilateration method, were tested. This report (Phase I) outlines the experimental objectives, summarizes the test results and presents the major findings. The Tables in this report chart out the Fairchild, the Hazaltine, the Hoffman, and the Teledyne Test Results. /UMTA/

Blood, BE Kliem, BWA ; Transportation Systems Center, (DOT-TSC-UMTA-77-28) Final Rpt. UMTA-MA-06-0041-77-2, June 1977, 51 pp; Sponsored by DOT, Federal Highway Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-270951

12 165772 OPERATIONS OF SMALL BUSES IN URBAN TRANSIT SERVICE IN THE UNITED STATES. The overall objective of the Small Bus Project is the development of a general and performance specification for an advanced small urban transit bus. It is a six-phase program designed to insure that final vehicle specifications would evolve from a comprehensive analysis of all aspects of the operating environment and thus have a broad applicability. The Small Bus Project is presented in six separate reports: 1) Operations of Small Buses in Urban Transit Service in the United States. This report investigates the operating environment of small buses in the U.S. and relates them to vehicle requirements; 2) Bus Characteristics Needed for Elderly and Handicapped in Urban Travel. Constraints imposed on

bus design by the elderly and handicapped are outlined; 3) Operating Profiles and Small Bus Performance Requirements in Urban Transit Service. This report develops a set of operating profiles and service requirements as the basis for specifications for a new small urban transit bus to meet the identified operational needs; 4) Guidelines for the Design of Future Small Transit Buses and Bus Stops to Accommodate the Elderly and Handicapped. This report presents scenarios for the future uses and market of small buses, as well as the conceptual design for three vehicle configurations to assess the feasibility of meeting design requirements; 5) General and Performance Specifications for a Small Urban Transit Bus. Requirements for an advanced design coach which may be used for both demand-responsive and general service on urban arterial streets are presented; 6) Small Transit Bus Requirements Study. This report summarizes the findings presented in the five project reports. /FHWA/

RRC International, Incorporated, (IT-06-0074) Intrm Rpt. UMTA-IT-06-0074-77-1, July 1975, 153 pp; Sponsored by the Urban Mass Transportation Administration, DOT.; Contract DOT-UT-30006; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-269393

12 165773 PRE-DEMONSTRATION ACTIVITIES OF THE WESTPORT INTEGRATED TRANSIT SYSTEM. In August 1976 the Urban Mass Transportation Administration of the U.S. Department of Transportation awarded a demonstration grant to the Westport Transit District (WTD) to examine the feasibility of combining shared-ride taxi service and other paratransit services with conventional bus services in Westport, Connecticut. This report describes the Westport, Connecticut, Service and Methods Demonstration Project involving integrated transit operations and paratransit services, and documents and assesses the implementation process associated with this demonstration. This report focuses on documenting and assessing the brokerage role performed by the WTD in implementing shared-ride services. The contents include a discussion of the institutional and operational elements involved in contracting with local taxi operators to provide shared-ride service. In addition, arrangements for system maintenance, marketing, and public information dissemination are described. Implications from the Westport pre-demonstration experience are potentially of interest and applicability to other locales. /FHWA/

Furniss, RE ; CACI, Incorporated, (DOT-TSC-UMTA-77-33) Intrm Rpt. UMTA-MA-06-0049-77-7, July 1977, 81 pp; Sponsored by the Urban Mass Transportation Administration, under contract to the Transportation Systems Center.; Contract DOT-TSC-1082; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-271998

12 165817 DESIGN AND EVALUATION OF ON-FREE WAY TRAFFIC CONTROL SYSTEMS AND SURVEILLANCE TECHNIQUES. Studies of urban traffic operations were conducted on the freeways of Texas to determine the design and effectiveness of traffic control systems and surveillance techniques. The control systems were designed to relieve peak period congestion. Surveillance techniques were

studied for application in detecting disabled vehicles and their impact on the operation and safety of freeways. This study used demonstration installations and field testing under laboratory conditions to determine the implementation requirements as well as to evaluate the operational theory. /Author/

McCasland, WR Ritch, GP ; Texas Transportation Institute, (Res Rpt. No. 173-3F) Final Rpt. TTI-2-18-76-173-3F, Oct. 1976, 53 pp, 5 Fig., 1 Tab., 16 Ref., 1 App.; Cooperative research with the Texas State Department of Highways and Public Transportation: Transportation Planning Division and DOT and FHWA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273276/6ST

12 166143 URBAN AUTOMATED TRAFFIC CONTROL (A BIBLIOGRAPHY WITH ABSTRACTS). The control of urban vehicular traffic movement by means of automatic synchronization of intersection and lane signals is covered. Studies on sensing and telemetry devices, computer programming, models, system development, and route guidance systems are included. (This updated bibliography contains 159 abstracts, 24 of which are new entries to the previous edition.)

Lehmann, EJ Kenton, E ; National Technical Information Service Bibliog. June 1977, 164 pp
Supersedes NTIS/PS-76/0382, NTIS/PS-75/403, and COM-73-11716.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0512/2ST

12 167273 PRE-DEMONSTRATION ACTIVITIES OF THE WESTPORT INTEGRATED TRANSIT SYSTEM. SERVICE AND METHODS DEMONSTRATION PROGRAM [Interim rept. Aug 76-Apr 77]. In August 1976 the Urban Mass Transportation Administration of the U.S. Department of Transportation awarded a demonstration grant to the Westport Transit District (WTD) to examine the feasibility of combining shared-ride taxi service and other paratransit services with conventional bus services in Westport, Connecticut. This report describes the Westport, Connecticut, Service and Methods Demonstration Project involving integrated transit operations and paratransit services, and documents and assesses the implementation process associated with this demonstration. The report focuses on documenting and assessing the brokerage role performed by the WRD in implementing shared-ride services. The contents include a discussion of the institutional and operational elements involved in contracting with local taxi operators to provide shared-ride service. In addition, arrangements for system maintenance, marketing, and public information dissemination are described. Implications from the Westport pre-demonstration experience are potentially of interest and applicability to other locales.

Furniss, RE ; CACI, Inc.-Federal, Los Angeles., Calif. Transportation Systems Center, Cambridge, Mass. Urban Mass Transportation Administration., Washington, D.C. 1200-25-77, DOT-TSC-UMTA-77-33., July 1977, 81p; Report on UMTA/TSC Project Evaluation Series.; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271998/7ST

12 167373 A COMPREHENSIVE FIELD TEST AND EVALUATION OF AN ELECTRONIC SIGNPOST AVM SYSTEM. VOLUME I. TEST RESULTS [Final rept. Sep 76-Mar 77 on Phase 1]. The report covers the activities of Phase I which involved the installation and test of a HI3 AVM System in Philadelphia, Pennsylvania, during the winter of 1976-1977. A summary report on all systems tested is Experiments on four different techniques for automatically locating land vehicles (PB-270 951). Phase I tests were divided into two primary categories: (1) random-route tests (police, paratransit, taxi, etc.), and (2) fixed-route (transit). In the random-route tests, the system showed the capability of locating the vehicle to within 282 feet, at 95 percent of the sample points under a wide range of urban and environmental conditions. In the fixed-route tests, an odometer and 15 signposts provided the vehicle's location to within 105 feet at 95 percent of the sample points along a 13-mile route. The time of passage of designated bus schedule 'timepoint' was automatically determined to within 11 seconds 95 percent of the time. Phase I consists of two volumes: Volume I: Test Results contains a description of all test configurations, test procedures, location algorithms, data processing, and test results; Volume II: Appendix contains the test log sheets, test data, and data processing results corresponding to all Phase I tests.

Gruver, GW ; Hoffman Information Identification, Inc., Fort, Worth, Tex.*Transportation Systems Center., Cambridge, Mass.*Urban Mass Transportation, Administration, Washington, D.C. RO-77-0026, UMTA-MA-06-0041-77-8, Aug. 1977, 331p; See also PB-270 951.; Contract DOT-TSC-1237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272907/7ST

12 167592 INCREASING THE PEOPLE-MOVING CAPABILITY OF SHIRLEY HIGHWAY. Because of the dramatic increase in construction costs of rail rapid transit in recent years, the exclusive highway right-of-way for high-occupancy vehicles has emerged as a possible cost effective alternative for transporting peak-period commuters through congested corridors. The Shirley Highway busway in northern Virginia offered the first such exclusive right-of-way when its first section was opened to buses in 1969. The busway was opened to car pools of four or more riders in December 1973 and became the principal element of the Urban Mass Transportation Administration's Shirley Highway express-bus-on-freeway project, which was conducted for 1 year until December 1974. Priority treatment accorded buses and car pools resulted in a substantial improvement in the corridor's people-moving capability during peak hours. In addition, considerable travel-time savings were realized by all commuters using Shirley Highway. This paper discusses (a) increases in the people-moving capability of Shirley Highway and (b) the reasons for the increases. The increases in the people-moving capability of Shirley Highway can be attributed to increases in commuter use of buses and car pools. Particular attention was given to bus users to determine why a large number of automobile users--many with upper-middle incomes from homes with several automobiles--switched to bus and why some bus users switched to automobiles (driving alone or car pooling). /Author/

McQueen, JT (Urban Mass Transportation Administration) Waksman, R (Transportation Systems Center) *Transportation Research Record* No. 626, 1977, pp 21-27, 4 Fig., 1 Tab., 4 Ref.; From *Transportation Research Record* No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

12 168069 BUS PASSENGER SERVICE-TIME DISTRIBUTIONS. The characteristics of bus passenger service-time distributions are a necessary input for the transportation simulation models that are used to evaluate the operations of street transit systems. In this paper, distributions of passenger service times through bus doors (the rates at which passengers entered, passed through, and departed from the bus) are analyzed by photographic studies and simulated by an Erlang function. These mathematical expressions simulating the passenger rates of flow entering and departing from a bus are compared with the observed times; the differences are not significant at the 95 percent level. The results of this research can be used to analyze a series of bus transit-flow situations and may serve as guidelines in assisting the designer and operator in evaluating existing or proposed bus systems. Specific models could be developed to evaluate the effects of the method of fare collection on passenger queue lengths and average waiting time under different rates of passenger arrivals. The overall design of bus transit vehicles has been shown to affect passenger flows in relation to such items as fare collection and in the use of door(s) for boarding alighting. /Author/

Kraft, WH (Edwards and Kelsey, Incorporated) Deutschman, H (New Jersey Institute of Technology) *Transportation Research Record* No. 625, 1977, pp 37-43, 5 Fig., 5 Tab., 7 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

12 168142 THE OPERATION OF URBAN BUS ROUTES. 3 WIDER ASPECTS OF OPERATION. This is the last in a series of three articles on the operation of urban bus routes. The operation is studied in terms of the times spent by passengers and buses in different stages of their journeys. The first article provided an introduction to the subject area and a framework for assessing route performance, together with some results. The second article assessed the sources of irregularity in bus route operation and compared their magnitudes. This final article presents a variety of topics of a broader nature of relevance to the passenger, the traffic engineer and the bus operator. Included are walking to and waiting at stops, measuring delays to buses, and the optimum spacing of stops and routes. It concludes with a discussion on the implications of the work reported in the whole series. /Author/TRRL/

Chapman, RA Gault, HE Jenkins, IA (Newcastle upon Tyne University, England) *Traffic Engineering and Control* Vol. 18 No. 9, Sept. 1977, pp 416-419, 9 Fig., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 228755)

12 168915 URBAN TRAFFIC CONTROL AND BUS PRIORITY SYSTEM SOFTWARE MANUAL. VOLUME I. FUNCTIONAL DESCRIPTION AND FLOW CHARTS [Final rept. (Rev. C)]. An Urban Traffic Control and Bus Priority System has been implemented in the

District of Columbia. The system includes on-street surveillance and control elements and a central office data processing facility. This manual describes the software for this system. This is Volume I of 2 volumes which comprise the UTCS/BPS Software Manual. It contains Section 1, Introduction and Section 2, Programming Specifications.

Sperry Rand Corp., Great Neck, N.Y. Sperry Systems, Management Div.*Federal Highway Administration,, Washington, D.C. Traffic Systems Div. GF-16-1003-1, FHWA/RD-76-185, June 1976, 401p; Supersedes report dated Feb 73, PB-220 867. See also Volume 2, PB-273 431.; Contract FH-11-7605; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273430/9ST

12 168916 URBAN TRAFFIC CONTROL AND BUS PRIORITY SYSTEM SOFTWARE MANUAL. VOLUME II. VARIABLE DEFINITIONS; ALGORITHM AND OFF-LINE SOFTWARE DESCRIPTIONS [Final rept. (Rev. C)]. An Urban Traffic Control and Bus Priority System has been implemented in the District of Columbia. The system includes on-street surveillance and control elements and a central office data processing facility. This manual describes the software for this system. This is Volume II of 2 volumes which comprise the UTCS/BPS Software Manual. It contains Section 3, Glossary and Section 4, Appendices.

Sperry Rand Corp., Great Neck, N.Y. Sperry Systems, Management Div.*Federal Highway Administration,, Washington, D.C. Traffic Systems Div. GF-16-1003-2, FHWA/RD-76-186, June 1976, 181p; Supersedes report dated Feb 73, PB-220 868. See also Volume 1, PB-273 430.; Contract FH-11-7605; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273431/7ST

12 168917 A COMPREHENSIVE FIELD TEST AND EVALUATION OF AN ELECTRONIC SIGNPOST AVM SYSTEM. VOLUME II. APPENDIX [Final rept. Sep 76-Mar 77 on Phase 1]. The application of Automatic Vehicle Monitoring (AVM) to enhance the management of mobile resources has, in recent years, become a subject of continued interest to all types of fleet vehicle operations. This report covers the activities of Phase I which involved the installation and test of a HI3 AVM System in the City of Philadelphia during the winter of 1976-1977. These tests represent the most extensive tests ever performed on an AVM system which can locate vehicles which operate either as fixed-route vehicles (transit) or as random-route vehicles (police, para-transit, taxi, etc.). Volume I of this report contains a description of all test configurations, test procedures, location algorithms, data processing, and test results. This Appendix contains the test log sheets, test data and detailed data processing results corresponding to all Phase I tests. Section 2 of this Appendix is an executive summary of the Phase I program. Section 3 contains pertinent random-route data and data processing results. Section 4 contains fixed-route data and data processing results. (Portions of this document are not fully legible)

Gruver, GW ; Hoffman Information Identification, Inc., Fort, Worth, Tex.*Transportation Systems Center,, Cambridge, Mass.*Urban Mass Transportation, Administration, Washington, D.C. RO-77-0026-Vol-2, UMTA-MA-06-0041-77-9, Aug. 1977, 339p; See also report

dated Aug 77, PB-272 907.; Contract DOT-TSC-1237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273436/6ST

12 169256 LORAN AUTOMATIC VEHICLE MONITORING SYSTEM, PHASE I. VOLUME II. APPENDICES. Contents: Loran calibration data; Special case test data sheets; Augmentor location summary; Typical monitor station strip chart recording; Report of inventions. (Portions of this document are not fully legible)

Stapleton, R Chambers, F ; Teledyne Systems Company, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-7730-II, TSC-50463-1-Vol-2, Aug. 1977, 160 pp; See also Volume 1, PB-274 955 and PB-270 951.; Contract DOT-TSC-1238-2; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-274956/2ST

12 169628 THE FEASIBILITY OF APPLYING THE ACTIVE TVTIME SYSTEM TO AUTOMATIC VEHICLE LOCATION [Final rept]. The National Bureau of Standards Boulder laboratory has studied the use of television as a carrier for accurate time and frequency signals. The usefulness of the TvTime System applied to locating cars and other vehicles automatically is examined. Such a need exists in transit, police, taxi, utility and many commercial fleets. Past approaches to the problem are outlined. The NBS TvTime System and experimental results are discussed. Two models of a car locating system are outlined, each having three parts: (1) a TV decoder in the car, (2) a radio link such as a mobile channel between car and central dispatch, and (3) a computer which determines the car's position. Results show that this system is capable of achieving a location accuracy of better than 60 m with 95 percent confidence. Some advantages and limitations of the system are discussed and cost estimates for the equipment are given.

Howe, DA ; National Bureau of Standards, Boulder, Colo. (NBS-2730117) 1974, 7p; Pub. in *Jnl. Inst. Navigation* 21, n1 p9-15 Spring 1974.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273128/9ST

12 169761 EVOLUTION AND OPERATIONS OF THE RESTON, VIRGINIA COMMUTER BUS SERVICE. The report focuses on documenting and assessing the evolution and operations of the Reston Commuter Bus (RCB). RCB is a good example of a community group overcoming many legal, regulatory, and institutional constraints to develop and refine a viable commuter bus service for community residents. UMTA sponsored this review and assessment of RCB because the RCB approach to commuter bus service is of potential interest and applicability to other communities across the country. RCB is a community-based nonprofit corporation which operates a non-subsidized, weekday, peak-period express commuter bus service operating between Reston, Virginia, and Washington, D.C. area employment centers. RCB is managed essentially by volunteer support. Since 1968 RCB has contracted with public and private carriers to operate the service. The current RCB service is supplied by a private carrier. This report examines the current RCB service operations, the development of the service and the organization, as well as ridership, cost, and productivity data.

It addresses the viability of RCB service in terms of contractual costs of transportation weighed against the revenue generated by system ridership. System productivity is addressed over time by comparing actual and breakeven load factors.

Furniss, RE ; CACI, Incorporated, Transportation Systems Center, (UMTA-MA-06-0049) Final Rpt. DOT-TSC-UMTA-77-47, Aug. 1977, 149 pp; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275792/OST

12 170389 BUSES IN URBAN AREAS 1970-1976. The material listed in this bibliography is a selection of the books and articles relating to buses in urban areas available in the headquarters library of the departments of environment and transport. It has been arranged in seven main sections which are then sub-divided into (I) books, pamphlets and conference reports; (II) articles; (III) other countries. Publications since 1970 have been included but the emphasis throughout is on material published since 1974. The main sections are as follows: (a) DOE publications, includes official and non-official material published by the department since 1970, DOE circulars, and a selection of the reports and supplementary reports produced by the departments' transport and Road Research Laboratory (TRRL). (b) urban transport: policy and research, includes general works on urban transport policy with particular reference to buses, and to documents dealing with modes of travel within the city. (c) management and operation of bus services, is divided into eleven parts. Part (I) relates to overall bus operation and management; parts (ii)-(x) deal with specific aspects, and part (xi) includes some miscellaneous references. (D) and (e) are concerned respectively with theoretical models used in planning of bus services and technical advances being discussed but not yet incorporated into bus management and operational practice. (F) includes a few references, mainly of an historical nature, intended as background reading. (g) lists a few of the current research projects relating to bus services in urban areas. /TRRL/

Collins, J Lambert, CM ; Department of the Environment, England Monograph Bibliography No. 17C, Dec. 1976, 64 pp; ACKNOWLEDGMENT: TRRL (IRRD-228707)

12 170394 A ONE-YEAR TRIAL EXPERIMENT WITH ELECTRIC BUSES IN NORTH RHINE-WESTPHALIA. FIRST OPERATIONAL RESULTS AND THEIR APPLICATION TO A COMPLETE ELECTRIC TRAFFIC SYSTEM [Ein Jahr Modellversuch Elektrobus in Nordrhein-Westfalen. Erste Betriebserfahrungen und Ihre Anwendung auf ein Gesamtsystem des Elektrischen Strassenverkehrs]. In October 1974 an existing public transport system operated by diesel buses was changed, for the first time, to battery operated electric buses. The most important data applicable in tabular form. The operational performance is presented in numerical terms and an initial study of the troubles incurred during the first year are given in four main categories. In connection with the discussion of special problems of electric vehicles and their component accessories, exhaustive studies are made of the operational running and the control of electric driving units, the

protection of the electric circuits, the requirements of traction batteries, the current and voltage curve of the electrical supply to the auxiliary units, the influence of braking, battery charging and changing points and the production of auxiliary power for the operation of various services. Electricity can play an important role as the motive power for vehicles in urban areas, supported on the existing public transport network. The importance of the trial experiment with electric buses, in association with further large scale trials with other categories of vehicles lies in the fact that it yields information which not only facilitates comparison with other competing systems but also assists the planning of production and operation of larger systems. /TRRL/ [German]

Mueller, HG *Automobil Technische Zeitschrift* Vol. 78 No. 5, May 1976, pp 203-207, 4 Fig., 2 Tab., 3 Phot., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-304927), Federal Institute of Road Research, West Germany; ORDER FROM:

12 170934 VARIABLE MESSAGE SIGNING FOR TRAFFIC SURVEILLANCE AND CONTROL--A STATE OF THE ART REPORT. This report is a state of the art summary of variable message signing (VMS) technology currently utilized for traffic control applications. The report briefly describes the four basic component of a VMS system. These are the VMS display, VMS control system, VMS system interconnect, and VMS highway surveillance system. The report focuses on the VMS display. It covers the following nine display types: (1) Flap, (2) Scroll, (3) Drum, (4) Inert gas (Neon) (5) Fiber optics, (6) Light bulb matrix, (7) Electromechanical flap matrix, (8) Electrostatic vane matrix, (9) Electromagnetic disk matrix. For each display type its functional characteristics, manufacturers, operational experiences, and currently available publications are presented. The final section of the report describes current VMS research activity being undertaken by the federal government and by the VMS manufacturers. /FHWA/

Dorsey, W ; Federal Highway Administration Final Rpt. FHWA-RD-77-98, Jan. 1977, 137 pp, 20 Fig., 18 Tab., Refs., 4 App.; ORDER FROM: NTIS; PB-275055/AS

12 172060 REPORT ON PHASE I TESTS OF FAIRCHILD AUTOMATIC VEHICLE MONITORING (AVM) SYSTEM. During the winter of 1976-77 four different techniques for automatically locating land vehicles were tested in both the low and high-rise regions in Philadelphia, Pennsylvania. The tests were carried out by four different companies under separate contract to the Transportation Systems Center. These tests were designed to evaluate the four techniques for their applicability as location subsystems for automatic vehicle monitoring (AVM) systems. The overall objective of this AVM program is to design, implement, and operate an area-wide multi-user AVM system in Los Angeles (Phase II) for the purpose of making a quantitative evaluation of AVM effectiveness for transit, paratransit, and other AVM users. A summary report on all four systems is available and titled: Experiments on Four Different Techniques for Automatically Locating Land Vehicles (PB-270951). This document contains the results obtained by one of the contractors, Fairchild

Industries, and covers the activities of Phase I which involved the instrumenting of a section of downtown Philadelphia with approximately 140 signposts. Part of the allocated section was used for tests applicable to fixed-route (transit) systems, and part was used for random-route applications (police cars, taxis, paratransit, etc.). In addition to the Philadelphia tests a series of separate engineering tests were performed at the Fairchild Plant in Germantown, Maryland. This Fairchild report states that the complete exercise served a two-fold purpose: 1) it proved the reliability of AVM systems and, 2) it performed as an invaluable learning tool from which all parties will profit. /Author/

Pokorny, AJ Briefel, H ; Fairchild Space and Electronic Company, (DOT-TSC-UMTA-77-35) Final Rpt. UMTA-MA-06-0041-77-3, Aug. 1977, 188 pp; Sponsored by DOT, UMTA and performed under contract to Transportation Systems Center, DOT.; Contract DOT-TSC-1235; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-273816/9ST

12 172360 URBAN TRAFFIC CONTROL AND BUS PRIORITY SYSTEM OPERATIONS AND MAINTENANCE-FINAL REPORT. This report presents a comprehensive review of the UTCS/BPS operation and maintenance. The results and conclusions presented herein highlight system and equipment operating and maintenance experience and the costs, management and staffing for these related tasks. /Author/

Sperry Rand Corporation Final Rpt. FHWA-RD-76-160, June 1976, 185 pp, 38 Fig., 16 Tab., 3 App.; Sponsored by DOT and FHWA.; Contract DOT-FH-11-7605; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276377/9ST

12 172550 PUBLIC TRANSPORT TIMING: CAUSES OF DELAY ARISING DURING BUS JOURNEYS. Bus movement times were studied on three routes. An attempt was made to analyse delays at traffic-light-controlled intersections in the city centre along these routes. In the study it was concluded that: delay times are seldom more than 20 per cent of the mean travel time and on average vary from 4 to 10 per cent of the mean travel time; about 80 per cent of the delays are caused by traffic-light-controlled intersections; delays due to congestion caused by other vehicles are a substantial minor factor; boarding time per passenger on one-man-operated buses is twice that on two-man operations; the timetable allowance for inbound journeys is not realistic compared with the time allowed for outbound journeys; in this case, very little time would be saved by rerouting of the services; the average running speeds of the buses varied between 25 and 50 km per hour, depending on the route, the average travel speeds being higher than the scheduled speeds; there was very little variation in mean travel time between that on average weekdays and on Saturdays. /TRRL/

Ramlan, N Hassan, N ; Dundee University, Scotland Monograph Apr. 1977, 87 pp, Figs., Tabs., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-228682)

12 173316 EVALUATION BY SIMULATION OF CONTROL STRATEGIES FOR A HIGH FREQUENCY BUS SERVICE. In order to assess the potential value of bus control a computer simulation of a high frequency urban bus service (London Transport Service 11) has been used to estimate the likely effects of applying a number of control strategies formulated for use when the positions of buses on the route were known. Four strategies were considered: the first three regularised bus departures from termini by making adjustments to bus layover periods, while the fourth curtailed buses short of their scheduled destinations in order to make up lost time. Initially these strategies were evaluated with levels of cancellations (16 per cent) and unpunctuality at the start of the day which were typical of service 11 at the time of the study (1975). Combined use of the layover adjustment strategies reduced the mean passenger waiting time by up to 20 per cent (about 1.2 minutes), but did not effectively reduce late running. Additional use of the curtailment control had little effect on the improved waiting times but reduced the occurrence of bus lateness in excess of 10 minutes by a factor of about two. These benefits were shown to be sensitive to both the level of cancellations and the degree of poor time-keeping on starting. When all the buses started on time the magnitude of the waiting time reduction attributable to control was reduced by a factor of about 4. /Author/TRRL/

Jackson, RL ; Transport and Road Research Laboratory Monograph TRRL Lab Report 807, 1977, 19 pp, 3 Fig., 7 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230639), NTIS; ORDER FROM: NTIS; PB-281414/3ST

12 173955 BUSWAYS IN NEW TOWNS. The author stresses that among the many suggested improvements to urban transportation systems in recent years is the busway, of which several are in operation in the United States, and many others are in various stages of development, planning, or contemplation. The several advantages that they are supposed to have and list of the various subtypes possible are reviewed.

Grava, S (Parsons, Brinckerhoff, Quade and Douglas, Inc) *Traffic Quarterly* Vol. 31 No. 4, Oct. 1977, pp 657-672, 13 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

12 174674 EVALUATION OF EXPRESS BUSWAY ON SAN BERNARDINO FREEWAY-THIRD YEAR REPORT [Final rept]. This is the final report completing the evaluation of the San Bernardino Freeway Express Busway in the operational mode of exclusive use by buses. The San Bernardino Freeway Express Busway is an 11-mile, double-lane, exclusive roadway for buses connecting downtown Los Angeles to the City of El Monte. The busway lanes, which were built in the median strip of land, at some points, alongside the freeway, are physically separated by concrete and flexible barriers from those lanes which serve automobile traffic, making it a bus rapid transit system. This \$57 million system is the most complete facility of its kind in the country, having off-line stations, park-ride facilities, double (bi-directional) bus lanes, feeder bus lines, and a downtown reserved (contraflow) lane. The Busway offers a service that is competitive with automobile commuting on the semi-congested freeway. The running time on the 11.2 mile

busway, including two intermediate station stops, is 14 minutes. The project is part of the SCAG High Occupancy Vehicle Program consisting of transportation measures for improving air quality and energy conservation, and includes preferential treatment for high occupancy vehicles on freeways and major arterials, carpool action programs and transit development strategies.

Southern California Association of Governments,, Los Angeles. Crain and Associates, Menlo Park,, Calif. Urban Mass Transportation Administration,, Washington, D.C., (UMTA-CA-09-0022) May 1976, 187p; Prepared by Crain and Associates, Menlo Park, Calif.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274884/6ST

12 176516 EMPLOYEE PROTECTION: PARATRANSIT AND ITS IMPACT ON THE OPERATOR WITH DISCUSSION. The extension of service to various outlying areas is discussed, and a recent trend toward the use of transportation in social services whereby social service agencies take the responsibility of using transit as a method of developing skills is noted. In this situation, there is a competitive organization that is not recognized because it is under the guise of social service. The problem of the driver who works during the peak hour, thereby obtaining union benefits, and also works regular hours at another job is discussed, as well as the problem of the full time union people who moonlight for private operators for less money than they receive as union drivers. Some points that were raised during discussions of paratransit and section 13c are also include here.

Cusick, L (Regional Transportation Authority, Chicago) *Transportation Research Board Special Report* No. 181, 1978, pp 169-171; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

12 176595 NATIONAL AUTOMATIC POSITION INDICATOR SYSTEM (NAPIS). The demand for an automatic vehicle monitoring system (AVM system) which automatically detects the present position and operating condition of a vehicle station has increased as a result of diversification of social conditions and deterioration of traffic conditions. The present system has been developed for taxis, to make possible an integrated dispatch and control system which automates dispatch functions by automatically detecting and displaying the present position of an available vehicle, and produces a daily report for management. The new system is based on the inverse proximity technique using tone frequency signal and weak radio wave. This technique uses the digital transmission and voice communication channel of FSK-200 BPS, based on the AVM system for a patrol car delivered to the National Police Agency in Japan. The system has been improved in various aspects through actual oper-

ation tests and analysis of the test results in order to realize the fair and speedy dispatch of vehicles. As a result, position detection accuracy is ensured within a 0.5 to 1 km area, and dispatch capacity is doubled. "NAPIS" is a trademark of Matsushita Electric Industrial. Co., Ltd. [Japanese]

Shibata, T Aiki, T *National Technical Report* Vol. 23 No. 5, Oct. 1977, pp 706-716, 17 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

12 177026 AUTO OPINION: FLEXIBILITY STILL COUNTS. The bus and the automobile are compared for energy efficiency in urban passenger transport. Results of several studies are given and discussed, and it is indicated that possibility the greatest fuel savings can be achieved by design and use of energy-efficient automobiles rather than by substitution of buses for automobiles. The social and economic factors associated with large and small buses, shuttle service, railway rapid transit, and automobiles are discussed.

Rosenthal, B *Environment* Vol. 19 No. 5, 1977, pp 18-24; ACKNOWLEDGMENT: Energy Abstracts for Policy Analysis

12 178752 THE SANTA MONICA FREEWAY DIAMOND LANES: FREEWAY ACCIDENT ANALYSIS. The Santa Monica Freeway Diamond Lanes, a pair of concurrent-flow preferential freeway lanes for buses and carpools linking the City of Santa Monica, California with the Los Angeles Central Business District (CBD), opened on March 16, 1976, and operated amid much controversy for 21 weeks until the U.S. District Court halted the project. One of the most disturbing aspects of the project was the high incidence of freeway accidents, which increased by a factor of 2.5 times pre-project levels when the barrier-free preferential lanes were operating. This paper tabulates accident levels before, during and after the project; postulates and analyses a number of hypotheses regarding potential accident causes; compares the Santa Monica Freeway accident history with that of other preferential lane projects; and identifies the most likely causes of the increased accident levels. This analysis is part of a broader study of the Diamond Lane Project sponsored by the Urban Mass Transportation Administration's Service & Methods Demonstration program. Factors contributing to the increased accident rate included the distracting effect of increased enforcement activities and the congestion resulting from the removal of freeway lanes from general use. However, it appears that the most significant factor was the pronounced speed differential between the free-flowing traffic in the sparsely-occupied preferential lane and the stop-and-go traffic in congested adjacent lanes, coupled with the frequent lane changes made by vehicles entering and leaving the freeway. The experiment in Santa Monica raises serious questions about the use of barrier-free preferential lanes. /Author/

Billheimer, JW (Systan, Incorporated) *Transportation Research Record* No. 663, 1978, pp 1-7, 2 Fig., 2 Tab., 5 Ref.; This article appeared in Transportation Research Record No. 663, Recent Developments in Bus Transportation.; ORDER FROM: TRB Publications Off

12 178753 THE SANTA MONICA FREEWAY DIAMOND LANES: EVALUATION OVERVIEW. The Santa Monica Freeway Diamond Lanes, a pair of concurrent-flow preferential lanes for buses and carpools linking the City of Santa Monica, California with the Los Angeles Central Business District (CBD), opened on March 16, 1976 and operated amid much controversy for 21 weeks until the U.S. District Court halted the project. The Diamond Lane project marked the first time preferential lanes had been created by taking busy freeway lanes out of existing service and dedicating them to the exclusive use of high-occupancy vehicles. Although the Diamond Lanes entailed no major physical modifications or construction on the freeway itself, they caused significant physical and emotional dislocation among freeway drivers, public officials and other residents of Los Angeles, and generated considerable controversy regarding the reported and actual impacts of the project. This paper summarizes the findings of the official, objective, independent evaluation of the project sponsored by the U.S. Department of Transportation as part of the UMTA Service and Methods Demonstration Program. The paper addresses a broad range of project impacts in the following major areas: traffic speeds and travel times; traffic volumes and carpool formation; bus operations and ridership; safety and enforcement; energy and air quality; and public attitudes and response. Analysis shows that the project succeeded in increasing carpool ridership by 65% and the increased bus service accompanying the Diamond Lanes caused bus ridership to more than triple. Nonetheless, energy savings and air quality improvements were insignificant, freeway accidents increased significantly, non-carpoolers lost far more time than carpoolers gained, and a heated public outcry developed which has delayed the implementation of other preferential treatment projects in Southern California and given planners and public officials in other areas ample cause for reflection before attempting to implement similar projects. /Author/

Billheimer, JW (Systan, Incorporated) *Transportation Research Record* No. 663, 1978, pp 8-16, 6 Fig., 1 Tab., 3 Ref.; This article appeared in *Transportation Research Record* No. 663, Recent Developments in Bus Transportation.; ORDER FROM: TRB Publications Off

12 180645 SIMULATION STUDIES OF BUS OPERATIONS AND CONTROL ON LONDON TRANSPORT ROUTE 11. Computer simulation of London Transport Route 11 has been used to examine the effects and interaction of various measures aimed at reducing the irregularity of the service. The measures investigated are both preventative (the improvement of punctuality of garage departures, the reduction of cancellations and rescheduling of a depleted service) and remedial, by means of bus control. The results show that the two basic approaches (preventative and remedial) are interdependent in that the adoption of one type of action reduced the scope for improvement by the other. This is an important consideration when taking investment decisions aimed at improving bus service regularity. The results suggest that for Route 11, the provision of more buses is an expensive way to improve the services compared with measures which make more efficient use of existing resources. (Copyright (c) Crown Copyright 1977.)

Jackson, RL ;

Transport and Road Research Lab., Crowthorne, (England). 39 TRRL-SUPPLEMENTARY-3, 1977, 28p; Also Pub. as ISSN-0305-1315.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279129/1ST

12 180801 AUTOMATED GUIDEWAY TRANSIT SERVICE AVAILABILITY WORKSHOP. The workshop consisted of four panel sessions: Service Availability Definitions; Operator Experience in Operational Systems; Theoretical Aspects of AGT Service Availability; and User-Manufacturer Relationships. The workshop presented a wide spectrum of informed opinion on how to specify, predict, design, and measure the effectiveness of automated guideway transit systems. The document contains the papers and remarks presented at the four panel sessions, the comments made during the question and answer period that followed, and a list of attendees. The discussions illustrated the wide spectrum of meanings currently given to the term 'service availability.' The positions taken by representatives of the various portions of the transit industry--properties, designers, researchers, and manufacturers--showed the variety of ways in which system performance is specified and evaluated today, and the reasons for such a variety.

Watt, CW ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-46, UMTA-MA-06-0048-77-4, Feb. 1978, 392 pp; Contract DOT-MA-06-0048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282295/5ST, DOTL NTIS

12 181168 A COMPARATIVE COST/BENEFIT ASSESSMENT OF MINITRAM AND OTHER URBAN TRANSPORT SYSTEMS. This report gives a summary account of a cost/benefit analysis of several hypothetical fixed track automatic passenger transport systems in an urban scenario based on the West Midlands. The assessment was carried out as part of the Minitram project study and is mainly concerned with a system using 20 place Minitrams, but other automatic systems studied for comparative purposes include a network cab system (Cabtrack) and Minitram systems using larger vehicles. Comparative work was also done on a rail rapid transit system, trams, and express buses running on ordinary roads. The report includes a brief description of the methodology used, with particular reference to the problems of estimating modal split to a new mode when two or more existing modes are present. The main conclusion reached from the study was that a suitable Minitram network is likely to produce enough cash revenue to cover its direct operating costs and to produce sufficient social benefit to give an internal rate of return of more than 10 per cent on its capital cost. However the capital cost of the infrastructure is too great for capital charges to be paid out of net revenue, and a substantial capital grant would be required as an initial subsidy. The report stresses the importance of selecting appropriate economic criteria for optimization before a valid economic comparison can be made with other systems. (Copyright (c) Crown Copyright 1977.)

Langdon, MG ; Transport and Road Research Laboratory Lab Rpt. TRRL-LR-747, 1977, 35 pp; Also pub. as ISSN 0305-1293.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282750/9ST

EDGMENT: NTIS; ORDER FROM: NTIS; PB-280865/7ST

12 181248 DUAL MODE TRANSPORTATION (A BIBLIOGRAPHY WITH ABSTRACTS). The cited reports relate to discussions of personal rapid transit systems, inter-city networks, rapid transit railways, buses, automobile travel, and automated guideways. References are made to communication requirements, worst case analysis freeway transit, dial-a-ride, airport access, and socioeconomic factors. Materials are included on modal split and multimodal systems.

Kenton, E ; National Technical Information Service Final Rpt. June 1978, 169 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0538/5ST

12 181826 RECENT DEVELOPMENTS IN BUS TRANSPORTATION. Contents: The Santa Monica freeway diamond lanes--freeway accident analysis; The Santa Monica freeway diamond lanes--evaluation overview; A comparative analysis of results from three recent non-separated concurrent-flow high occupancy freeway lane projects; Boston, Santa Monica and Miami; Bus priority signal control--simulation analysis of two strategies; Southeast expressway reserved lane for buses and carpools; A simulation study of alternative real-time bus headway control strategies; Incentive program for bus carriers; Peak-base cost allocation models; An interactive bus transit management information system using credit card fare collection data; Cost analysis of current U.S. surface transit fare collection systems; Bus terminal performance measured with time stamping; A model for investigating the effects of service frequency and reliability on bus passenger waiting time; Optimal urban bus size.

Billheimer, JW ; Transportation Research Board, Washington, D.C. TRB/TRR-663, 1978, 83p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282750/9ST

12 182784 CENTRALIZED CONTROL OF A BUS LINE, THE TOULOUSE EXPERIMENT [Regulation centralisee d'une ligne d'autobus, l'experience de toulouse]. The regularity of bus services is a constant preoccupation for operators of public transport networks. The experience gained in Toulouse is an attempt at automatic control in which the operator is involved only in the filtering of control decisions taken by the automatic equipment. /TRRL/ [French]

Fajot, J (Compagnie Generale D'automatisme) *Automatisme* No. 6/7, June 1977, pp 191-197, 1 Fig., 2 Tab., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-105422), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

12 183127 SMALL BUS SYSTEM IMPROVES GRADUALLY AFTER GOING PUBLIC. Six buses inaugurated service for Monterey Peninsula Transit (MPT) September 26, 1973. The scope of service has grown dramatically under MPT administration and ridership gains have kept operating costs per mile relatively constant. In 1974, the operating cost per mile was \$1.33, compared with \$1.31 in 1977. The effi-

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ciency gained by a larger-scale operation was cited by officials as a major reason that this figure is slightly lower in the face of spiraling inflation. /GMRL/

Metro Vol. 74 No. 3, June 1978, pp 34-36
ACKNOWLEDGMENT:

12 183320 ECONOMIC AND SERVICE COMPARISON OF CONVENTIONAL BUS AND AUTOMATED TRANSIT-A CASE STUDY. The paper discusses the findings of an automated guideway transit (AGT)-bus comparative analysis carried out for the city of Trenton, NJ, for 1985. Four transit modes were originally assessed: demand-responsive bus, light rail, scheduled bus and automated guideway transit. Two of these, light rail and demand-responsive bus, were eliminated as relatively ineffective in the area concerned. The other two systems, conventional bus and AGT, were examined in detail as extreme alternatives. Area-wide AGT represents the ultimate in urban mobility while conventional line-haul buses offer easily introduced short-term improvements. The analysis showed that while AGT would offer a high level of mobility to compete with car travel and could enhance future development in Trenton, investment requirements were prohibitive. The analysis of the fixed-route bus system network showed that a significant increase in use could be achieved by increasing frequencies along certain corridors for a relatively modest investment. /TRRL/

Lutin, JM Kornhauser, AL Lion, PM (Princeton University) *Transportation Planning and Technology* Vol. 4 No. 3, May 1978, pp 139-151, 7 Fig., 9 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234543); ORDER FROM: ESL

12 183460 RUFBUS, RETAX AND BUSTAXI: THREE EUROPEAN SYSTEMS OF DEMAND-ACTUATED PUBLIC TRANSPORT. The article describes three European systems, Rufbus, Retax and Bustaxi, of demand-actuated public transport. The rufbus system developed by dornier is intended for rural areas and offers transport between bus-stops in the area of Friedrichshafen. There is no schedule or fixed route and the destination is always reached without passenger transfer. A trip request can be made either by telephone or by a trip selector at the bus stop. The vehicles used are 20-seater Mercedes 0303D buses in which route information is displayed on a terminal in front of the driver. The retax system developed by mbb is designed for urban areas and also offers transport between bus stops, the route being determined by trip requests from microprocessor-controlled trip selector units. Although initial trials were carried out using the Steyr Citybus, the network now uses a volkswagen bus with a capacity of 20 passengers. This system features a display showing the next stop as well as the number of passengers to be picked up. The Retax system is controlled by a PDP 11/70 computer. The demand-actuated bustaxi system developed at delft university of technology, uses selectors connected to the control centre by leased telephone lines. Bus drivers are informed of the route to be followed by digital mobilophone transmission. The system is designed to handle trip requests in urban areas of up to 1500 requests/h. The most important difference between the Bustaxi and the two West German system is the algorithm used to allot passengers to the vehicles. The differences in the

algorithms and operating systems are discussed. /TRRL/

Breur, MWKA Verdonck, W (Delft University of Technology, Netherlands) *Traffic Engineering and Control* Vol. 19 No. 6, June 1978, pp 287-291, 7 Fig., 7 Phot., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 234538)

12 183838 VEHICLE DETECTION USING A MAGNETIC FIELD SENSOR. The measurement of vehicle magnetic moments and the results from use of a fluxgate magnetic sensor to actuate a lighting system from the magnetic fields of passing vehicles is reported. A typical U.S. automobile has a magnetic moment of about 200 A-m squared (Ampere-meters squared), for a school bus it is about 200 A-m squared. When the vehicle is modeled as an ideal magnetic dipole with a moment of 200 A-m squared, the predicted results from an analysis of the sensor-vehicle geometry agree closely with observations of the system response to automobiles.

Marshall, SV (Missouri University, Rolla) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 2, May 1978, pp 65-68, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

12 184017 BUS NETWORK [Le reseau d'auto-bus]. This issue, exclusively devoted to the RATP bus network, deals with the following: operation (method of operation, financing, reorganisation of bus networks, modernisation of operational methods), infrastructure of the lines in the network (stops, terminus), publicity campaigns, rolling stock and its maintenance, organisation, personnel, statistics, evolution in traffic. /TRRL/ [French]

Bulletin de Documentation et d'Information--RATP Special edition, Apr. 1976, 40 p., Figs., Tabs., Photos. ACKNOWLEDGMENT: TRRL (IRRD-105149), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

12 184849 THE NEW YORK CITY DOUBLE DECK BUS DEMONSTRATION PROJECT: AN EVALUATION. From July 1974 through June 1977, the Double Deck Bus (DDB) Demonstration Project was conducted in New York City and in Los Angeles. The primary objective at the two sites was to assess potential increase in vehicle productivity in a feeder/park-and-ride-express busway service (L.A.) and in local service (NYC). Double deck buses carry from 68 to 85 passengers as contrasted with conventional buses which carry from 45 to 47 passengers. Both buses call for only a single transit employee, the driver. This report provides a comparative evaluation between the eight British Leyland double deck buses and four conventional GM buses in New York. Volume I contains an executive summary of both projects, while Volume III provides a detailed analysis of the double deck bus demonstration in Los Angeles. Bus routes in New York were characterized by congested traffic, heavy passenger loads, frequent stops, and frequent passenger turnover. A full-range of socio-economic classes was served and the routes traversed lower-to upper middle-class residential districts, major shopping centers and commercial and business areas. Only seven months of revenue service data are analyzed in this report, due to delays in manufacturing and in satisfying United

States safety and environmental requirements. The evaluation considers passenger (including transit dependent) acceptance and perceptions of the DDB when compared with the conventional bus. Drivers, mechanics, and dispatchers were interviewed to identify their reactions to the new bus. Statistics are presented on schedule adherence, dwell times, passenger throughput, vehicle reliability, on-board safety, fuel and oil consumption rates, operating costs, and financial and scheduling implications. Problems encountered in introducing a non production-line vehicle into revenue service in an existing fleet are discussed.

McCall, CH, Jr (Kendall Square) Simkowitz, H (Transportation Systems Center); CACI, Incorporated, Transportation Systems Center Final Rpt. UMTA-NY-06-0044-78-1, May 1978, 210 p., 8 Fig., 21 Tab., Photos., Apps.; Contract DOT-TSC-1082; ACKNOWLEDGMENT: UMTA, UMTA; ORDER FROM: NTIS; PB-287836

12 184855 LORAN C TRACKING OF LAND VEHICLES USING MICROCOMPUTERS. The concept, design, and evaluation of two similar Loran C land vehicle tracking systems developed by MITRE are presented. One system was developed to provide field demonstrations of applications of Loran C location techniques such as highway inventory accounting, highway resident site recording, control and dispatch of emergency and law enforcement vehicles, and control of mass transit vehicles. The second system was configured to automatically display the reported status and location of two emergency medical service (EMS) vehicles to aid in more efficient dispatch and control functions. The Loran coordinates of the vehicle are transmitted to the base station where a microcomputer resolves the Loran coordinates into geographic/display coordinates and displays the vehicle location. Accurate Loran C land vehicle tracking requires calibration of the Loran signals to respective geographic or map coordinate locations. The two systems being discussed use a linear approximation of the hyperbolic Loran grid. The Loran coordinate to display screen position algorithm is therefore, linear. Automatic tracking Loran receivers are installed in the vehicles. The receivers have been modified to output an audio band signal containing the two Loran time coordinates, the internal status of the receiver, a vehicle identification code, and 1 of 8 vehicle status codes entered on a manual keyboard located in the vehicle. A transmitter key control is also available. Commercial land mobile radios are used for transmission and reception of the audio signal. The land mobile receiver output at the base station is demodulated by a commercially available demodulator and input to the microcomputer on a serial port. After initialization of the system, map display, tracking, screen refresh, and status reporting are all automatic. /Author/

El-Sawy, AA Feuerstein, JW Mayer, RP (Mitre Corporation); Institute of Electrical and Electronics Engineers 1978, pp 157-161, 7 Fig., 2 Ref.; This paper was presented at the 28th IEEE Vehicular Technology Conference at Denver, Colorado, March 22-24, 1978. Sponsored by the IEEE Vehicular Technology Society and the Denver Section, IEEE with the cooperation of the VTS Denver Chapter and the Administrative Committee of VTS.; ORDER FROM: IEEE Services Center, 445 Hoes Lane, Piscataway, New Jersey, 08854

12 184857 PHILADELPHIA FIELD TESTS OF AN OVERLAPPING SIGNPOST AVM SYSTEM DURING THE MULTI-USER AVM PROGRAM. The system tested was a direct proximity RF signpost system utilizing overlapping signposts operating at 49.86 MHz. Testing was divided into three categories, (1) random-route tests (taxi, police, pick-up and delivery, dial-a-ride), (2) fixed-route tests for transit-type vehicles, and (3) special tests for verifying performance under any conceivable urban environmental condition. The location system was specified to provide a basic vehicle location accuracy of at least 3000 feet at 95 percent and 450 feet at 99.5 percent of all test locations. At each checkpoint the location of the vehicle, as determined by the AVM System, was compared to the vehicle's actual location, the radial difference between these locations being the location error. For random route tests, signposts were installed such that the fields from adjacent signposts overlap. Each signpost periodically transmits a 16-Bit digital code using CFSK at 79.86 MHz. Each code includes a 7-Bit North code and a 7-Bit East code. Along any street, only the North or the East codes of adjacent signposts change, thereby creating a "chain." In the AVM equipped vehicle, a simple processor compares the codes received from adjacent signposts and determines if they "chain." By (1) identifying the code from the closest signpost, (2) comparing the codes from the two chaining signposts, and (3) comparing the levels received from each signpost, the vehicle is able to determine its location at one of five locations between each signpost pair. The combination of (1), (2), and (3) above results in an 18-Bit Location Region Code (LRC) which is stored in the vehicle until transmission over a communication link to the base station. At the base station each LRC is assigned to an X-Y coordinate in a data base file. Upon receipt of an LRC from a vehicle, the base station performs a table look-up and generates a physical X-Y location for the vehicle. When signposts are laid out as in the Philadelphia tests, an average of six unique LRC's are generated for each signpost. Thus, ignoring the perimeter, the number of valid X-Y location coordinates is approximately six times the number of signposts. Hoffman signposts may be laid out in different patterns. This flexibility allows virtually any specified location accuracy to be achieved. During fixed-route tests, signposts were located approximately one mile apart along the route. These signposts cause an odometer on the vehicle to be reset. An algorithm based on the last received signpost code and the elapsed odometer distance, provided accurate vehicle location. Testing involved recording, on cassette, the LRC output from a vehicle unit, the output of a reference fifth-wheel, and a series of manual reference inputs. Off-line processing of these cassettes produced location error statistics. Test results, including the effects of a simulated 5 percent communication error rate are presented.

Gruver, GW (Hoffman Information Identification Incorporated); Institute of Electrical and Electronics Engineers 1978, pp 543-548, 9 Fig., 6 Ref.; This paper was presented at the 28th IEEE Vehicular Technology Conference at Denver, Colorado, March 22-24, 1978. Sponsored by the IEEE Vehicular Technology Society and the Denver Section, IEEE with the Cooperation of the VTS Denver Chapter and the Administrative Committee of VTS;

ORDER FROM: IEEE Services Center, 445 Hoes Lane, Piscataway, New Jersey, 08854

12 185382 SOUTHEAST EXPRESSWAY HIGHWAY OCCUPANCY VEHICLE LANE EVALUATION REPORT. A non-separated concurrent-flow lane was instituted on Boston's Southeast Expressway on May 4, 1977. An eight-mile section of the left-most inbound lane was reserved for buses and carpools of three or more persons between the hours of 6:30 a.m. and 9:30 a.m. There were no official intermediate points of access or egress, removable plastic inserts were used to separate the lane from the other northbound lanes, and compliance was voluntary until October 17, 1977. Construction on a portion of the roadway began in June, 1977, reducing capacity at that point by about 25 percent. The report describes the project development, implementation, and operations and addresses impacts in the following areas: travel times on the Expressway and alternate routes; transportation system use patterns; cost of express lane operation; violations, enforcement, and safety; and institutions and attitudes. By the end of the project the Expressway was carrying eight percent fewer people while the number of automobiles had declined 16 percent, reflecting a 71 percent increase in the number of carpools. Bus ridership increased by only 5 to 6 percent while ridership on rapid rail increased by 12 percent. Travel times were lower during the summer months for all Expressway users, but during the enforcement period an average trip in the general lanes took 7.5 minutes longer. The violation rate fell from 80 percent to 35 percent when enforcement was initiated. /Author/

Simkowitz, H ; Transportation Systems Center, (DOT-TSC-UMTA-78-25) Final Rpt. UMTA-MA-06-0049-78-4, May 1978, 76 p., 21 Fig., 7 Tab.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ORDER FROM: NTIS

12 185703 BUS TRANSPORTATION. PART 2. LOCAL STUDIES (A BIBLIOGRAPHY WITH ABSTRACTS). The second part of a two-part study of bus transportation, principally in the U.S., covers the planning, testing, operation, and evaluation of bus systems and facilities in specific localities. Abstracts are alphabetically arranged according to the states or other areas from which information has been obtained. The materials deal with community relations, environmental issues, financing, management, maintenance, problems, benefits and costs, alternatives, travel patterns and modes, demand, vehicles, theories, and social aspects. Feasibility studies, performance assessments, public relations, road and highway issues, experimental programs, local projects, and special services are also included. (This updated bibliography contains 259 abstracts, 27 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Bibliog. Sept. 1978, 263 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0968/4ST

12 186167 ACCELERATING MOVING WALKWAY SYSTEMS. MARKET ATTRIBUTES, APPLICATIONS, BENEFITS, REPORT D. This report is part of a series that assesses the technology and development of Ac-

celerating Moving Walkway Systems (AMWS). The system is a pedestrian assist device with the capability through changing treadway configuration to accelerate pedestrians to 4 to 5 times the normal entrance speeds after boarding, and to decelerate prior to discharge. This report attempts to show how AMWS offers the prospects of improving average pedestrian speeds and trip times and reduces human energy expenditure. This would effectively extend the pedestrian range and provide for increased urban development constrained by the limits of acceptable walking distance. Pedestrian movement within cities is not always convenient, vehicular transportation does not function well on congested urban streets, vehicles pollute and are energy intensive, and the central city is in need of improvement in its quality of life. Effective human scale horizontal movement systems are seen as an important means of fulfilling many of these objectives. Potential applications include feeders to transit; substitutes for AGT, bus, or rail; airport movement systems; urban land use integrators; and vehicle free zone support systems. Benefits include improved transit connections, pedestrian safety, reduced pollution and energy use, and improvements in urban life.

Fruin, J Marshall, R Perilla, O ; Port Authority of New York and New Jersey, Urban Mass Transportation Administration, (UMTA-IT-06-0126) UMTA-IT-06-0126-78-4, Mar. 1978, 82 p.; See also PB-287 082 and PB-287 084.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-287083/OST

12 186230 THE NEW YORK CITY DOUBLE DECK BUS DEMONSTRATION PROJECT: AN EVALUATION. REPORT NO. 2 (FINAL). This report is the second of three documents that constitute an evaluation of the Double Deck Bus (DDB) Project sponsored by UMTA. The project was conducted in New York City and Los Angeles (July 1974-June 1977). The primary objective at the two sites was to assess potential increases in vehicle productivity in an express, limited busway service (L.A.) and in regular service (NYC). DDB carry from 68-84 passengers; conventional buses carry from 45-47 passengers. Both buses require a single transit employee, the driver. This report provides a comparative evaluation between the eight British Leyland double deck buses and four conventional GM buses in New York City. Bus routes in New York were characterized by congested traffic, heavy passenger loads, frequent stops, and frequent passenger turnover. Only seven months of revenue service data were analyzed, due to delays in manufacturing and in satisfying U.S. safety and environmental requirements. The evaluation considers passenger acceptance/perceptions of the DDB vis-a-vis the conventional bus. Statistics are presented on schedule adherence, dwell times, passenger throughput, vehicle reliability, on-board safety, repair and maintenance costs, and fuel and oil consumption. This report concludes that: passengers preferred the DDB; there were no serious problems with the use of internal stairs nor with crime or vandalism on the second level; the DDB project was hampered by problems related to the purchase of foreign vehicles and their re-design to meet American requirements; and the results favored the incorporation of the double decker into the American bus fleets from

both an economic and level-of-service point of view.

McCall, CHJ Simkowitz, HJ ; CACI, Incorporated, Urban Mass Transportation Administration UMTA-NY-06-0044-78-1, May 1978, 200 p.; See also Report No. 3, PB-297837.; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287836/1ST

12 186231 THE LOS ANGELES DOUBLE DECK BUS DEMONSTRATION PROJECT: AN EVALUATION. REPORT NO. 3 (FINAL). This report is the third of three documents that constitute an evaluation of the Double Deck Bus (DDB) project sponsored by UMTA. The DDB project involved the purchase and operation of contemporary DDBs in New York City and Los Angeles (July 1974-June 1977). The intent was to assess whether the DDB was able to make its greater passenger capacity available at a cost per capacity-mile less than or equivalent to its conventional counterpart. DDBs carry from 68-84 passengers; conventional buses carry from 45-47 passengers. Both buses require a single transit employee, the driver. This report provides a comparative evaluation between the two German Neoplan DDBs and the two conventional Flexible buses, and it explores vehicle-related, transit operator-related, and user-related issues. In Los Angeles, the two Neoplan buses operated between the suburbs and the central business district, providing a combination of express and collection/distribution/park-and-ride services. Only eleven months of revenue service are analyzed, due to project delays to correct original manufacturing deficiencies. This evaluation considers passenger acceptance/perception of the DDB vis-a-vis the conventional bus. Statistics are presented on schedule adherence, dwell times, passenger throughput, vehicle reliability, on-board safety, repair and maintenance costs, and fuel/oil consumption. The report concludes that: passengers (52%) preferred the DDB; operating costs were nearly identical for the two bus types; major delays were associated with debugging and retro-fitting the DDBs; and results argued for the incorporation of the DDB into the American bus fleets from both an economic and level-of-service point of view.

McCall, CHJ Simkowitz, HJ ; CACI, Incorporated, Urban Mass Transportation Administration UMTA-CA-06-0069-78-1, May 1978, 142 p.; See also PB-287838.; Contract DOT-TSC-0069; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287837/9ST

12 186232 THE DOUBLE DECK BUS DEMONSTRATION PROJECT: EXECUTIVE SUMMARY. This report is one of three documents that constitute an evaluation of the Double Deck Bus (DDB) Demonstration Project sponsored by UMTA. The project was conducted in Los Angeles and New York City (July 1974-June 1977). The primary objective at the two sites was to assess potential increases in vehicle productivity in an express, limited busway service (L.A.) and in regular service (NYC). DDB carry from 68-84 passengers; conventional buses carry from 45-47 passengers. Both buses require a single transit employee, the driver. In New York City, eight British Leyland double deckers operated on two Manhattan routes characterized by congested traffic, heavy passenger loads, frequent stops, and frequent passenger turnover. In Los

Angeles, the two German Neoplan buses operated between the suburbs and the central business district, providing a combination of express and collection/distribution/park-and-ride services. Seven months of revenue service were analyzed for NYC project and eleven months of revenue service for Los Angeles. The evaluation considers passenger acceptance/perceptions of the DDB vis-a-vis the conventional bus. Statistics are presented on schedule adherence, dwell times, passenger throughput, vehicle reliability, on-board safety, repair and maintenance costs/capacity mile, and fuel and oil consumption rates. It was concluded that: passengers preferred the DDB; foreign production line vehicles should have been treated as prototypes and undergone extensive on-site testing and re-design before they were produced as standard production line vehicles and accepted for revenue service--this procedure is recommended for all future purchases of double deck vehicles.

McCall, CHJ Simkowitz, H ; CACI, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0049-78-7, May 1978, 48 p.; See also Report No. 2, PB-287836.; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-287838/7ST

12 188356 THEORETICAL CAPACITY AND SPACE REQUIREMENTS OF HEAVY RAIL AND BUS RAPID TRANSIT. An investigation has been made to establish the theoretical capacity of an unidirectional single track heavy rail transit service as offered by the South African Railways and a similar study has been made for an exclusive unidirectional single bus-way. This information is used to examine the spatial requirements per passenger for these two modes of transport for an open section right of way, an intermediate halt and a terminal, and to subsequently determine the effectiveness of these two high density urban passenger systems.

Voort, JJP van der (South African Railway) *Civil Engineer in South Africa* Vol. 20 No. 8, Aug. 1978, pp 197-202, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

12 188381 SELECTIVE DETECTION-CENTRAL SWANSEA. The purpose and operation of the detection system using a passive unit mounted under a bus and buried loops in the road powered from roadside equipment is discussed. A brief history of the development of selective detection is given. The system is used in non-segregated flows to give buses a higher priority at traffic signals. Provisions are made to compensate other traffic after a bus priority sequence has operated and ensure that buses do not take complete control of a junction. The effect on the travelling public, motorists and pedestrians is examined. It is estimated that a high rate of return will be obtained with benefits to public transport and private vehicles making more efficient use of junctions outweighing the slight disbenefits to motorists on non-priority approaches. The cost of providing bus priorities by bus-lanes or any other means is far greater. The Swansea System, the first operational system in Europe will be closely monitored and modified if required. /TRRL/

Ward, WJ Heys, JS (West Glamorgan County Council, England) *Chartered Mechanical Engineer* Vol. 105 No. 7, July 1978, pp 197-200, 3

Fig. 1 Phot., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 235525)

12 188384 STUDY OF BUS TRAFFIC CONTROL IN AN URBAN ENVIRONMENT. APPENDIX: SIMULATION (RESBUS PROGRAM) [Etude sur le controle et la regulation d'autobusen milieu urban. Annexe: Simulation (Programme Resbus)]. This report describes part of the research into processes for improving the regularity or level of service of a bus network. The appendix "simulation" (resbus program) outlines the simulation approach used to investigate the different processes on a network. The program takes the passengers into account individually by means of an origin-destination, station to station or zone to zone matrix. The simulation is applied to the case of the public transport network of the town of Besançon. /TRRL/ [French]

Centre d'Etudes et de Recherches Monograph July 1977, 149 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 105491), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

12 189098 SAN BERNARDINO FREEWAY EXPRESS BUSWAY EVALUATION OF MIXED-MODE OPERATIONS. Evaluation of the San Bernardino Freeway Busway has been going on since it was opened in January 1973. From October 1976 through June 1978, carpools of three or more were permitted on this previously bus-only facility. This report evaluates mixed-mode (bus and carpool) operations of the busway; it includes a summary of the bus-only phase (Jan. 1973-Oct. 1976) as well as implications of this research to other possible busway developments. Data was collected from traffic studies and from written and oral surveys. All of the surveys are described in detail in Appendixes A through D of this report. This project has shown that busways can be cost-effective, non-controversial, and a way of attracting substantial numbers of solo auto drivers into buses and carpools. There are about 2600 people now carpooling as a direct result of mixed-mode busway operations. Surveys show that public opinion at all levels support the mixed-mode operation of the busway. The busway is an 11-mile, double-lane, exclusive roadway for high occupancy vehicles, running eastward from downtown Los Angeles. The busway lanes are physically separated by either concrete or flexible barriers from auto traffic lanes, making it a true rapid transit system for buses and carpools. This \$57 million system is the most complete facility of its kind in the country, with offline stations, park-ride facilities, two uni-directional bus lanes, feeder bus lines, outlying park-pool lots, and supplemented by a downtown reserved lane. This report concludes that the user-cost savings, for busway-induced carpools and bus riders only, cover two thirds of the annual (capital and operating) costs of the busway. /UMTA/

Crain and Associates, (CA-09-0059) Final Rpt. UMTA-CA-09-0059-78-1, July 1978, 204 p.; Prepared for Southern California Association of Governments. Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-285913

12 190932 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-1. EVALUATION OF THE NW 7TH AVENUE EXPRESS BUS AND BUS PRIORITY SYSTEMS. This report presents a summary of the evaluation of Phase I of the I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project in Miami. The twenty-six month Phase I evaluation consisted of evaluation of several techniques for providing express buses with a priority service on an urban arterial street. Four bus priority systems were implemented and evaluated on NW 7th Avenue in Miami. These systems were: buses with traffic signal preemption capability in mixed mode operation; buses with traffic signal preemption capability in a reversible exclusive bus lane; buses in the exclusive lane with traffic signal progression; and buses with traffic signal preemption capability in the exclusive lane with traffic signal progression. For the traffic pattern and geometric configuration on NW 7th Avenue, it was found that the travel times for both buses and autos were reduced under each of the priority treatments. Auto accident rates were unaffected but the provision of the exclusive bus lane introduced some problems with bus accidents. Buses moved up to 25% of the passengers and represented less than 2% of the vehicles in the traffic stream. The express bus system achieved a modal split of 8.6% of the potential trips. Several inefficiencies in the transit system reduced the economic viability of the transit service.

Wattleworth, JA Courage, KG Wallace, CE Wolfe, RS Reaves, DP ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-00067-78-1, Sept. 1978, 131 p.; See also Rept. No. 2, PB-291138. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291137/8ST

12 190933 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-2. EFFECTS OF NW 7TH AVENUE BUS PRIORITY SYSTEMS ON BUS TRAVEL TIMES AND SCHEDULE VARIABILITY. Bus priority techniques have been widely implemented in recent years in an effort to improve the effectiveness of public transportation. To facilitate the evaluation of bus priority operations, a new automated technique for data recording and analysis was developed and applied to a demonstration project in Miami, Florida, in which two schemes were evaluated. The first involved preemption of 35 traffic signals along an arterial route. In the second, an exclusive bus lane was added to the system, with the signal preemption features retained. The measures of effectiveness used to evaluate the two bus priority techniques include speed, delay, travel time, fuel consumption, and comfort measures such as speed noise, number of stops, and speed changes. It was found that both priority techniques resulted in significant improvement in all of the measures of effectiveness. The most dramatic improvement occurred in the number of unscheduled stops, which were reduced by 87%.

Courage, KG Wattleworth, JA Wallace, CE Michalopoulos, PG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-2, Sept. 1978, 75 p.; See also

Rept. No. 3, PB-291139. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291138/6ST

12 190934 I-95 NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-3. CHANGES IN TRANSIT OPERATIONAL CHARACTERISTICS ON THE NW 7TH AVENUE EXPRESS BUS SYSTEM. This report was written to present the evaluation of the operational characteristics of the Orange Streaker express bus system. The evaluation was conducted collecting data needed to develop primary and secondary measures of system performance for determination of system operating, ridership and revenue characteristics of the Orange Streaker system. The analysis showed that one-way peak period express service resulted in large portions of non-productive (deadhead) time and miles. Ridership generally increased although some routes experienced low levels of utilization. The fare structure provided revenue-generating characteristics that were inadequate to support the quality of service provided. Service modifications to improve the efficiency of operation and fare increases are necessary to reduce deficit operations.

Wolfe, RS Wattleworth, JA Wallace, CE Siegel, RL Courage, KG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-3, Sept. 1978, 143 p.; See also Rept. No. 4, PB-291140. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291139/4ST

12 190936 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-5. EFFECT OF THE PARK'N'RIDE FACILITY ON USAGE OF THE NW 7TH AVENUE EXPRESS BUS SYSTEM. This report presents a description of the Golden Glades Park'n'Ride Facility and an assessment of the impact of the Facility on usage of the I-95/NW 7th Avenue Express Bus/Car Pool Systems Demonstration Project during Phase I. The Golden Glades Facility is an intermodal transfer facility which provides parking for persons transferring from the auto mode to the express bus or car pool mode. The Facility serves as a staging area for Orange Streaker buses and car pools with provisions for kiss'n'ride and local bus transfers, as well as the park'n'ride transfers. Covering 8.1 acres and providing 967 parking spaces, the Facility is located at the southern end of the Project market area with access to the Project corridor via NW 7th Avenue. This report represents an analysis of data from daily MTA starter counts, input/output studies, air photo studies, system user and intermodal transfer studies, which were used to determine the type of use, growth, and distribution of vehicles as they arrived and left the Facility.

Wattleworth, JA Wallace, CE Courage, KG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-5, Sept. 1978, 69 p.; See also Rept. No. 6, PB-291142. Spon-

sored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291141/0ST

12 190937 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-6. EFFECTS OF NW 7TH AVENUE BUS PRIORITY SYSTEMS ON NW 7TH AVENUE TRAFFIC STREAM FLOW AND PASSENGER MOVEMENTS. The purpose of this report was to document the effects of several bus priority systems implemented on NW 7th Avenue in Miami, Florida, on traffic stream flow and passenger movement characteristics. Data were collected regarding traffic volume, vehicle occupancy, system delay (air photos), violations of the reserved lane, auto travel time and accidents. Analyses were conducted to determine the effects of each bus priority system on the operational characteristics of automobile traffic and passenger movements on NW 7th Avenue. Some of the general conclusions were: (1) none of the implemented bus priority systems produced an adverse effect on auto traffic and, in fact, the auto traffic was generally improved under all bus priority systems; (2) the bus priority system consisting of a reversible, exclusive bus lane and traffic signal progression produced better operation for the automobile traffic than did the systems which used the exclusive bus lane and traffic signal preemption; (3) the initiation of the exclusive lane was associated with a significant increase in bus accident rates; after a 'start up' period, the bus accident rate decreased somewhat but still remained higher than the bus accident rate before the initiation of the bus lane; (4) the rate of violation of the reserved lane was relatively low (about 5%); there was an indication that the violation rate decreased with time as drivers learned of the reserved lane and left turn restrictions.

Wattleworth, JA Viele, GJ Wallace, CE Courage, KG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-6, Sept. 1978, 207 p.; See also Rept. No. 7, PB-291143. Sponsored in part by; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291142/8ST

12 190938 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-7. EVALUATION OF THE CHARACTERISTICS OF USERS AND NON-USERS OF THE NW 7TH AVENUE EXPRESS BUS/CAR POOL SYSTEM. This report presents the findings of three surveys performed during Phase I of the I-95/NW 7th Avenue Express Bus/Car Pool Systems Demonstration Project. The surveys were administered to obtain data on the socio-economic, travel, and attitudinal characteristics of two types of transit users, express bus passengers and Golden Glades car pool patrons; and similar data from a representative sample of non-users from among the target market population. The user surveys were self-administered questionnaires distributed to the respondents at the Golden Glades Terminal while the non-user survey consisted of telephone interviews conducted by a market research firm. An analysis of the data indicated that the users

differed from the non-users with respect to the distribution of several socio-economic traits within each group. Users had a disproportionately larger percentage of females while the non-users had a greater concentration of males. This difference carried over to other socioeconomic traits as well.

Reaves, DP Goldberg, AP Wolfe, RS Wattleworth, JA Wallace, CE ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-7, Sept. 1978, 145 p.; See also Rept. No. 8, PB-291144. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291143/6ST

12 190939 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-8. EFFECT OF THE BUS PRIORITY SYSTEMS OPERATION ON PERFORMANCE OF TRAFFIC SIGNAL CONTROL EQUIPMENT ON NW 7TH AVENUE. This report deals with the effects of a bus preemption system on the traffic control system operation on NW 7th Avenue in Miami. The quantities examined in detail were the operating parameters of the signal system, i.e., cycle length, bus phase length, non-bus phase length, etc. Substantial variation in these parameters was found throughout the course of the Project. However, most of the variation was attributable to misoperation of detectors and other signal equipment and to changes in the design parameters which were necessary throughout the course of the Project. The bus preemption system performed satisfactorily from a reliability point of view. No difficulties were experienced either with the failure to recognize buses or with false alarms. Preemption equipment problems accounted for only 3 percent of the maintenance calls. The traffic control system itself, however, presented somewhat of a maintenance problem. The rate of maintenance calls for this particular system was approximately double the county-wide average. The introduction of the computerized signal system on NW 7th Avenue compounded the general maintenance problem.

Courage, KG Wallace, CE Wattleworth, JA ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-8, Sept. 1978, 677 p.; See also Rept. No. 9, PB-291145. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291144/4ST

12 190940 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-9. ECONOMIC VIABILITY OF THE NW 7TH AVENUE EXPRESS BUS OPERATION. Several priority techniques were tested in Miami, Florida, to demonstrate methods of providing preferential treatment for express buses on an arterial highway (NW 7th Avenue). The techniques implemented and evaluated included express bus preemption of traffic signals, progression of traffic signals to favor express flow and a reversible, exclusive lane for the express buses. Also included in the Project was a new park'n'ride lot and

deluxe buses for the transit service. All of the priority techniques proved to be highly successful in improving the quality of transit service, particularly in terms of travel time advantages. However, the cost of several of the priority treatment strategies was quite high, both to implement and to operate. The benefits derived were in terms of reductions in vehicle miles per person, and total passenger hours per person in the corridor. Economic analyses were conducted to determine the economic viability of the transit service, the cost trade-off for express transit users and the total system cost effectiveness.

Wallace, CE Wattleworth, JA Courage, KG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-9, Sept. 1978, 27 p.; See also Rept. No. 1, PB-291137. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291145/1ST

12 190975 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT II-1. EVALUATION OF THE I-95 EXPRESS BUS AND HIGH OCCUPANCY VEHICLE PRIORITY SYSTEMS. This report, Report II-1, presents a summary of the evaluation of Phase II of the project, and it consists of the evaluation of the effect of the exclusive bus/car pool lanes on the I-95, Golden Glades Park'n'Ride facility, and a direct flyover connector between the facility and the reserved lanes on I-95.

Wattleworth, JA Courage, KG Long, G Wallace, CE Wolfe, RS ; Florida University, Gainesville, Florida Department of Transportation, Urban Mass Transportation Administration, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-10, Sept. 1978, 143 p.; Sponsored in part by Florida Department of Transportation. See also PB-291147 and PB-291145.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291146/9ST

12 190976 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT II-2. EVALUATION OF THE EFFECTS OF THE I-95 EXCLUSIVE BUS/CAR POOL LANE PRIORITY SYSTEM ON VEHICULAR AND PASSENGER MOVEMENTS. Express bus operations on the new priority lanes on I-95 in March 1976 constitute Phase II of the project. The report, Report II-2, discusses the effects of priority systems on vehicle operations, passenger movements, violations and enforcement, and safety. The report concludes that: all travel times were reduced when lanes were opened; violation rate dropped from 63% (three persons occupancy) to 37% (two persons occupancy); additional lanes on I-95 significantly decreased the accident rate on a daily basis.

Wattleworth, JA Courage, KG Wallace, CE ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-11, June 1978, 75 p.; Sponsored in part by Florida State Dept. of Transportation, Tallahassee. See also PB-291146 and PB-291148.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291147/7ST

12 190977 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT II-3. EVALUATION OF THE EFFECTS OF THE I-95 EXCLUSIVE BUS/CAR POOL PRIORITY SYSTEM ON THE EXPRESS BUS SYSTEM. Express bus operations on the new priority lanes on I-95 in March 1976 constitute Phase II of the project. This report, Report II-3, presents the evaluation of the effects of Phase II on the express bus and car pool operation. In addition, the effect of Park'n'Ride facility and flyover ramp on the utilization of the I-95 priority system is presented along with the effect of the marketing program. The economic viability of the I-95/NW 7th Avenue bus/car pool priority systems is also presented.

Wattleworth, JA Wallace, CE Wolfe, RS Courage, KG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-12, Sept. 1978, 134 p.; Sponsored in part by Florida State Dept. of Transportation, Tallahassee. See also PB-291147 and PB-291149.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291148/5ST

12 193619 ANALYZING TRANSIT OPTIONS FOR SMALL URBAN COMMUNITIES. VOLUME I: TRANSIT SERVICE OBJECTIVES AND OPTIONS. The information and analytical techniques contained in this manual are designed to assist in the planning of new or improved transit services in small urban communities with less than 200,000 residents, that are currently sponsoring, promoting, providing, or considering such services. Portions of the manual will be useful in larger urban areas. Techniques are presented to assist in planning for both conventional bus transit and paratransit alternatives and for estimating the demand, cost, and revenue implications of various transit service alternatives. Opportunities for Federal and State financial assistance are summarized, Federal requirements are described, and the experience of urban communities involved in local mass transportation is illustrated. Volume One contains Chapters 1 through 4, and presents a generalized process for planning transit and paratransit options in small urban communities. The process consists of a logical sequence of steps which combine the form basic tasks. These tasks are outlined in the report. Information is presented to assist in the first and second set of activities in the planning process, which includes discussions of the relationship between goals, standards, and criteria; the importance of transit service objectives; guidelines for establishing local transit goals and objectives and for assessing the local need for transit service; and the range of characteristics that differentiate between transit service alternatives. In addition, the capabilities of specific modal opportunities are summarized, and their relationship to the achievement of local transit service objectives are addressed. A Listing of Publications is included for guidance in preparing the design of the alternatives. /UMTA/

James, DH, Transportation Consultant ; Peat, Marwick, Mitchell and Company, (IT-06-9020) Manual UMTA-IT-06-9020-78-1, Jan. 1978, 109 p.; Sponsored by the Urban Mass Transportation Administration. This manual consists also of "Volume Two: Analysis Methods" and "Volume Three: Summary of Management and Operations

Experience". (Three volume set available as PB-291449.); Contract DOT-UT-50021; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291450/AS

12 193620 ANALYZING TRANSIT OPTIONS FOR SMALL URBAN COMMUNITIES. VOLUME TWO: ANALYSIS METHODS. The information and analytical techniques contained in this manual are designed to assist in the planning of new or improved transit services in small urban communities with less than 200,000 residents, that are currently sponsoring, promoting, providing, or considering such services. Portions of the manual will be useful in larger urban areas. Techniques are presented to assist in planning for both conventional bus transit and paratransit alternatives, and for estimating the demand, cost, and revenue implications of various transit service alternatives. Opportunities for Federal and State financial assistance are summarized, Federal requirements are described, and the experience of urban communities involved in local mass transportation is illustrated. Volume Two contains Chapter 5 of the manual. The transit planning process in small urban communities consists of a logical sequence of steps, which combine to form basic tasks, and are outlined in Volume One. Volume Two presents information and techniques designed to assist in the third set of activities in the planning process. Evaluation is an activity that continues throughout this process, and is based on: (1) the degree to which each alternative achieves transit service objectives set by the community or transit manager; and (2) the financial implications of each alternative in relation to transit service cost limits or budgets set by the community. In this volume, an evaluation approach is described and detailed techniques are presented with which one can estimate the patronage, cost, and revenue implications of a transit service operation, which are the key elements in evaluating transit service alternatives. References are also contained herein. /UMTA/

James, DH, Transportation Consultant ; Peat, Marwick, Mitchell and Company, (IT-06-9020) Manual UMTA-IT-06-9020-7802, Jan. 1978, 181 p.; Sponsored by the Urban Mass Transportation Administration. This manual consists also of "Volume One: Transit Service Objectives and Options" and "Volume Three: Summary of Management and Operations Experience". (Three volume set available as PB-291440.); Contract DOT-UT-50021; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291451/3ST

12 193621 ANALYZING TRANSIT OPTIONS FOR SMALL URBAN COMMUNITIES. VOLUME THREE: SUMMARY OF MANAGEMENT AND OPERATIONS EXPERIENCE. The information and analytical techniques contained in this manual are designed to assist in the planning of new or improved transit services in small urban communities with less than 200,000 residents, that are currently sponsoring, promoting, providing, or considering such services. Portions of the manual will be useful in larger urban areas. Techniques are presented to assist in planning for both conventional bus transit and paratransit alternatives, and for estimating the demand, cost, and revenue implications of various transit service alternatives. Opportunities for Federal and State finan-

cial assistance are summarized, Federal requirements are described, and the experience of urban communities involved in local mass transportation is illustrated. Volume Three contains the last chapters of the manual, which are 6 and 7. This volume describes the activities of a transit operation, explores the relationships between these activities, identifies arguments for and against local control of transit organizations, provides estimates of stall requirements of various-sized transit systems, and describes the desired characteristics of a transit manager. Numerous data and statistics are given on the financial and operating performance of existing conventional transit and paratransit services in small urban communities. This information is available for the quick evaluating of transit service alternatives in comparable communities. A Listing of References is also contained herein. /UMTA/

James, DH, Transportation Consultant ; Peat, Marwick, Mitchell and Company, (IT-06-9020) Manual UMTA-IT-06-9020-78-3, Jan. 1978, 142 p.; Sponsored by the Urban Mass Transportation Administration. This manual consists also of "Volume One: Transit Service Objectives and Options" and "Volume Two: Analysis Methods". (Three volume set available as PB-291449.); Contract DOT-UT-50021; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291452/AS

12 193915 COMBINATORIAL PROBLEMS IN AN ADAPTIVE PUBLIC TRANSPORTATION NETWORK. The paper addresses the following combinatorial problems: what are the minimal number of buses and drivers needed to keep up an adaptive public transportation network with prescribed departure and travel times. The system is adaptive in the sense that buses as well as drivers are not restricted to travel only one given two way line, but may also traverse among lines. However, adaptation to passenger loading is not yet directly considered. The relaxation of the "two way lines" constraint should provide more flexibility in employing the resources required to maintain and operate the network. No assumptions are imposed upon either the departure or travel times. The solution process is simple and intuitive and it seems that it can serve as a basic framework for accommodating some changes in the underlying structure of the system. The algorithm is an interim step in a mathematical program where the departure times are taken as control variables and are selected to minimize the average waiting time of passengers, or alternatively other performance indices of the network. The final buses' trips are not unique and their choice is subject to managerial considerations.(a) /TRRL/

Friedman, M (Arizona State University, Phoenix) *Transportation Research* Vol. 12 No. 5, Oct. 1978, pp 305-308, 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237579)

12 193921 BUS CONTROL: A REVIEW OF PRESENT KNOWLEDGE. The routes where bus control will lead to the greatest benefit are the heavily congested, high frequency routes in urban areas. The types of control system considered are: (1) roadside inspector systems, which are efficient when operated effectively (however, their use is likely to decline owing to high staff costs.); (2) centralised systems relying primarily on the use of radio-telephones, which is potentially the cheap-

est method of control in many instances (however, their effectiveness depends on the accuracy of information passed to the controller and the ability to maintain effective supervisory control if roadside staff are withdrawn); and (3) centralised systems relying on the use of radio-telephones in conjunction with some form of vehicle monitoring. Some experimental systems introduced in the UK were unnecessarily complex. A possible low cost system is outlined. Various manipulatory control actions, together with comments on their potential limitations, are given. /TRRL/

Finnamore, AJ Jackson, RL (Transport and Road Research Laboratory) ; Leeds University, England Monograph 1977, pp 41-52, 4 Tab., 10 Ref.; 9th Annual Seminar on Public Transport Operations Research, July 6-8, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 237710)

12 193923 APPLICATIONS OF TRANSYT [Toepassing van transyt]. TRANSYT is a computer program that simulates and optimizes the traffic flow in a network with controlled intersections. The program has shown to be a good study tool and an instrument for the design of control schemes. The program has some restrictions because it works with fixed traffic volumes and fixed control schemes. It is possible, however, to construct traffic dependant modifications, for instance to give absolute priority to vehicles of public transport. This paper describes some possibilities and restrictions of TRANSYT. /Author/TRRL/ [Dutch]

Vanmiers, MA *Verkeerskunde* Vol. 29 No. 12, Dec. 1978, pp 583-586, 9 Fig., 2 Phot., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237655), Institute for Road Safety Research

12 195415 THE DEVELOPMENT AND TESTING OF A COST EFFECTIVE TRANSIT PASSENGER COUNTER. Presently transit properties must conduct costly labour intensive and time consuming passenger counts in order to assess in a reliable way the performance of the system and to improve responsiveness of operations. Because of the costs and the number of field staff required these counts are generally carried out infrequently, on a fragmentary basis, and are sometimes not particularly reliable. Because of their infrequency, they do not provide a dynamic up-to-date picture of the transit property's market penetration and changing demand situations on the various routes in the system. To overcome this, the IBI group has developed and continues to develop for a number of properties (Toronto, Edmonton and Mississauga) transit passenger counting systems and prototype devices tailored to the needs of these properties. The purpose of this paper is to review the costs and benefits involved in counting passengers manually vs mechanically; the approach taken in developing counting devices for Edmonton and Toronto; the development, testing and performance characteristics of these devices, and provide some guidance on realistic passenger counter criteria such as costs, accuracy, reliability, adaptability, flexibility, etc. /TRRL/

Rebeiro, RB David, RH ; Roads and Transportation Association of Canada Monograph 1978, 20 p., 2 Fig., 3 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 240489), Roads and Transportation Association of Canada

12 195450 STATISTICAL ANALYSIS OF AN URBAN BUS ROUTE. The present paper is a mathematical description of an urban bus route carrying peak hour traffic. The deterministic and stochastic mechanisms of bus operation are analysed-with focus on time evolution-and general models for route structure, boarding and alighting, link travel times and stop times are formulated. Estimation of model parameters is performed on data from a bus route in central Stockholm. Various measures of goodness of fit are used for validation and model choice, the final models being chosen primarily for application in an interactive simulation program. /TRRL/

Andersson, PA Scalia-Tomba, GP ; Linköping University, Sweden, (0348-2960) Monograph LITH-MAT-R-78-11, 1978, 58 p., 15 Fig., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239019), National Swedish Road & Traffic Research Institute

12 195459 A TIME DEPENDENT MODEL FOR SIMULATION OF AN URBAN BUS ROUTE. During the interactive simulation, the route and the buses are shown on a display. The operator acts from a keyboard by giving commands e.g. for an extra bus or to turn a bus short of its terminus, as in real traffic. The purpose is to evaluate control strategies in varying situations, by repeated simulation runs of one or two strategies, for the training of controlling operators and for the assistance of traffic engineers in formulating general rules for strategy application. The program collects overall statistics automatically, but the operator has to ask for local data e.g. waiting times at certain stops. The report refers to an example from a bus route in Stockholm, where each simulated 20 min run takes 0.8 seconds cpu-time on a Dec-10 computer. /TRRL/

Andersson, PA Hermansson, AA Tengvald, E ; Linköping University, Sweden, (0348-2960) Monograph LITH-MAT-R-78-10, 1978, 37 p., 20 Fig., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239016), National Swedish Road & Traffic Research Institute

12 195504 MANUAL FOR SIMULATION PROGRAM OF AN URBAN BUS ROUTE [Manual till simuleringsprogram foer busstrafik i taetort]. This report is a manual for the simulation program of an urban bus line also dealt with in IRRD 239016, 239017 and 239019. /TRRL/ [Swedish]

Hermansson, AA ; Linköping University, Sweden, (0348-2960) Monograph LITH-MAT-R-78-9, 1978, 24 p., 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 239018), National Swedish Road & Traffic Research Institute

12 195882 FOURTH U.S.-GERMAN URBAN TRANSPORTATION WORKSHOP, LOS ANGELES, SAN FRANCISCO, CHICAGO, CAMBRIDGE, APRIL 17-25, 1978. The Fourth US-German Workshop on Urban Transportation was conducted in the United States on April 17 through April 25, 1978. These workshops are held in alternate years in the Federal Republic of Germany and the United States on their basis of International agreements between the Federal Ministry of Transportation, the Federal Ministry of Research and Technology, and the U.S. Department of Transportation. The purpose of the Workshops is to share experience and research

findings relative to policy, finance, planning, management, operations, and technologies in the field of urban transportation. The visiting group generally consists of from 12 to 15 delegates. Half of these represent the Federal Government and the other half represent local governments and the transportation industry. This report contains papers presented during the conference portion at the Transportation Systems Center (TSC) at Cambridge on April 24 and 25. The conference sessions were preceded by a series of briefings, discussions, and site inspections in Los Angeles, San Francisco, and the Chicago during the week of April 17 through April 21. Topics presented in the conference at TSC include: planning; legislation and finance policies in the United States and the Federal Republic of Germany; progress in performing alternative analyses for making urban transportation decisions in the United States; preliminary findings of the Service and Methods Demonstrations Program of the Urban Mass Transportation Administration (UMTA); practical organizational approaches toward public transportation in semi-urban areas in Germany; recent developments in bus and paratransit in both countries; rail safety practices and railcar standardization approaches in both countries; and marketing research in the United States. Papers or summaries of papers are provided in both English and German. /UMTA/

Urban Mass Transportation Administration, (UMTA) (UM-843/R8752) Proceeding UMTA-MA-06-0086-78-1, Sept. 1978, 342 p.; Contract MA-06-0086; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-294972/AS

12 196812 ELECTRIC CARS-THEIR FUTURE ROLE IN URBAN TRANSPORT, CANBERRA, 1975. CONFERENCE PAPERS. This conference was arranged by the Bureau of Transport Economics, Australia in conjunction with the Australian Electric Vehicle Association. Papers presented at the conference discussed topics such as the future transport needs of Australian cities, the role of electric vehicles, and the potential demand for electric vehicles in the future. The impact of electric vehicles on the environment is also discussed. Electric vehicle operating costs, energy consumption of these vehicles compared to motor vehicles running on petroleum as well as technological developments in motor and control systems, batteries and the overall design of electric cars and commercial vehicles are also covered. /TRRL/

Australian Government Publishing Service, (0 642 01790 5) Monograph 1975, 436 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 236955), Australian Road Research Board

12 196816 NEW STRUCTURES FOR AUSTRALIAN CITIES: THE ROLE OF ELECTRIC VEHICLES. The cities commission has just completed a study examining possible future structures for Australian cities. The study concerned new cities in metropolitan and other regions and the planning and development opportunities they offer. It did not attempt to design any specific new city, but rather to suggest a range of urban forms which might be considered when developing new cities; to discuss some techniques for planning and developing them; and to introduce some considerations which normally have not been part of city planning in Australia. This

paper highlights the role electric vehicles could play in the four alternative new city models developed. /Author/TRRL/

Warrell, EG ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 19-39, 8 Fig.

From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236959), Australian Road Research Board

12 197028 RIDE A BENDIBUS TO BANBURY CROSS. Details are given of the performance and of some of the handling characteristics of the man bendibus during a trial drive around the country market town of Banbury. Banbury itself has narrow congested streets and the surrounding housing estates were not planned with public transport in mind. The bus is designed to the standard German VOV Bus layout, is of integral construction having 4 doorways, seats 63 with space for 96 standing passengers-a total of 159. Its manoeuvrability is said to be impressive though it really requires modern city layouts of countries such as the USA. The author does not see the bus being widely adopted in the United Kingdom where urban bus operations are geared to the short, large capacity double-decker and the introduction of a bus of this sort would lead to many changes in fare structures and collection systems and in many cases could lead to a complete revision of routes and siting of stops. /TRRL/

Fielder, J *Coaching Journal and Bus Review* Vol. 47 No. 3, Jan. 1979, pp30-31, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 240617)

12 197357 DESIGN GUIDELINES FOR PARK-AND-RIDE FACILITIES. The report presents guidelines for designing bus park-and-ride facilities. Specifically, guidelines are developed for: (1) locating park-and-ride lots; (2) determining the desired size of a park-and-ride lot; (3) evaluating the capacity of selected design components of the lot (access/egress, kiss-and-ride, bus loading spaces, shelter area); and (4) establishing the physical layout of the parking area. The guidelines developed should be of greatest use to those individuals already familiar with typical parking lot design who are involved in the initial design of new park-and-ride facilities.

Christiansen, DL Rathbone, D ; Texas Transportation Institute, Federal Highway Administration, Texas State Department of Highways & Public Transp FHWA-TX-78-205-3, TTI-2-10-74-205-3, Sept. 1978, 49 p.; Sponsored in part by Texas State Department of Highways and Public Transportation, Transportation Planning Division.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294783/6ST

12 197646 EVALUATION OF PASSENGER COUNTER SYSTEM FOR AN AVM EXPERIMENT. VOLUME I: TECHNICAL REPORT. Passenger count information is needed by transportation planners and transit management to determine total transportation system requirements based on projected passenger movement throughout the transit network. This report, Volume I, contains the results of an evaluation of three commercial transit-line passenger counter systems for use in transit buses, namely: Dynamic Controls, Inc.; Dyniman, Inc.; and International Pro-data Corporation. (One counter incorporated treadle mats at each door step, and the other two

counters incorporated infrared beams established across each doorway.) The evaluation was conducted to assess the potential performance of these systems for use as part of the Multi-User (Automatic Vehicle Monitoring) System. It involved three phases: (1) controlled testing of each candidate's counting accuracy under laboratory conditions; (2) simultaneous field testing of all three candidates on a transit bus during normal in-service operation; and (3) simultaneous environmental testing of the three candidates' sensors. The evaluation results indicated that the passenger counter which incorporated treadle mats operated by the pressure of passengers' feet, exhibited slightly superior counting performance under virtually all test conditions.

Balaram, A Gruver, G Thomas, H ; Gould Information Identification, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0041) Final Rpt. DOT-TSC-UMTA-78-54, Feb. 1979, 78 p.; See also Volume 2, PB-294200.; Contract DOT-TSC-1237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294199/5ST

12 197647 EVALUATION OF PASSENGER COUNTER SYSTEM FOR AN AVM EXPERIMENT, VOLUME II: TEST DATA. This report contains the test data of the evaluation of passenger counter sensors (PCS) for use in transit buses. It contains many laboratory/field test data sheets that describe each specific test that was conducted, the number of samples involved, and the conditions under which each test was performed, as well as sheets depicting the data recording format and data analysis.

Balaram, A Gruver, G Thomas, H ; Gould Information Identification, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0041) Final Rpt. DOT-TSC-UMTA-78-54, Feb. 1979, 168 p.; See also Volume 1, PB-294199.; Contract DOT-TSC-1237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294200/1ST

12 197691 CONTROL OF SERVICE RELIABILITY IN URBAN BUS NETWORKS: SIMULATED MODEL USERS' MANUAL. The manual provides the information required to use the bus network simulation model developed as a part of a project on analysis of control strategies for improving service reliability. The manual includes: (1) information on computer requirements, preparation of inputs and interpretation of outputs, and limits on the size of system which can be modeled; (2) detailed descriptions of all major subroutines; (3) error messages which can be produced by the model; and (4) a sample problem set-up.

Bowman, LA Turnquist, MA ; Northern University, Department of Transportation Final Rpt. DOT/RSPA/DPB-50/79/6, Mar. 1979, 79 p.; Contract DOT-OS-80018; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295731/4ST

12 198144 BROOME COUNTY / TOWN OF OWEGO RURAL-URBAN TRANSPORTATION / HUMAN SERVICES STUDY. The results of a 10-month study of the potential for rural transit development and coordination of human service agency transportation in Broome County and the town of Owego, New York, are presented. Existing conditions in the study area

are described, as well as the planned rural transit system design. Consideration is given to alternative rural transit systems, the recommended transit system design, the 5-year development program for the area, the management approach, the implementation plan, the marketing plan, and human service agency coordination. The recommended rural transit system is a demand-response service with a 24-hour advance notice requirement. This service will operate from 8 a.m. to 6 p.m., Monday through Friday. Coordinated transfers between the rural transit system and the Broome Transit System will be available in downtown Binghamton. The basic fare for the recommended system is \$0.25 per trip. It is also recommended that one free transfer to the Broome Transit System be allowed for each trip into the urban area and that a discount ticket program be initiated. The proposed management structure for the rural transit system includes the Broome County structure which is already operational and a transportation commission for the town of Owego. Data on financial projections and the cost structure are provided. Coordination and consolidation are the two key concepts recommended to facilitate implementation in the study area. Five coordination and consolidation elements are identified: information and referral coordination, volunteer driver coordination, an operations clearinghouse, centralized dispatching, and consolidation.

Applied Resource Integration Limited, Urban Mass Transportation Administration, New York State Department of Transportation Techn Rpt. Mar. 1978, 184 p.; Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002664/ES.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002664

12 198677 APPLICABILITY OF DIGITAL DATA COMMUNICATION FEATURES IN PUBLIC TRANSIT SYSTEMS: EXECUTIVE SUMMARY. A survey was conducted of the state of the art of automatic vehicle monitoring (AVM) systems and their use in public transit, taxi, and police operations. The survey identified systems applicable to improving operational efficiency and quality of service, and reviewed various of their elements related to AVM systems. These elements included vehicle location, vehicle identification, vehicle monitoring, computer scheduling, computer dispatch, silent alarms, security alarms, mechanical alarms, on-board readout, real time display, passenger counting, management reporting, and digital data hardware.

Datta, TK Bowman, BL Cynecki, MJ ; Wayne State University, Highway Safety Research Institute, Michigan Transportation Commission UM-HSRI-78-44-1, Sept. 1978, 27 p.; Sponsored in part by Michigan State Highway Commission, Lansing.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296369/2ST

12 198678 APPLICABILITY OF DIGITAL DATA COMMUNICATION FEATURES IN PUBLIC TRANSIT SYSTEMS: TECHNOLOGY ASSESSMENT. A survey was conducted of the state of the art of automatic vehicle monitoring (AVM) systems and their use in public transit, taxi, and police operations. The systems identified are applicable to improving operational efficiency and quality of service. The

various system elements related to AVM systems were reviewed. Those elements included vehicle location, vehicle identification, vehicle monitoring, computer scheduling, computer dispatch, silent alarms, security alarms, mechanical alarms, on-board readout, real-time display, passenger counting, management reporting, and digital data hardware.

Datta, TK Bowman, BL Cynecki, MJ ; Wayne State University, Highway Safety Research Institute, Michigan State Highway Commission Final Rpt. UM-HSRI-78-44-2, Sept. 1978, 156 p.

Sponsored in part by Michigan State Highway Commission, Lansing.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296379/1ST

12 198752 VEHICLE DETECTION, PHASE III: PASSIVE BUS DETECTOR/INTERSECTION PRIORITY SYSTEM DEVELOPMENT, OPTION II: MANUFACTURING DRAWINGS AND PROTOTYPE DEVELOPMENT, VOLUME I. OPERATION AND MAINTENANCE MANUAL. General information regarding the installation, operation and maintenance of the Passive Bus Detector (PBD) is discussed. Installation and operation require no special adjustments except tuning the inductive-loop electronics to the loop and lead-in. When operated with a 6-ft x 6-ft loop, correct classification of mass transit (40-ft) buses should reach or exceed 95% with less than 1% false classification.

Lubke, RA Sawyer, DD ; Honeywell, Incorporated, Federal Highway Administration FHWA-RD-77-120, F2186-FR1, Oct. 1977, 145 p.; See also Volume 1, Phase 3, Option 1, dated December 1975, PB-268879.; Contract DOT-FH-11-8149; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298193/4ST

12 198753 VEHICLE DETECTION, PHASE III: PASSIVE BUS DETECTOR/INTERSECTION PRIORITY SYSTEM DEVELOPMENT, OPTION II: MANUFACTURING DRAWINGS AND PROTOTYPE DEVELOPMENT. A production prototype 16-channel Passive Bus Detector (PBD) was developed, based on the engineering model Passive Bus Detector/Intersection Priority System. The PBD is functionally the same as the engineering model except that the traffic controller function was not carried along into the production prototype mode. The PBD was repackaged to facilitate production and evaluated in an intersection with a typical traffic controller. Operation in the intersection for a 2-month period was successful.

Lubke, RA Putnam, DG ; Honeywell, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-77-122, F2186-FR3, Oct. 1977, 301 p.; See also report dated August 1976, PB-264747 on Phase 3, Option 1.; Contract DOT-FH-11-8149; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298194/2ST

12 224973 FEASIBILITY STUDY FOR BUS RAPID TRANSIT IN THE SHIRLEY HIGHWAY CORRIDOR. THE OBJECTIVES ARE TO DETERMINE (1) IF BUS RAPID TRANSIT (HIGH-SPEED EXPRESS SERVICE) CAN BE INSITUATED IN THE SHIRLEY HIGHWAY CORRIDOR AND, IF SO, THE FORM SUCH SERVICE SHOULD TAKE; (2) THE PATRONAGE ATTRACTED TO THE

IMPROVED TRANSIT SERVICE ON AN INTERIM AND LONG-RANGE BASIS; (3) THE EFFECT OF THE SERVICE ON HIGHWAY SERVICE AND USE IN THE CORRIDOR. THE RESULTS OF THE STUDIES WOULD BE UTILIZED TO ENSURE THE BEST MIX OF AUTO AND BUS USE AND PROVIDE THE BEST POSSIBLE OVERALL TRANSPORTATION SERVICE IN THIS AND SIMILAR TRAFFIC CORRIDORS. TO MEET THESE OBJECTIVES, A DETAILED ANALYSIS OF HIGHWAY OPERATING CHARACTERISTICS FOR THE SHIRLEY HIGHWAY CORRIDOR WAS DEVELOPED. BUS TRANSIT OPERATIONS AND PATRONAGE FIGURES WERE ANALYZED. AUTO AND BUS SURVEYS WERE CONDUCTED TO DETERMINE TRAVEL PATTERNS. ALL OF THESE COUPLED WITH THE CURRENT AND PROJECTED SOCIO-ECONOMIC CONDITIONS PROVIDED THE BASIS FOR SELECTION OF TWO ALTERNATIVE EXPRESS BUS PLANS. A COST/BENEFIT ANALYSIS WAS CONDUCTED AND A PREFERRED ALTERNATIVE WAS SELECTED. EXPRESS BUS ROUTES AND "PARK AND RIDE" LOCATIONS WERE RECOMMENDED AND A FINANCING AND IMPLEMENTATION PLAN WAS PROVIDED. /FHWA/

Bergendoff, ; Metro Washington Council of Governments, Federal Highway Administration /US/ ; Contract DOT-FH-11-6876; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB-197085

12 242572 BUS TRANSIT PLANNING AND OPERATIONS, SELECTED REFERENCES. THE BIBLIOGRAPHY LISTS 483 REFERENCES PUBLISHED BETWEEN 1965 AND 1971 ON THE OPERATION AND DEVELOPMENT OF BUS TRANSIT IN THE UNITED STATES. THE ENTRIES INCLUDE REPORTS, CONFERENCE PAPERS, AND PERIODICAL ARTICLES DRAWN FROM THE TRANSPORTATION CENTER LIBRARY COLLECTION. ARRANGEMENT IS TOPICAL WITH EACH ENTRY IDENTIFIED BY A SECTION/ITEM ALPHANUMERIC. TOPICAL CATEGORIES INCLUDE: GENERAL RESEARCH; VEHICLE AND DRIVER SCHEDULING AND ROUTING; ACCESS AND WAITING TIME; SPEED AND DELAY IN STREET TRAFFIC; IDENTIFICATION, COMMUNICATIONS, AND CONTROL; FARES AND FARE COLLECTION; BUSES; MINIBUSES AND JITNEYS; FEEDER SERVICE; FREEWAY OPERATIONS; BUSWAYS; DUAL MODE; DEMAND SERVICE; AND AREA STUDIES. THE REPORT CONCLUDES WITH A GEOGRAPHIC INDEX. /AUTHOR/

Northwestern Univ Transportation Center June 1972, 69 pp; ACKNOWLEDGMENT: NTIS

12 242739 BUS USE OF HIGHWAYS: STATE OF THE ART. This report, based on a review of ongoing and completed research, reflects the experience of more than 200 bus priority treatments in the United States and elsewhere. The types of treatments, the number of people they serve, and the design details they utilize vary widely. Treatments can be grouped into three broad categories: those relating to freeways,

arterials, and terminals. Most bus priority treatments consist of reserved bus lanes on downtown city streets. Busways and other freeway-related treatments are ground or proposed mainly in large U.S. cities with rail transit systems, large downtown employment, and/or heavy peak-hour transit use. These specialized treatments, however, were of greatest concern to public officials, for they involved larger expenditures and produced the most significant benefits. Design standards should consider the driving skills of professional bus drivers, the high levels of vehicle maintenance, and the relatively light bus volumes needed to accommodate heavy passenger flows. It is significant to note that most existing express bus priority treatments represent either contra-flow operations on existing radial freeways or special treatments to bypass queues. Most major proposals, however, call for exclusive bus roadways. Yet, measured in capital costs per person-minute saved, busways are far cost-effective than contra-flow lanes and other operational treatments. The importance of ramp metering, downtown distribution facilities, fringe parking effective enforcement of arterial buslanes, and the importance of allowing for future conversion to other systems are also discussed.

Levinson, HS Hoey, WF Sanders, DB Wynn, FH *NCHRP Report* No. 143, 1973, 83 pp, 12 Fig., 28 Tab., 39 Ref., 6 App.; ORDER FROM: TRB Publications Off

12 261656 CARPOOL AND BUSPOOL MATCHING GUIDE (THIRD EDITION). Important aspects of any comprehensive carpool include public information to inform the commuter of the benefits of carpools, incentives in the form of parking priorities and priority lanes, a locator service for matching and a continuing program to maintain locating services for new or moving employees. The critical factor in carpools and vanpools is Time-Origin-Destination, from that point, public information can promote the time, cost, convenience, ecological and energy saving advantages of carpools. Data processing can make the Time-Destination-Origin available by collecting the information, matching it by manual or computer methods and distributing the information. Methods of matching include hand matching and grid overlays of maps in conjunction with computer programs. A continuing service keeps the program up to date. Well established programs include McDonnell Douglas Corporation, St. Louis, Missouri, the Connecticut Department of Transportation, Hartford, Conn., the Bouroughs Corporation and Operation Oxygen, Pasadena, California, the National Aeronautics and Space Administration, and several other agencies in Washington, D.C.

Pratsch, L ; Federal Highway Administration Nov. 1973, 31 pp, 8 Fig., 8 Ref., 2 App.

12 261730 PARA TRANSIT: NEGLECTED OPTIONS FOR URBAN MOBILITY. Increasing concern over pollution, congestion, and fuel consumption accompanying the use of private the auto in urban areas, together with greater emphasis on needs of those without access to autos, has led to major efforts to upgrade scheduled bus and rapid rail transit service in the U. S. cities. Other forms of transportation which are available to the public and use the streets and highways of urban areas, referred to as "para-transit," are now under

consideration as transportation alternatives. This study was designed to review the experience to date with para-transit services, to access their potential for servicing urban transportation demand, and to design an RD&D program as needed to identify and demonstrate innovations in the provisions of para-transit services which would be beneficial. Services studies were grouped into 3 categories: (1) "hire and drive"-daily car rentals and forms of short-term car rentals that have been proposed including Minicar and Public Automobile System; (2) "hail or 'phone"-taxi, dial-a-ride, jitney and related services; and (3) pre-arrange ride-sharing-forms of car pool, van pool, and subscription bus services. Four major applications of para-transit services are identified. Chapters include comparative study of para-transit modes, innovations in para-transit regulations and case studies. A para-transit bibliography is furnished. Tables and figures complement the text. A summary of this report is "Para-Transit: A Summary Assessment of Experience and Potential."

Kirby, RF Bhatt, KU Kemp, MA McGillivray, RG Wohl, M ; Urban Institute, (UI-4800-8-2) UMTA-CA06-0045-74-2, June 1974, 442 pp; Contract DOT-UT-20018; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche

12 261731 PARA-TRANSIT: A SUMMARY ASSESSMENT OF EXPERIENCE AND POTENTIAL. Increasing concern over the congestion, pollution, and fuel consumption accompanying the use of the private automobile in urban areas, together with greater emphasis on the needs of those without access to an auto, has led to major efforts to upgrade the scheduled bus and rapid rail transit service in U. S. cities. Other forms of transportation which are available to the public and use the streets and highways of urban areas, referred to as "para-transit," are now under consideration as transportation alternatives. This study was designed to review the experience to date with para-transit services, to access their potential for servicing urban transportation demand, and to design a research, development, and demonstration (RD&D) program as needed to identify and demonstrate innovations in the provisions of para-transit services which would be beneficial. The services studied were grouped into 3 categories: (1) "hire and drive"-comprising daily car rentals and the various forms of short-term car rentals that have been proposed including the Minicar and Public Automobile Systems; (2) "hail or 'phone"-taxi, dial-a-ride, jitney and related services; and (3) pre-arranged ride-sharing-including various forms of car pool, van pool, and subscription bus services. Four major applications of para-transit services are identified, recommendations put forth and references furnished. This report is the executive summary and overview of the study, "Para-Transit: Neglected Options for Urban Mobility."

Kirby, RF ; Urban Institute, (UI-4800-8-1) UMTA-CA-06-0045-71-1, June 1974, 48 pp; Contract DOT-UT-20018; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234319

12 261815 SAN BERNARDINO FREEWAY-BUSWAY-PEOPLE MOVING IN THE L.A. AREA. The California Department of Transportation's goal of creating preferential

treatment for high-occupancy vehicles has resulted in the San Bernadino Freeway-Busway. This was created as a solution to getting high-occupancy vehicles into the center of Los Angeles faster. It consists of a tri-modal transportation corridor incorporating a freeway, busway, and railroad. Parking lot with "kiss and ride" facilities are provided, as well as new terminal for buses. The article details the many government agencies involved in the whole project, the division of responsibilities involved, the need for cooperation among the various agencies, and the measures undertaken for noise pollution control. This concept of a bus rapid transit system was untried at the time of its initiation, and the question was whether motorists would leave their cars and use it. The energy crisis proved that people will tolerate many inconveniences rather than leave their cars. Patronage on the busway has increased, but it has also increased on the freeway. An evaluation of the busway is being done by a consulting firm which will involve experimenting with controlled freeway access for carpools, and exclusive bus use of the busway to elicit public reaction. At this time, the two goals of higher vehicle occupancy and greater use of the freeway which created the San Bernadino Busway are also making it work effectively.

Parrish, HL (California Department of Transportation) *Metropolitan* Vol. 70 No. 4, July 1974, pp 10-13, 2 Phot.

12 263441 LOCATING AND OPERATING BUS RAPID TRANSIT PARK-RIDE LOTS: A SYNTHESIS OF EXPERIENCE AND SOME PRELIMINARY PLANNING GUIDELINES. This report reviews and synthesizes previous experiences with locating and operating park-ride lots throughout the country in such places as Seattle, Washington, Washington, D.C., New Brunswick, New Jersey, Milwaukee, Wisconsin and the Northeast Corridor in general. The data represents the experiences of 7 municipalities and accounts for approximately 4500 park-ride spaces in 13 park-ride lots serving as change of mode facilities for bus transit. The characteristics of park-ride users are investigated. Data were analyzed to determine the characteristics of trip lengths and trip times as well as the trip purpose, type of employment, trip origin and mode to bus. Further considerations included mode of travel to work prior to the establishment of park-ride lots and environmental impact factors. From the analysis of data gathered, some preliminary and general planning guidelines relevant to the location and sizing of a park-ride facility in an urban transportation corridor are developed. References are furnished.

Gatens, DM ; Washington University, Seattle, (WA-11-0003) UMTA-WA-11-0003-73-6, Aug. 1973, 33 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236010

12 263571 SPECIAL REPORTS FROM ENGLAND AND SWEDEN. Special reports from England and Sweden are presented on the status of demand-responsive transport experiments in those countries. One major consideration in England is the lack of telephone availability—approximately a third of what it is in the United States. This factor, combined with the well-used transit system will produce a de-

mand-responsive system with a compromise between fixed-route and dial-a-ride operations. Because of the high density of the urban areas, it is proposed to have the dial-a-ride vehicle provide fast line-haul service into the city center. The experiments under way are entirely manual, fixed schedule, and variable route. A thorough social and economic evaluation will be conducted of the costs and benefits to the operator and to society as a whole. A dial-a-ride feasibility study, partially supported by the government, was done in Gothenburg. One major problem in Europe is obtaining an acceptable vehicle for a dial-a-ride system. Gothenburg has for some years had a transportation service for disabled persons. The operation of this service and the vehicles it utilizes are discussed.

Slevin, R (Cranfield Institute of Technology, England) Elmberg, CM (Gothenburg Transit Authority, Sweden) *Transportation Research Board Special Reports* No. 147, 1974, pp 78-80; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB Publications Off

12 263578 GROWING DEMAND-RESPONSIVE SYSTEMS IN THE UNITED STATES AND CANADA. A panel discussion was organized with members of communities having successful, even expanding demand-responsive systems. The systems are considered from the point of view of users, rather than from a technological orientation. The panelists were asked the reasons for expansion. In each case an increase in transit ridership was evident. Improvements to the systems based on experience were discussed. There included placement of stations in parks rather than in residential areas, selection of the best vehicle, improvement of dispatching procedures and fare collection. Alternative systems such as capital-intensive PRT, dial-a-bus, and Teltran are considered, and the methods of integrating demand-responsive systems with public transit are discussed. An examination was conducted of the users of research, costs and operation of the system, such as deviation from schedules and waiting times. Government regulation, primarily through subsidy, is discussed, as are dispatching procedures and diverted and new trip makers. Finally, staff hiring and training programs and management requirements are examined.

McDougall, WR (Kates, Peat, Marwick and Company) *Transportation Research Board Special Reports* No. 147, 1974, pp 3-16, 4 Tab.; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

12 267013 OVER VIEW OF AUTOMATIC VEHICLE MONITORING SYSTEMS. This report is an overview of Automatic Vehicle Monitoring (AVM), systems which automatically determine and make available to a central control point the position of a vehicle or a group of vehicles. AVM systems used in urban applications are based upon, or are varieties of, four basic techniques: radio propagation time, proximity, dead reckoning, and triangulation. The relative merits of each of these systems is discussed. Test

or simulation data and cost information are provided where available. Also included is a discussion of secondary systems functions (polling, computation, telemetry, etc.) that must be addressed before a workable AVM system can be implemented. Potential applications for AVM systems include: transit buses, police vehicles, taxi fleets, delivery services, maintenance services, and possibly even moving vans, which would require inter-city capabilities in order to be completely responsive. This state-of-the-art in AVM systems begins with a brief discussion of these applications, followed by a more detailed analysis of AVM techniques that have been demonstrated, tested, or proposed. The best available technical and cost data have been used throughout and are documented. The report concludes with a discussion of the various system considerations. An appendix summarizes the cost data for one specific AVM system. A full list of references and an extensive bibliography is provided.

Mitre Corporation Aug. 1973; Notification of this publication appeared in Urban Mass Transportation Administration Abstract, November 1973.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC; PB-223509

12 300138 ARTIC BUSES-HOW PRACTICAL ARE THEY?. The feasibility of using articulated buses on roads in the United Kingdom is discussed. Although their carrying capacity is higher and they can take up and discharge passengers more rapidly than the normal British double-decker they take up more road space and are less manoeuvrable. Also it is estimated that articulated buses would cost more to run with maintenance costs of 1.2 to 1.8 times those of the compatible two-axled vehicles. Several methods of fare collection are possible and a low floor could be achieved with a front or rear engine configuration. The author suggests that the extra capacity of the articulated bus could be used to provide a more appealing standard of comfort on suburban operation rather than the traditional "standee" layout used for urban work. There are possible advantages associated with a system using a quickly-detachable two-wheeled trailer. The trailer could be coupled on to cope with peak demand and removed for normal off peak working. /TRRL/

Rowlands, P *Transport Engineer* Jan. 1979, pp 20-23, 5 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241067)

12 300439 SYSTEM FAILURES ON ROAD TRAFFIC NETWORKS: CAN ERGONOMICS HELP. The nature of urbanisation in Western society requires a certain type of transport system. Conversely, the type of transport system provided strongly influences our society. When dealing with such complex systems it is unlikely that an investigator will establish fundamental causal relationships. There are many cases of the system being tampered with to achieve one objective, only to find that the secondary results negate any improvements. Thus it is impossible to say exactly why a particular project does not show the expected benefits. Our knowledge and methodologies are just not sufficient. This paper will attempt to show where weaknesses in technique have contributed to the failure (serious non-optimum performance) of some schemes. Emphasis will be placed on illustrating how an

ergonomics viewpoint would have alleviated the situation. Three projects, selected to illustrate the wide spectrum of the problem area, will be simplified and examined. The first is the continuing attempt to provide master control for a network of traffic signals, where the simplistic model of human behaviour used reduces the chances of obtaining good results. The second is concerned with the signposting of motorways and purports to show how 'engineering' solutions to problems and the methodologies adopted ignore fundamental user requirements. The final project is the Bay Area Rapid Transit System. This is used to demonstrate how a simple lack of understanding of human preferences contributed to the poor usage of the system. /Author/TRRL/

Lewis, PA (Birmingham University, England) *Ergonomics* Vol. 22 No. 2, Feb. 1979, pp 117-124, 2 Fig., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240872)

12 301154 TECHNICAL AND ECONOMIC ASPECTS OF ARTICULATED BUSES. One answer to the increased need for high-capacity trams and buses is the articulated bus. This article describes several types of articulated buses currently in use and analyses the results of a survey of European bus companies which employ these vehicles. In general, the principal advantages of articulated buses were economic, i.e. their higher capacity lowered labor costs and operating costs per passenger. The disadvantages most cited were difficulties in maneuverability, especially on curves. It is concluded that, since articulated buses involve the lowest specific investment per passenger place offered on urban services (assuming a large number of standing spaces) and (needing no infrastructure of their own, (e.g. rails or overhead lines) offer a particularly economical cost price per place-kilometer offered, they are thus advisable on heavily loaded routed, especially if they have the benefits of various traffic priorities (priority thorough fares, special bus lanes, control of traffic lights to give priority at crossings, etc.) an appendix which summarizes these provisions of United Nations Regulation 36 (Uniform Provisions concerning the construction of Public Service Vehicles) dealing with articulated motorbuses which, if approved by all countries, permit their use in countries whose statutory requirements currently preclude it (e.g. Great Britain) and alleviate difficulties in countries whose road traffic legislation does not take these vehicles into account, is included.

Brechbuhl, A Quarre, L *UITP Revue* No. 4a, 1979, 27 p., Figs., 5 Tab., 1 App.; This report is from the 43rd International Congress, Helsinki 1979, of the International Commission for the Study of Motorbus.

12 301800 U. S. DEPARTMENT OF TRANSPORTATION'S AUTOMATIC VEHICLE MONITORING PROGRAM. The Urban Mass Transportation Administration (UMTA) and the Transportation Systems Center (TSC), a Department of Transportation systems engineering organization, are developing a fully-functional automatic vehicle monitoring (AVM) system which will be installed on selected routes of the Southern California Rapid Transit District (SCRTD). The objectives of this program are to: conduct a thorough test and evaluation of a fully-functional, area coverage AVM system; quantify the benefits to transit and other users;

advance the state of the art of AVM; and establish technical and economic bases for future deployments. The UMTA/TSC AVM system to be installed in Los Angeles will involve two experiments—a fixed route experiment and a random-route experiment and will be primarily intended for transit application. Information on each (equipped) vehicle's location, passenger load by bus stop, dispatch readiness and silent alarm status will be instantaneously known at the central control point. The system is intended to be used as a real-time transit fleet command and control system.

Symes, DJ (Urban Mass Transportation Administration); Institute of Electrical and Electronics Engineers; Presented at the 29th IEEE Vehicular Technology Conference, held in Arlington Heights, Ill., March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

12 302054 URBAN TRAFFIC CONTROL AND BUS PRIORITY SYSTEM. EQUIPMENT CHECKLIST SPECIFICATION MANUAL. The Urban Traffic Control System (UTCS)/Bus Priority System (BPS) was developed and implemented in Washington, D.C. jointly under contract to the Federal Highway Administration (FHWA) and the Urban Mass Transportation Administration (UMTA). The functions of this system include on-street surveillance of private vehicles as well as buses, and the digital computer control of traffic signals. The specifications used in the procurement of the various subsystems have been generalized and condensed into a checklist format, and combined into a manual. This manual serves as a guide in checking equipment specifications which have been prepared, or are in the process of being prepared, for a similar traffic system. /FHWA/

Sperry Rand Corporation, Federal Highway Administration, (GF-16-1005 (NP)) Manual FHWA-Imp-76-1, Nov. 1975, 156 p.; SPONSORING AGENCY; RESPONSIBLE INDIVIDUAL: Raus, J (HDV-21); Contract DOT-FH-11-7605; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-102023

12 302264 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME V: UMTA SPECIAL TECHNOLOGY PROGRAMS WORKSHOPS. This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on UMTA Special Technology Programs. Part I deals with safety, qualification, and life-cycle costing, and includes discussions of rail transit safety and product qualification. Part II—consumer inquiry technology, National Cooperative Transit R&D Program, and technology program—includes discussions of consumer need for information on transit availability, the National Cooperative Transit R&D Program (NCTRP), the technology sharing program, and transit marketing. This volume contains six resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants. These proceedings (Rpt. Nos. UMTA-DC-06-0157-79-1 thru UMTA-DC-06-0157-79-9) consist of nine separately titled

volumes, namely: Volume I: Proceedings of General Sessions and Summarized Reports of Workshops; Volume II: Bus and Paratransit Technology Workshops; Volume III: AGT and Advanced Systems Workshops; Volume IV: Service and Methods Demonstration Workshops; Volume V: UMTA Special Technology Programs Workshops; Volume VI: Rail and Construction Technology; Volume VII: Transit Management Workshops; Volume VIII: Access for Elderly and Handicapped Persons Workshops; and Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association, Urban Mass Transportation Administration, (DC-06-0157) UMTA-DC-06-0157-79-5, Nov. 1978, 75 p.; This report is a sequel to reports: Proceedings of the UMTA/APTA R&D Priorities Conference, February 1978 (PB 255-898); and Proceedings of the Second R&D Priorities Conference, December 1976 (PB 266-158); Contract DOT-UT-70026; ORDER FROM: NTIS; PB-300990

12 302921 ROAD ACCIDENTS IN HONG KONG. The author presents an account of his experiences during a 2 1/2 year contract as a motor vehicle examiner in the enforcement and control section of the Hong Kong government. Data presented indicate that some 4 1/2 M people live in a total land area of 1049 square km, with some 6.1 M trips made daily on public transport by road, rail and sea. Official statistics indicate that there are 208000 vehicles sharing 1092 km of road surface, and during 1977 there were 14000 traffic accidents. The results of certain investigations undertaken to determine the contribution of vehicle defects to the accident situation are described and discussed, related to steering, brakes, lights, tyres and damage. In particular, reference is made to buses owned by the Kowloon Motor Bus Co, public light buses consisting of 7400 taxis and 4350 mini buses which augment the overloaded public transport systems and certain commercial vehicles. /TRRL/

Cooper, DA *Institute of Automotive Eng Assessors, Journal of* Vol. 14 1978, p 22, 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241877)

12 303295 URBAN TRANSPORTATION FOR HANDICAPPED PERSONS: ALTERNATIVE FEDERAL APPROACHES. This paper evaluates three alternative options for providing transportation services to handicapped persons living in urban areas. The first option—the Transit Plan—presents one possible outcome of the rules issued by DOT under Section 504. The second alternative—The Taxi Plan—calls for a number of small modifications on existing systems, and door-to-door public transportation for severely disabled persons. The third option—the Auto Plan—offers financial aid to severely disabled persons for the purchase of specially adapted automobiles, as well as door-to-door public transportation for those unable to drive cars. The three options are compared on the basis of costs and the number of persons who could be expected to benefit from the services. The modifications to transportation vehicles and the services required under the three options are outlined in a table, and the corresponding costs and patronage are also summarized in a table. The decision by the Congress will most likely be based on these factors as well as on the issues of civil rights and social integration of handicapped persons. (Authors)

United States Congress Nov. 1979, 113 p., 3 Fig., 25 Tab., 6 App.; ORDER FROM: GPO

12 303935 EVALUATION OF BUS AND CARPOOL OPERATIONS ON THE SAN BERNARDINO FREEWAY EXPRESS BUSWAY. The San Bernardino Freeway Express Busway, which runs eastward from downtown Los Angeles, is the most complete busway in the national. It includes park-and-ride and on-line stations, feeder bus lines, outlying park-and-pool lots, and a supplemental contraflow bus lane in the central business district. Beginning in October 1976, carpools of three or more were permitted on the previously bus-only facility. During the mixed-mode operations, the number of carpools on the busway and freeway more than doubled, increasing by at least 800. These carpools were new and not caused by diversion from parallel roadways. Bus ridership was not noticeably effected until after a major fare increase. During the peak 1 h, the busway lane carries twice the number of people as does one adjacent freeway lane, but traffic still moves at 88 km/h (55 mph). Surveys were conducted among bus riders, busway carpoolers, and freeway users (busway non-users). Most carpoolers said they would not be carpooling if they could not use the busway. Attitudes of most busway nonusers were positive; the busway is not controversial. There were no major safety or enforcement problems. The type of separation between busway and freeway was found to strongly affect safety and enforcement requirements. The busway was generally found to be more cost effective than an additional freeway lane. The average savings in out-of-pocket costs, for busway-induced carpoolers and bus riders only, covered two-thirds of the annual (capital and operating) costs of the busway. Most of these conclusions would probably change, however, if congestion on the adjacent freeway was reduced or eliminated (for example, because of ramp metering or freeway widening).

Glazer, LJ Crain, J (Crain and Associates) *Transportation Research Record* No. 718, 1979, pp 18-23, 6 Fig., 1 Tab., 5 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

12 303936 ANALYSIS OF BUS SYSTEMS TO SUPPORT RAIL RAPID TRANSIT (ABRIDGMENT). This paper describes an evaluation of alternative bus systems that will serve as line-haul and feeder service for the Metropolitan Dade County Stage I Rapid Transit System (Miami area). The weighted derivative (sensitivity) of Transit ridership is defined and computed for all study-area zones, zone pairs, districts, and district pairs. Then a comprehensive transit system is determined for the study area to aid in the planning process. These two concepts were applied to a large urban area by using the urban transportation planning system (UTPS) and UTPS compatible programs: the weighted derivative of transit ridership and a comprehensive transit system. Because design of bus route systems for Dade County had progressed considerably before application of these concepts, they did not lead to major changes in alternative transit systems. However, they did provide clear and meaningful new insight in explaining the superiority of a grid bus system; because it was

able to achieve higher productivity by concentrating service in the core districts, which have much greater weighted derivative values. Since the comprehensive system attracted about the same number of riders for both connected service areas, the difference between the two design systems is largely emphasis on different areas. It is hoped that these concepts will be used to guide subsequent refinements of the grid system.

Sharp, GP Rardin, RL (Georgia Institute of Technology) Eisenstadt, HG Shogren, RT Schimpeler, CC *Transportation Research Record* No. 718, 1979, pp 23-27, 16 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

12 304682 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MA., ON NOVEMBER 16-17, 1978. VOLUME II. BUS AND PARATRANSIT TECHNOLOGY WORKSHOPS. The document is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Bus Paratransit Technology. Part I deals with paratransit integration and includes discussions of operational technologies (as distinct from vehicle and propulsion system development), experiences of the City of Cincinnati with their Urban Transportation Laboratory Program, the Logan Airport (Boston) Share-A-Cab Program, and the Rochester Dial-A-Ride Program. Part II (Bus Technology, Paratransit Vehicle Development, and Flywheel Energy Storage System) contains discussions of the vehicles themselves and the Flywheel Energy Storage Program. This volume contains six resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-2, Nov. 1978, 52 p.; See also Volume 3, PB-300988.; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300987/5ST

12 305778 COMPUTER DIAL-A-RIDE. Computer Dial-A-Ride is a system of computer programs that automates the operation of a personalized transportation service; a service that provides on request a shared-ride from any location within a community to another. Since 1975 this computer system has been tested and operational in Rochester, New York with guidance and project management provided by the Massachusetts Institute of Technology, Department of Civil Engineering. The system consists of a real-time program that controls all aspects of scheduling and dispatching the transportation service and various support programs used for file maintenance and statistical analyses...Software Description: The program is written in the FORTRAN programming language for implementation on a IBM computer using the TOPS-10 operating system. 650K bytes of core storage are required to operate the model.

Ziegler, EW, Jr Markowski, M ; Urban Mass Transportation Administration UMTA-DC-06-0141-77-0, DOT/DF-79/004, Feb. 1978, n.p.; Source tape is in ASCII character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode

by specifying density only. Call NTIS Computer Products if you have questions. Price includes documentation PB80-115744, PB80-115751, PB80-115769, PB80-115777, and PB80-115785.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-115736

12 305832 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 5: THE IMPACTS OF TECHNOLOGICAL INNOVATION. A number of new technologies have been implemented with or proposed for paratransit systems. As part of the overall IP benefit cost study, the potential impact of two such technologies, digital communications and computer dispatching, have been analyzed in detail and are reported here. In addition, some preliminary analyses have been conducted on the potential impacts of computer-aided dispatching, computer control of radio channels, automated control-to-passenger communications, automated passenger information systems, automatic vehicle monitoring, and a new paratransit vehicle.

Flusberg, M Menhard, HR Walker, J Sobel, K ; Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-79-39-5, Sept. 1979, 78 p.; See also Volume 4, PB80-125503 and Volume 6, PB80-125529. Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125511

12 307709 THE DEVELOPMENT OF A FUTURE BUS SYSTEM CONCEPT [Entwicklung Eines Konzeptes fuer ein Zukuenftiges Bus-Verkehrssystem]. The aim of this study is to suggest comprehensive measures for the qualitative improvement of public transport bus services. In this respect it is fundamental that the interaction of vehicle, route/stopping place and operation should characterise the consideration of the system. After the compilation of a list of requirements from the user, management and general public viewpoints measures are developed to fulfil these requirements. In doing this two phases for the realisation of the measures are recognised: up to 1980/85 and up to 1995. Cost-benefit studies are carried out for the different measures. For calculation purposes cost-effectiveness analysis was selected. A sensitivity analysis was effected by varying the weighting factors in the user, operator and public sectors. For the further development of bus services within a system it is recommended that priority should be given to the introduction of special bus lanes and bus-priority measures in road traffic and the erection of bus shelters with a greater degree of comfort for the passenger. It appears that the diesel engine has the best chance for success in the future of all the power sources discussed. Regional bus services are considered as well as urban services. Due to severe rises in the cost of operation dial-a-ride systems have only slender chances of being brought into operation. /TRRL/ [German]

Internationales Verkehrswesen Vol. 19 No. 5, Sept. 1977, pp 271-273 ACKNOWLEDGMENT: TRRL (IRRD 307710), Federal Institute of Road Research, West Germany

12 308073 COMPUTER DIAL-A-RIDE: COMPUTER SOFTWARE AND DOCUMENTATION (TAPE); VOLUME 1: SOFTWARE INSTALLATION GUIDE; VOLUME 2: OPERATORS HANDBOOK AND REFERENCE MANUAL; VOLUME 3: STREET NAME FILE BUILDING SYSTEM; VOLUME 4: SOFTWARE DESIGN AND FUNCTIONAL DESCRIPTION; VOLUME 5: TERMINAL HANDLING SYSTEM. Computer Dial-A-Ride (DAR), a demand-responsive transit system, is a system of computer programs that automates the operation of a personalized transportation service—a service that provides on request a shared-ride from any location within a community to another. DAR is a research and development program sponsored by UMTA, performed by ADP Network Services, and in collaboration with the Massachusetts Institute of Technology (MIT). The intended users of DAR are researchers, private or public agencies, transit operators, and other interested persons. The project was instituted in February 1972 in Haddonfield, New Jersey. Since 1975 this computer system (referenced on this tape) has been tested and operational in Rochester, New York, with guidance and project management from MIT, Department of Civil Engineering. The software was developed from the experience gained in the Haddonfield demonstration. The system consists of a real-time program that controls all aspects of operating the transportation service and various support programs used for file maintenance and statistical analyses. The Computer Dial-A-Ride program also consists of five separate volumes (UMTA-DC-06-0141-77-1 through UMTA-DC-06-0141-77-5), respectively: computer Dial-A-Ride Software Installation Guide; Computer Dial-A-Ride Operators Handbook and Reference Manual; Computer Dial-A-Ride Street Name File Building System; Computer Dial-A-Ride Software Design and Functional Description; and Computer Dial-A-Ride Terminal Handling System. (UMTA)

Harper, SH Hughes-Caley, L ; Urban Mass Transportation Administration, (DC-06-0141) Jan. 1978, v.p.; These reports cover UMTA numbers UMTA-DC-06-0141-70-0 through UMTA-DC-06-0141-77-5 and NTIS numbers PB80-115736, PB80-115785, PB80-115744, PB80-115751, PB80-115769, and PB80-115777, respectively.; Contract DOT-UT-70010; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB80-115736

12 309027 TRANSIT PRIORITIES AND DEVELOPMENT OF A PASSIVE BUS DETECTION SYSTEM IN EDMONTON. This paper describes the need which led to the development of a cost-effective passive bus detection system in Edmonton (Alberta, Canada). The system utilizes "of-the-shelf" equipment and, through the use of a simple algorithm, its discrimination reliability between local diesel buses or trolley-buses and other vehicles approaches 100 per cent. Software is based on identification of basic features of vehicle 'signatures' as produced by a standard loop-detector. The development objectives and principles, as well as the initial experience, are discussed. (TRRL)

Cheng, L Schnablegger, J (Edmonton, City of, Canada) Teply, S (Alberta University, Canada) *Traffic Engineering and Control* Vol. 20 No. 11, Nov. 1979, pp 522-525, 4 Fig., 2 Tab., 2 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD

244329)

12 309131 DEMAND-RESPONSIVE PUBLIC TRANSPORT: A SIMULATION MODEL. This paper was presented at Session 31-Traffic Systems and Analysis 2. This paper reviews some analytical methods which may be employed by public road passenger transport operators and transportation planners to effect some improvement in public road passenger transport. Four areas where improvement is possible (transportation planning, bus route and timetable planning, bus and crew scheduling, control and communications) are discussed, with particular emphasis upon mathematical techniques for bus route and timetable planning. The paper also describes a computer model for simulating the behaviour of a dial-a-bus system operating on an irregular road network. The model is suitable for use with a small computer, and can be used to determine the effect of three critical factors (the level and pattern of demand, the service area size, the level of service as reflected by service time constraints) upon the cost of a dial-a-bus system. The simulation model can be used to determine the feasibility of a dial-a-bus system and could be used as the basis of a computer procedure for controlling (or assisting a despatcher to control) a dial-a-bus system. (TRRL)

Nicholson, AJ (Ministry of Works and Development, New Zealand) *Australian Road Research Board Conference Proc Conf Paper* Vol. 9 No. 5, 1979, pp 120-127, 3 Fig., 35 Ref.; Ninth Australian Road Research Board Conference Brisbane, 21-25 August 1978 Proceedings.; ACKNOWLEDGMENT: TRRL (IRRD 239421), Australian Road Research Board

12 309569 BUS STOPS ON RURAL AND HIGH CAPACITY ROADS. MOTIVES FOR DESIGN AND LOCATION [Busshaalplatter paa landsbygd och vid hoegklassiga trafikleder. Motiv till utformning och placering]. This report describes background data and standpoints of a committee work preceding the design of specifications for bus stops on rural and high capacity roads. The report deals with basic criteria such as: (1) bus length, width and manoeuvring geometry, (2) bus acceleration, deceleration and jerk, (3) types of stop, (4) bus manoeuvring performance and speed. The motives for design and location are presented under the following headlines: (1) choice of stop type, (2) stop design, (3) stop location and (4) footways at stops. Appendices are dealing with the following factors: (1) design acceleration, (2) model for choice of stop type, (3) possible entrance and exit speeds at stops, (4) comparison of bus bay dimensions and (5) driving models for stop location. (TRRL) [Swedish]

National Swedish Road Administration Monograph Meddelande TU 1979:3, 1979, 78 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243206), National Swedish Road & Traffic Research Institute

12 310592 REGIONAL PARATRANSIT SERVICES: AN EVALUATION. The primary purpose of this paper is to evaluate a data collection method that is being used in a public transportation project in Barnstable County, Mass. An integral part of the method is the use of a serially numbered rider identification pass. Each person who uses the bus service acquires a pass in

advance and completes a questionnaire regarding their socioeconomic characteristics and physical disabilities. When a passholder telephones to schedule a trip, the dispatcher records his or her pass number, pickup time, trip purpose, origin, and destination. As a result, socioeconomic and trip data are collected for 100% of all riders. These data may be used to: (1) Evaluate vehicle productivity and efficiency; (2) examine the impacts of local policy decisions; (3) assess the portion of a deficit to be paid by each town; (4) develop social service agency user charges and contractual agreements; (5) identify social service agency eligibles; and (6) describe user characteristics.

Collura, J (Massachusetts University, Amherst) Warren, RP *ASCE Journal of Transportation Engineering* Vol. 105 No. 6, Nov. 1979, pp 683-697, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

12 311830 AUTOMATIC VEHICLE LOCATION. A SURVEY OF METHODS WITH SPECIAL INTEREST TO DEAD RECKONING [Automatisk fordonslokalisering. En oersikt oever metoder med tonvikt paa doedraekning]. This report is a literature study of automatic vehicle location. References are given to abt 100 articles, patents etc. The report gives a survey of present methods for automatic vehicle location with emphasis on vehicle location according to dead reckoning method. The use of this system is applied to taxi location. The report also comprises an attempt to evaluate a special type of direction sensor for vehicles. (TRRL) [Swedish]

Vanter, C ; Chalmers University of Technology, Sweden Monograph Rapport R78-05, 1978, 40p, Figs., 2 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 244641), National Swedish Road & Traffic Research Institute

12 313190 THE APPLICABILITY OF NON-STANDARD BUSES FOR SERVICE IN THE WASHINGTON METROPOLITAN AREAS. Higher capacity buses allow higher driver and vehicle productivities to be achieved, which, in turn, would allow costs to be reduced or capacity expanded at little or no increase in cost. A series of demonstration projects, conceptual design and vehicle specification studies led ultimately to the creation of a consortium of ten U.S. transit operators supporting development of a high capacity articulated bus. This report analyzes the characteristics and requirements of these buses and outlines the plan for their introduction into the Washington Metropolitan Area Transit Authority (WMATA) system. This report is a first step in the implementation process, beyond the actual ordering of the vehicles. It identifies and analyzes the distinguishing characteristics of the articulated vehicle, and relates these to its utilization, maintenance, and servicing.

Costinett, PJ Stribling, RM Andrie, SJ ; Voorhees (Alan M) and Associates, Incorporated, Urban Mass Transportation Administration Final Rpt. AMV-785-78-1, UMTA-IT-09-0054-80-1, Sept. 1978, 228p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-143944

12 313475 CURRENT PARATRANSIT AND RIDE-SHARING ACTIVITIES. Contents: Jitney-paratransit services—an appraisal of present and future operations; Dial-a-ride in Rochester—search for a viable suburban transit alternative;

Hybrid paratransit service; Integrated paratransit--myths and realities; Review and assessment of paratransit models; Evaluation of interpersonal influences in the formation and promotion of carpools; Technology transfer in paratransit--five case studies; Estimating the costs of a subscription van service; Economics of vanpooling.

Heramb, C Sen, A Soot, S Holoszy, M Sobel, KL ; Transportation Research Board, Washington, DC. TRB/TRR-724, ISBN-0-309-02974-0, 1979, 64p; Library of Congress catalog card no. 79-26648. Also pub. as ISSN-0361-1981. Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-138183

12 314790 BUS TRANSIT MONITORING STUDY: INTERIM REPORT 1: DATA REQUIREMENTS AND COLLECTION TECHNIQUES. In recent years, an interest in revitalizing public transportation has led to an increased awareness of the need to utilize existing resources more efficiently. This implies that transit properties must carefully evaluate, or re-evaluate, all services, both current and planned. As a result, the collection of passenger-related transit operations data has received much more attention. Research into the utilization of this data has received much more attention. Research into the utilization of this data has considerably advanced the state-of-the-art of transit evaluation and,

simultaneously, generated considerable controversy regarding its proper role. Some transit operators, faced with an increasing need to provide the most effective service, have adopted sets of performance measures and standards and have developed plans for using them in a systematic service evaluation. In many cases, however, transit operators have not been able to implement the measures and standards because they have had difficulty in developing a cost-effective system to collect the needed information. To assist these operators, UMTA's Office of Planning Assistance, through its Special Studies Program, has initiated a study in data collection. The purpose of this study is to develop a comprehensive statistically-based data collection manual that will enable transit operators to collect passenger-related data in a cost-effective manner which maximizes the usefulness of the overall data base. This first interim report presents the results of the first two tasks of the study, which were to identify current data collection techniques and data requirements. These two closely related tasks were conducted in parallel through three major activities: 1) a literature review; 2) a review of material collected by the Massachusetts Bay Transportation Commission in Norfolk, Virginia, in a study for UMTA, focusing on service evaluation techniques; and 3) discussions with forty-one transit properties in the United States and Canada. (UMTA)

Flusberg, M Kruger, J Curry, J ; Multisystems, Incorporated, ATE Management and Service

Company, Incorporated Inrm Rpt. UMTA-IT-09-9008-79-1, Apr. 1979, 86p; Sponsored by DOT, UMTA.; Contract DOT-UT-9005; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB80-161409

12 322066 OPERATION OF ELECTRIC BUSES IN URBAN AREAS. This paper discusses two areas where the performance and travel range of battery powered buses can be optimized: (I) public transport priority traffic management schemes and (II) more efficient power sources. An analysis of the bus journeys on a radial route into Edinburgh showed that buses do not spend much time at their cruising speed. It was shown that the introduction of bus lanes had minimal impact on the effect of key obstacles such as traffic lights and bus stops. The situation could be improved by reducing the number of bus stops and extending bus lanes up to traffic lights using detectors to give bus priorities. At present, the low energy density of batteries presents a problem but it is possible that sodium/sulphur batteries will meet the criteria for successful economic operation. Dual-mode systems, such as trolley/battery, trolley/diesel or diesel/battery may also be suitable for present applications. (TRRL)

Forde, MC Whittington, HW (Edinburgh University, Scotland) *Electric Vehicle Developments* No. 6, June 1980, pp7-9, 3 Fig., 5 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 248464)

13 041318 STATE OF THE ART CAR: READY FOR REVENUE TESTING.

Two State of the Art transit cars are now undergoing testing at the UMTA test facility at Pueblo. Next month the cars will be moved to begin a series of revenue service tests. These cars represent the first phase of a three year program. Phase two will attempt to produce a better transit car, constrained only by 600 volt DC power, standard track gauge, and the clearance envelope of five transit systems. Systems manager Boeing-Vertol has five tasks: observe the prototype car program of BART, manage production of the state of the art cars, manage design competition leading to Advanced Concept Train ACT-1 cars, manage the ACT-2 component development program to move from first generation ACT-2 cars to second generation ACT-3 cars, and plan for ACT-3 revenue demonstration. There are two versions of the state of the art car, a 64 seat version and a 72 seat version. The car bodies are stainless steel. The lightweight trucks use air bellows and eliminate metal to metal contact from the car body to the rail. In tests, the interior noise level at 40 mph was 63 db. Each truck is fitted with a pair of 175 hp DC traction motors. Solid state chopper propulsion is used. The car builder, St. Louis Car, and the truck supplier, GSI Castings Division, are both being liquidated. The cars are air conditioned.

Houser, FN, Mechanical Editor *Railway Age* Vol. 174 No. 1, Jan. 1973, pp 17-19, 1 Fig, 1 Tab, 4 Phot; ACKNOWLEDGMENT: *Railway Age*; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

13 041625 BART SETS THE PACE.

BART is serving as a model for other metropolitan areas, but Toronto and Montreal led the way in building less complex systems. Toronto opened subway lines in 1954, 1963, and 1966, and the lines are now being extended. The Toronto lines spurred building booms. Montreal's Metro was opened in time for Expo '67. Montreal's Metro uses rubber tired wheels, which increase adhesion and reduce noise level; but cost more to build, generate more friction, and cost more for power. BART was envisioned to avoid conventional urban sprawl. So far, only San Francisco has really had a building boom, other parts of the Bay Area have a 'wait and see' attitude. Metropolitan Atlanta Rapid Transit Authority is producing an impact study encompassing: socio-historic factors, economic factors, esthetic factors, ecologic factors, acoustic factors, air quality, and water resources. The economic return is estimated at 2.79 to 1. Construction is well underway for the Washington Metropolitan Area Transit Authority. This 158 km system will serve 86 stations. Rohr will build 300 Metro cars. The automatic fare collection system will be similar to that of BART. Washington Metro will use padded rails and floating slabs to reduce noise and vibration. Special tunnel ventilation will be used.

IEEE Spectrum pp 45-54, 12 Fig This article is the fifth and last of a series on BART. Through October 1973 a combined reprint of the series of articles will be available at \$4.50 for the first copy and \$1.50 each for additional copies. Request No. X72-113 from IEEE, 345 East 47th Street, New York, New York 10017, Attention SPSU.; ACKNOWLEDGMENT: *IEEE Spectrum*; ORDER FROM: IEEE, Repr PC

13 043023 SEPARATELY EXCITED DC TRACTION MOTOR APPLIED TO DC AND SINGLE PHASE AC RAPID TRANSIT SYSTEMS AND ELECTRIFIED RAILROADS--1.

The introduction of power thyristors and rectifiers in dc-dc chopper and ac-dc converter circuits allows the replacement of the traditional dc series motor by the separately excited dc motor. This paper considers the characteristics of separately excited dc motors operating from either a dc input with a dc chopper using dynamic braking, or from a single-phase ac input with an ac-dc converter using regenerative braking.

Van Eck, RA (AiResearch Manufacturing Company) *IEEE Transactions on Industry & General Applications* Vol. IGA7 No. 5, pp 643-649, 14 Ref; ACKNOWLEDGMENT: EI (EI 72 25217); ORDER FROM: ESL, Repr PC, Microfilm

13 043024 SEPARATELY EXCITED DC TRACTION MOTOR APPLIED TO DC AND SINGLE PHASE AC RAPID TRANSIT SYSTEMS AND ELECTRIFIED RAILROADS--2.

The separately excited dc traction motor can be used for traction only because of the availability of large power thyristors. In this paper, the type of control circuit required in order to use the separately excited dc motor (dc-dc chopper or ac-dc converters) is investigated depending on the power supply available (ac or dc).

Van Eck, RA (AiResearch Manufacturing Company) *IEEE Transactions on Industry & General Applications* Vol. IGA7 No. 5, pp 650-657, 11 Ref; ACKNOWLEDGMENT: EI (EI 72 24126); ORDER FROM: ESL, Repr PC, Microfilm

13 046344 TESTS WITH CHOPPER EQUIPMENT (KESAR) FOR THE CONTROL OF TRACTION MOTORS IN THE PARIS UNDERGROUND.

The authors, who are respectively Ingenieur en Chef and Inspecteur Principal Hors Classe at the RATP, give details of the tests carried out by their Authority aimed at the adaptation of the chopper (named KESAR) to the traction conditions encountered in the Paris Underground. They go into the advantages that are expected. Three prototype tractive units have been built and their design and construction characteristics are described as well as the test results obtained. Furthermore, a pneumatic-type trainset is now under construction. [French]

Leroy, J Guibereau, S *Revue Generale des Chemins de Fer* Vol. 92 Jan. 1973, pp 23-28; ACKNOWLEDGMENT: British Railways (29164); ORDER FROM: Societe Nationale des Chemins de Fer Francais, 92 rue Bonaparte, 75 Paris 6e, France Repr PC

13 046353 KEISEI TRAINS SERVE NEW NARITA AIRPORT LINK.

Opening of the new Tokyo International Airport at Narita, due to take place this spring, will bring a heavy demand for transport to and from the city centre. Although an extension of the JNR Shinkansen high speed network is planned within the next four years, immediate needs will be met by a 7.3 km branch of the standard-gauge Keisei Electric Railway, recently completed and due to open at the same time as the airport. To operate the line, KER placed orders with Tokyo Car Manufacturing Company, Limited, Tokyo, for five 6-car electric trains specially designed for airport service. Known as the AE (Airport Express) type, these units have been delivered well in advance to

allow ample time for crew training and service testing before the opening date.

Railway Gazette International Vol. 129 No. 3, Mar. 1973, pp 96-97, 1 Fig, 2 Phot ORDER FROM: IPC Transport Press, Repr PC

13 046390 NEWLY DEVELOPED THYRISTOR CHOPPER EQUIPMENT FOR ELECTRIC RAILCARS.

In the chopper control system for railcars, it is effective to adopt high operation frequency of the chopper for achievement of the following: 1) decrease of higher harmonic current induced in the trolley wire, 2) reduction of weight for reactors and capacitors in the traction circuit, and 3) improvement of control response. Through development of reverse-conducting thyristors with very short turn-off time and a repulsion type two-phase chopper, we finally realized production of a new standard high-frequency chopper equipment with regenerative braking for 1500-V dc railcars. Technical achievements mentioned previously were completely realized as a result of adoption of high frequency, 660 Hz, in the equipment. The newly developed standard high-frequency chopper equipment for 30 cars were delivered to the Chiyoda Line of Teito Rapid Transit Authority in Tokyo, and they have been operated satisfactorily in revenue service since March 1971. This paper also describes: 1) the chopper circuit using fast-switching reverse-conducting thyristors and series saturable reactors, 2) analysis of commutation circuit and methods of suppressing reapplied forward voltage increasing rate (dv/dt) and shortening commutation period, 3) the composition of the traction circuit including the protection system, such as protection for overvoltage at the regenerative braking, and 4) test results on the Chiyoda Line of Teito Rapid Transit Authority.

Tsuboi, T Izawa, S Wajima, K Ogawa, T (Hitachi Limited) Katta, T (Teito Rapid Transit Authority) *IEEE Transactions on Industry Applications* Vol. IA-9 No. 3, May 1973, pp 294-301; ORDER FROM: ESL, Repr PC, Microfilm

13 046415 ALTERNATIVE SYSTEMS FOR RAPID-TRANSIT PROPULSION AND ELECTRICAL BRAKING.

The need for rapid transit is stimulating further development in the technology and equipment for propulsion and electrical braking. Although the traditional cam-controller equipment is being improved, control systems based on thyristors have some advantages over it, achieved at a cost in weight and complexity of the control equipment. The thyristor approaches overcome 2 basic problems of cam-controller equipment: the need for continual maintenance on the cam switch contacts and the power losses incurred when voltage is controlled by resistors.

Krings, BJ *Westinghouse Engineer* Vol. 33 No. 2, Mar. 1973, pp 34-41; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

13 046775 TYNESIDE RAPID-TRANSIT SYSTEM CRYSTALLISES.

Integrated rail rapid-transit and road bus service proposed by Tyne Wear transport plan envisages a 50-mile V d.c. network incorporating some BR lines. Preliminary work starts this year and enquiries for prototype light-weight two-car articulated-sets are also in hand.

Rail Engineering International Vol. 3 No. 1, Jan. 1973, 1 pp ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

13 046817 LIGHT-WEIGHT RAPID-TRANSIT VEHICLES INCORPORATING LOAD-BEARING INTEGRAL CONSTRUCTION. Prefabricated assemblies and pressed-plate underframe to ensure full load-bearing body structure is produced into which a moulded glass-fibre roof is introduced to complete a stress-distributed monocoque construction.

Rail Engineering International Vol. 3 No. 4, Apr. 1973, 6 pp, 11 Fig ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

13 046819 RAPID TRANSIT TRAIN SET UNDER DEVELOPMENT FOR BRITISH CITY APPLICATIONS. Twin articulated sets designed for multiple-unit operation shown in mock-up form at the Transport & Road Research Laboratory, Crowthorn, in conjunction with a conference 'Moving People in Cities'.

Rail Engineering International Vol. 3 No. 4, Apr. 1973, 1 pp, 3 Phot ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

13 046982 INTERBOROUGH RAPID TRANSIT: THE NEW YORK SUBWAY. ITS CONSTRUCTION AND EQUIPMENT. This book covers the planning and development of the Interborough Rapid Transit in New York City. Construction of the system is covered in text and in photographs. Details are given of the power supply system, the signaling system, and the design and construction of the cars.

Arno Press ; Reprinted from a 1904 Edition.; ORDER FROM: Arno Press, New York, New York, Repr PC

13 046984 THYRISTOR CONTROL. A detailed treatise on all aspects of thyristor circuits, from the elementary switch concept of the thyristor to design of choppers and inverters, and power semiconductor devices.

Mazda, FF ; Wiley (John) and Sons, Incorporated 1973, 381 pp; ORDER FROM: Wiley (John) and Sons, Incorporated, 605 Third Avenue, New York, New York, 10016 Repr HC

13 047264 GUIDELINE SPECIFICATION FOR URBAN RAIL CARS. The specification provides guidelines for both commuter and rapid transit rail cars. The purpose of the specification is to establish uniform practices for the preparation of detail procurement specifications for these two types of vehicles to aid in the use and comparative analysis of the specification content. The specification encourages the use of modern technology and innovation by establishing measurable performance objectives rather than specifying existing equipment or equivalent. The specification covers all subsystems of the vehicle applicable to this type of equipment as a class and not unique to one design.

Dunton, WH Norton, PR ; Boeing Company Final Rpt D174-10013-1, Mar. 1973, 187 pp; Contract DOT-UT-10010; ACKNOWLEDGMENT: NTIS (PB-220678/7);

ORDER FROM: NTIS, Repr PC, Microfiche; PB-220678/7, DOTL NTIS

13 047273 DEVELOPMENT AND TESTING OF A COMPLETELY PASSIVE, AIR SUSPENDED, AIR PROPELLED PERSONAL RAPID TRANSIT VEHICLE. A prototype Uniflo vehicle base with mock-up superstructure was tested on 55 ft. of full-scale track. Sound treatment to meet NCA 60 at 25 ft. from the guideway enclosure and within the vehicle was proposed and the costs determined. A heating and cooling system using passive vehicle heat sink elements with station berth recharging was found desirable because of its lower cost and reliability. An evaluation of the estimated production quantity costs for the vehicle base, guideway surface, levitation and thrust elements showed a reduction of 49% compared to previous design estimates. Extensive tests confirmed the feasibility of the track based linear air turbine used for acceleration and service braking in the Uniflo PRT system. Ride quality measurements indicated a need for improved secondary suspension. Empty vehicle speeds over 20 ft./sec. and accelerations exceeding 5 ft./seconds squared were achieved with an air flow of 72.0 cubic feet/sec. Vehicle starting drag was less than 5 lbs. force. (Author)

Smoot, CH ; Uniflo Systems Company Final Rpt Apr. 1973, 95 pp; Contract DOT-TSC-367; ACKNOWLEDGMENT: NTIS (PB-220795/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-220795/9, DOTL NTIS

13 047276 URBAN-RAIL SUPPORTING-TECHNOLOGY PROGRAM (UM-204). FISCAL YEAR 1972, YEAR-END SUMMARY. The report outlines activities managed by the Transportation Systems Center for the Urban Mass Transportation Administration, Office of Research, Development and Demonstrations' Rail Programs, in support of advancing urban rail technology. The emphasis has been in the area of rapid transit; however, the long-range applications of the program will benefit both commuter rail and light rail. The report describes the major instrumentation and equipment development activities directed toward the establishment of a basic measurement capability, in support of the evolving program plan, for the test and evaluation of rapid rail cars, car subsystems, and track structures. Under the category technology development, several projects are described including a tunneling plan, noise abatement project, wheel-rail dynamics research facility and descriptions of various contractor reports.

Madigan, RJ ; Transportation Systems Center, (nUMTA-Mass-06-0025) Status Rpt Apr. 1973, 28 pp; ACKNOWLEDGMENT: NTIS (PB-220846/0); ORDER FROM: NTIS, Repr PC, Microfiche; PB-220846/0, DOTL NTIS

13 047389 ELECTRICAL FEATURES OF THE MORGANTOWN PROJECT VEHICLES, POWER SUPPLY, AND CONTROL SYSTEMS. The Morgantown vehicle electrical system, power distribution and propulsion system, and the control and communication system are described in the context of a demonstration program conducted by Boeing for the Urban Mass Transportation Administration (UMTA). The projected benefits of a Personal Rapid Transit (PRT) system, building on the experience

gained at Morgantown, are discussed with emphasis on benefits to urban areas through the use of automated electrically-powered systems. Some basic elements of economic analysis and system performance are included. Arguments are presented for immediate deployment of similar systems in urban areas.

Geiger, JK (Boeing Company) Hess, WL ; Institute of Electrical and Electronics Engineers Vol. 1A-9 No. 2, Mar. 1973, pp 248-255; ACKNOWLEDGMENT: EI (EI 73 033052); ORDER FROM: ESL, Repr PC, Microfilm

13 047392 POWER SUPPLY INSTALLATIONS OF THE LOCAL RAILROAD SYSTEM IN THE REGION OF FRANKFURT ON THE MAIN, WEST GERMANY. [DIE BAHNSTROMANLAGEN DER NAHVERKEHRSSTRECKEN IM RAUM FRANKFURT (MAIN)]. A system is described which is expected to be ready for operation in 1978. The system is designed to facilitate traffic at maximum efficiency and have good connection with the existing urban transit system. The electrification of the new system is discussed. [German]

Weigert, E *Elektrische Bahnen* Vol. 44 No. 1, Jan. 1973, pp 13-21, 10 Ref; ACKNOWLEDGMENT: EI (EI 73 032269); ORDER FROM: ESL, Repr PC, Microfilm

13 047476 ELECTRIC BRAKING-PART 1: MULTIPLE UNITS. Braking is simply a means of converting energy from one form into another. The moving train has kinetic energy which can be calculated. If the train slows down for any reason, its kinetic energy must be converted into some other kind of energy. If a simple mechanical brake is used, the energy appears as heat; similarly, if the vehicle is coasting to a lower speed, heat appears in the bearings as a result of friction. If an electric brake is used, electricity is the new form of energy. This article is the first of two dealing with electric brakes on railways; it deals mainly with electric braking on multiple-unit trains.

Scott, M *Modern Railways* Vol. 30 No. 299, Aug. 1973, pp 318-321, 3 Fig, 4 Phot; ACKNOWLEDGMENT: Modern Railways; ORDER FROM: XUM, Repr PC

13 047485 THE SEARCH FOR STANDARD TRANSIT. Standardization of rapid transit rolling stock can lower construction and operating costs, but it may also impose undesirable limits on innovation. Leaders of the rapid transit industry in several parts of the world show a qualified concern for standardization; rolling stock profiles are already determined by the infrastructure, but there is scope for a standardized line voltage which would widen the choice in traction equipment.

Railway Gazette International Vol. 129 No. 5, May 1973, pp 172-175 ORDER FROM: ESL, Repr PC, Microfilm

13 047902 STATE-OF-THE-ART TRANSIT CARS GO THE ROUNDS. The two experimental cars designed to raise technical and comfort standards on US transit systems are described. The high-density car has molded fiberglass seats with small upholstered cushions, but the commuter car has fully-upholstered seats. Rubber chevron primary springs isolate wheelset vibration from the body.

Railway Gazette International Vol. 129 No. 4, 1973, pp 140-142 ACKNOWLEDGMENT: EI (EI 73 034258); ORDER FROM: IPC Transport Press, Repr PC, Microfilm

13 047922 POWER SUPPLY FACILITIES OF THE RAPID TRANSIT SYSTEM IN MUNICH, WEST GERMANY, ON THE OCCASION OF THE 20TH OLYMPIC SUMMER FESTIVAL [STROMVERSORGUNGSANLAGEN DER MUENCHNER S-BAHN ANLASSLICH DER XX, OLYMPISCHEN SOMMERSPIELE]. Expansions of the existing power supply system and the introduction of improved techniques are discussed. The establishment of the first capacitor facilities for reactive power compensation is reported. [German]

Kuenzel, H *Elektrische Bahnen* Vol. 44 No. 3, Mar. 1973, pp 62-65; ACKNOWLEDGMENT: EI (EI 73 036204); ORDER FROM: ESL, Repr PC, Microfilm

13 047925 CALCULATION OF THE DISTRIBUTION OF THE CURRENT AND VOLTAGE IN THE RAIL NETWORKS OF D.C. TRACKS TAKING INTO ACCOUNT GROUND LEAKAGE [DIE BERECHNUNG DER STROM-UND SPANNUNGSVERTEILUNG IN SCHIENENNETZEN VON GLEICHSTROMBAHNEN MIT BERUECKSICHTIGUNG DER ABLEITUNG GEGEN ERDE]. The problem of calculation is considered under conditions of uniform load. After constructing basic equations for single tracks it is shown that in arbitrarily intertwined networks there exist linear dependences between the junction voltages and the currents at the track ends, although the distribution of the current and voltage within individual tracks can be described only by means of considerably complicated functions. A method is indicated how the extensive calculation work can be solved by means of a computer program. [German]

Werner, LW (Stadtwerke-Rechenzentrum) *Oesterreichische Z fuer Elektrizitaetswirtschaft* Vol. 26 No. 2, Feb. 1973, pp 46-55; ACKNOWLEDGMENT: EI (EI 73 030043); ORDER FROM: ESL, Repr PC, Microfilm

13 048136 APPLICATIONS OF BART PROGRAM EXPERIENCE TO THE UMTA URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. The Bay Area Rapid Transit (BART) System prototype car demonstration program was observed and reviewed to identify possible improvements applicable to the State-Of-The-Art Car (SOAC) and Advanced Concept Train (ACT) projects within the Urban Rapid Rail Vehicle and Systems Program. Such improvements which were incorporated in SOAC during the design phase involved the windshields, side window material, brakes, propulsion motor cooling and coupling, console, equipment trays, accessibility and noise specifications. These and other requirements based on BART experience were considered during the ACT study and proposal efforts and are reflected in the specifications for the ACT-1 vehicles.

Boeing Company Final Rpt D174-10016-1, Apr. 1973, 48 pp; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS (PB-221955/8); ORDER FROM: NTIS, Repr PC, Microfilm; PB-221955/8, DOTL NTIS

13 048173 DESIGN REVOLUTION CUTS CAR CONSTRUCTION COSTS. Transit rolling stock throughout the world has been the subject of a major revolution in design over the past ten years. Result is a new range of urban railway cars which are both lighter and faster-cutting manufacture and operating costs and reducing damage to the permanent way.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 3 pp, 1 Fig ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

13 048174 BART ELIMINATES THE BUGS--AND TRAFFIC FIGURES CLIMB. Since last September, when the Bay Area Rapid Transit (BART) system opened the first 44 km of its projected 113-km, the eyes of United States' city authorities have been firmly fixed on its progress. If BART succeeds, other new subways could sweep in on its coat tails. If it fails the cause of US transit could be set back drastically. Passenger results to date have compared well with pre-service forecasts. By the end of last year about 95% of BART's projected patronage for the 1972-73 year had been achieved.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 2 pp, 1 Fig ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

13 048241 WORLD IN TRANSIT. In May, members of the International Union of Public Transport meet at their 40th Congress in The Hague. To mark the occasion, IRJ devotes this issue to a survey of rapid transit developments around the world--in Holland, India, U.S., USSR, Germany, Belgium, Switzerland, Australia, Hungary. A 4-page table reviews world transit development at a glance.

International Railway Journal Vol. 13 No. 4, Apr. 1973, pp 28 ACKNOWLEDGMENT: British Railways (29369); ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

13 048293 SOLID-STATE PROPULSION TECHNOLOGY. The advent of solid-state thyristors with large power capabilities is providing several practical alternatives to the cam-controller equipment that has been almost universally used in rapid-transit cars. Cam-controller equipment controls the voltage and current, and thus the speed and torque, of d-c series motors by switching voltage-dropping resistors in and out of the circuit by means of cam switches. One of the alternative approaches is to supply d-c power to series propulsion motors from a thyristor chopper, which controls acceleration by very rapidly turning the motor current on and off in a controlled pattern. The chopper also provides for either regenerative braking (regeneration of the car's stored energy into the d-c supply) or dynamic braking (dissipation of the stored energy in a resistor).

Krings, BJ, Systems Engineer (Westinghouse Electric Corporation) *Railway Locomotives and Cars* Vol. 147 No. 7, Aug. 1973, Systems En, gineer; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

13 050049 DYNAMIC RESPONSE OF A RAPID TRANSIT VEHICLE TO RANDOM GUIDEWAY ROUGHNESS. Measured roadway roughness data and the transfer function for a five-degrees-of-freedom model of a rapid transit vehicle are used for determining vertical and lateral passenger motion of a rapid transit vehicle. Optimization studies are used for spring and damping parameters to minimize passenger discomfort for the input spectra associated with the sums and difference of the measured random individual wheel input profiles.

Hartz, BJ Platt, RM ; Washington University, Seattle 73-ICT-15, Sept. 1973; Presented at the Intersociety Conference on Transportation, September 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 050056 PROPULSION DRIVE FOR ADVANCED CONCEPT TRAIN. Discussed are the requirements imposed on an optimized propulsion system for this type of service. These requirements are then implemented by utilizing an advanced concept regenerative drive coupled to a d-c shunt or series motor. A generalized approach is evolved. It is shown that close analogy exists between a-c and d-c systems intended to fulfill the same requirements. The approaches differ mostly in the method of implementation, i.e., induction machine versus synchronous machine--PWM versus AVI power processor, etc. The paper thus projects the philosophy that advanced concepts and improved performance are not synonymous, as is often assumed, with the exercise of varying the method of implementation.

Berman, B Gelb, GH ; TRW Systems Group 73-ICT-8, Sept. 1973; Presented at the Intersociety Conference on Transportation, September 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 050060 KINETIC ENERGY STORAGE: A "NEW" PROPULSION ALTERNATIVE FOR MASS TRANSPORTATION. The increasing public awareness of the dual problems of air pollution and energy shortage has provided impetus for a search to find new vehicle propulsion alternatives which can alleviate the present dilemma. Recent studies have shown that the incorporation of practical energy storage elements into vehicle drives offers the potential of significant reduction emissions as well as improvement in overall efficiency. The recent "rediscovery" of the kinetic energy flywheel as a highly effective energy storage system provides several new candidate propulsion systems either in heat engine/flywheel hybride or pure flywheel-drive configurations.

Lawson, LJ ; Lockheed Missiles and Space Company 73-ICT-10, Sept. 1973; Presented at the Intersociety Conference on Transportation, September 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 050327 BART--FINALLY ON THE TRACKS. This article maintains that BART is an excellent ride and is a beautiful operation even though the Westinghouse-designed train control system is not performing properly.

Anderson, G *Passenger Train Journal* 1973, pp 11-14, 9 Phot; ORDER FROM: Passenger Train Journal, 29 East Broad Street, Hopewell, New Jersey, Repr PC

13 050440 TRANSIT TROUBLES: WOES WITH NEW CARS COMPLICATE GROWTH OF URBAN RAIL LINES. This article discusses some of the problems that rapid transit systems and commuter railroad operations are having with new cars. Old established car builders are dropping out and the market is being taken over by new companies, generally aerospace oriented. Some of the sophisticated systems on new cars are troublesome.

Williams, JD *Wall Street Journal* Nov. 1973, 2 pp; ORDER FROM: Dow Jones and Company, Incorporated, 30 Broad Street, New York, New York, 10004 Repr PC

13 050479 THYRISTOR CONVERTERS FOR TRACTION DC MOTOR DRIVES. Based on tests in laboratories and on German Federal Railways (GFR) trial vehicles type ET 25 as well as on an industrial locomotive type 500 of the Rheinische Braunkohlen AG the subsequent development has been concentrated on the improvement of the power factor lambda and the displacement factor cos phi in four vital stages: 1) introduction of half-control, unsymmetrical half-controlled, and fully-controlled single-phase bridge connection with specially designed control systems; 2) introduction of sequence connection of several half-controlled bridges; 3) optimization of the so far applied connections for major assemblies such as rectifier transformer, rectifier, and smoothing reactor for improving the power factor; and 4) introduction of sector control with self-commutating unsymmetrical bridge for improving the power factor. The design of the control systems and power circuits is demonstrated for each step with the aid of actual constructions. Test results and precalculated theoretical power factor characteristics of the primary line current as function of the speed or Ud/Udo, respectfully, are given. Measurements and calculations, however, showed that the growing concentration of thyristor vehicles may increase the expenditures for railway power supply systems up to approximately 30 percent.

Bezold, KH Forster, J Zander, H *IEEE Transactions on Industry Applications* Vol. IA9 No. 5, Sept. 1973, pp 612, 10 Fig; ORDER FROM: ESL, Repr PC, Microfilm

13 050553 NEW YORK'S MTA: LIGHT AT THE END OF THE TUNNEL. New Yorkers are now beginning to see the fruits of a \$3-billion improvement program. Today TA trains are 94% on time; the total fleet of 6,859 cars includes 1,100 new generation cars purchased under MTA, another 752 are on order from Pullman-Standard, and there will be thousands more. By 1980, the entire fleet will be air-conditioned. Meanwhile 50 miles of new rail transit lines are being added. The Second Avenue subway is under construction; new Queens extension are being built; a new four-bore rail tunnel under the East River at 63rd Street, to be shared by the TA and the Long-Island Rail Road, is over 90% complete. The LIRR is the beneficiary of a \$300-million improvement program, including 770 new air-conditioned cars. And there is more to come.

Railway Age Vol. 174 No. 7, Apr. 1973, 2 pp, 1 Fig, 4 Phot

ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

13 050637 SUBURBAN ROLLING STOCK: REQUIREMENTS AND COMPROMISE SOLUTIONS [LE MATERIEL DE BANLIEUE: EXIGENCES ET COMPROMIS]. In this article, the author gives details of the requirements suburban rolling stock must fulfill because of the nature and the volume of the traffic carried: daily peak periods, necessary high vehicle capacity, frequent stops; fast loading and unloading of vehicles which, among other problems, involves that of the positioning of the steps in relation to platform height. The author then explains why and how the double-deck coach has been adopted; this type had already been operated in France but it has been modified fundamentally to provide a more modern and comfortable vehicle. [French]

Portefaix, A, Ingenieur General *Revue Generale des Chemins de Fer* Apr. 1973, pp 238-243, 6 Fig

A similar article appears in French Railway Techniques, N4, 1973; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

13 050638 THE NEW DOUBLE-DECK COACHES [LES NOUVELLES VOITURES A 2 NIVEAUX]. The author defines the basic choices and describes the double-deck suburban rolling stock now under construction. He gives the four main objectives of his study: optimum capacity, maximum number of seats, generous access dimensions, improved comfort; he states that, per linear metre, the double-deck coach increases seating capacity by 60% and seating plus standing space by 42%. He refers to the dimensions and technical characteristics of the four type of vehicle adopted which are all training stock. Trains will comprise 7, 8 or 9 units excluding the locomotive. [French]

Tachet, P, Ingenieur Principal *Revue Generale des Chemins de Fer* Apr. 1973, pp 244-249, 5 Fig; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

13 050722 THERMAL BEHAVIOR OF TRANSIT VEHICLE RESISTOR GRIDS. The report was prepared under the Institute for Rapid Transit (IRT) project, 'Ventilation and Environment Control in Subway Rapid Transit Systems,' and is one of the many such reports leading to the final product--a 'Subway Environmental Design Handbook.' The report describes a mathematical model and a corresponding computer subroutine which characterize the thermal behavior of transit vehicle acceleration and deceleration resistor grids. This subroutine is part of the Subway Environmental Simulation (SES) computer program and computes the instantaneous heat rejection rate from transit vehicle resistor grids. (Modified author abstract)

Transit Development Corporation, Incorporated, (UMTA-DC-06-0010) Jan. 1973, 51 pp; Prepared in cooperation with Parsons, Brinckerhoff, Quade and Douglas, Inc., New York; ACKNOWLEDGMENT: NTIS (PB-222013/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222013/5

13 050729 ANALYSES OF RAIL VEHICLE DYNAMICS IN SUPPORT OF DEVELOPMENT OF THE WHEEL RAIL DYNAMICS RESEARCH FACILITY. The development of experimental facilities for rail vehicle testing at the DOT High Speed Ground Test Center is being complemented by analytical studies. The purpose of this effort has been to gain insight into the dynamics of rail vehicles to guide the equipment development and to establish an analytic framework for the design and interpretation of tests to be conducted at the facility. The mechanics of rail vehicle lateral guidance are reviewed on the basis of linearized models. Computer programs are developed for predicting stability and general lateral response characteristics. Computer programs for predicting vertical and pitch vehicle response to track irregularities are included. (Modified author abstract)

Weinstock, H ; Transportation Systems Center Intrm Rpt DOT-TSC-UMTA-72-10, June 1973, 228 pp; Contract DOT-MA-06-0025; ACKNOWLEDGMENT: NTIS (PB-222654/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222654/6

13 050730 INVESTIGATION OF VOLTAGE TRANSIENTS AND SPIKES IN DIRECT CURRENT RAPID TRANSIT SYSTEMS. Voltage transients and spikes have been investigated on five existing rail rapid transit systems to define the power environment in which new rail transit cars might be expected to operate. A final report describes and evaluates observed third-rail shoe transient and spike voltages, measured in subway installations in Philadelphia, New York City, Boston, Cleveland, and Chicago during rush and non-rush hours. It condenses these data into curves which may be used as the basis of a general performance specification. The underlying theory as well as special test equipment used during the field test activity is described in detail, together with a special computer program required for test data evaluation. The results obtained may be applied to future subway car speed control systems using static power conversion.

Boeing Company Final Rpt DI74-10017-1, June 1973, 256 pp; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS (PB-222698/3); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222698/3

13 050731 REPORT ON DEVELOPMENT OF GUIDELINE SPECIFICATION FOR URBAN RAIL CARS. The purpose of the report is to present the general methodology, industry coordination and pertinent observations on the development of the Guideline Specification for Urban Rail Commuter Car. The guideline specification was developed in a series of three drafts which were coordinated in meetings with a review committee of UMTA personnel and industry representatives. Basic specification matters under consideration include: scope, system requirements, car body, coupler and draft gear, miscellaneous car body items, door operation and control, heating-cooling-ventilating, lighting auxiliary electrical equipment, power and traction, trucks and suspension systems, friction braking systems, train electronics, emergency systems, system support, management systems, testing, quality assurance, applicable documents and general information. (Modified author abstract)

Boeing Company Final Rpt D174-10013-2, Mar. 1973, 185 pp; Contract DOT-UT-10004; ACKNOWLEDGMENT: NTIS (PB-222740/3);

ORDER FROM: NTIS, Repr PC, Microfiche; PB-222740/3

13 050736 BART PROTOTYPE CAR DEVELOPMENT PROGRAM. VOLUME 2, PROGRAM DETAILS. The report traces The Bay Area Rapid Transit District Rapid Transit Vehicle Program through the planning phase, design phase, and the development and prototype test phase. The program was established to enhance the attractiveness of rail rapid transportation to the urban traveler by providing a comfortable, reliable and safe car incorporating the latest engineering concepts. The report provides design justifications, testing highlights, and reasons for modifications and changes resulting from the prototype test Administration. This Volume 2, Program Details, provides the detailed technical material for Engineering personnel. (Author)

Rohr Corporation Final Rpt Mar. 1973, 271 pp
See also Volume 1, PB-222975.; ACKNOWLEDGMENT: NTIS (PB-222976/3); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222976/3, DOTL NTIS

13 050738 BART PROTOTYPE CAR DEVELOPMENT PROGRAM. VOLUME 1, PROGRAM SYNOPSIS. The report traces The Bay Area Rapid Transit District Rapid Transit Vehicle Program through the planning phase, design phase, and the development and prototype test phase. The report provides design justifications, testing highlights, and reasons for modifications and changes resulting from the prototype test program, sponsored by the Urban Mass Transportation Administration. This report is divided into two volumes. Volume 1, Program Synopsis, provides an overview of the complete program and is directed toward Federal, Local Government and Rail Transit Management personnel. Volume 2, Program Details, provides the detailed technical material for Engineering personnel.

Rohr Corporation, (UMTA-CA-06-0032) Sum Rpt Mar. 1973, 80 pp; Prepared in cooperation with Parsons Brinckerhoff-Tudor-Bechtel. See also Volume 2, PB-223132.; ACKNOWLEDGMENT: NTIS (PB-223131/4); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223131/4

13 050885 DETERMINING TRAIN PERFORMANCE. Rapid evaluation and determination of train performance reliability is more than ever important with tight headways and intensive operation of train services in peak hours. Taking into consideration weight of rolling stock, acceleration and stopping distances, output is mathematically assessed against a practical operating background.

Koffman, JL *Rail Engineering International* Vol. 3 No. 8, Oct. 1973, pp 350-353, 5 Fig; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

13 051331 COPENHAGEN PREPARES FOR MORE COMMUTERS. Rapid expansion of the electrified suburban network will place an extra burden on the congested line through the centre of Denmark's capital, and a prototype train with all axles motored is to be tried next summer to improve schedules. At the same time, one-man train operation with speed supervision will be introduced to ease staff shortages.

Maltby, CE (GEC Traction Limited) *Railway Gazette International* Vol. 129 No. 11, Nov. 1973, pp 426-428; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

13 051384 ENERGY ECONOMICS THROUGH SOLID-STATE POWER CONVERSION. Energy savings of around 30 per cent can be achieved on rapid transit systems through the use of thyristor choppers and blended regenerative/rheostatic braking schemes. In a.c. traction scope for energy saving through the use of thyristors is more limited, but replacement of rotary machines by solid state frequency converters reduces substation losses by up to 40 per cent.

Bjerkehagen, O Kollberg, B *Railway Gazette International* Vol. 129 No. 12, Dec. 1973, pp 459-461, 1 Fig; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

13 051407 TRANSIT CAR RIDE QUALITY: PREDICTION, TEST AND IMPROVEMENT. Techniques for evaluating rail car vibratory accelerations against various forms of ride quality criteria are discussed. The development of a computer program to predict these vibratory accelerations is described, and the results obtained from the program are validated by comparison with field test data and data obtained from laboratory vibration tests on a full-scale truck. An active suspension concept to improve ride quality is described, and laboratory test results of several candidate active suspension systems are presented.

Rinehart, RE Roach, RE, Jr Bain, JA Croshaw, PF (General Electric Company); American Society of Mechanical Engineers Paper 73-ICT-76, Sept. 1973, 20 pp, 17 Fig, 1 Tab, 8 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 051409 STANDARD LIGHT RAIL VEHICLE. This paper summarizes the results of a joint agency cooperative effort to develop the National Standard Light Rail Vehicle for surface-subway passenger transport. Selected vehicle performance characteristics, design criteria and design features are described.

Muehlberger, RF (Massachusetts Bay Transportation Authority); American Society of Mechanical Engineers Paper 73-ICT-80, Sept. 1973, 12 pp, 8 Fig, 1 Tab; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 051412 SIMULATION OF LATERAL DYNAMICS FOR A CONTACT POWER COLLECTION SYSTEM. The mathematical model of a sprung mass moving along a simply supported beam is used to analyze the lateral dynamics of a power collection device as it slides along a power rail. A computer simulation of one-dimensional motion is used to demonstrate the phenomena of collector-power rail interac-

tion. Parametric resonance in an undamped collector is shown to exist at several speeds below 300 mph. However, it is demonstrated that amplitude can be controlled at all of these resonant speeds with the proper use of damping.

Spenny, CH (Department of Transportation); American Society of Mechanical Engineers Paper 73-ICT-84, Sept. 1973, 11 pp, 10 Fig; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 051416 THE SPECIFICATION OF MULTIPLE UNIT RAIL CAR PERFORMANCE. The importance of carefully reasoned multiple unit railcar performance specifications is discussed. Two methods of specifying performance are presented, speed-time-distance and schedule speed. Reasons for favoring schedule speed, as determined from computer simulation, are advanced, and a sample specification format exhibited.

Phelps, DR (General Electric Company); American Society of Mechanical Engineers Paper 73-ICT-90, Sept. 1973, 9 pp, 3 Fig, 5 Tab, 5 Ref
Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 051446 RAILROAD MOTOR CARS WITH INVERTOR FED ASYNCHRONOUS DRIVE FOR LOCAL TRAFFIC IN THE UNITED STATES [NAHVERKEHRSTRIEBWAGEN MIT UMRICHTERGESPEISTEM ASYNCHRONMOTORANTRIEB IN DEN USA]. The development of a three-phase power transmission system for the Cleveland Transit System is reported. The lines are equipped with overhead contacts for the 600-v dc system. The transmission system converts the direct current into three-phase current of variable voltage and frequency so that the three-phase short-circuit rotor motors can be used as traction motors. Details about the electric and mechanical systems are presented. [German]

Teich, W *Elektrische Bahnen* Vol. 44 No. 5, May 1973, pp 108-114; ACKNOWLEDGMENT: EI (EI 74 056292); ORDER FROM: ESL, Repr PC, Microfilm

13 051453 ENVIRONMENTAL CONTROL FOR THE CARACAS METRO. New subway systems, such as the proposed Metro de Caracas, will benefit from aerospace technology which has led to innovations in rapid transit vehicle designs. Increased amounts of kinetic energy in the form of heat through car-mounted resistor grids during the braking are included in design. Rates of heat release generated by train operation and car air-conditioning systems are described.

Bendelius, AG Metsch, WW *Experimental Mechanics* Vol. 15 No. 9, Sept. 1973, pp 47-54; ACKNOWLEDGMENT: EI (EI 74 059239); ORDER FROM: ESL, Repr PC, Microfilm

13 051471 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. The report reviews the second year's efforts of the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program. The objective of the program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. Review of the BART prototype testing has been completed. The State-of-the-Art Car (SOAC) was delivered and tested at the High Speed Ground Test Center. The full-scale SOAC mockup has been exhibited in several cities. The design and specification development phase of the Advanced Concept Train (ACT-1) was completed.

Boeing Company, (UMTA-IT-06-0026) Ann Rpt DI-74-10021-1, July 1973, 70p; See also report dated Jul 72, PB-212 848; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS (PB-224141/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224141/2, DOTL NTIS

13 051529 TWO MEANS OF ALLEVIATING RUSH-HOUR CROWDING. Two means are suggested for increasing the rush-hour capacity of urban train systems already operating trains of maximum headway. They are: (1) Replacing some or all of the regular cars by standee-only cars; and (2) using double-length trains and, at the stations, having each train first stop with its front half alongside the station platform, and then advance to put its second half alongside the platform. A theoretical analysis shows that in some cases these methods can lead to a significant increase in the carrying capacity of a system. Formulas are presented for estimating the increase achievable in any particular case.

Libove, C (Syracuse University) *ASCE Journal of Transportation Engineering Proc Paper* Vol. 99 No. TE4, #10144, Nov. 1973, pp 845-862, 6 Fig., 1 Ref.; Presented at the July 9-12, 1973, ASCE National Transportation Engineering Meeting, held at Tulsa, Oklahoma.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

13 051532 THE DYNAMICS OF HIGH SPEED SLIDING POWER COLLECTION SYSTEMS FOR ELECTRICALLY PROPELLED VEHICLES. Methods for estimating the contact force variation are presented. Particular attention is given to third rail waviness and flexibility and their effects on contact force at high speed. Waviness measurements of a commercial third-rail are given in power density form. Conclusions are drawn concerning the feasibility of power collection at 300 mph as affected by waviness, rail flexibility, and brush wear.

Bain, JA (General Electric Company); American Society of Mechanical Engineers Paper 73-ICT-98, Sept. 1973, 9 pp, 3 Fig, 7 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

13 051587 DETAIL SPECIFICATION FOR STATE-OF-THE-ART CAR. The report contains the detail specification for the State-of-the-Art Car (SOAC). This specification represents the SOAC configuration as delivered to the Urban Mass Transportation Administration (UMTA) for test and demonstration. The SOAC

has been developed under UMTA's Urban Rapid Rail Vehicle and Systems program which has the objective of enhancing the attractiveness of rapid rail transportation to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. The SOAC is one phase of this program. (Modified author abstract)

Boeing Company, Urban Mass Transportation Administration D174-10018-1, IT-06-0026-73-2, May 1973, 208 pp; Includes Revision A dated Oct 73. Supersedes PB-222 147. Detail specification report.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS (PB-225934/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-225934/9, DOTL NTIS

13 052079 CONTROL TECHNIQUES FOR PRT. Around the family of automatic guided transport now known as PRT, control systems have been developed to cope with complex service patterns and close headways. The author examines these techniques and concludes that while few have direct application to conventional rail, the same fundamental questions remain to be tackled in heavy rapid transit.

Thomas, TH (Warwick University) *Railway Gazette International* Vol. 130 No. 1, Jan. 1974, 3 pp, 3 Fig, 1 Tab, 1 Phot; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

13 052505 APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. INVESTIGATIONS ON A.C. MOTIVE POWER UNITS WITH SEVERAL THYRISTOR CIRCUITS (TESTS AND RESULTS OBTAINED FROM THE BLS-LOCOMOTIVE RE4/4 NO. 161). This report concerns the tests undertaken with the BLS-Locomotive Re 4/4 161 fitted with several thyristor circuits. The object of the tests was to clarify the changes in the power factor and the harmonic wave content-the latter in view of its effects on signalling and telecommunication installations-resulting from the increased number of inverter steps and the limitation of the firing angle of the thyristor bridges to 35 degrees. The tests conducted have shown that in the case of thyristor-controlled motive power units, a multi-step control of the voltage regulation leads to a reduction of the harmonics of the line current and to an improvement in the power factor during acceleration and running below full power. The limitation of the firing angle of the thyristor bridges of 35 degrees, considered in its entirety, does not bring any advantages however.

International Union of Railways A122/RP6/E, Apr. 1973, 27 pp, 11 Fig., 5 Tab., 3 App.; This document is restricted. ORDER FROM: Office for Research and Experiments, Oudenoord 60, Utrecht, Netherlands

13 052506 APPLICATION OF THYRISTORS IN RAILWAY TECHNOLOGY: CONSEQUENCES AND REMEDIES. TESTS WITH A STATIC FREQUENCY CONVERTER FOR 50-16 2/3 HZ. The Swedish State Railways (SJ) have conducted several comparative measurements on the Moholm-Skovde line, using a prototype of a static frequency converter (power 6 MVA) During the tests the equivalent disturb-

ing currents and the weighted longitudinal e.m.f. induced in telecommunication circuits were measured; for these tests, the test line was fed through the static converter or through rotary converters. When the feeding took place through the static converter, the levels of the disturbing current in the overhead contact system and the induced weighted longitudinal e.m.f. were raised. However, a lowering of the levels measured may be expected, after the filter for the static converter has been modified. On the three-phase side there are no adverse effects, as long as the power of the static converter is very small in comparison with the short-circuit power of the high voltage network. The SJ have ordered, for two sub-stations, two static converters each with a power of 15 MVA each.

International Union of Railways A122/RP8/E, Apr. 1973, 14 pp, 7 Fig., 1 Tab.; This document is restricted. ORDER FROM: Office for Research and Experiments, Oudenoord 60, Utrecht, Netherlands

13 053358 UNCONVENTIONAL TRACKS. ENQUIRY REPORT-PRESENT STATE OF KNOWLEDGE AND FUTURE USE. This report presents an analysis of the replies received from the member-railways of ORE and the UITP Metro Committee members to a questionnaire designed to establish the likely extent of the use of slab track systems in the next 10 years, the current state of knowledge, and the areas of research which might still be necessary. The conclusion of the report is that no further formal research study should be carried out, but the pooling of experience acquired should be continued.

International Union of Railways D 87/RP 18, Oct. 1979, 55 p.; This document is restricted. ORDER FROM: Office for Research and Experiments, Oudenoord 60, Utrecht, Netherlands

13 053729 ROLLING STOCK FOR THE SUB-URBAN SERVICES OF THE ITALIAN STATE RAILWAYS. The Italian State Railways have developed suitable suburban public transport systems in the more important Italian conurbation areas such as Rome, Milan, Turin, Genoa, Bologna and Naples. In this connection, it became necessary, after the end of the second world war, to provide purpose designed rolling stock for these services. Special vehicles with low slung floors were developed for the peak commuter services operated in the suburbs of the more important cities. These vehicles afford direct access from the station platforms through two large vestibules with double doors on either side.

Giovanardi, G Cardini, E (Italian State Railways) *Rail International* No. 1, Jan. 1973, 25 pp, 34 Fig; ORDER FROM: ESL, Repr PC, Microfilm

13 053731 POWER SUPPLY FOR RAILWAYS IN CITY REGIONS. I. BASIC CONSIDERATIONS. On the occasion of the last symposium in Vienna in 1968, attention was drawn to the difficulties arising from current collection and power supply for high-speed running. These problems were taken up by ORE and are at present being tackled. In the meantime, it had to be recognised that problems of a partly similar and partly different nature are also encountered, and must be solved, in respect of current collection and power supply for high-frequency train services in large conurbations. Here,

the first step must be to analyse the problems themselves and to assess the range where the difficulties are liable to occur within a near future. It should be pointed out that the present paper is exclusively concerned with conventional railway systems and well-known systems of current supply to motive power units.

Breyer, W (Austrian Federal Railways) *Rail International* No. 1, Jan. 1973, 9 pp, 7 Fig., Tabs., 8 Ref.; ORDER FROM: ESL, Repr PC, Microfilm

13 053732 POWER SUPPLY FOR RAILWAYS IN CITY REGIONS. II. PRACTICAL APPLICATIONS. It is a common observation throughout the world that motor traffic in large cities has grown to such an extent that it can no longer be tackled even with a road construction programme which destroys the traditional urban structures. There is a lack of proportion between the space available in large cities and the space requirements of private motor traffic. Most of the existing means of local public transport such as buses and trams share the use of the roads and get stuck in traffic jams during rush hours so that their attractiveness is impaired. In some cases, remedies are sought by according privileges to public transport, but these reduce the road space available for private motor traffic. It is therefore not surprising that there is an increasingly urgent clamour for high-capacity modes of public transport, independent of the streets. The aim is to restore the attractiveness of local public transport and thereby to attract a great number of commuters who have hitherto regarded the use of their own car for the journey to work as indispensable. In future, local public transport will not succeed without acquiring a certain "rider appeal".

Bauermeister, K (German Federal Railway) *Rail International* No. 1, Jan. 1973, 13 pp, 16 FIG; ORDER FROM: ESL, Repr PC, Microfilm

13 053747 CHOPPERS ON THE SNCF--EXPERIMENTAL DESIGNS. This article describes some experimental thyristor control systems on the French National Railroads. Details are given of installations on both multiple unit equipment and on locomotives. Test results are discussed.

Cossie, A (French National Railways) *French Railway Techniques* No. 4, 1973, 10 pp, 16 Fig; ORDER FROM: ESL, Repr. PC, Microfilm

13 053861 A BONDED CONTINUOUS TURNOUT FOR CWR TERRITORY. Design developed for use on Washington's rapid transit system involves a "glued" switch insert and a standard frog modified so as to provide a greater bonding area.

Mester, GE Robey, RH (De Leuw, Cather and Company) *Railway Track and Structures* Vol. 69 No. 11, Nov. 1973, 2 pp, Fig; ACKNOWLEDGMENT: Railway Track and Structures; ORDER FROM: XUM, Repr PC

13 053869 EFFECT ON THE SYSTEM OF A.C. LOCOMOTIVES REGULATED BY THE ASSEMBLY IN STAGES OF THYRISTOR BRIDGES CONNECTED IN SERIES [NETZVERHALTEN VON WECHSELSTROM-TRIEBFahrZEUGEN MIT MEHRFACH-FOLGESTEUERUNGEN IM STROMICHTERSPARSCHALTUNG]. A report submitted at the 14th meeting dealing with

"Modern railway stock", held in Graz. The assembly in question was designed by Brown Boveri, in order to: 1. Suppress, in the supply system, the high-frequency harmonics, as well as their induced effects causing interference on the lines carrying weak current. 2. Suppress the low-frequency harmonics capable of having an effect on the track circuits. 3. Improve the power factor. This assembly was tested on an RC 4/4 locomotive No. 161. The report contains a theory covering this assembly, as well as details, set out in the very numerous diagrams, of the results obtained during tests, and conclusions concerning the conditions under which the desired effects can be obtained. [German]

Winter, P *Glaser's Annalen ZEV* No. 2-3, 1973, 10 pp, Figs, 6 Ref; ACKNOWLEDGMENT: UIC (1187); ORDER FROM: ESL, Repr PC, Microfilm

13 054004 "PROJECT 21" RAPID TRANSIT SYSTEM. SYNTHESIS OF THE SYSTEM AND VALIDATION OF THE GUIDEWAY. Project 21 is a complete new railroad system, particularly adapted for elevated rapid transit in medium-density cities. It features (a) low cost and esthetic acceptability of guideway and stations; (b) prefabricated, reusable guideway and station elements to allow quick installation and flexibility of relocation; and (c) a practical switch for two-way traffic. Trains carry some 35 to 150 passengers and operate generally like streetcars. This paper covers synthesis of the Project 21 concept and structural/dynamic analyses to validate the guideway design.

Edwards, LK Donnell, LH ; American Society of Mechanical Engineers ASME #74-RT-6, Jan. 1974, 17 pp, 14 Fig, Apps; Contributed by the Rail Transportation Division of The American Society of Mechanical Engineers for presentation at the ASME-IEEE Joint Railroad Conference, Pittsburgh, Pa., April 3-4, 1974; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

13 054286 WHEEL SIZES FOR CITY AND SUBURBAN STOCK. Dearth of suitable guiding information brought to a head with long-accepted P-D ratios restricting wheel-diameter reductions which are conducive to wheelset weight-saving, savings in first cost and energy economies. P-D ratios shown to over simplify the position and recent studies into contact stresses of wheels and rails have given valuable information. The author shows that maximum contact pressures of higher values than could be accepted by traditional P-D values are currently giving no problems.

Koffman, JL *Rail Engineering International* Vol. 4 No. 2, Feb. 1974, pp 53-56, 4 Fig, 9 Ref; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

13 054476 PRE REVENUE SERVICE ACTIVITIES. AC PROPULSION PROJECT. In 1971 the Cleveland Transit System received a grant contract from the Department of Transportation's Urban Mass Transportation Administration to test, demonstrate and evaluate a solid state AC propulsion system on three rapid transit cars. The retrofit process is described and illustrated in detail. The car check-out program to verify

system performance is also described and specific problems and solutions discussed. The problems and unusual difficulties encountered in the pre revenue service effort are summarized in the report. The installation of a car carried computer based data acquisition system is described and the problems encountered in this unique effort enumerated.

Pier, JR ; Cleveland Transit System, (UMTA-OH-06-0006) *Intrm Rpt* Sept. 1973, 71 pp Prepared by Westinghouse Air Brake Co., Wilmerding, Pa.; ACKNOWLEDGMENT: NTIS (PB-228983/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-228983/3, DOTL NTIS

13 054477 SINGLE CAR PERFORMANCE. AC PROPULSION PROJECT. The report presents the testing, demonstration and evaluation of a solid state AC propulsion system on three rapid transit cars. To demonstrate general performance and applicability of the propulsion system, an on-board computer controlled data acquisition system was used to collect performance data. The data were reduced, analyzed, and plotted by computer. The description of the general performance characteristics of the propulsion system is presented in the form of tabular listings and graphs. Some of the areas covered include rolling resistance, acceleration and braking capability, torque output, power consumption, system efficiency, and motor temperatures.

Cymbor, WP Smith, RD ; Cleveland Transit System, (UMTA-OH-0006) Aug. 1973, 93 pp; Prepared by Westinghouse Air Brake Division, Wilmerding, Pa.; ACKNOWLEDGMENT: NTIS (PB-228987/4); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-228987/4, DOTL NTIS

13 054614 IMPROVING RAIL TRANSIT WITH A RESEARCH AND DEVELOPMENT PROGRAM. Commuter rail, rapid transit, and light rail are all of vital importance to our national transit operation. Yet all have been neglected, particularly light rail, which has had no R&D work since the PCC streetcar of the thirties. The article describes UMTA research programs involving the State of the Art cars, the Advanced Concept Train, and the standard light rail vehicle.

Silien, JS, Chief, Rail Programs (Urban Mass Transportation Administration) *Highway and Urban Mass Transportation* Sept. 1973, pp 8-10, 2 Phot; ORDER FROM: GPO, Repr PC; 5001-00072, DOTL JC

13 054615 SPECIFICATION FOR A STANDARD LIGHT RAIL VEHICLE. This article describes the development of specifications for a new light rail vehicle to replace the PCC streetcars now in service in several major U.S. cities. The specifications are for performance rather than for hardware. Standard overall dimensions are specified, but smaller versions may be produced if required. Each agency purchasing such vehicles can add its own requirements as an appendix to the standard specification.

Highway and Urban Mass Transportation Sept. 1973, pp 22-24, 1 Phot; ORDER FROM: GPO, Repr PC; 5001-00072, DOTL JC

13 054665 NEW CARS MARK SEPTA'S SEVENTH YEAR. In February 1974, the Southeastern Pennsylvania Transportation Authority (SEPTA) began to receive 144 new commuter

cars from General Electric. The cars represent the fourth generation of stainless-steel cars, first of which were purchased in 1957 by the Pennsylvania Railroad. The Silverliner IV is an 85 foot vehicle with a seating capacity of 129. Each car has a "performance and fault indicator display unit" which is expected to simplify maintenance and trouble shooting. The unit had originally been developed by GE for Amtrack Metroliners. Fourteen of the cars will go to the Reading and 130 to PC.

Railway Age Vol. 175 No. 5, Mar. 1974, p 34
ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: XUM, Repr PC

13 054679 DOT AWARDS CONTRACT FOR ACT I TO GARRETT. Garrett AiResearch Manufacturing Company, Torrance, California received an \$8 million contract from the DOT for the construction of a prototype train of the Advanced Concept Train (ACT-1). The exterior of the train will be similar to Britain's Advanced Passenger Train (APT), but will incorporate a revolutionary new propulsion system. An energy-storage flywheel propulsion system will be designed to conserve electricity. When the train is braking, the motors will act as generators to accelerate a high velocity flywheel. When the train starts, it will draw upon the energy stored in the flywheel to provide an extra boost of power.

Myers, ET *Modern Railroads* Vol. 29 No. 3, Mar. 1974, pp 67-68; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

13 054750 BART IN OPERATION--INNOVATIONS IN RAPID TRANSIT. The San Francisco Bay Area Rapid Transit System (BART) is the first completely new full-scale urban mass transportation system to be completed in the United States in approx. 70 yr. As such, it offered engineers an unusual opportunity to develop new technology in vehicle performance use of electronics for automatic train controls and fare collection, esthetics, multiple use of transportation corridors, passengers station design, subway construction, and other aspects of rapid transit planning and construction. These features are described in this article, along with "start-up" problems encountered, early patronage, and the significance of the System to the economic well-being of the Bay Area.

Bugge, WA *ASCE Journal of Transportation Engineering* Proc Paper Vol. 100 No. TE2, #10522, May 1974, 18 pp; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr PC, Microfilm

13 056765 CHOPPER CONTROLS FOR TORONTO SUBWAY CARS. The Toronto Transit Commission has installed regenerative chopper controls in six of its latest subway cars, type H-2, replacing conventional electromechanical cam shaft controls. The operation of the cars, and future trends, are discussed.

Roberts, FW ; Institute of Electrical and Electronics Engineers ; Presented at the IEEE International Electr, Electron Conference and Expo. Toronto.; ACKNOWLEDGMENT: EI (EIX740504163);

ORDER FROM: ESL, Repr PC, Microfilm

13 056771 NEW UNITED STATES STANDARD LIGHT RAIL VEHICLE. This paper presents details of the new United States standard light rail vehicle (LRV) being built by the Boeing Vertol Co. for the Boston and San Francisco public transportation authorities. System operation, design features, and performance are described for the LRV, successor to the ubiquitous President's Conference Committee car, last built in the United States in 1951. Used most effectively for an intermediate mass transit volume of 8000-24,000 passengers/h, the Boeing LRV incorporates much of the available state-of-the-art technology. The car body is tough and lightweight with numerous functionally oriented features. The propulsion system is the latest in thyristor-chopper control as applied to separately excited d-c traction motors. In addition, a variety of features enhance the comfort, safety, and maintainability of the LRV. Its multiple-wear resilient wheels make it a more quiet neighbor.

Lenow, M (Boeing Company) ; Society of Automotive Engineers Preprint N740227, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740506279); ORDER FROM: ESL, Repr PC, Microfilm

13 056772 BOEING DESIGNS LIGHT MASS TRANSIT VEHICLE. This light rail vehicle is designed to operate in mixed traffic on city streets or in subways, at a mass transit volume of 8000 to 24,000 passengers per hour. Each motorized truck has a resiliently mounted 210-hp (continuous) at 1135 rpm separately excited d-c traction motor, and incorporates a pneumatic-hydraulic friction brake system as a reserve to dynamic braking. High/low steps allow passenger use in subways or streets.

Automobile Engineer Vol. 82 No. 4, Apr. 1974
ACKNOWLEDGMENT: EI (EIX740506414); ORDER FROM: ESL, Repr PC, Microfilm

13 056789 ELECTRO-MAGNETIC COMPATIBILITY DESIGN FOR RAPID TRANSIT SYSTEMS. Design criteria and techniques used to minimize the interference levels between the communication and signal channels for control of rapid transit vehicles and other working systems (such as propulsion, power system, auxiliaries, etc.) or the environment, are analyzed in this paper. The particular system under consideration utilizes a higher frequency band to allow a wide separation from signal to noise, but below 10 KHz and at low power level so that it does not require special license to operate. In addition, the use of FSK and the well known features of signal capture as developed in fm systems, are used to further increase the EMC of the overall system. The techniques presented in this paper have been successfully implemented in various transit systems which are presently in operation.

Barpal, IR ; Institute of Electrical and Electronics Engineers ; Presented at the IEEE International Electromagn Compat Symp Rec, New York, N.Y.; ACKNOWLEDGMENT: EI (EIX740102349); ORDER FROM: ESL, Repr PC, Microfilm

13 056790 ELECTROMAGNETIC COMPATIBILITY BETWEEN THYRISTOR-CHOPPER CONTROLLED CARS AND ELECTRIC FIXED INSTALLATIONS IN TOKYO SUBWAYS. When commercial operation was initiated between Ayase and Kasumigaseki stations

on the Chiyoda Line (Tokyo) in March, 1971, the Teito Rapid Transit Authority put into service 130 chopper-controlled cars made up of thirteen 10-car trains. In February 1972, 60 chopper-controlled cars were put into service. Compared with conventional rheostat-controlled cars, chopper-controlled cars offer improved riding comfort, reduced electric power consumption, and low temperature rise in subway tunnels. However, the thyristor-chopper control generated ripple currents in the trolley wires and rails causing problems with the signaling and communication installations. Analytical studies and tests provided a solution to these problems by employing such measures as filtering and adopting a 660 Hz chopper frequency. As a result of the tests, compatibility between chopper-controlled cars and electric fixed installations was established

Yukawa, R ; Institute of Electrical and Electronics Engineers ; Presented at the IEEE International Electromagn Compat Symp Rec, New York, N.Y.; ACKNOWLEDGMENT: EI (EIX740102348); ORDER FROM: ESL, Repr PC, Microfilm

13 056795 FINNISH NATIONAL RAILROADS COMMUTER LOCOMOTIVE [NAHVERKEHRSTRIEBZUG DER FINNISCHEN STAATSEAHNEN]. Details are presented about the mechanical and electric equipment of the local rapid transit system in Helsinki, Finland. The trains feature new design improvements, such as the use of light-weight metal for the bodies of the cars instead of steel which was used in the past. The trains are capable of producing an acceleration from 0.8 to 1.1 m/sec² for a corresponding speed from 0 to 30 km/hr. [German]

Karha, K Myllarniemi, K *Elektrische Bahnen* Vol. 44 No. 10, 1973; ACKNOWLEDGMENT: EI (EIX740306237); ORDER FROM: ESL, Repr PC, Microfilm

13 056798 INTERFERENCE TO TELECOMMUNICATION INSTALLATIONS BY RAPID TRANSIT SYSTEMS. Power conversion by means of semiconductor elements, i. e. the use of thyristors in traction systems operating with dc or ac has resulted in new electromagnetic compatibility problems. While it has hitherto been possible to control the interference to telecommunication installations caused by the fundamental frequency and harmonics of the traction current without great difficulties, the growing number of harmonics may call for special measures to be taken. In addition, traction currents are also increasing due to the demand for higher acceleration and speed of trains, particularly of rapid transit systems in densely populated areas-a demand which can particularly be met by the thyristor technique. This paper examines the electromagnetic compatibility problem from both the viewpoint of the Railways and the telecommunication authorities. Moreover, measures for keeping the interference within tolerable limits are indicated.

Buckel, R Riedel, HA ; Institute of Electrical and Electronics Engineers ; Presented at the IEEE International Electromagn Compat Symp Rec, New York, N.Y.; ACKNOWLEDGMENT: EI (EIX740102347); ORDER FROM: ESL, Repr PC, Microfilm

13 056814 SELF-COMMUTATED RECTIFIER TO IMPROVE LINE CONDITIONS.

When thyristor rectifiers are used for electric drives, reactive power is produced with fundamental and harmonic frequencies. Especially in single-phase traction lines, with their low short-circuit power, a technical solution of this problem, applicable mainly to thyristor-driven rail cars and locomotives, had to be found. In this paper, the sector-control system of a self-commutated unsymmetrical bridge is described. In the unsymmetrical half-controlled bridge connection, the two thyristors can be quenched by adding a self-commutating device. This attachment (supplement) can be applied to the single bridge or to two bridges in series (sector control). By using this self-commutating attachment, it is possible to shift the fundamental of the current to a leading angle with respect to the voltage.

Zander, H (Telefunken) *Institution of Electrical Engineers, Proceedings* Vol. 120 No. 9, Sept. 1973; ACKNOWLEDGMENT: EI (EIX740100145); ORDER FROM: ESL, Repr PC, Microfilm

13 056851 FAULT DETECTION ON DIRECT CURRENT RAPID TRANSIT SYSTEMS.

Due to the similarity between fault currents and load currents, it has been difficult to adequately protect a dc transit system, particularly against low current, arcing faults. The electrical characteristics of these systems are reviewed and analyzed to develop the basic design requirements for their proper protection. An analysis is made of a new device designed specifically for protection against low current faults. Test results are reported, and application guidelines are formulated.

Stewart, J Waldron, JE ; Institute of Electrical and Electronics Engineers ; Presented at the IEEE Ind. Appl. Soc., 8th Annu. Meet.; ACKNOWLEDGMENT: EI (EIX740303827); ORDER FROM: ESL, Repr PC, Microfilm

13 056853 DISK ASSIST, THE SIMULTANEOUS USE OF TREAD AND DISK BRAKES.

The combination of on-tread and disk braking is an excellent method to obtain the advantages of each kind of braking and to minimize the disadvantages. There is a real need for combination braking on rapid transit cars and many freight cars. Results of in-service performance of a test car are given.

Archibald, RH (Westinghouse Air Brake Company) Cable, GM ; American Society of Mechanical Engineers Paper 73-WA/RT-11, Nov. 1973; ACKNOWLEDGMENT: EI (EIX740104848); ORDER FROM: ESL, Repr PC, Microfilm

13 056949 COMMUTER RAILROAD FEASIBILITY STUDY ON SELECTED LINES IN THE LOS ANGELES METROPOLITAN AREA.

The objective of the report was to explore feasibility if installing and operating a limited scope rail commuter service over one Southern Pacific and two Santa Fe routes into Los Angeles, California. A package of data is provided including statistical compilations on the operational and physical characteristics of the rail lines under consideration. It is believed possible to inaugurate limited commuter service relatively early, employing Santa Fe trackage on the Santa Ana and Los Angeles route and the San Bernadino-Los Angeles route via Pasadena. Summary of principle statistics of the proposed routes is presented.

Findings include annual deficits, projected ridership, marketing aspects, operational and capital costs and implementation of service.

England, CRJ ; Southern California Association of Governments, (UMTA-CA-09-0022) Final Rpt Jan. 1974, 72p; ACKNOWLEDGMENT: NTIS (PB-231117/3); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231117/3

13 057150 BART BATTLES COMPLEX PROBLEMS.

Since Bart opened, its cars and automatic train control systems have not operated properly. Until electronic problems in the Trans Bay Tube system are overcome, hopefully by September 1974, the transit system operates in two parts and ridership is not as high as it should be. Defects in the automatic, computer controlled operation have led to a series of train failures, derailments, etc. However, BART hopes to have these problems solved within eight months. The car problem is just as serious as the electronic problems. On some days over half the cars are unserviceable.

Myers, ET *Modern Railroads* Vol. 29 No. 4, Apr. 1974, pp 68-73; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

13 057417 ADVANCED TECHNOLOGY IN THE DESIGN OF RAILROAD ROLLING STOCK

[Tecnologie di avanguardia nella costruzione del materiale ferroviario]. Requirements which modern railroad cars have to satisfy are listed and their consequences for their structural design and the materials used are discussed. Application of advanced technology, in particular the use of light alloys, stainless steel, plastics, adhesives, etc., for railroad car construction is surveyed. Examples of realization for the Circumvesuviana Railroad and for the Milan and Rome subways are presented. [Italian]

Martinelli, M (Breda Costruzioni Ferroviario, Italy) Ricco, N *Ingegneria Ferroviaria* Vol. 28 No. 10, Oct. 1973; ACKNOWLEDGMENT: EI (EIX740604260); ORDER FROM: ESL, Repr PC, Microfilm

13 057431 ELECTRO-ACOUSTICAL EQUIPMENT FOR THE TRAINS AND STATIONS OF THE MUNICH UNDERGROUND

[Besehallungsanlagen fuer die Zuege und die Bahnhoeefe der Muenchener U-Bahn]. Siemens has supplied and, to a large extent, also installed the electro-acoustical equipment for the trains and the 17 stations of the first section of the Munich Underground. The train equipment includes loudspeakers for internal and external announcements. The excellent quality attainable by the system is exemplified by graphs of the sound distribution in the interior of the train and on the platforms and by frequency analyses of the loudspeaker transmissions in relationship to the existing background noise. [German]

Bauersachs, R Gerland, H *Siemens Review* Vol. 48 No. 1, Jan. 1974; ACKNOWLEDGMENT: EI (EIX740601949); ORDER FROM: ESL, Repr PC, Microfilm

13 057440 FINNISH RAILROADS AND PUBLIC TRANSPORT IN HELSINKI

[Le ferrovie finlandesi ed i trasporti pubblici di Helsinki]. Recently, the Finnish railways started the electrification of some lines starting from Helsinki, on which there is an intense suburban traffic. One of the main reasons which induced the VR to make this decision was that of limiting the importance of fuels of foreign origin and to make a better use of national power resources deriving from the possibility of exploiting, with hydroelectric power stations, the numerous lakes and rivers which cover about a tenth of the area of the country. In the Helsinki Region, for essential connections not served by VR suburban lines, two metropolitan lines will be constructed, with advanced characteristics, on which the use is envisaged of trains with automatic drive. The street car network of Helsinki, made up of 9 lines, will be maintained and modernized with the introduction, among other things, of 40 modern articulated cars equipped with static speed regulation. Details of the the Finnish RR development program are given. [Italian]

Marini, R Ziccardi, G *Ingegneria Ferroviaria* Vol. 29 No. 1, Jan. 1974, pp 21-33, 13 Ref.; ACKNOWLEDGMENT: EI (EIX740605344); ORDER FROM: ESL, Repr PC, Microfilm

13 057725 FEDERAL GERMANY'S RAPID-TRANSIT AND TRAMWAY DEVELOPMENT INCLUDING THYRISTOR-CONTROL TECHNIQUES.

Duweg and Siemens joint development for Cologne is B-type lightweight articulated car for 100 km/h running with electric braking while Hanover will initiate its tram-subway operation next year with ten existing cars converted and 100 cars on order incorporating AEG, Kiepe and Siemens electrical equipment, the latter having been entrusted with the project work in co-operation with Ustra, the local transport undertaking.

Meier, GA *Rail Engineering International* Vol. 4 No. 5, June 1974, p 216; ORDER FROM: ESL, Repr. PC, Microfilm

13 057727 FRENCH MONOMOTOR BOGIE FOR METRO LINES.

A design incorporating a single traction motor located within a large roller-ring supporting the body provides good accessibility together with a straightforward "H" frame using rubber primary-and air-secondary suspension in the interests of minimizing maintenance.

Grevisse, L *Rail Engineering International* Vol. 4 No. 5, June 1974, p 226; ORDER FROM: ESL, Repr. PC, Microfilm

13 057729 A REPORT ON PROGRESS IN THE DEVELOPMENT OF THREE-PHASE TRANSMISSION FOR RAIL TRACTION.

Trials as direct electric traction units with the asynchronous motor by DB and SBB, a motor coach on CTS Cleveland, USA, and a USSR locomotive conversion together with an order for six diesel-electrics of 2,500 hp from SBB are summarized and techniques briefly reviewed.

Teich, W (Brown Boveri) *Rail Engineering International* Vol. 4 No. 5, June 1974, p 235; ORDER FROM: ESL, Repr. PC, Microfilm

13 057873 EXPERIMENTAL TESTS ON VIBRATION-PROOF TRACKS AND THEIR EFFECTS. To minimize vibrations and noise from subway operation under a primarily residential area, a new line incorporated test sections of rubber mats under crushed-stone ballast, neoprene strips in a cast concrete roadbed, and vibration-proof asphalt concrete under crushed stone. The mats proved most effective but would invite greater settling of the track, complicating maintenance. The concrete slab, while more expensive, would minimize maintenance but would be costly to restore once performance had deteriorated. The vibration-proof asphalt concrete was not effective.

Fujiwara, T Nakamura, S (Teito Rapid Transit Authority, Japan) *Permanent Way* Vol. 15 No. 3, No. 56, pp 20-28; Also available through Japan Railway Civil Engineering Association.; ACKNOWLEDGMENT: Permanent Way; ORDER FROM: ESL, Repr. PC, Microfilm

13 057884 ASSESSMENT OF DESIGN TOOLS AND CRITERIA FOR URBAN RAIL TRACK STRUCTURES. VOLUME I. AT-GRADE TIE-BALLAST TRACK. The report presents the results of a critical review of the technical factors which govern the design and performance of at-grade tie-ballast track for urban rail systems. The assessment of current design practice is based on a review of the literature and discussions with experienced track design personnel. The evaluation includes design loads and the criteria for selecting rail size, tie size and spacing, ballast depth, and subgrade parameters. The major track problems identified were rail joints, rail wear and noise on curves, rail fasteners, and rail corrugation. Detailed technical evaluations were made to determine those areas where the track design procedures are inadequate. The report includes detailed information for the engineering design of track and recommendations for both short and long-range program plans for future research pertaining to the improvement of track performance.

Prause, RH Meacham, HC ; Battelle Columbus Laboratories Final Rpt. Apr. 1974, 247 pp; See also Volume 2, PB-233017. RRIS #012656.; Contract DOT-TSC-563; ACKNOWLEDGMENT: NTIS (PB-233016/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233016/5, DOTL NTIS

13 057885 ASSESSMENT OF DESIGN TOOLS AND CRITERIA FOR URBAN RAIL TRACK STRUCTURES. VOLUME II. AT-GRADE SLAB TRACK. This report presents the results of a critical review of the technical factors which govern the design and performance of at-grade slab track for urban rail systems. The assessment of current design practices is based on a review of the literature and discussions with experienced track design personnel. The evaluation includes descriptions of slab structures now in use in four countries, followed by review of design and analysis procedures used to characterize the subgrade and its support characteristics; the reinforced concrete slab itself, and the subgrade-support system. With a few exceptions, most of the work reported in the literature is based on highway or runway applications, where the mechanism of load transfer into the slab is completely different than in a rail support slab. Further research on the mechanisms of load

transfer from rail fasteners into a reinforced concrete slab is needed, and the newly developed finite element approach appears well-suited.

Meacham, HC Prause, RH Waddell, J ; Battelle Columbus Laboratories Final Rpt. Apr. 1974, 101p; See also Volume 1, PB-233016.; Contract DOT-TSC-563; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-233017/3, DOTL NTIS

13 071794 BOEING'S STATE-OF-THE-ART CAR: THE BIG TEST BEGINS IN NEW YORK. Two State-of-the-Art Cars (SOAC) operating on New York's Eighth Avenue subway line were produced as vehicles with an overall length of 74 ft. 8 in. and a truck center distance of 54 feet. The lightweight SOAC truck has a cast alloy-steel frame isolated from the axles by rubber-chevron primary springs which eliminate metal-to-metal contact between rail and carbody. The air-bellows secondary springing controls carbody leveling as well as further isolating rail-generated noise. Each truck is fitted with two 175-hp DC traction motors driving through double-reduction helical gears and elastomeric couplings.

Houser, F *Railway Age* Vol. 175 No. 11, June 1974; ACKNOWLEDGMENT: EI (EIX740803407); ORDER FROM: ESL, Repr PC, Microfilm

13 071812 CHOPPER CONTROL EQUIPMENT WITH REGENERATIVE BRAKE SUPPLIED TO TORONTO TRANSIT COMMISSION. An experimental conversion of 6 conventional resistor-controlled subway cars to chopper control was made. The 2-phase 600 v dc chopper equipment is capable of controlling eight 86 kw traction motors (per two cars) and provides 65% weak field controlling regenerative braking. All major components are designed to withstand severe service conditions in temperatures as low as -30 C. Computer simulation indicates that electric cars using this control system consume about 30% less power than resistor-controlled cars.

Konno, N (Mito Works) Tsuzuki, Y Narita, H *Hitachi Review* Vol. 23 No. 5, 1974; ACKNOWLEDGMENT: EI (EIX740702572); ORDER FROM: ESL, Repr PC, Microfilm

13 071843 ATA RAIL TRANSIT CONFERENCE HELD IN SAN FRANCISCO, CALIFORNIA ON APRIL 14 AND 16, 1974. CAR EQUIPMENT SESSIONS. PAPERS. Two of the papers concern the BART maintenance philosophy and their scheduled and unscheduled maintenance, rail vehicle inspection, diagnostic procedures and vehicle warranties as well as personnel training and tools and materials. The paper by Jeffrey Mora discusses the AC motor versus D.C. motor demonstration project conducted on three Cleveland Transit System rail cars. Mr. Lawson discusses a current study of the use of a kinetic energy flywheel as an efficient energy storage system and his intention to demonstrate this system in San Francisco Muni electric trolley coaches. The paper by J. R. Vollmar discusses the merits, costs and problems of electric locomotive versus multiple unit electric trains in both commuter and inter-city service.

Lawson, LJ Presho, WJ Venturato, A Mora, JG Vollmar, JR ; American Transit Association ATA/RT-74/1, Aug. 1974, 74p; Prepared by Lockheed Missiles and Space Co., Inc., Bay Area Rapid Transit District, Urban Mass Transporta-

tion Administration, and Louis T. Klauder and Associates. Paper copy also available in set of 3 reports as PB-234 823-SET, PC\$12.00.; ACKNOWLEDGMENT: NTIS (PB-234824/1); ORDER FROM: NTIS, Repr. PC, MICROFICHE; PB0234824/1, DOTL NTIS

13 071994 SUBURBAN TRAINS USING THYRISTORS [Rames de banlieue a thyristors]. The composition of suburban trains is presented from the viewpoint of utilization criteria which are prevalent in Switzerland in order to meet the requirements of public transportation in the suburbs on existing railroad networks. The possibility of achieving improved performance is considered. Modern electric equipment incorporating thyristors is described. The concept of electronic control and further extensions are discussed. [French]

Schaffner, JC (Ateliers de Secheron, Switzerland) *Association Suisse des Electriciens Bulletin* Vol. 65 No. 5, 5 Ref; ACKNOWLEDGMENT: EI (EIX740900404); ORDER FROM: ESL, Repr PC, Microfilm

13 072005 TRACKED TRANSPORT SYSTEMS OF THE FUTURE: STATE-OF-THE-ART AND DEVELOPMENT IN EUROPE IN 1973 [Spurgebundene Verkehrssysteme der Zukunft Stand und Entwicklung in Europa 1973]. The report gives an overview of the existing tracked transport systems and of the techniques available. It outlines the state of development of technical components. It reviews planning and research in Germany and in 15 other European nations and also studies undertaken by European and international organizations. The report concludes that by the end of the century a tracked high efficiency rapid transport system will be an economic and social necessity in Europe. Such a system could be based on several technical solutions, specifically on the wheel-on-track system, air cushion or magnetic levitation. It is very important that European nations collaborate rather than compete in the research for the best technical and economical solutions. Planning should start immediately for the anticipated future European structure of population and economy. The network for a future high efficiency rapid transport system should be determined. Projections for passenger and freight transport in such a network should be made and speed limits should be determined. [German]

Ministry of Transport, West Germany A8/16.50.10-F, Oct. 1973, 45 pp; ACKNOWLEDGMENT: TSC; ORDER FROM: Ministry of Transport, West Germany, Bundesminister fuer Verkehr (BMV), Bonn, West Germany Repr. PC

13 072047 INTER-AIRPORT CONNECTION CGN-DUC WITH A HIGH-EFFICIENCY RAPID TRANSIT SYSTEM [Flughafenverbindung CGN-DUC mit einer Hochleistungsschnellbahn]. The report projects the demand for a high-efficiency rapid transit system (HSB) between the airports of Cologne (CGN) and Dueseldorf (DUC) for 1980 and compares it to the demand of 1968. The projection is based on the existing structure of the airport access and may have to be adjusted when new systems are introduced. Investments and costs of a high efficiency rapid transit access (HSB) are calcu-

lated. A table gives travel time for the airport access. [German]

Kilian ; Messerschmitt-Boelkow-Blohm GmbH July 1973, 11 pp, 1 Tab., 1 Ref.; ACKNOWLEDGMENT: TSC; ORDER FROM: Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany

13 072444 PREDICTION AND CONTROL OF RAIL TRANSIT NOISE AND VIBRATION. A STATE OF THE ART ASSESSMENT. As systems manager for the Urban Mass Transportation Administration's Rail Supporting Technology Program, the Transportation Systems Center has undertaken research in rail transit noise abatement. As part of this effort, this report contains the results of a critical review of current technology for the prediction and control of urban rail transit noise and vibration, with primary emphasis on the parameters affecting propagation paths. Specifically included are tools for the prediction of wayside noise and vibration adjacent to both at-grade and elevated transit track, groundborne noise propagation from subway tunnels, and noise in cars and in stations. In addition, several noise and vibration control techniques are evaluated including resilient rail fasteners, floating slabs, noise barriers, elevated structure enclosures, structural damping, and acoustical treatment of stations and tunnels. Specific recommendations are made for areas requiring further research and development. Two of these areas, elevated structure noise and groundborne vibration from tunnels, have been selected for continued investigation under this contract.

Manning, JE Cann, RG Fredberg, JJ; Cambridge Collaborative, Incorporated, (DOT-TSC-UMTA-74-6) Intm Rpt. UMTA-MA-06-0025-74-5, Apr. 1974, 254 pp; Contract DOT-TSC-643; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC

13 072449 SUPPRESSING NOISE AND VIBRATION IN THE SUBWAY. With extensions totalling 8.5 miles due for completion by 1977, partly through environmentally-sensitive areas along the route of the abandoned Spadina Expressway, Toronto Transit Commission acknowledges the need for continuing research to fill gaps in existing knowledge about noise and vibration problems. TTC has examined these in detail, and in many cases successful solutions have been developed to meet standards set by the Institute for Rapid Transit.

Murray, RJ (Toronto Transit Commission) *Railway Gazette International* Vol. 130 No. 9, Sept. 1974, pp 337-340, 4 Fig., 3 Phot., 4 Ref.; ORDER FROM: XUM, Repr. PC

13 072459 INITIAL CORROSION SURVEY OF THE BAY AREA RAPID TRANSIT SYSTEM. The 75-mile (120-km) Bay Area Rapid Transit System has a dc traction power supply that uses the continuously welded steel running rails for its negative current return. The rails are mounted on insulating fasteners to minimize leakage current. However, high values of stray current have been measured during the initial operation of the system. Testing has demonstrated that the negative return grounding at traction substations and its interconnection with other grounding has been the major cause of stray earth currents. An alternate method of negative return grounding through diodes has been tested

and is being installed. The diodes block exchange currents, but allow leakage and fault current return to the traction rectifiers.

Transportation Research Record No. 500, 1974, pp 45-49, 2 Fig. ORDER FROM: TRB, Repr. PC

13 072476 THE BART CAR SYSTEMS AND MAINTENANCE PHILOSOPHIES. This paper briefly reviews the propulsion, auxiliary electrical and miscellaneous electrical systems selected for use on the San Francisco Bay Area Rapid Transit cars. It also discusses the general maintenance philosophies and activities of the Rolling Stock and Shops Division as they were anticipated for full BART system operation.

Van Eck, RA (South Broward Transit) Grief, N (Bay Area Rapid Transit District) *IEEE Transactions on Industry Applications* Vol. IA10 No. 5, Sept. 1974, pp 353-359, 4 Fig, 1 App.; ACKNOWLEDGMENT: IEEE Transactions on Industry Applications; ORDER FROM: ESL, Repr. PC, Microfilm

13 072477 THE DESIGN AND OPERATION OF THE BART POWER SYSTEM. This paper contains a general description of the electrical power distribution facilities serving the Bay Area Rapid Transit system. Included are the systems supplying power to both the fixed facilities and the traction vehicles, but concentrating on the latter. Emphasis is placed on features that provide reliability and continuity of service.

Miller, RH (Bay Area Rapid Transit District) *IEEE Transactions on Industry Applications* Vol. IA10 No. 5, Sept. 1974, pp 560-566, 1 Fig.; ACKNOWLEDGMENT: IEEE Transactions on Industry Applications; ORDER FROM: ESL, Repr. PC, Microfilm

13 072497 RAPID TRANSIT--THERE'S AN ELECTRIC BILL TO PAY. This paper presents an argument for total system planning, prior to introducing new vehicles into a rapid transit system. The electric bill can be overlooked in planning, but soon becomes a shocking reality. Benefits and detriments to the electric system through operation of vehicles with various characteristics is discussed.

Davis, JR (Gibbs and Hill, Incorporated) ; Institute of Electrical and Electronics Engineers, (74 CHO 833-41A) Proceeding Part 1, 1974, pp 315-317; This paper was presented at the Ninth Annual Meeting of the IEEE Industry Applications Society, Pittsburgh, Pennsylvania, 7-10 October 1974; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 072552 PLASTIC MOULDED-SLEEPERS APPLIED TO AN UNDERGROUND RAILWAY TO SUPPRESS NOISE. The Vienna U-bahn system is laid with Voest plastic sleepers embedded in a solid concrete formation incorporating a glass-fibre mat to minimize vibration and noise transmission. Anticombustion and inherent electrical insulation properties are advantageous to Metro lines.

Rail Engineering International Vol. 4 No. 7, Sept. 1974, pp 340-342, 3 Fig., 4 Phot. ORDER FROM: ESL, Repr. PC, Microfilm

13 072655 DIRECTIONS IN TRACK STRUCTURE RESEARCH. This paper presents a survey of contemporary problems in track structure

technology and the programs of research and development addressing these problems. It reports current and anticipated investigations into aspects of the service environment of railroad track structures, the mechanics of track structure degradation, the fatigue and fracture of rails, the development of rational design and maintenance techniques, the improvement of track components, and the development of non-conventional, low maintenance track structures for application to high speed high density service. Efforts involved with both the fundamentals of track mechanics, and the design of improved structures for urban rapid transit applications, as well as mainline railroad use are included.

McConnell, DP (Transportation Systems Center) American Society of Mechanical Engineers 74-WA/APM-24, July 1974, 9 pp, 1 Tab., 47 Ref. Contributed by the Applied Mechanics Division of the American Society of Mechanical Engineers for presentation at the winter Annual Meeting, 17-22 November 1974, New York, New York.; ACKNOWLEDGMENT: ASME; ORDER FROM: ASME, Repr. PC

13 072672 PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1973-1974 REPORT OF SURVEY COMMITTEE) CARS AND EQUIPMENT. This survey covers some of the major developments in freight and people transportation equipment made public in the last calendar year. Because of the oil embargo, the increasing demand for power, and more stringent pollution laws, the demand for low sulfur coal out of the west is in great demand. Hence, there is a large need for cars to haul coal. Because of large loss and damage claims in the automotive industry, new equipment for transporting automobiles that is vandalism-and damage-free was developed. In the people transport area, new developments, mostly funded by the Department of Transportation (D.O.T.), are continuing to materialize.

Manos, WP (Pullman-Standard) ; American Society of Mechanical Engineers No. 74-WA/RT-10, June 1974, 9 pp, 30 Fig.; This paper was contributed by the Rail Transportation Division of ASME for presentation at the Winter Annual Meeting, 17-22 November 1974, New York, New York.; ACKNOWLEDGMENT: ASME; ORDER FROM: ASME, Repr. PC

13 072762 LIGHT-WEIGHT TWIN-CAR ARTICULATED-SETS FOR TYNE AND WEAR 1,500-V METRO. Compact 270-passenger capacity aluminum-clad sets designed for multiple-operation up to three units mounted on Duwag bogies with leading and trailing motored and intermediate incorporating a three-ring ball-race articulation with wide vestibule-connection between bodies. Metro-Cammell designed in conjunction with GEC and Siemens for speeds up to 80 km/h with Westinghouse Westcode control and Scharfenberg automatic couplers incorporating all connections to ensure manual-free making-up of multiple formations. Dynamic braking and spring-operated disc brakes with magnetic track brakes for emergency application.

Rail Engineering International Vol. 4 No. 8, Oct. 1974, pp 371-374, 2 Fig., 2 Phot. ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: ESL, Repr. PC, Microfilm

13 072764 RUNNING GEAR DESIGN INCORPORATING RUBBER SPRINGS. The use of rubber springs and components at primary and secondary suspension stages has spread very rapidly, notably with city rolling stock such as underground railways and tramways, and also with industrial, shunting and main line locomotives. Body-supporting airsprings are used in conjunction with primary rubber suspensions with underground, city and suburban coaches and to a lesser extent, with main line coaches. The reasons are to a great extent because of the exceptionally low, if any, demands as far as maintenance is concerned, combined with reduced noise levels, the absorption of high-frequency oscillations and the ability to implement the desired characteristics in all three planes.

Reed, AJ (Dunlop Limited) Koffman, JL *Rail Engineering International* Vol. 4 No. 8, Oct. 1974, pp 361-368, Figs.; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: ESL, Repr. PC, Microfilm

13 072794 A BIBLIOGRAPHY ON THE DESIGN AND PERFORMANCE OF RAIL TRACK STRUCTURES. This bibliography was prepared as part of the Rail Supporting Technology Program being sponsored by the Rail Programs Branch of the Urban Mass Transportation Administration. It is based on the reference material that was used to evaluate the technical factors which govern the design and performance of at-grade track structures for urban rail systems. While most of the reference material that has been included is directly related to track used for railroad, rail rapid transit and light rail transportation, there are some additional references on related topics such as rail vehicle dynamics, soil mechanics, stress analysis, etc. However, this bibliography does not include a comprehensive review of these related topics. This survey includes much of the published literature on track design, track loading, ballast, wood and concrete cross ties, rail and rail fasteners. It also includes considerable material on track problems such as rail wear corrugation, rail defects, rail joints and track degradation. The formal literature search for this bibliography covered the time period from about 1963 to 1973. The principal sources were the National Technical Information Service (NTIS) file of government reports, Engineering Index, and the Applied Science and Technology Index. Earlier references were identified from the Railroad Research Information Service (RRIS) computerized data base and bibliographies prepared by the RRIS and the Association of American Railroads.

Prause, RH Pestel, HC Melvin, RH; Battelle Columbus Laboratories, (DOT-TSC-UMTA-74-11) Final Rpt. UMTA-MA-06-0025-74-7, Sept. 1974, 142 pp; Individual abstracts from this bibliography have been selected under RRIS numbers 072794-072851.; DOT-TSC-563; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC; PB-238127/5SL, DOTL NTIS

13 072853 HEATHROW EXTENSION BRINGS LONGER TUBE CARS TO THE PICCADILLY LINE. Delivery of the first cars of London Transport's 1973 tube stock heralds a large-scale reshuffle of cars between lines when the Heathrow extension is completed in 1976 and the Fleet line opens in 1977.

Railway Gazette International Vol. 130 No. 10, Oct. 1974, pp 398-399, 1 Fig. ACKNOWLEDGMENT: 68

Railway Gazette International; ORDER FROM: XUM, Repr. PC

13 080072 THE IMPORTANCE OF TIME SPENT AT STATION STOPS. The demand for high schedule speeds must be met by ensuring effective passenger interchange at stations and circulation within the coaches. To facilitate this, doors should be provided every 4,000 to 5,500 mm. These should offer a 1,250 to 1,300 mm wide passage. A space of 350 to 375 mm should be provided between door edge and partition for standing passengers, who will thus be moved out of the path of entering or leaving passengers. The use of swing-sliding (ss) doors will permit a simpler and lighter body structure and reduce draughts and at the same time improve noise insulation.

Koffman, JL *Rail Engineering International* Vol. 4 No. 6, July 1974, 3 pp, 1 Fig.; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: ESL, Repr. PC, Microfilm

13 080078 DESIGN AIMS AND SCOPE FOR RAPID-TRANSIT SYSTEMS [Aufgaben und Möglichkeiten des Designs für S-Bahnen]. Among the manifold tasks of the DB's Design Centre is the furnishing of ideas for the best passenger-oriented equipment of rapid-transit rail vehicles, and also proposals concerning the construction of the transit system as a whole. The work of the Design Centre is described. [German]

Radlbeck, K *Eisenbahntechnische Rundschau* Vol. 23 No. 7/8, July 1974, pp 313-317, 7 Fig., 2 Ref.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Hernichel und Dr. Strauss, Darmstadt, West Germany Repr. PC

13 080082 THE "COLOGNE" URBAN SERVICE CAR--A MODERN UNDERGROUND RAILWAY VEHICLE [Der Stadtbahnwagen Typ Köln--ein modernes U-Bahn Fahrzeug]. The "Cologne" urban service car was developed by DUWAG for new underground and urban railways, and can also be used on ordinary tramway systems. The article reports on the planning concept and design of this vehicle. [German]

Brand, W *Eisenbahntechnische Rundschau* Vol. 23 No. 9, Sept. 1974, pp 339-346, 8 Fig., 2 Ref.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Hernichel und Dr. Strauss, Darmstadt, West Germany Repr. PC

13 080099 BAY AREA RAPID TRANSIT SYSTEM (BART). During the activation of the dc-powered commuter train system in the San Francisco Bay Area, stray current has affected many substructures. These problems and their solutions are discussed by operators of transit system facilities, underground electric facilities, gas distribution system, underground telephone cables and petroleum products transmission pipelines.

Bomar, HE (Pacific Telephone and Telegraph Company) Dean, RO Hanck, JA Orton, MD Todd, P (Pacific Gas and Electric Company) *Materials Performance* Vol. 13 No. 12, Dec. 1974, pp 9-17, 23 Fig., 1 Tab.; ACKNOWLEDGMENT: Materials Performance; ORDER FROM: ESL, Repr. PC, Microfilm

13 080249 SOAC (STATE-OF-THE-ART CAR) DEVELOPMENT PROGRAM. VOLUME I. DESIGN, FABRICATION AND TEST. Design, fabrication and test of two new State-of-the-Art Cars (SOAC) whose objective is to demonstrate the current state-of-the-art in rail rapid transit vehicle technology were carried out. Passenger convenience and operating efficiency were primary goals. The SOAC features a DC-DC chopper in the propulsion system, separately excited DC traction motors, all-steel construction (with molded fiberglass ends), and vandal-resistant and fire-retardant materials in the interior. This volume, Volume 1 of a two-volume report, covers the development program through engineering testing; including data on design and performance, propulsion and braking, subsystems, test program, mockup and demonstration programs, and economic analysis.

Boeing Company, Urban Mass Transportation Administration Final Rpt. D174-10031-1, Apr. 1974, 193 pp; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS (PB-235703/6ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235703/6ST, DOTL NTIS

13 080300 THE INFLUENCE OF RAILS ON TRAIN NOISE. This paper presents an evaluation of the dynamic interaction of steel wheels on steel rails and an estimation of the contribution of sound radiated by rails to total train noise levels. The interaction is modeled as a random process, for which dynamic forces at the wheel/rail interface are related to wheel and rail impedances and roughness wavenumber spectra. Roughness spectra, estimated from rail vibration data, are found to be proportional to the fourth root of the wavenumber. Comparing analytical predictions with measured data shows that the rail can be adequately modeled as a beam on an elastic foundation. Modeling the wheel as a simple mass reveals that at intermediate frequencies the wheel impedance is much higher than the rail impedance. Therefore, rail vibration levels are expected to be substantially higher than levels of wheel vibration. Analytical models of rail radiation, confirmed by experimental data acquired by shaking a rail in a reverberant chamber, show that rail radiation is efficient above 500 to 1000 Hz. When these models and data are combined, it is found that rail radiation may dominate at mid-and high frequencies (between 500 and 5000 Hz), but it is less important than other sources outside of these frequency regimes.

Bender, EK Remington, PJ (Bolt, Beranek and Newman, Incorporated) *Journal of Sound and Vibration* Vol. 37 No. 3, 1974, pp 321-334, 10 Fig., 7 Ref.; ACKNOWLEDGMENT: Journal of Sound and Vibration; ORDER FROM: ESL, Repr. PC, Microfilm

13 080359 MULTIPLE CAR PERFORMANCE, AC PROPULSION PROJECT. In 1971 the Cleveland Transit System received a grant contract from the Department of Transportation's Urban Mass Transportation Administration to test, demonstrate and evaluate a solid state AC propulsion system on three rapid transit cars (Project OH-06-0006). The AC propulsion system was developed by the Westinghouse Air Brake Division, Westinghouse Air Brake Company (WABCO), Wilmerding, Pa. This report is one of a series on various aspects of the project. To demonstrate general performance and applica-

bility of the propulsion system, an on-board computer controlled data acquisition system was used to collect performance data. The data were reduced, analyzed, and plotted by computer. This report presents the performance data collected during the multiple car operation. The general performance characteristics are displayed by means of graphs plotted by computer from the raw data. Detailed descriptions of the data system and single car performance results are reported separately in UMTA-OH-06-0006-73-1 and UMTA-OH-06-0006-73-3 respectively.

Cymbor, WP Smith, RD ; Cleveland Transit System, (OH-06-0006) Tech. Rpt. UMTA-OH-06-0006-74-2, Mar. 1974, 49 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC

13 081388 CHOOSING THE RIGHT TRACK FOR URBAN CONDITIONS. Several conurbations in South America, India and the Far East are building or planning metros to cope with a huge rise in population. The author draws on five year's experience as Deconsult's chief consulting engineer to the Sao Paulo metro--which opened last September--to present and discuss technical and economic criteria for the choice of track design and components, and for the design and installation of concrete slab track with vibration suppression.

Hehenberger, W *Developing Railways* 1975, 7 pp, 6 Ref.; ACKNOWLEDGMENT: Developing Railways; ORDER FROM: XUM, Repr. PC

13 083028 A NEW BRITISH LIGHT-WEIGHT SINGLE-ARM PANTOGRAPH. Light-weight vehicle-construction is the logical order of the day in the interests of reducing wear and tear, and energy consumption in particular. This light-weight pantograph discussed has been developed for the lighter urban and suburban systems but has a ready potential for conventional railway suburban lines and speeds above those for which it was originally designed.

Dixon, DL *Rail Engineering International* Vol. 4 No. 9, Nov. 1974, pp 425-428, Figs.; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: ESL, Repr. PC, Microfilm

13 083040 GETTING THE BUGS OUT OF BART. With the full 114-km network now in operation, the Bay Area Rapid Transit is still struggling to bring signaling and car reliability problems under control so that planned levels of service can be achieved this year. The author explains what went wrong and how the problems are being tackled, but he also points out that BART has established high aesthetic and comfort standards which set the pace for the second generation of transit systems in the U.S.

Middleton, WD *Railway Gazette International* Vol. 131 No. 1, Jan. 1975, pp 14-17, 2 Phot.; ORDER FROM: XUM, Repr. PC

13 083041 NEW YORK SUBWAY TRIES OUT FLYWHEEL ENERGY STORAGE. Backed by a DOT grant, Garrett AiResearch has developed a flywheel energy storage system which is being tried out in New York. NYCTA's traction supply is becoming overloaded, but energy savings through choppers and regenerative braking were not considered to be a technically satisfactory solution.

Railway Gazette International Vol. 131 No. 1, Jan. 1975, pp 23-24, 1 Fig., 1 Phot. ORDER FROM: XUM, Repr. PC

13 083926 COACH DESIGN FOR THE HELSINKI UNDERGROUND. After more than 20 years of planning, an underground system will be opened in Helsinki in 1978. In 1972, a short line was constructed, with six coaches for experiments. This article describes an analysis of these coaches from the point of view of ergonomics. A travelling experiment was organized, designed to simulate the final travelling situation. After the experiment the subjects filled out a questionnaire. During the trip the behavior of the subjects and their moving in and out was observed by two TV recorders and two film cameras.

Saari, JT *Applied Ergonomics* Vol. 5 No. 3, Sept. 1974, pp 149-152; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL, Repr. PC, Microfilm

13 084707 QUIET PROGRESS OF A RAILROAD WHEEL. The problem of subway car wheels screeching along the tracks is receiving practical attention by the use of a new wheel. Developed specifically by Standard Steel, it can reduce noise levels above 90 decibels, which can be harmful to human ears. Slated to be used initially on standard light rail vehicles in Boston and San Francisco, the "Acousta Flex" is the most effective design so far in eliminating wheel-track interface, the source of the noise. Patterned after a wheel designed for BART, it is composed of an aluminum center, which lessens its weight, and a steel tire which absorbs the wear and can be replaced when fully worn. It also incorporates acoustic features which suppress the noise. The design of the Acousta Flex emerged after much testing, and other research still continues for other noise-reducing wheels. One such wheel is the Penn Cushion Wheel, which has a special rubber cushion design. Noise levels depend on many factors, and the amount of the reduction varies. With this design, it is usually between 20 and 50 percent.

Metropolitan Vol. 71 No. 2, Mar. 1975, pp 10-12, 1 Fig., 4 Phot.

13 090118 REVENUE SERVICE OPERATION, 1973. AC PROPULSION PROJECT. This report discusses the integration of three AC powered cars into the Cleveland Transit System's revenue operation during 1973. The year of operation was divided into two distinct operating periods. In the first period, January through June, the three AC cars were not compatible with the remaining Airporter fleet. During the second period, July through December, the three AC cars were modified in such a manner as to render them compatible with the DC cars and were operated the remainder of the year in mixed service.

Smith, RD Skantar, ET ; Cleveland Transit System, Urban Mass Transportation Administration, Westinghouse Air Brake Company, (UMTA-OH-06-0006) Tech Rpt. Apr. 1974, 79p; Prepared in cooperation with Westinghouse Air Brake Co., Wilmerding, Pa. Westinghouse Air Brake Div.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238568/OST, DOTL NTIS

13 090658 URBAN RAIL SUPPORTING TECHNOLOGY PROGRAM FISCAL YEAR 1974. YEAR END SUMMARY. Major areas include program management, technical support and application engineering, facilities development, test and evaluation, and technology development. Specific technical discussion includes track measurement systems; UMTA facilities development at the DOT High Speed Ground Test Center, Pueblo, Colorado; rail car test and evaluation; instrumentation for data acquisition and processing; noise abatement technology; tunneling; and car crashworthiness studies.

Madigan, RJ ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-7, Mar. 1975, 94 pp; See also PB-238 602.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241239/3ST, DOTL/NTIS

13 091889 STEEL WHEEL PLATE CRACKING. This document describes the results of an investigation into the cause of premature cracking on 28-inch reversed dish transit car wheels. Methods used in determining the operating thermal and track load stresses in the critical areas of a wheel are presented. The observations made on the cracked specimens all indicate that the cracks which formed were due to fatigue. The problem was resolved by specifying a new wheel plate thickness and also by machining and shot peening the plate surface.

Yontar, M ; Transit Development Corporation, Incorporated TDC/500-74/4, June 1974, 10 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241849/9ST, DOTL NTIS

13 092215 STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORTS. No Abstract.

Boeing Vertol Company, Urban Mass Transportation Administration Aug. 1974, 833 pp; Set includes PB-244 048 thru PB-244 052.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC; PB-244047-SET/ST, DOTL NTIS

13 092216 STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME I. COMPONENT TESTING. The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The overall objective is to enhance the attractiveness of rail transportation to the urban traveler by providing service that is as comfortable, reliable, safe and economical as possible. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. This document, Volume 1 of the SOAC Final Test Report, presents the test results of the component testing of the State-of-the-Art car. The purpose of these tests was to show compliance with the SOAC Detail Specification (NTIS PB-225 934). All component tests were conducted by the supplier of the applicable subsystems. An introduction, test procedures and results, and conclusions are presented. Appendices are titled: Propulsion, Dynamic Braking and Auxiliary Power Equipment; Truck Frame; Truck Bolster;

Windshield; Seat Strength; and Materials-Fire Resistance.

Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10024-1, UMTA-IT-06-0026-74-1, Aug. 1974, 291 pp; See also Volume 2, PB-244 048. Paper copy also available in set of 5 reports as PB-244 047-SET, PCS\$26.00.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244048/5ST, DOTL NTIS

13 092217 STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME 2. SUBSYSTEM FUNCTIONAL TESTING. The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing technology. Primary goals for the cars are passenger convenience and operating efficiency. This document, Volume 2 of the SOAC Final Test Report, presents the test results for the subsystem functional testing of state-of-the-art transit cars. The purpose of these tests was to show compliance with the SOAC Detail Specification (NTIS no. PB-222 147). After adjustments and changes where required, all subsystems met the requirements of the detail specification. Chapters of the report present instrumentation, test procedures and results, and conclusions. Items discussed in the chapter on test procedures and results are car body, lighting, wiring, equipment, main propulsion control and motor rotation, braking, propulsion auxiliaries, car weight, pantograph, air compressor, hostling panel, and visual.

Dunton, W ; Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10024-2, UMTA-IT-06-0025-74-3, Nov. 1974, 143p; See also Volume 1, PB-244 048, and Volume 3, PB-244 050. Paper copy also available in set of 5 reports as PB-244 047-SET, PCS\$26.00.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244049/3ST, DOTL NTIS

13 092218 STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME 3. ACCEPTANCE TESTING. The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. This document, Volume 3 of the SOAC Final Test Report, presents the test results for the vehicle acceptance testing of two state-of-the-art transit cars. Performance, ride quality, noise and electromagnetic interference (EMI) acceptance tests were conducted. Chapters contain a summary of test results, configuration, test equipment and instrumentation, and test procedures.

Brown, P; Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10024-3, UMTA-IT-06-0026-74-4, Apr. 1974, 284p; See also Volume 2, PB-244 049, and Volume 3, PB-244 051. Paper copy also available

in set of 5 reports as PB-244 047-SET, PCS\$26.00.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244050/ST, DOTL NTIS

13 092219 STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME 4. SIMULATED DEMONSTRATION TEST. The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art Car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. Simulated Demonstration Tests of the SOAC two-car train was conducted with the purpose to enhance the probability of trouble-free operation in the demonstrations for the riding public to be held in the cities of New York, Boston, Chicago, Cleveland, and Philadelphia. The demonstration profile was set up as a composite of the five demonstration city routes.

Gordon, T ; Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10024-4, UMTA-IT-06-0026-74-5, Oct. 1974, 50p; See also Volume 3, PB-244 050, and Volume 4, PB-244 052. Paper copy also available in set of 5 reports as PB-244 047-SET, PCS\$26.00.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244051/9ST, DOTL NTIS

13 092220 STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM FINAL TEST REPORT. VOLUME 5. POST REPAIR TESTING. The Urban Rapid Rail Vehicle and Systems Program is an integrated development program directed toward improving high speed, frequent-stop urban rail systems. The objective of the State-of-the-Art car (SOAC) is to demonstrate the best state-of-the-art in rapid rail car design, with two improved cars using existing proven technology. Primary goals for the cars are passenger convenience and operating efficiency. This document presents the test results for the Post-Repair Testing of the SOAC. The purpose of these tests was to show: (1) compliance with the SOAC Detail Specification (NTIS no. PB-222 147) following repairs to the Number 2 car damaged in an accident on August 11, 1973 at the DOT High Speed Ground Test Center, Pueblo, Colorado; and (2) to complete the Simulated Demonstration Testing (Volume 4) which had been interrupted by the accident. Chapters present configuration, instrumentation, test procedures, test results and conclusions.

Christiansen, G ; Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10024-5, UMTA-IT-06-0026-74-6, Dec. 1974, 65 pp; See also Volume 4, PB-244 051. Paper copy also available in set of 5 reports as PB-244 047-SET, PCS\$26.00.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244052/7ST, DOTL NTIS

13 092340 WHEEL/RAIL NOISE AND VIBRATION. VOLUME I: MECHANICS OF WHEEL/RAIL NOISE GENERATION. The final reports are reported of a project to develop

a basic understanding of urban transit wheel/rail noise control measures. Analytical models of impedance, response, radiation efficiency, and directivity of wheels and rails are presented and compared with field and laboratory measurements. Analytical formulas for the prediction of noise in the three general categories of wheel/rail noise- squeal, impact, and roar-are presented and verified by comparison with laboratory measurements as well as field measurements using a small steel-wheeled personal rapid transit vehicle on a test track. Volume one deals with the theory of wheel/rail noise generation.

Remington, PJ Rudd, MJ Ver, IL ; Transportation Systems Center, Urban Mass Transportation Administration, Bolt, Beranek and Newman, Incorporated Final Rpt. DOT-TSC-UMTA-75-1, UMTA-MA-06-0025-7510, May 1975, 210 pp; Prepared in cooperation with Bolt Beranek and Newman, Inc., Cambridge, Mass. See also PB-237 012, and Vol. 2, PB-244 515.; Contract DOT-TSC-644; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244514/6ST, DOTL NTIS

13 092341 WHEEL/RAIL NOISE AND VIBRATION. VOLUME II: APPLICATIONS TO CONTROL OF WHEEL/RAIL NOISE. The second volume of a two-volume report on urban transit wheel-rail noise control deals with the development of prediction formulas for wheel-rail noise, verification of these formulas by means of test vehicles operating on test tracks, techniques for the suppression of wheel-rail noise, and suggested testing procedures for improving control measures.

Remington, PJ Rudd, MJ Ver, IL ; Transportation Systems Center, Urban Mass Transportation Administration, Bolt, Beranek and Newman, Incorporated Final Rpt. DOT-TSC-UMTA-75-1-V2, UMTA-MA-06-0025-7511, May 1975, 169 pp; Prepared in cooperation with Bolt Beranek and Newman, Inc., Cambridge, Mass. See also PB-237 012 and PB-244 514.; DOT-TSC-64 4 AC KNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244515/3ST, DOTL NTIS

13 092463 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORTS. No Abstract.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center Jan. 1975, 824p-in 6V; Set includes PB-244 747 thru PB-244 752.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC; PB-244746-SET/ST, DOTL NTIS

13 092464 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME I. PROGRAM DESCRIPTION AND TEST SUMMARY. The six-volume report presents the technical methodology, data samples, and results of tests conducted on the SOAC on the Rail Transit Test Track at the High Speed Ground Test Center in Pueblo, Colorado during the period April to July 1973. The Test program comprises three areas: Vehicle testing,

ways and structures testing and track geometry measurement. The objective of the SOAC program is to demonstrate the current state-of-the-art in rail rapid transit vehicle technology, with passenger convenience and operating efficiency as primary goals. In this series, Vol. I contains a description of the SOAC test program and vehicle, and a summary of the test results; Vol. II, Performance Test data; Vol. III, Ride Quality Test data; Vol. IV, Noise Test data; Vol. V, Structural, Voltage, and Radio Frequency Interference Test data; and Vol. VI a description of the Instrumentation system used for performance, ride quality and structural testing.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-75-1, Jan. 1975, 88 pp; Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244747/2ST, DOTL NTIS

13 092465 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME II. PERFORMANCE TESTS. No Abstract.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-72-2, Jan. 1975, 160 pp; See also RRIIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244748/0ST, DOTL NTIS

13 092466 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME III. RIDE QUALITY TESTS. No Abstract.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-75-3, Jan. 1975, 250 pp; See also RRIIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244749/8ST, DOTL NTIS

13 092467 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME IV. NOISE TESTS. No Abstract.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-75-4, Jan. 1975, 125 pp; See also RRIIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244750/6ST, DOTL NTIS

13 092468 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME V. STRUCTURAL, VOLTAGE, AND RADIO FREQUENCY INTERFERENCE TESTS. No Abstract.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-75-5, Jan. 1975, 84 pp; See also RRIIS 03-095464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244751/4ST, DOTL NTIS

13 092469 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. FINAL TEST REPORT. VOLUME VI. SOAC INSTRUMENTATION SYSTEM. No Abstract.

Boeing Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-75-6, Jan. 1975, 117 pp; See also RRIIS 03-092464. Paper copy also available in set of 6 reports as PB-244 746-SET, PC\$28.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244752/2ST, DOTL NTIS

13 093346 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. The report reviews the third year's efforts of the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program. The objective of the Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. Accomplishments for the year ending June 1974 included the following: Completion of the review of BART data; completion of the SOAC test and simulated demonstration programs at the High Speed Ground Test Center, Pueblo, Colorado after repairing the damage to the SOAC cars resulting from a collision with a standing car on August 11, 1973; completion of SOAC demonstration runs on the NYCTA lines.

Boeing Vertol Company, Urban Mass Transportation Administration Ann. Rpt., 3 D174-10033-1, UMTA-IT-06-0026-74-1, July 1974, 125 pp; See also PB-224 141.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245310/8ST, DOTL NTIS

13 093468 EVALUATION OF THE WABCO AC PROPULSION SYSTEM. VOLUME 1. CTS/UMTA AC PROPULSION PROJECT. In 1971, the Cleveland Transit System received a grant contract from UMTA to test, demonstrate, and evaluate a WABCO solid state AC propulsion system on three rapid transit cars (Project OH-06-0006). The independent evaluation was performed by Transportation and Environmental Operations, TRW, Inc, Redondo Beach, Calif. This is the final project report. AC Pulse Width Modulation propulsion test data is evaluated to determine whether the advantages claimed for AC PWM propulsion were demonstrated. Retro-fit feasibility, AC/DC car compatibility, signal

compatibility, and electromagnetic interference are assessed. Factors related to the relatively undeveloped state of the AC system limit the specificity of the results and conclusions relative to their applicability to other transit properties in the future. Chapters present project objectives, project description, summary and conclusions, principal task evaluations, the AC/PWM propulsion system, and ancillary task evaluations. A bibliography is furnished.

Hoppe, CF ; Cleveland Transit System, Urban Mass Transportation Administration Final Rpt. UMTA-OH-06-0006-74-3, Sept. 1974, 211 pp; Paper copy also available in set of 2 reports as PB-245 388-SET, PC\$15.00.; Contract UMTA-OH-0006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; Repr. PC \$7.75, Microfiche\$2.25

13 093469 EVALUATION OF THE WABCO AC PROPULSION SYSTEM. VOLUME 2. RELATED REPORTS AND EXHIBITS. In 1971, the Cleveland Transit System received a grant contract from UMTA to test, demonstrate, and evaluate a WABCO solid state AC propulsion system on three rapid transit cars (Project OH-06-0006). The independent evaluation was performed by Transportation and Environmental Operations, TRW, Inc, Redondo Beach, Calif. This is the final project report. Measurements of wheel wear, window safety glazing, ride quality, and passenger reaction to the restyled car interiors and new AC propulsion system are discussed. Contents of this report are: experimental design description for the CTS/WABCO AC propulsion demonstration program; instrumentation assessment, AC propulsion project; life cycle cost analysis plan for the Cleveland Transit System AC propelled cars; passenger reaction to AC propelled restyled rapid transit cars; evaluation of safety glazing; survey of Cleveland Transit System rapid transit maintenance procedures and facilities; and, telephone influence factor measurements.

Hoppe, CF ; Cleveland Transit System, Urban Mass Transportation Administration Final Rpt. UMTA-OH-06-0006-74-4, Sept. 1974, 301 pp; Paper copy also available in set of 2 reports as PB-245 388-SET, PC\$15.00.; Contract UMTA-OH-0006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245390/0ST, DOTL NTIS

13 094184 ASSURED ENERGY RECEPTIVITY STUDY. The study objective was to determine the amount of heat removed from rapid transit tunnels by adding wayside resistors which would absorb braking energy that could not be absorbed by normal regeneration. In addition, preliminary design and cost data for the installation of the wayside resistors was to be provided. As the study progressed it was found that the addition of the wayside receptive devices provided a very marginal improvement over normal regeneration, and a substitution in the direction of the study made; the effect of improving the regenerative capability of the trains was measured rather than completion of the design for the wayside resistors.

Westinghouse Electric Corporation, Transit Development Corporation, Incorporated Final Rpt. TDC-AER-75-3, May 1975, 138 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247760/2ST, DOTL

NTIS

13 094317 ASSURED ENERGY RECEPTIVITY. A PROJECT OVERVIEW. The program successfully verified the technical feasibility of wayside resistors and produced two alternative preliminary designs for the mechanization of this concept. It was further verified that such wayside resistors for assured receptivity would have a very beneficial effect on ventilating and air-conditioning apparatus for subway stations and tunnels. However, cost-effectiveness analysis showed that in the general case wayside resistors are not cost-effective. The program results conclusively demonstrated that natural regeneration is highly cost effective in a system designed or adapted for effective functioning of regeneration to a naturally-receptive distribution network. Additionally, this phase of the program established the feasibility of an alternative wayside system utilizing flywheel motor generator sets (based on state-of-the-art apparatus) for energy storage and reuse.

Phelps, DR ; Transit Development Corporation, Incorporated Final Rpt. TDC/500-75/10, Sept. 1975, 30 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-246247/1ST, DOTL NTIS

13 094319 ASSURED ENERGY RECEPTIVITY STUDY. The objective of this study is to compare a conventional chopper-controlled train propulsion system without regeneration with two schemes of regeneration: (1) natural receptivity and (2) assured receptivity. A system that employs natural receptivity regeneration converts the kinetic energy of braking trains to electrical energy which is used to power onboard equipment. An assured receptivity regeneration system operates in a manner similar to a natural receptivity system, except that the excess electrical energy is stored, dissipated, or redistributed. The objective of this study is to quantify savings achieved in power consumption and cooling capacity by the use of a regenerative braking system, and compare them to the added costs of the electrical system for both natural and assured energy receptivity.

Transit Development Corporation, Incorporated, Parsons, Brinckerhoff, Quade and Douglas, Inc Final Rpt. TDC-AER-75-1, June 1975, 61 pp; Prepared by Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-246244/8ST, DOTL NTIS

13 094483 ENERGY STORAGE PROPULSION SYSTEM FOR RAPID TRANSIT CARS. SYSTEM DESIGN AND EQUIPMENT DESCRIPTION. When a transit rail car accelerates, it draws energy from a wayside electric power source; when it decelerates, the car must rid itself of this energy. Conventional rail cars dissipate this energy in the form of heat. This report describes a transit car propulsion system which will save much of this presently wasted energy by storing the car's kinetic energy in flywheels which are mounted below the car floor. The stored energy is then available for the subsequent acceleration of the car. Thus a significant reduction in energy usage is expected, along with a resultant reduction in subway tunnel heating. This energy storage propulsion system

has been installed on two New York City subway cars and will be subjected to an extensive series of tests. This report discusses the background and design approach and describes the technical features of the Energy Storage propulsion system.

Raskin, D Yutko, RT ; Metropolitan Transportation Authority of New York, Urban Mass Transportation Administration, New York State Department of Transportation, AiResearch Manufacturing Company, (UMTA-NY-06-0006) UMTA-NY-06-0006-75-1, Sept. 1975, 52 pp; Sponsored in part by New York State Dept. of Transportation, Albany, and AiResearch Mfg. Co., Torrance, Calif.; Grant DOT-UT-550; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249063, DOTL NTIS

13 094606 URBAN RAIL SUPPORTING TECHNOLOGY PROGRAM FISCAL YEAR 1975. YEAR END SUMMARY. The Urban Rail Supporting Technology Program is described for the 1975 fiscal year period. Important areas include program management, technical support and applications engineering, facilities development, test and evaluation, and technology development. New projects were started in all important areas. Specific technical discussion includes: Technical Support and Applications Engineering, the Crashworthiness of Vehicles, Advanced Concept Train, and Rail Transit System Costs; Facilities Development, Permanent Track Power, Catenary, Wheel truing Machine, and Track Scale; Test and Evaluation, State-of-the-Art Car testing and Revenue Service Demonstration, the testing of existing Revenue Service Vehicles, testing on the UMTA RTTT (Energy Storage Car Gas-Turbine/Electric cars, Standard Light Rail Vehicle, Track Geometry Measurement System, and General Vehicle Test System); Technology Development, Noise Abatement, and Tunneling.

Madigan, RJ ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 7 DOT-TSC-UMTA-75-28, UMTA-MA-06-0025-75-1, Dec. 1975, 85 pp; See also report dated Mar 75, PB-241 239.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250447/0ST, DOTL NTIS

13 095227 ALUMINUM CENTER WHEELS FOR RAPID TRANSIT RAIL SERVICE. This paper is a report on the experience with aluminum-center steel rim wheels used on the rapid transit cars on Bay Area Rapid Transit. These wheels are exhibiting some properties not noticed previously. Some particular problems encountered are cited and the measures taken to counteract their effect are described. It is intended as a preliminary report to the industry, with further data to follow, as they become available.

Van Overveen, JP (San Francisco Bay Area Rapid Transit District) Grosser, JF (Westinghouse Electric Corporation); American Society of Mechanical Engineers 75-RT-5, Apr. 1975, 8 pp, 11 Fig., 4 Tab., 1 App.; Contributed by the Rail Transportation Division of The American Society of Mechanical Engineers for presentation at the IEEE-ASME Joint Railroad Conference, San Francisco, California, April 15-17, 1975.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr. PC, Microfilm

13 095229 EVOLUTION OF A NEW TRUCK DESIGN FOR NEW YORK CITY TRANSIT AUTHORITY. This paper describes the specification, design, and testing required to develop the new lightweight air spring truck design for cars presently under construction for the New York City Transit Authority (NYCTA) under Equipment Contract R-46. The design is of particular significance since the trucks are part of the largest rail passenger car contract in history and for the largest rapid transit property in the world. This paper also summarizes the design characteristics of trucks which have been operating under transit cars on the New York City Transit System during the past seven decades.

Curtis, RD (Pullman-Standard Car Manufacturing Company) Maisch, LD (Rockwell International) Sebastiano, J (New York City Transit Authority); American Society of Mechanical Engineers 75-RT-4, June 1975, 12 pp, 3 Fig., 1 App.; Contributed by the Rail Transportation Division of The American Society of Mechanical Engineers for presentation at the IEEE-ASME Joint Railroad Conference, San Francisco, California, April 15-17, 1975.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr. PC, Microfilm

13 095669 TRACTION OVERHEAD. This article reviews electric railway overhead wire construction practices as used by street railways and by interurban lines. Although written for railfans, the article contains much excellent technical material on electric railway overhead wire practices, and is largely based on American Electric Railway Association material. Trolley wire, catenary, pole installation, backbone, and other types of construction are covered.

Clouser, WJ ; Kalmbach Books 1974, pp 67-76, 53 Fig.; This article is contained in the book "Traction Guidebook for Model Railroads", edited by Mike Schafer, Kalmbach Books, 1974.; ORDER FROM: Kalmbach Books, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233 Repr. PC

13 095670 TRACKWORK IN STREETS. This article reviews street railway track practices. Although written for railfans, the article contains much excellent technical information on trackwork in streets, and is based largely on American Electric Railway Association material. Track layout, turnouts, switches, girder rail, and operational aspects of track are covered.

Clouser, WJ ; Kalmbach Books 1974, pp 53-63, 33 Fig.; This article is contained in the book "Traction Guidebook for Model Railroads", edited by Mike Schafer, Kalmbach Books, 1974.; ORDER FROM: Kalmbach Books, 1027 North Seventh Street, Milwaukee, Wisconsin, 53233 Repr. PC

13 095818 ONTARIO'S PROGRAM FOR INTERMEDIATE-CAPACITY TRANSIT. This paper describes the Ontario government's program for building and testing a demonstration transit system of intermediate capacity in Toronto. This demonstration system is considered a forerunner and test-bed for revenue systems, which, it is anticipated, will be built in major Ontario cities in the next decade. The scope of the revenue systems is also described as are the government's plans to develop an industrial capability in Canada for developing improved transit systems.

Harmelink, MD (Ontario Ministry of Transp & Communications, Can) *Transportation Research Record* No. 522, 1974, pp 1-9, 2 Fig., 3 Tab., 3 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

13 095867 DYNAMIC BRAKING. The kinetic energy of rapid transit trains that is normally dissipated as heat during braking can be converted to potential energy. The use of a flywheel energy storage system is an old idea that has recently been revived. A competitive idea being advanced is the thyristor inverter-recuperative system. While extensive operational experience is not yet available for either, both are currently being tested. The flywheel system is being tested on the New York Transit Authority and the regenerative system on the Sao Paulo, Brazil, Metro. It appears that the regenerative system is more efficient and requires less maintenance, thereby justifying the additional capital investment.

Kalra, P (Bechtel Corporation) *IEEE Spectrum* Vol. 12 No. 5, May 1975, pp 63-66, 4 Fig., Refs.; ORDER FROM: ESL, Repr. PC, Microfilm

13 096541 BRUSSELS METRO COMPARES WELDED AND RIVETED ALLOY BODIES. In designing the equipment for full-scale rapid-transit operation of the Brussels Metro, which was built for light-rail operation initially, prototypes were built utilizing riveted wide extrusions and welded extrusions of more conventional design. Previously the weight savings of aluminum alloys had been adopted; the method of construction had to be established. Since wide aluminum extrusions could become popular for high speed intercity trainsets and for urban railways, the STIB tests have compared the alternate construction techniques.

Railway Gazette International Vol. 131 No. 4, Apr. 1975, pp 156-157, 2 Fig. ORDER FROM: XUM, Repr. PC

13 096605 WEST GERMANY: THE PHOENIX RISES. Various features of the German Federal Railway (Deutsche Bundesbahn or "DB") are described. Of the 29,000 total route kilometers, some 9000 route kilometers (or 31 percent of the system) are electrified. The DB traction equipment consists of a mix of all-electric, diesel-hydraulic, relatively few diesel-electric, and steam locomotives. Details on the DB electric, diesel-hydraulics and diesel-electrics are given. The Intercity mainline railway service, S-Bahnen (rapid transit rail systems) operating from center city to nearby and/or outlying suburbs, U-Bahnen (subways), and tramways are discussed.

Friedlander, GD *IEEE Spectrum* Vol. 11 No. 4, Apr. 1974, pp 62-70; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 098019 TYPE B'B'B' CLASS BE 8/8 DOUBLE-ARTICULATED TRAMS NO. 1 TO 16 OF THE CITY OF BERN TRANSPORT AUTHORITY. The electric equipment for a series of double-articulated trams with four single-motor bogies is described in detail. The conventional switchgear equipment (electropneumatic contactors) is controlled through traction electronics. This permits constant acceleration or deceleration during starting and braking and also constant speed downhill running. The

electrical equipment was designed to facilitate operation with trailers. As a result, the carrying capacity can be adapted to peak period demands.

Venetz, R *Brown Boveri Review* Vol. 61 No. 12, Dec. 1974, pp 540-545; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 098054 SUSPENSION AND STRUCTURE: SOME FUNDAMENTAL DESIGN CONSIDERATIONS FOR RAILWAY VEHICLES. Some of the fundamental criteria which affect the design of suburban passenger equipment are reviewed. There are many design approaches to both suspension and structure. The goals for cars for commuter and rapid transit service are minimum weight, maximum comfort, and maximum reliability at minimum cost. Based on U.S. DOT ride quality specifications, the authors recommend air bag secondary suspension and combined natural frequencies as low as 0.6 Hz which will require active self-centering and frequency-sensitive damping along with anti-roll bars at each truck. Natural frequencies of a typical carbody may be close to a natural frequency of truck frames. Lightweight all-welded carbodies are at a disadvantage because of the minimal structural damping within them.

Newland, DE Cassidy, RJ *Railway Engineering Journal* Vol. 4 No. 2, Mar. 1975, pp 4-26, 48 Fig.; ORDER FROM: ESL, Repr. PC, Microfilm

13 099229 STUDY OF TRANSIENT VOLTAGES IN TRANSIT SYSTEMS. Data on transient-voltage environment are needed for the specification and design of reliable transit-system electrical equipment, especially those containing semiconductor devices. Such data taken on the 600-V dc propulsion systems of the Chicago Transit Authority (CTA) and the Long Island Railroad (LIRR) are presented. Transient-voltage counters, supplemented by an automatic cathode ray oscilloscope, were used to monitor transient voltages in substations, wayside switching stations and transit cars. The 37.5-V dc battery line was also monitored on board one transit car on the LIRR system. This program spanned a period of two and a half years. Theoretical analysis on the characteristics of transients caused by lightning and switching is also presented. /Author/

Chowdhuri, P *IEEE Transactions on Electromagnetic Compatibility* Vol EMC-17, No. 3, Aug. 1975, pp 140-149

13 099795 A SLOW ORDER FOR BART. After six months of limited level revenue service on its 71-mile system, the Bay Area Rapid Transit still is confronted with a multitude of technical problems. It has also filed a \$237 million suit against its consultant and three major suppliers, claiming inadequate engineering and contract management and failure to meet equipment specifications. Train control equipment and the availability and reliability of the rolling stock are major problems which are being attacked by a task force approach.

Middleton, WD *Railway Age* Vol. 176 No. 9, May 1975, 3 pp, 2 Phot.; ORDER FROM: XUM, Repr. PC

13 099866 METRO 1972-1973. The work comprises 1000 references in a 225-page volume,

providing the most recent information on technical publications existing in such areas as tunnel construction, automatic fare collection, electronics, safety, rolling stock, signalling equipment, noise reduction, vehicle cleaning, park-and-ride systems, escalators, etc.

International Union of Public Transport Bibliog. 1973, 225 pp; ACKNOWLEDGMENT: International Union of Public Transport; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PV

13 125791 REINFORCED (GLASS) PLASTIC COMPONENTS FOR RAPID TRANSIT CARS. This paper describes the procedure for the production of fiberglass reinforced polyester exterior and interior components for use in mass transportation and people-mover vehicles. The major emphasis of this presentation deals with describing the preparation of Skybus-type front ends and interiors. The paper covers the design and production of the wood patterns, finishing of the patterns, preparation of the production molds from fiberglass and polyester resins and the production of finished gel-coated exterior and interior components using hand lay-up and spray-up techniques. The sizes of these exterior and interior components range from eight to ten feet in width and height, constituting a very large production piece. Special jigs and holding fixtures are used in handling the components during the various stages of their production.

Fekete, F Thrash, DJ ; Society of the Plastics Industry 1975, 6 pp; Presented at a meeting held in Washington, D.C., February 4-7, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 125831 HIGHLIGHTS OF UMTA'S RAIL PROGRAM. This paper highlights the role of the rail research programs of the Urban Mass Transportation Administration (UMTA). Included are descriptions of several recently developed computer transit cars-the state-of-the-Art Car, The Advanced Concept Train and dual-powered, gas turbine/electric cars. Also discussed are efforts by UMTA in developing test facilities for urban rail vehicles and in furthering research in tunneling technology and noise abatement.

Silien, JS (Department of Transportation) ; Society of Automotive Engineers Preprint 750441, Feb. 1975, 4 pp; Presented at the SAE Automotive Engineering Congress and Exposition, Detroit, 24-28 February 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 125834 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM PROGRESS. This paper describes the content, objectives, and status of the U.S. Dept. of Transportation's Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program (URRVS).

Hervey, DE (Boeing Vertol Company) ; Society of Automotive Engineers Preprint 750444, Feb. 1975, 16 pp; Prepared for meeting 24-28 February 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 125836 NEW DC MULTIPLE-UNIT TRAINS 472/473 FOR THE URBAN RAPID TRANSIT SYSTEM IN HAMBURG, WEST GERMANY [Neue Gleichstrom-Triebzuege 472/473 fuer die Hamburger S-Bahn]. The rapid transit system operating in the metropolitan area of Hamburg uses 1.2-kv dc power, with current collection realized through a contact rail. The electric and mechanical equipment are described. Technical data on performance and capacity are tabulated. [German]

Rappenglueck, W *Elektrische Bahnen* Vol. 46 No. 3, Mar. 1975, pp 57-64, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 125837 MASS TRANSPORTATION VEHICLES AND PEOPLE MOVERS. The purpose of this paper is to give an overview of developments in mass transportation vehicle and people mover design and to illustrate the constraints facing the industrial designer. To discuss specific transportation projects which Sundberg-Ferar has been directly involved in, such as the San Francisco BART Car; the Washington, D.C. Metro; the New York City Transit Authority R-44 Subway Car; the Morgantown and Dshaveyor people movers. Also, vehicle design for both exterior and interior components with commentary on design criteria and final results.

Heck, RA (Sundberg-Ferar, Incorporated); Society of Automotive Engineers Preprint SAE 750440, Feb. 1975, 10 pp; Prepared for meeting 24-28 February 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 126255 INTERNATIONAL CONFERENCE ON POWER ELECTRONICS-POWER SEMICONDUCTORS AND THEIR APPLICATIONS, 3-5 DECEMBER 1974. Among the papers presented at the conference were the following: A Transistor Controller for a Battery Driven Vehicle. Daniels,AR, Gott,VS and Howe,KW; A High Voltage Thyristor Regulator for Control of a Linear Induction Motor, Brown,M and Ferry,GA; Analogue/Hybrid Simulation of a D.C. Chopper Drive System, Tso,SK and AU,PK; Stability Criteria in Feedback Control System for a Full-Chopper Rapid Transit Application, Camurri,F and Rizzi,C. /TRRL/

Institution of Electrical Engineers Conf Pub 123, 1974, 274 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 213517); ORDER FROM: ESL, Repr. PC, Microfilm

13 126410 RESILIENT WHEELS TO REDUCE NOISE OF CARS. In this paper, the construction, the characteristics and the state of development of resilient wheels is discussed. It has been ascertained that resilient wheels contribute to reducing the noise from rolling contact of the wheels on rails and, until now, they have been mainly used for low-speed cars, i.e., streetcars and some subways. Recently, the noise of higher speed cars has also become a major problem. Hence the necessity of studying the use of resilient wheels in higher speed cars, as well as their construction. [Japanese]

Matsumiya, S Sugawara, S *Sumitomo Light Metal Technical Reports* Vol. 26 No. 2, Apr. 1974, pp 97-104, 12 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 126417 USE OF ALUMINUM FOR RAILROAD VEHICLES [Die Verwendung von Aluminium bei Schienenfahrzeugen]. A review is presented of railroad and subway cars constructed of lightweight aluminum alloys which are currently in use in various industrially developed countries. [German]

Schieb, AE *Metallurgie* Vol. 15 No. 1, 1975, pp 11-16; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 126429 NOISE REDUCTION IN RAIL TRAVELING URBAN TRANSIT SYSTEMS BY USING RUBBER CUSHIONED WHEELS [Geraeuschninderung im Schienengebundenen Nahverkehr durch Einsatz Gummigefederter Raeder]. Results of determinations of noise emission produced by rolling contact between wheel and rail are presented. The effects of wheel design, differences between straight track and curves, and other variables are taken into consideration.

Raquet, E Licht, H Spieker, W *Technische Mitteilungen Krupp, Werksberichte* Vol. 33 No. 2, May 1975, pp 51-54; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 127636 OBSERVATIONS ON ENERGY REGENERATION IN RAPID TRANSIT SYSTEMS [He'arot 'al Hehzayr Energiya Be-ma'arakhot Le'hassa'a Hamonit]. Present-day electric train systems for rapid transit use single wagons following closely one another, not long trains, separated by great distances. Energy regeneration is therefore not produced by a single train moving down a grade and returning energy to the national network, but rather by the supply of braking energy from one wagon to another wagon that is accelerating nearby. The actual saving of energy will depend on adequate organization of the traffic time-table, which should ensure that when a wagon starts up, there should be another one nearby that is braking. The factors involved in energy regeneration are discussed and computation methods presented. Diagrams, curves, and equations complement survey. [Hebrew]

Wallach, I (Technical-Israeli Institute of Technology) *Association of Engineers & Architects of Israel, J* Vol. 34 No. 1, Jan. 1975, pp 12-18, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: Association of Engineers & Architects of Israel, J, Repr. PC

13 128577 RAPID TRANSIT CAN BE ECONOMICALLY SOUND. The Lindenwold-Philadelphia Rapid Transit Line has proved that attractive, modern rail rapid transit trains working in coordination with the private automobile can produce an efficient transportation system. Operational concepts which have contributed to the success of the transit include the following: the train is operated by one man regardless of the length; trains are designed to facilitate rapid changes in train-consist without intervening moves to a marshalling yard; successful automation; and an automatic fare collection system. The design of this transit system emphasized concepts of speed, reliability and cleanliness. The factors which influence choice of travel mode have been identified as (in descending order): speed, convenience, comfort and cost. Features regarding the operating organization and operating results are briefly outlined. The transit service has shown that it can reduce air and noise pollution and

conserve energy; materially reduce traffic congestion; and existing technology is capable of providing the kind of rapid transit service which will induce automobile drivers to become transit riders.

Johnston, RB (Port Authority Transit Corporation of Penna & NJ) *Passenger Transport* Vol. 33 No. 48, Nov. 1975, pp 1-8, Photos.

13 128621 PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1974-1975 REPORT OF SURVEY COMMITTEE) CARS AND EQUIPMENT. This survey of the annual ASME report covers some of the major developments in freight and passenger equipment made public in the last calendar year. Because of federal legislation and, in general, a continuing shortage of oil, the need for cars to haul low sulfur coal is still large. The establishment of "Rail Box" has created a large need for a "standardized" general purpose box car. In the people transport area, rapid transit is continuing to grow and new equipment is in the offing for Amtrak.

Manos, WP (Pullman-Standard Car Manufacturing Company); American Society of Mechanical Engineers 75-WA/RT-6, Nov. 1975, 8 pp, 27 Fig.; This paper was contributed by the Rail Transportation Division of the ASME for presentation at the Winter Annual Meeting, Houston, Texas, November 30-December 5, 1975.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr. PC, Microfilm

13 128869 STUDY OF TRANSIENT VOLTAGES IN TRANSIT SYSTEMS. Data on transient-voltage environment are needed for the specification and design of reliable transit-system electrical equipment, especially those containing semiconductor devices. Such data taken on the 600-v dc propulsion systems of the Chicago Transit Authority and the Long Island Railroad (LIRR) are presented. Transient-voltage counters, supplemented by an automatic cathode ray oscilloscope, were used to monitor transient voltages in substations, wayside switching stations and transit cars. The 37.5-v dc battery line was also monitored on board one transit car on the LIRR system. This program spanned a period of two and a half years. Theoretical analysis on the characteristics of transients caused by lightning and switching is also presented.

Chowdhuri, P (General Electric Company) *IEEE Transactions on Electromagnetic Compatibility* Vol EMC-17 N3, Aug. 1975, pp 140-149; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

13 128880 AUTOMATIC VARIABLE FIELD CHOPPER CONTROL SYSTEM FOR ELECTRIC RAILCARS. A description is presented of 1) principle of the AVF chopper control system; 2) analysis of field characteristics, the field intensity to the chopper-conduction ratio; 3) applying the AVF system to high voltage, large capacity, high frequency chopper equipment; and 4) test results on the Chiyoda Line of Tokyo's Teito Rapid Transit Authority.

Kitaoka, T (Mitsubishi Electric Corporation) Ohno, E Ashiya, M Katsuki, K Katta, T *IEEE Transactions on Industry Applications* No. t 1, 74 CHO 833-41A, 1974, pp 85-94, 3 Ref.; IEEE Ind Appl Soc, 9th Annual Meeting, Conf record, Pittsburgh, Pennsylvania, October 7-10, 1974;

ACKNOWLEDGMENT: EI; ORDER FROM: IEEE, Repr. PC

13 129122 PLASTICS IN TRANSIT. This paper presents results of a research program which aimed at the development of the most technologically advanced computerized and pollution-free transportation system incorporating scientific advancements especially formulated for "Astroglide"—hydrostatic levitation (air-cushion) and linear induction propulsion. Astroglide represents the first major urban transportation alternative to be presented to cities within the last 50 years. The use of plastics in the astroglide system is discussed under the headings: vehicle body; structural frame work (GFRP); doors; windows; and ventilating ducts. The paper was illustrated by slides.

Seelzo, GP (PRT Systems Corporation); Society of Plastics Engineers Proc Paper 1974, pp 217-218; Presented at the SPE National Technical Conference: Plastics in Surface Transport, Detroit, Michigan, Nov. 12-14, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: Society of Plastics Engineers, Detroit, Michigan, Repr. PC

13 129273 BUSES AND TRAMS IN THE YEAR 2000 [Bus en tram in het jaar 2000]. Scenariomethodology and structure of the organization. Cost and amount of rural and urban transport. Urbanbus versus tram costs (approach), bus and subway and rural services (passenger/km). Productivity development 1968-1972. Expansion in the future: assumptions for the productivity in 2000 ("Expansion scenario"), the transport-volume and cost implications. Assumptions with regard to a "2000-growth-scenario". Expansion versus "2000 growth" Profitable public transport seems illusory.

Hupkes, G *Openbaar Vervoer* Vol. 8 No. 3-4, 19 pp; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Uitgeverij — Ceres —, Meppel, Netherlands Repr. PC

13 129301 POWER GENERATION AND DISTRIBUTION-LONDON TRANSPORT. The paper traces the evaluation of power generation, distribution and control from the days of the independent underground and tube railways to the present London Transport system. Describes current steam-raising and steam turbine and gas turbine practice with notes on the proposed future use of natural gas instead of oil. Other subjects include types of cable, substation rectifiers, remote control systems, protection, equipment, etc.

Burgess, JM; Institution of Railway Signal Engineers 1975, 19 pp, 14 Fig.; Presented to the Institution of Railway Signal Engineers, London, January 8, 1975.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Institution of Railway Signal Engineers, 1 Ashborne Close, London W5, England Repr. PC

13 129423 R-46. The R-46 cars, long awaited by New York subway riders, represent the largest order ever placed for rail passenger cars in the U.S., a total of \$214 million for 754 cars. These technologically sophisticated vehicles presented many design and production problems. Introduction of the cars into service was then delayed by problems with the cam control system.

Van Der Sluys, W (Pullman-Standard Car Manufacturing Company) *Mass Transit* Vol. 2 No. 11, Dec. 1975, 5 pp, 7 Phot.; ORDER FROM: Mass Transit, 538 National Press Building, Washington, D.C., Repr. PC

13 129813 LIGHT RAIL PERMANENT-WAY REQUIREMENTS AND SOURCES. This paper sets forth the technical requirements for the permanent way needed in construction of light rail transit facilities and then develops sources for assembling rights-of-way. Described first are the physical capabilities of light rail transit for grade, curves, and clearances. Requirements for the guideway are established with the development of standards for track work suited to light rail transit. The latest techniques in track component design are evaluated. Pitfalls to be avoided in light rail facility design are pointed out. General requirements for stations are set forth with particular emphasis on space needs. Types of platforms, shelters, and security enclosures are described. Station needs for light rail transit are contrasted with the needs of full-scale rapid transit. Sources that can be considered for light rail rights-of-way are treated in a way intended to stimulate the imagination of the engineer and planner in locating potential routes. Dealt with are surplus railroad tracks, boulevard and freeway center strips, canal beds, stream channelization, electric transmission lines, parkways, street running, reservation of streets, and the selective application of elevated lines, bridges, and subways to light rail transit. Advantages and limitations of each type of right-of-way are explained.

Landgraf, RJ (Ohio Department of Transportation) *Transportation Research Board Special Reports* No. 161, 1975, pp 77-85, 9 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

13 129816 FOREIGN LIGHT RAIL VEHICLE DEVELOPMENT. This paper begins with a brief description of how the light rail mode has been developed in several West European countries, especially in the Federal Republic of Germany. The basic features of the light rail vehicle and how the vehicle was derived from the streetcar and the subway or heavy rapid transit car are explained. Finally, the various attempts at standardization of light rail vehicles in West Germany after World War II are discussed. Several modern light rail vehicles are described, and it is explained why standardization could only be partially achieved.

von Rohr, J *Transportation Research Board Special Reports* No. 161, 1975, pp 99-110, 10 Fig., 1 Tab., 32 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

13 129827 DIRECTIONAL ROLLER BEARING RINGS AND BOGIES FOR THE PARIS METRO [Couronnes d'orientation et bogies de metro]. The author explains that a new link-up between body and bogie has been tested with success on coaches of the Paris Metro. The orientation of the bogies in relation to the body is effected by means of a crossed roller bearing ring. Small-radius curves can be taken very easily, and wheel flange wear is avoided. The directional roller bearing rings, which are pre-stressed during manufacture, provide a rigid assembly which gives the body excellent lateral stability. This rigidity also enables the bogie thrust centre to be lowered to axle level, which limits the transmission of bogie hunting movement to the body, and increases the comfort of the coaches. [French]

Bonnet, J *Revue des Roulements* No. 184, 1975, pp 20-21, 2 Fig.; ACKNOWLEDGMENT: UIC; ORDER FROM: Revue des Roulements, Brussels, Belgium

13 131027 USE OF FINITE ELEMENT ANALYSES FOR RAILCAR DESIGN. The analysis of railcar structures is improved by the use of electronic computers. Outlined are specific applications of finite element analyses to total car systems, and stress concentration. Data are presented on modeling, dynamic characteristics, and correlation of results.

Dennis, MJ (Boeing Vertol Company) *ASCE Journal of Transportation Engineering* Proc Paper Vol. 102 No. TE1, No. 11921, Feb. 1976, pp 105-116, 5 Fig., 4 Tab.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131271 THE RELATIONSHIP BETWEEN VEHICLE SIZE AND OPERATING COSTS IN URBAN TRANSIT NETWORKS [Der Einfluss der Fahrzeuggrösse auf die Betriebskostenstruktur im Schnellverkehr]. The authors based their study on the Berlin and Hamburg networks, but a typical 20 km standard line was chosen for the study of the relationship between vehicles and productivity. Variable information concerning traffic, comfort, timetables, vehicle size and costs were used and it was seen that the volume of traffic must be determined before deciding on the size of the vehicles to be used. Operating costs for vehicles are lowest for vehicles/trains with seating for less than 100 passengers, for example, if peak traffic involves less than 3,000 passengers per hour in each direction. Trains with seating for 100 to 200 passengers are required for traffic involving 4,000 to 7,000 passengers per hour in each direction. For all types of operating, capital costs represent between 43 and 70% of rolling stock operating costs. [German]

Pampel, F *Verkehr und Technik* Vol. 28 No. 11, Nov. 1975, 14 pp, 12 Tab., 9 Ref.; ACKNOWLEDGMENT: UIC; ORDER FROM: Schmidt (Erich) Verlag, Herforderstrasse 10, 4800 Bielefeld, West Germany Repr. PC

13 131626 PERFORMANCE ASPECTS OF THE HONG KONG MASS TRANSIT RAILWAY. Kennedy & Donkin (Far East) are the Consulting Engineers responsible to Freeman Fox & Partners (Far East), the principal consultants for the project, for all Electrical and Mechanical engineering and operational aspects of the Hong Kong Mass Transit Railway. This paper examines some of the problems encountered and systems chosen in the design of the

railway which will operate in sub-tropical conditions at one of the highest traffic densities. The Authors wish to point out that opinions expressed are their own and are not necessarily shared by Freeman Fox & Partners (Far East) or the Mass Transit Railway Corporation.

Kennedy, JA McClean, HG ; Institute of Electrical and Electronics Engineers C76 459-3 IA, Feb. 1976, 6 pp, 6 Fig.; Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.; ACKNOWLEDGMENT: ASME, IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131630 REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 1: MECHANICAL ACCUMULATOR DESIGN. A regenerative drive system for subway trains is mathematically modeled and numerically evaluated for the Toronto Bloor-Danforth Subway Line. The scope of the study dictates a multipaper presentation of system and component modeling. This first paper designs and optimizes the mechanical accumulator subsystem (bearings, seals, losses) of the vehicle propulsion package. Preliminary design criteria (stress-energy relationships) predict the required performance capability of the one and two accumulator per vehicle systems; the need for high energy densities is of secondary importance compared to the required power density for vehicle operation. Accumulator performance tests suggest ease of integration with the current drive system. Subsequent papers model the external and internal drive systems, and numerically optimize the flywheel control concept and accumulator size; day savings, on a round-trip basis, are predicted in the order of 26 percent.

Flanagan, RC Suokas, LA (Toronto University, Canada); American Society of Mechanical Engineers 76-RT-1, Jan. 1976, 7 pp, 14 Fig., 23 Ref.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.; ACKNOWLEDGMENT: ASME, IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131631 REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 2: OVERALL SYSTEM MODEL. The external system (track, vehicle) for the regenerative drive study is modeled from actual construction drawings and performance specifications. A general duty cycle is constructed and found to compare within a few percent of actual measured data; furthermore, the duty cycle simulates all vehicle operational modes ("all out," cruise, coast, brake). Vehicle dynamics are simulated using current railroad engineering practice; the equivalent mass of rotational elements (transmissions, rotors), about 16 percent of the vehicle curb mass, is accounted for in the accelerated state. The internal d.c. electric drive system is modeled using current industrial design practice; the technique of energy flow-through efficiencies facilitates the determination of vehicle station-station tractive requirements.

Suokas, LA Flanagan, RC (Toronto University, Canada); American Society of Mechanical Engineers 76-RT-2, Jan. 1976, 7 pp, 8 Fig., 4 Tab., 11 Ref.; Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.; ACKNOWLEDGMENT: ASME, IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131632 REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 3: SYSTEM EVALUATION. The most efficient hybrid drive philosophy eliminates high-acceleration power peaking and operates as a fully regenerative system (little or no accumulator top-off during station stop). The optimal accumulator control concept is designed as vehicle velocity dependent and is shown to vary only slightly with vehicle load and station distance. Furthermore, accumulator sizing is numerically determined subject to this control concept. The effect of large coast (5 percent) or cruise periods opposes the justification of any regenerative system and is herein questioned as an integral part of the drive cycle. Conversely, short coast (2 percent) or cruise has little effect on the hybrid drive performance. As a basis of comparison (with other drive systems), the ideal vehicle concept is postulated.

Flanagan, RC Suokas, LA (Toronto University, Canada); American Society of Mechanical Engineers 76-RT-3, Jan. 1976, 5 pp, 7 Fig., 3 Ref.; Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.; ACKNOWLEDGMENT: ASME, IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131633 REGENERATIVE DRIVE FOR SUBWAY TRAINS. PART 4: OVERALL SYSTEM PERFORMANCE. Vehicle energy consumption and savings for the Toronto Bloor-Danforth Subway Line are evaluated. Two vehicle loads are chosen (for this evaluation) indicative of rush-hour and nonrush-hour operation. A comparison test run shows the numerical simulation to be within a few percent of actual measured data. Evaluation of round trip results indicate energy savings as high as 33 percent for a large vehicle weight, but based on daily operation, savings are more realistically 26 percent. The effect of long coasts (5 percent) on actual station runs is again shown to be detrimental to the energy savings for the regenerative system.

Suokas, LA Flanagan, RC (Toronto University, Canada); American Society of Mechanical Engineers 76-RT-4, Jan. 1976, 5 pp; Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976.; ACKNOWLEDGMENT: ASME, IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131646 DESIGN OF A TURBINE/ELECTRIC BIMODAL RAIL PASSENGER CAR.

This paper presents the unique features of a rapid transit rail passenger car having two modes of power, conventional 650 volts DC third rail plus two on-board gas turbine power modules. Design objectives are defined with a description of the car's systems showing how the objectives were met. Early track test experience is also reviewed.

Isler, NJ Clingerman, RL Paternoster, NL (General Electric Company); American Society of Mechanical Engineers 1976, pp 165-176, 7 Fig.

Presented at the 1976 Joint ASME/IEEE Railroad Technical Conference, Chicago, Illinois, April 6-8, 1976. For the complete volume see RRRIS No. 02 131638, Publication 7602.; ACKNOWLEDGMENT: ASME, IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

13 131927 NORTH AMERICAN LIGHT RAIL VEHICLES. This paper presents the evolution of North American light rail vehicles from the 1920s to the present. Emphasis is placed on conditions

of the electric street railway industry in the 1920s, attempts of car standardization, and movement toward a radically new, high-performance car as background to the development of the Presidents' Conference Committee car of the 1930s. Events leading to the new standard light rail vehicle are presented along with its significant dimensional specifications and performance characteristics. The proposed Canadian light rail vehicle is described.

Silien, JS Mora, JG (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 93-98, 1 Fig., 7 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested, For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

13 132947 COMPOSITE CONDUCTOR RAILS FOR RAPID TRANSPORTATION SYSTEMS-STATE OF THE ART.

By way of introduction some details of the rapid transportation networks planned in various countries are given together with an account of the kind of development work involved. Rapid transportation systems are intended to operate over distances of 200 to 600 km. Speeds of up to 500 km per hour are planned and so a whole series of problems not previously encountered have to be solved. The paper deals mainly with the problems concerning the conductor rail which has to supply the electrical power to the vehicle. The need for a lightweight ac rail makes composite rails attractive. A wide range of conductor rails available is presented and it is shown that the need for a lightweight rail eliminates a number of otherwise interesting designs. Factors such as corrosion resistance, rigidity and safety are discussed with a view to their importance and limits which can be tolerated.

Maitland, A Rieger, W ; Kalerghi Publications Proc Paper 1974, pp 111-119, 3 Ref.; Presented at the Int. Hovering Craft, Hydrofoil and Adv. Transit Syst. Conf., Brighton, Sussex, Engl., May 13-16, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: Kalerghi Publications, 51 Welbeck Street, London W1, England

13 133090 GENERAL VEHICLE TEST PLAN (GVTP) FOR URBAN RAIL TRANSIT CARS.

The General Vehicle Test Plan provides a system for general vehicle testing and for documenting and utilizing data and information in the testing of urban rail transit cars. Test procedures are defined for nine categories: (1) Performance; (2) Power Consumption; (3) Power System Interaction; (4) Adhesion; (5) Ride Roughness; (6) Passenger Compartment Noise; (7) Community Noise; (8) Simulated Revenue Service; (9) Structure Dynamics. The procedures can be adapted to any vehicle in the general class of urban rail vehicles. They are derived from testing on UMTA's Rail Transit Test Track in Pueblo, Colorado. In addition, these procedures can be modified for use on other urban rail tracks as required. Specifications are included for instrumentation required to implement the tests. Data processing and analysis requirements are defined by specifying standard output formats for the parameters of interest.

Neat, GW Lotz, R Kasameyer, R Oren, R Brown, PF ; Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt., 4, nDO UMTA-MA-06-0025-75-1, Sept. 1975, 346 pp; Contract DOT-TSC-580; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250575/8ST, DOTL NTIS

13 133285 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. No abstract available.

New York City Transit Authority Mar. 1975, 2204 pp; Set includes PB-251 642 thru PB-251 653.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251641-SET/ST, DOTL NTIS

13 133292 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. TRACK AND CONTACT RAIL. The project was designed to develop a revised and updated series of handbooks covering various aspects of the design, construction, and equipment of a modern rail rapid transit system. This volume deals with track and contact rail.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-7, Mar. 1975, 58 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251648/2ST, DOTL NTIS

13 133294 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. POWER. The Power Standards for new lines provide the basic concepts for the design of traction power systems for new routes. The Standards describe the criteria used for the determination of the power requirements, the parameters used in the selection of substation sites and the types of electrical equipment employed for the conversion of High Tension AC power to DC traction power. They include the techniques used to control the power system from one control point and the means by which each substation can be controlled in the event of a supervisory cable failure. The Standards also describe the methods employed to give maximum safety in the substations and on the railroad in case of faults or emergencies. These guides should prove helpful in the design of traction power systems for new routes.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-9, Mar. 1975, 31 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251650/8ST, DOTL NTIS

13 133295 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. NEW CAR ENGINEERING. The project was designed to develop a revised and updated series of handbooks covering various aspects of the design, construction, and equipment of a modern rail rapid transit system. This document contains information on new car engineering.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt., 0 UMTA-IT-09-0014-75-1, Mar. 1975, 269 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-25165/6ST, DOTL NTIS

13 133430 SOAC: STATE-OF-THE-ART CAR ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH SPEED GROUND TEST CENTER. VOLUME VII. POST-REPAIR TESTS. The document presents the test results for the State-of-the-Art Car Post-Repair Engineering Test Program conducted at the DOT High-Speed Ground Test Center, Pueblo, Colorado, from March 18th to 29th, 1974. The SOAC has been developed under UMTA's Urban Rapid Rail Vehicle and Systems Program to enhance the attractiveness of rapid rail transportation to the urban traveller. The test data continuity between the original HSGTC Engineering Tests and the Post-Repair Test was established. Test data of variations from the original data have not been significant in terms of overall vehicle performance. A description of test procedures, equipment and facilities was provided in the original six-volume report, UMTA-MA-06-0025-75-1 through -6. PB-244 746 is the complete six volume set; PB-244 747 through PB-244 752 are the NTIS document numbers for each volume, I through VI respectively.

Oren, R ; Boeing Vertol Company, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt., nDOT UMTA-MA-06-0025-75-7, Nov. 1975, 206 pp; See also PB-247 752.; Contract DOT-TSC-580; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-252337/1ST, DOTL NTIS

13 133627 THE STAGE CONSTRUCTION OF METROPOLITAN RAILWAYS: THE EXAMPLE OF FEDERAL GERMANY [La realizzazione delle ferrovie metropolitane in fase successiva: L'esempio della Germania Federale]. The term u-bahn refers to an urban transport system of the following characteristics: vehicles that run on rails; a rail network entirely reserved to the system, and which can be elevated, at ground level, or underground; the intervals between vehicles or trains must be automatically controlled; station platforms must be at the level of entry into the cars; the light rolling stock must be capable of 100km/h maximum speeds, have a capacity of 200-250 seats, and allow rapid entry and exit. The stage construction of u-bahn systems in West Germany is dictated by budget restraints, the first projects being built in areas of insufficient public transport. /TRRL/ [Italian]

Sciarone, G *Automobilismo E Automobilismo Industriale* No. 11/1, Nov. 1974, pp 65-86, 3 Fig., 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 216698); ORDER FROM: Automobile Club d'Italia, Via Marsala 8, 00185 Rome, Italy

13 134307 PROCEEDINGS OF A SEMINAR ON RESEARCH AND INNOVATIONS IN GUIDED GROUND TRANSPORT. This publication contains the proceedings of the second Canadian Institute of Guided Ground Transport

conference. The theme of the conference was research on and innovations in guided ground transport. 15 individual papers were presented and two panel discussions are appended. /TRRL/

Canadian Institute of Guided Ground Transport Nov. 1974, 406 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 217421); ORDER FROM: CIGGT

13 134534 ALUMINUM COACH AND THE PARIS METRO [Voitures aluminium et metro de Paris]. Technical results of the construction of aluminium coaches for the Paris metro; a comparison is made between the manufacturing methods used for these coaches and for steel coaches. The difficulties arising from the use of special, very long metal sections, the assembly on a dummy of the chassis frame using prefabricated units, constraints imposed by certain alloys and distortions caused in the welding sequences, are described in detail. [French]

Briseaux, A Fournier, R *Soudage et Techniques Connexes* No. 11, Nov. 1975, pp 415-426, 19 Fig.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL, Repr. PC, Microfilm

13 134554 MF 77 ROLLING STOCK: A NEW GENERATION OF "STEEL-WHEEL" TRAINSETS [Le materiel MF 77: nouvelle generation des rames "sur fer" de la RATP]. The construction programme begun in 1975 by the Paris Transport Authority (RATP), covers about a thousand coaches of the new generation MF type (materiel fer = steel-wheel trainsets as opposed to rubber-tired trainsets). This rolling stock, which is designed to be attractive (comfort, heating, sound-proofing), has been adapted to meet the many operating requirements (running control, automatic driving). The description of the technical specifications and especially the chopper or KESAR "traction-braking" equipment (sequential electronic supply-current switching and regenerative braking), is illustrated by numerous tables. [French]

Guibereau, S *Revue Generale des Chemins de Fer* Vol. 95 Jan. 1976, pp 26-39, 6 Tab., 10 Phot.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL, Repr. PC, Microfilm

13 136409 TRACKSIDE TEST PROGRAM FOR REGENERATIVE CHOPPER-CONTROLLED SUBWAY CARS. Six subway cars in Toronto were retro-fitted with a chopper control system which also provides regeneration capability during braking cycles. Testing was concurrent with a test program to evaluate vehicle performance. Trackside testing identified and investigated the level of chopper-produced interference in signals, communication, data transmission, remote supervisory control and traction power systems. Safety considerations, such as the possibility of sustained voltage on de-energized contact rail sections, were also investigated. Energy consumption of the chopper-equipped cars was expressed as a percentage saving compared with that of conventional cars.

Ledsham, HT (Toronto Transit Commission) ; American Transit Association ATA/RT-74/1,2,3, 1974, pp 65-79; Presented at the Am Transit Assoc Rail Transit Conf., San Francisco, Calif., Apr. 14 and 16, 1974, Power and Signals Sess. NTIS Nos. PB-234 824; PB-234 825 and PB-234 826.; ACKNOWLEDGMENT: EI;

ORDER FROM: NTIS

13 136410 WHEN TO USE MULTIPLE-UNIT CARS OR LOCOMOTIVES. The use of electric locomotive-hauled trains vs. electric multiple-unit trains in both commuter and intercity service is analyzed with respect to economic considerations. Available cost factors are presented. Other conditions, whose costs must be individually developed are identified. Warning is given that each proposed application must be analyzed in the light of all conditions peculiar to it.

Vollmar, JR (Klauder (Louis T) and Associates) American Transit Association ATA/RT-74/1,2,3, 1974, pp 50-75; Presented at the Am Transit Assoc Rail Transit Conf., San Francisco, Calif., Apr. 14 and 16, 1974, Car Equip Sess. NTIS Nos. PB-234; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS

13 136604 RETROFIT AIR CONDITIONING OF SUBWAY CARS. Recognizing the desirability of air conditioning as an inducement to attract patrons and offer them amenities that make rail mass transit comfortable as well as convenient, new car orders specify inclusion of air conditioning equipment (where climatic conditions justify consideration). Married pair cars and shared undercar equipment paired cars, as well as improved packaging, permit relatively easy installation in new vehicle purchases. The challenge is to air condition existing subway cars whose remaining life precludes replacement. Resolution of complicated design and retrofit problems faced by the New York City Transit Authority in its effort to develop a method of air conditioned cars on its IRT Division are described in this paper.

Greene, FS ; Transit Development Corporation, Incorporated Final Rpt. TDC/500-75/7, Dec. 1975, 17 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250811/7ST, DOTL NTIS

13 136828 ANALYTICAL METHODS AND DESIGN IMPLICATIONS OF DETERMINISTIC RIDE QUALITY CRITERIA. An alternative ride quality standard that involves the instantaneous values of acceleration and rate of change of acceleration (jerk) in all six degrees of freedom is proposed. The report develops an analytical form for the standard and discusses a twelve-dimensional 'comfort' ellipsoid along with possible maximum values for each axis. These values are obtained from a review of available data on human response to levels of acceleration and jerk. An analytical design approach, using such a deterministic standard, is developed employing linear system theory. The method developed allows the designer to design the vehicle's suspension system and/or to bound the allowable range of guideway disturbances so that the ride quality standard is satisfied. A rigorous development of the method is presented along with examples to illustrate its usage.

Hedrick, JK White, RCJ Firouztash, H ; Arizona State University, Tempe, Department of Transportation Final Rpt. ERC-R-74014, DOT/TST-76/2, Apr. 1975, 74 pp; Contract DOT-OS-40101; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253103/6ST, DOTL NTIS

13 137318 AN ASSESSMENT OF THE CRASHWORTHINESS OF EXISTING URBAN RAIL VEHICLES. VOLUME III: TRAIN-COLLISION MODEL, USERS MANUAL. The crashworthiness of existing urban rail vehicles (passenger cars) and the feasibility of improvements in this area were investigated. Both rail-car structural configurations and impact absorption devices were studied. This final report issued under the crashworthiness effort covers: (1) The development of analytical tools to predict passenger threat-environment during collision; (2) criteria for predicting passenger injury due to train collisions; (3) an application of injury criteria and analytic models to predict passenger injuries resulting from collisions of trains that represent existing construction types; (4) a preliminary investigation of applying impact absorption devices to transit vehicles; (5) a design study of car structural configurations for improved impact energy management; (6) a review of engineering standards for Urban Rail Car Crashworthiness. The report consists of three volumes.

Segal, DJ ; Calspan Corporation, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-7521III, Nov. 1975, 66 pp; See also PB-249143; Contract DOT-TSC-681; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254695/0ST, DOTL NTIS

13 137320 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. The report reviews the fourth year's efforts of the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program. The objective of the Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe and economical as possible. Accomplishments for the year included the following: Completion of the five-city test and evaluation of the SOAC cars; progress from the preliminary design phase to delivery of initial test hardware; completion of the integration of a self-synchronous propulsion system, a monomotor truck, and a synchronous brake into the SOAC cars; and preparation of subsystem specifications.

Boeing Vertol Company, Urban Mass Transportation Administration, (UMTA-IT-06-0026) Ann. Rpt. D174-10038-1, UMTA-IT-06-0026-75-1, July 1975, 120 pp; See also PB-245310; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254727/1ST, DOTL NTIS

13 137327 SOAC. STATE-OF-THE-ART CAR DEVELOPMENT PROGRAM. VOLUME 2. REPAIR, RE-TEST AND OPERATIONAL EVALUATION. The two-volume report documented the design, fabrication and test of two new State-of-the-Art Cars (SOAC) whose objective was to demonstrate the best available (1971-72) rail rapid transit vehicle technology. The SOAC features a DC-DC chopper in the propulsion system, separately excited DC traction motors, all-steel construction (with molded fiberglass ends), and vandal-resistant and fire-retardant materials in the interior. This volume, Volume 2, of a two-volume report covers the repair of the damage sustained by the No. 2 car in an accident at the Transportation Test Center (TTC) in August 1973, the post-repair testing at

the TTC, and the operational evaluation of the SOAC in revenue service in New York, Boston, Cleveland, Chicago and Philadelphia.

Dunton, WH ; Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10031-2, UMTA-IT-06-0026-75-2, Sept. 1975, 249 pp; See also report dated April 74, PB-235703; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254770/1ST, DOTL NTIS

13 137365 ACOUSTIC IMPACTS OF BART: INTERIM SERVICE FINDINGS. The report documents the findings and methodologies developed during a study of BART sound and vibration levels. The findings focus on: delineation of impacted regions, major factors affecting BART-generated sound, prototype vs. operational sound levels, BART vs. other transportation sound sources and BART-generated vibration levels. BART-generated sound levels were derived from direct wayside measurements and indirectly from on-board recording of sound levels throughout the BART system. Ambient community sound levels were based on predictive techniques verified by field measurements.

Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Bolt, Beranek and Newman, Incorporated Tech. Memo MTC-TM-16-4-76, Mar. 1976, 93 pp; Prepared by Bolt, Beranek and Newman, Inc., Cambridge, Mass.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB254966/5ST, DOTL NTIS

13 137370 A PROCEDURE FOR OPTIMIZING RAPID TRANSIT CAR DESIGN. The report provides a methodology for creating an initial rough design of a rail rapid transit car, or for evaluating an existing design. It is based on optimizing the design features by minimizing the sum of the annual costs of purchasing, power consumption, maintenance, and on-board operating labor for a fleet of such vehicles. Linear programming is used to arrive at a solution based on the interaction of several hundred equations which describe the complex inter-relationships amongst the elements of car design, dimensions, and performance, and the various components and sub-assemblies which comprise the vehicle, and the associated costs.

Huss, MF ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0009) Proj. Rpt. UMTA-NY-11-0009-75-3, May 1975, 248 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-2555048/1ST, DOTL NTIS

13 137698 APPLICATION OF THE FINITE ELEMENT TECHNIQUE TO THE STRUCTURAL ANALYSIS OF ROAD AND RAIL VEHICLES AT LONDON TRANSPORT. The structures of road and rail vehicles being used by London transport are of conventional design. Road vehicles consist of a separate body and chassis, the main structural members being steel and the skin panels being aluminum. Underground rolling stock, because of the constraints imposed on shape, size and interior layout, are of "tubular construction" and in most stocks consist of an aluminum roof and bodyside, with large openings for windows and doors, mounted on a

heavy steel underframe. The structural design of these vehicles has been the responsibility of the carbuilders and has been based on traditional stress analysis techniques consisting, in the main, of equivalent framework type analyses and relying heavily on past experience. Recently, however, London transport has been taking a greater involvement in the design of these vehicles and there has been a departure from the conventional designs. An emphasis on light weight has meant the use of aluminum throughout the vehicles and there is a tendency towards a more integral type of structure (as opposed to separate body and chassis) in the case of road vehicles. This departure from conventionality has led to the need for a more refined stress analysis technique. An investigation into the structural behavior of an underground railway coach has shown that the finite element technique is superior to the other techniques in predicting stresses and deflections. The dynamics section which has recently been set up within the design division of the chief mechanical engineer's department at London transport, has been applying the finite element technique to analysing bus and railway coach structures (including wheels) and to the calculation of the natural frequencies of these structures. The computer program used is the newpac package developed by the engineering research division of British Rail at Derby, the computation being performed at Derby on the IBM 370 computer. The computation facilities include an input/output graphical display which enables data checking and presentation. /Author/TRRL/

Hillel, H Sayer, J Phipps, RA (London Transport Executive) Gibbs, HG (Lucas (Joseph) Limited) Richards, TH (Ashton University, England) ; Applied Science Publishers Limited Proc Paper 1975, pp 351-388, 22 Fig., 4 Tab., 4 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219578); ORDER FROM: Applied Science Publishers Limited, Ripple Road, Barking, Essex, England

13 137704 THE APPLICATION OF STRESS, NOISE AND VIBRATION ANALYSIS TO DESIGN OF RAIL RAPID TRANSIT VEHICLES. This is a review paper dealing with design developments occurring with the aid of, or as a result of, noise and vibration analysis. To examine the main strength of a vehicle body, finite element techniques now provide a method vastly superior to previous methods, but its cost and complexity cannot always be justified at the present time. The much simpler framework analysis and approximate methods still have important functions. Comprehensive structural testing employing strain measurement techniques provides not only a final check on a new design but also yields information invaluable in the evolution of later designs. These techniques are applied to produce designs lighter in weight, cheaper in material or manufacturing costs, and hence more economic to the operator, whilst at the same time preserving the reliability and freedom from fatigue required for a vehicle life of 30 years or more. Increasing public awareness of noise being a form of environmental pollution is leading to greater efforts to produce quieter vehicles, both from the passenger's point of view and with regard to wayside problems. Measurement and analysis techniques show that great improvements can be achieved, often without undue penalties in cost and weight. Attention is given to vibration isolation of the body from track irregu-

larities, rotating machines on the body and to the effect of the body itself as a vibrating beam. (a). For covering abstract of the conference see IRRD no. 219564. /TRRL/

Bothan, GJM (Metro-Cammell Limited) Gibbs, HG (Lucas (Joseph) Limited) Richards, TH (Ashton University, England) ; Applied Science Publishers Limited 1975, pp 1-19, 5 Fig., 2 Tab., 2 Phot., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219565); ORDER FROM: Applied Science Publishers Limited, Ripple Road, Barking, Essex, England

13 137705 A PRELIMINARY INVESTIGATION INTO THE STRUCTURAL BEHAVIOUR OF AN UNDERGROUND RAILWAY COACH. The specialised function of urban underground railways, that of providing a frequent-stop, mass transportation facility catering for a very high volume of passengers with a large amount of changing at stations, sets an 'architectural' form on underground rolling stock, which is much more prescribed than that possible for main-line railways. Thus, not only is the exterior geometry largely decided by loading gauge, tunnel height, platform curvature, etc. When an existing network is being used but the internal layout is also closely defined. In particular, the number of doorways, their position, size and type, along with the need for large windows, dominates the form of the structure of the coach sides. Furthermore, freedom of circulation internally inhibits the over-use of structural bulkheads and pillars. Thus, the structural designer is confined to a large extent as to the geometrical parameters which he can vary. An underground railcar conventionally has a very heavy chassis or underframe which includes two main longitudinals, the solebars. These alone constitute a large proportion of the structural cost of the entire car. Much of the work done in the project described in this paper was concerned with examining the effects of alternative sizing of the main structure, the solebars, doors and window pillars and roof, in an endeavour to make the coach body work more efficiently overall. The loading case mainly considered was the dead-weight plus 'super-crush' passenger load. The analyses were carried out by the finite element method. This was the first time, as far as is known, that this method has been used on underground rolling stock in this country. The computer program used was the newpac package, developed by the engineering research division of British rail at Derby, and the computation was performed on the icl 1903a computer at Brunel University. The paper describes the idealisations used for the analyses, the main results, with comparisons with existing data available from other methods, and general conclusions concerning the structural behaviour and design of railcars for the loading case considered.

Yettram, AL (Brunel University) Smith, DJ (London Transport Executive) Gibbs, HG (Lucas (Joseph) Limited) Richards, TH (Ashton University, England) ; Applied Science Publishers Limited 1975, pp 313-350, 21 Fig., 1 Tab., 6 Phot., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219577); ORDER FROM: Applied Science Publishers Limited, Ripple Road, Barking, Essex, England

13 138328 TWO MANUFACTURERS TRY THREE-PHASE MOTORS IN DC TRACTION. The three-phase a-c traction motor, lighter and lower maintenance than the traditional d-c traction motor in railway applications, has been made possible by solid-state power conversion systems. One area where the a-c motor should offer particular advantage is in rapid-transit and light-rail applications. Two short articles describe experimental drives installed by Siemens in a Nurnberg tramcar and by Oy Stromberg in three two-car prototype transit vehicles in the Helsinki Metro.

Rudiger, W Brunnecker, U *Railway Gazette International* Vol. 132 No. 6, June 1976, pp 228-29, 2 Fig.; ORDER FROM: ESL

13 139534 EASTERN EUROPE LEADS IN TRAMCAR STANDARDISATION. With more than 60% of the urban tramway systems concentrated in the USSR and Eastern Europe, there is considerable scope for widespread standardization of tramcars. The author describes how progress in standardization has been achieved through strong central planning. Czechoslovakia and the USSR now supply 90% of all tramcars for East European undertakings.

Taplin, M *Railway Gazette International* Vol. 123 No. 7, July 1976, p 255, 4 Fig., 8 Phot.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL

13 139936 A SELECTED BIBLIOGRAPHY OF RAILROAD ELECTRIFICATION. This bibliography contains references to technical and economic articles in journals worldwide and to technical papers on all phases of railway mainline and rapid transit electrification. Selections cover the period 1929 to 1973 with listings under individual years.

Kusko (Alexander) Incorporated May 1974; Prepared under Contract and Technical Directive for Transportation System Center, DOT.; Contract DOT-TSC-203; ACKNOWLEDGMENT: TSC; ORDER FROM: Kusko (Alexander) Incorporated, 161 Highland Avenue, Needham Heights, Massachusetts, 02194

13 141105 MANUFACTURE OF COMPOSITE ALUMINUM-STEEL CONTACT RAILS WITH METALLURGICAL BONDING BETWEEN ALUMINUM AND STEEL BY CO-EXTRUSION [Herstellung von Aluminium/Stahlverbundstromschienen mit metallurgischer Bindung Zwischen Aluminium und Stahl durch Verbundstrangpressen]. The process of manufacturing steel-clad aluminum rails by coextrusion is described. Investigations of the properties of an AlMgSi 0.5 rail clad with 18-9 stainless steel include the strength of the bond, the bimetal effect, the effects of fatigue stresses, stretching and bending on the bond, corrosion of the rail, the abrasion resistance of the steel cladding, and weldability of the rail. The electric resistivity of the interface is about 1 micro-ohm/sq cm. [German]

Theler, JJ (Aluminium Rolling-mills, Germany) Wagner, A *Metall* Vol. 30 No. 3, Mar. 1976, pp 223-227; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 141274 PREDICTION OF WAYSIDE RAILROAD NOISE. The recent trends in the revitalization of rail transport in this country have

resulted in increased interest in the use of rail rapid transit systems in our cities and high-speed surface rail links between major population centers. Included in the technology assessment of new and improved rail service will be the associated environmental problems, including potentially serious wayside noise problems. The solution to the railroad noise problem requires a valid technique for prediction of wayside noise to assess the benefit of various noise control strategies. This paper describes a graphic method for use when the geometry is rather simple and a computer program for use in situations when track and terrain geometry are complicated.

Hanson, CE Wittig, LE (Bolt, Beranek and Newman, Incorporated) *Transportation Research Record* No. 580, 1976, pp 36-41, 5 Fig., 11 Ref.; ORDER FROM: TRB Publications Off

13 141498 CRITERIA AND LIMITS FOR WAYSIDE NOISE FROM TRAINS. Existing knowledge on speech interference, community annoyance, hearing hazard and sleep disturbance is reviewed in order to suggest criteria for the wayside noise from trains, it being borne in mind that the sound is intermittent and its points of reception may be indoors or outdoors. Criteria in terms of energy equivalent sound level are suggested for speech interference, community annoyance and hearing hazard. No authoritative criterion for sleep disturbance was found. Limits recommended by other authorities are summarized, and there is a worked example assessing the impact of a new urban rail system. (a) /TRRL/

May, DN (Ontario Ministry of Transportation & Communic, Can) *Journal of Sound and Vibration* Vol. 46 No. 4, June 1976, pp 537-50, 3 Fig., 3 Tab., 36 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 20950); ORDER FROM: ESL

13 141569 ACT-1 TURNS IDEAS INTO HARDWARE. Flywheel energy storage, lightweight sandwich body panels and aircraft air-conditioning are some of the innovations on UMTA's two-car Advanced Concept Train (ACT), due for delivery by Garrett. Like the State-of-the-Art (SOAC) cars produced in 1973, Act-1 is an attempt to push transit car technology forward after decades of neglect. UMTA's two objectives are to promote vehicle and component standardization in the USA so as to cut unit costs, but also to make the best use of novel techniques once they are proved to be thoroughly reliable. Beyond the test program, ACT-1 may serve as the engineering basis for a production car tailored to suit specific needs, but meeting as far as is practicable UMTA's goal of standardization in the interests of economy and reliability.

Silien, JS (Urban Mass Transportation Administration) *Railway Gazette International* Vol. 132 No. 9, Sept. 1976, pp 329-333, 3 Fig.; ORDER FROM: ESL

13 141570 HOW THE WEIGHT OF PASSENGER CARS HAS BEEN TRIMMED. In two decades, Japanese carbuilders have reduced the linear mass of carbody shells by improving construction techniques and using light alloys. Similar savings might have been made in trucks and electrical equipment had weight reduction measures not been offset by more elaborate suspensions and demands for higher power ratings. It is in these two areas that the search for

further savings must be made, as large extrusions have brought economic use of material in body construction close to the theoretical limit.

Kato, M (Japanese National Railways) *Railway Gazette International* Vol. 132 No. 9, Sept. 1976, pp 334-38, 2 Fig., 2 Tab., 2 Phot.; ORDER FROM: ESL

13 142072 THE CANADIAN LIGHT RAIL VEHICLE. This publication looks at the Canadian Light Rail Vehicle and considers the background to its development and its revival in Canada.

Main, L ; Urban Transportation Development Corporation Apr. 1975, 6 pp; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

13 142531 MANUFACTURE OF WELDED ALUMINUM BODIES FOR SUBWAY TWO-WAY CAB-DRIVEN CARS [Herstellung von U-Bahn-Doppeltriebwagen in Aluminium-Schweißkonstruktion]. The article describes the manufacture of welded aluminum alloy bodies for the East Berlin subway system, with emphasis placed on production requirements, welder training, and welding processes and equipment used. [German]

Kroschewsky, HJ (Komb Lokomotivbau) Oldenburg, H *Schweisstechnik* Vol. 26 No. 4, Apr. 1976, pp 147-150, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 144032 LIGHT RAIL TRANSIT: ITS NATURE AND ROLE. The U.S. Department of Transportation's policy to support efforts to develop a type of rail system which is less costly to build, operate and maintain than conventional rail transit (CRT) systems is noted, the rather arbitrary distinctions between the latter and light rail transit (LRT) systems are discussed, the principal characteristics of selected LRT systems are tabulated, and the key features common to all such systems are listed. The LRT systems may range from the simple streetcar line to the high capacity CRT and the heavy main-line commuter rail service. LRT's flexibility permits its operation anywhere that tracks and overhead wire can be constructed. This flexibility is derived from the overhead power collection and the ability to handle passengers at either high or low platforms. Significant cost savings and operating flexibility result from LRT's ability to run on "open" surface lines as well as in subways. Attention is focussed on certain noteworthy features of the Cleveland Shaker Heights LRT system, the MBTA Blue Line CRT system, and the San Francisco Muni Metro now under construction. It is suggested that any metropolitan area planning a new transit system or an unconstrained addition to an old system should consider LRT as an alternative.

Seamon, JH *Transportation Research News* No. 66, Sept. 1976, pp 7-9, 1 Fig., 1 Tab.; ORDER FROM: TRB Publications Off

13 144066 DETERMINATION OF THE OPTIMAL APPROACH TO RAIL RAPID TRANSIT CAR STANDARDIZATION. This report documents the findings of Phase I of a two-part program on standardization of rail rapid transit cars. The purpose of Phase I was to determine the optimal form of standardization

which would: stabilize the prices of new rail rapid transit cars; reduce operating and maintenance costs; improve equipment reliability and maintainability. APTA, the American Public Transit Association, and RPI, the Railway Progress Institute, established technical boards which provided transit industry technical analysis and review of the work plans, approaches, and findings of the technical contractor. This first phase final report documents the analysis leading to a determination that rail rapid transit car standardization is feasible and should be implemented under a phased program to develop a qualified products list and products qualification procedure, a car prototype certification procedure, and a family of car performance specifications.

Morris, R McGinnis, N deRegt, M Reinhardt, W International Research & Technology Corporation, (ITR-440-R) Final Rpt. UMTA-IT-06-0131-761, Aug. 1976, 131 pp; Work sponsored by UMTA, DOT.; Contract DOT-UT-60056; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-259363, DOTL NTIS

13 145141 PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1975-1976 REPORT OF SURVEY COMMITTEE) CARS AND EQUIPMENT. This survey of the annual ASME report covers some of the major developments in freight and passenger equipment made public in the last calendar year. It also covers developments worldwide as well as domestic. In the freight area, the main developments aimed at the transport of bulk commodities and unit trains with some thought being given to increased speeds. The passenger developments are continuing in LRVS, Rapid transit, and commuter transport.

Manos, WP ; American Society of Mechanical Engineers Conf Paper 76-WA/RT-12, Dec. 1976, 9 pp, 36 Fig.; Contributed by the Rail Transportation Division of The American Society of Mechanical Engineers for presentation at the Winter Annual Meeting, New York, N.Y., December 5, 1976.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

13 145552 URBAN RAIL SUPPORTING TECHNOLOGY. A FIVE YEAR PROGRESS SUMMARY, 1971-1976. Contents: Program management; Applications engineering and technical support; Facilities development; Test and evaluation; Technology development; Noise abatement; Tunneling; Safety and reliability.

Transportation Systems Center, Urban Mass Transportation Administration UMTA-MA-06-0025-76-7, June 1976, 133 pp; (PC A07/MF A01); Contract DOT-MA-06-0025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-25909/9ST, DOTL NTIS

13 147686 LIGHT VEHICLE DESIGN PHILOSOPHY. Shielded arc welding, greater knowledge about fatigue of welded joints, development of large extrusions and desire to conserve energy have resulted in greater interest in application of aluminum for rolling stock. History of the material's application and ways it is used in contemporary passenger equipment are discussed.

Zehnder, J (Swiss Aluminum Limited) *Railway Engineer* Vol. 1 No. 6, Nov. 1976, pp 46-48, 7 Fig.;

ORDER FROM: Mechanical Engineering Publications, Penthouse 1, 15 West 55th Street, New York, New York, 10019

13 148248 REGENERATION AND ASSURED RECEPTIVITY IN RAIL TRANSIT. Concern for energy conservation and reduced heat in the subway has caused increased interest in regeneration. However, receptivity of the distribution system to regenerated energy is questionable, leading to consideration of controlled wayside resistors to assure receptivity. The question was studied in terms of train operation, electrical network performance, ventilation and cooling system requirements, and present-worth economic analysis.

Metsch, WW (Parsons, Brinckerhoff, Quade and Douglas, Inc) Phelps, DR Sotak, RA Uher, RA Vitt, H ; American Society of Mechanical Engineers Conf Paper Paper D&O-14, 1976, 21 pp, 15 Ref.; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247.; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

13 148253 ENERGY STORAGE PROPULSION SYSTEM FOR ADVANCED CONCEPT TRAIN. The paper describes the propulsion system for the Advanced Concept Train (ACT-1), which is designed to minimize energy consumption of urban rail vehicles by the inclusion of on-board, motor-driven flywheels for recovery and storage of braking energy. This energy source then is used for the next required vehicle acceleration. Minimizing the energy consumption of this type of system requires that the flywheels be sized to absorb all energy recovered from the traction motors during normal vehicle decelerations. In addition, since the recovered energy is processed twice through the traction and flywheel motors, both these devices must be highly efficient.

McConnell, RW (Garrett Corporation) ; American Society of Mechanical Engineers Conf Paper Paper D&O-38, 1976, 6 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247.; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

13 148305 THREE-PHASE TRACTION MOTOR FOR D.C. TRAMS [Drehstromantrieb fuer Gleichstrombahnen]. A tram traction motor of squirrel-cage design is described. The motor is supplied by a converter consisting of a d.c. controller and an inverter with phase-sequence suppression. The vehicle has a combined regenerative and dynamic brake system. The transient characteristics of the motor are similar to those of a series-wound traction motor fed through a d.c. controller. [German]

Waidmann, W *Siemens Review* Vol. 50 No. 7, July 1976, pp 493-497; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 148313 NOISE AND VIBRATION CONTROL FOR THE MARTA RAIL TRANSIT SYSTEM. The noise produced by new high-speed rail rapid transit system operations is much less than traditionally expected due to the modern design concepts and equipment which include specific features for reducing noise and vibration. Using data obtained from various

operational and experimental rail transit vehicles and systems, the noise characteristics to be expected from the MARTA facilities and equipment have been determined. The known and specified noise characteristics can be used during the planning and design of the transit systems to determine the expected wayside or community noise levels for various types of way structures, vehicles, and operational conditions, and can also be used to determine design features or system characteristics which should be included for the control of noise. This permits the inclusion of noise as one of the factors affecting the system planning and design.

Wilson, GP (Wilson, Ihrig and Associates, Incorporated) Box, S ; Acoustical Publications, Incorporated Proceeding 1975, pp 302-309; This paper appears in NOISEXOP: National Noise and Vibration Control Conference, Proceedings of the Technical Program; the conference was held in Atlanta, Georgia, April 30-May 2, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Acoustical Publications, Incorporated, 27101 East Oviatt, Bay Village, Ohio, 44140

13 149406 ELECTRIC EQUIPMENT OF MULTIPLE UNITS SERIES 472/473 [Elektrische Ausruestung fuer die Triebzuege der Baureihe 472/473]. A description is given of the electric equipment of the multiple units consisting of three parts with all axles driven which has been developed for the urban rapid transit system of Hamburg, West Germany. The arrangement of main circuits and the driving and braking control are explained. The three-phase auxiliary supply network fed by a rotating converter, the door-control and heating and lighting of the passenger areas are also described. [German]

Wegener, P *Elektrische Bahnen* Vol. 47 No. 1, Jan. 1976, pp 24-27, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 149407 SIX-AXLE HIGH-SPEED URBAN RAPID TRANSIT CAR CONSTRUCTION TYPE KOELN (COLOGNE) [Der Sechssachsige Schnellverkehr-Stadtbahwagen Bauart Koeln]. A light-weight rapid-transit car is described which will make possible a gradual transition from the conventional operation toward a modern rapid transit system. The two-unit articulated multiple unit in steel light weight construction meets strict standards with regard to performance and riding quality. It reaches a maximum speed of 100 km/hr with a starting acceleration of 1.1 m/sq sec, has a one-hour rating of 2 x 235 kw at 750 v dc power supply and offers a capacity of 72 seats and 111 standers. The mechanical part and the electric equipment are described. [German]

Lellmann, K Barsch, O *Elektrische Bahnen* Vol. 47 No. 2, Feb. 1976, pp 31-38, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 149943 MODERN EXPRESS TRAMS [Moderne Sneltrams]. This book starts from the how and why of the renewed interest in modern tramway technology or light rapid transit (LRT). An attempt has been made to build up a current picture of the state of the art, in which the most relevant features of LRT as a public transport system are highlighted, including the reasons for its rebirth, traffic management developments, town planning, environmental and system building considerations. A closing chapter assembles

the most important criteria for financial, socio-economic, commercial and political evaluation, which are, wherever possible, quantified. /TRRL/ [Dutch]

Kaper, HP ; Uitgevers Wijt, (90-6007-558-7) Monograph 1976, 156 pp, Figs., Photos.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV60008E), TRRL (IRRD 224118); ORDER FROM: Uitgevers Wijt, 111 P de Hoochweg, Rotterdam, Netherlands

13 149979 ELECTRONIC CONTROL DEVICE FOR A MULTI-STAGE ELECTROMECHANICAL SPRING BRAKING SYSTEM [Elektronisches Steuergeraet fuer ein vielstufiges elektromechanisches Federspeicher-Bremssystem]. All-electric rail vehicles without a compressed air installation require mechanical braking to replace the compressed air system. The author uses the example of the "Tram 2000" of the Zurich city transport undertaking to explain the electrically-operated spring brake with electronic control, developed by the "Ateliers de Secheron" Company. [German/French]

Werder, J *Brown Boveri Review* Vol. 63 No. 12, Dec. 1976, pp 732-736, 6 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 150482 PRELIMINARY ANALYSIS OF THE EFFECTS OF NON-LINEAR CREEP AND FLANGE CONTACT FORCES ON TRUCK PERFORMANCE IN CURVES. Prediction of wheel displacements and wheel-rail forces is a prerequisite to the evaluation of the curving performance of rail vehicles. This information provides part of the basis for the rational design of wheels and suspension components, for establishing criteria for maintenance of track and wheels, for use as a guideline for safety standards, and for understanding the mechanism of noise generation and wheel-climbing. The analysis presented here extends the results from linear steady-curving appropriate to flangeless guidance, and provides a foundation for the examination of the details of forces and displacements under more severe conditions necessary to the understanding, prevention, and suppression of undesirable effects.

Perlman, AB Weinstock, H ; Transportation Systems Center, Federal Railroad Administration Intrm Rpt. DOT-TSC-FRA-75-5, FRA/ORD-75/56, May 1975, 42 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262177/9ST, DOTL NTIS

13 152396 UNDERGROUND RAILWAY TRACK EQUIPMENT [Armamento delle metropolitane]. The author gives information on rail measurements which are used for most of the world's underground railways and then calculates track characteristics and permissible rail wear limits. He describes the precautions that must be taken to limit corrugation and the most well-known track construction methods used for underground railways as well as for surface rail systems. [Italian]

Zignoli, V *Ingegneria Ferroviaria* Vol. 23 No. 4, Apr. 1976, pp 24-42, 20 Fig., 13 Tab., 20 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 152464 ELECTRICAL POWER SYSTEMS OF THE WASHINGTON METRO RAIL TRANSIT SYSTEM. The electrical systems of the METRO rail system may be divided into two basic functional systems. These are the electric traction system and the support utility electrical system. The traction system converts incoming primary energy to nominal 700 volts direct current for distribution via the contact rail to provide propulsion power for the multiple-unit rail transit cars. The support utility system transforms incoming primary energy for distribution via load centers to station and right-of-way for lighting, mechanical equipment, escalators, elevators, pumps, ventilation, communications and control systems. Both of these facilities are served at primary voltages from the power utility company that serves the jurisdiction that the facility is located in. The METRO power system does not employ sub-transmission between transit facilities at primary voltages.

Luhrs, AG (Washington Metropolitan Area Transit Authority); Institute of Electrical and Electronics Engineers Tech. Pap. 77CH1237-71A, 1977, pp 49-59, Figs.; Presented at the 1977 Joint ASME/IEEE/AAR Railroad Conference, March 30-April 1, in Washington, D.C.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL

13 152465 WASHINGTON METRO'S RAPID TRANSIT CARS. Every new transit property faces a multitude of difficult decisions in establishing the design criteria for its transit cars. These decisions deal with the cars' construction, dimensions, the various sub-systems, their interface with each other and with the train control equipment to provide optimum performance economically without sacrificing the equipment reliability and maintainability. This paper gives a description of the Washington Metro's present rapid transit cars and will give a brief evaluation of these cars' demonstrated performance.

Bassily, FP (Washington Metropolitan Area Transit Authority); Institute of Electrical and Electronics Engineers Tech. Pap. 77CH1237-71A, 1977, pp 32-41, 22 Fig., 3 Ref.; Presented at the 1977 Joint ASME/IEEE/AAR Railroad Conference, March 30-April 1, in Washington, D.C.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL

13 152677 A BASELINE AUTOMATIC TRAIN CONTROL SYSTEM INCORPORATING SYSTEM ASSURANCE CONSIDERATIONS. Agencies responsible for rail rapid transit projects are increasingly aware of the area of system assurance, including reliability, maintainability and safety. Specifications call for contractors to include system assurance programs establishing objectives, with supporting organization, procedures and documentation. This recognizes the contribution of system assurance in determining quality of service offered. Recently this thinking has been extended to a conceptual command and control system for a rapid transit system. The conceptual system is a baseline from which final performance and hardware specifications could be developed after analysis of variations therefrom. The baseline system permits automatic operation and takes advantage of the facts that acceptable performance can be achieved without an excessive number of commands, and that recent developments in rail insulated joints

offer high reliability of insulated track circuits. This permits use of power-frequency track circuits modulated by a limited number of command codes. The result is a relatively low system component count and reduction in active elements, factors with favorable impact on system availability. Principal command and control functions included in the baseline system, and subjected to system assurance analysis, include vehicle direction, speed, train separation, station stopping profile, platform positioning, door control, station dwell time, and train to wayside communication. Analysis indicates configuration variations are possible which could appreciably increase the estimate of mean time between failure while maintaining fail-safe standards of baseline system.

O'Neill, J; General Railway Signal Company No Date, 7 pp, 3 Fig., 2 Ref.; ACKNOWLEDGMENT: General Railway Signal Company; ORDER FROM: General Railway Signal Company, GRS and West Avenue, Rochester, New York, 14602

13 152780 ELECTRICAL EQUIPMENT FOR LONDON UNDERGROUND EXTENSIONS. Details are presented about trackside electric equipment for the new cross-London (England) Fleet line (completion next year) and the extension to London Airport (partially open last year). Features of the switchgear and protection equipment, low voltage switchboards, and signal frequency changers are reported.

Reeves, EA *Electrical Engineer* Vol. 53 No. 6, June 1976, pp 25-26, 4 Ref.; ACKNOWLEDGMENT: EI (EIX770200034); ORDER FROM: ESL

13 152784 R-32 ENERGY STORAGE PROPULSION SYSTEM. This paper describes a transit vehicle propulsion system which saves much of the presently wasted energy by storing the car's kinetic energy in two flywheels during vehicle braking. This stored energy is then used to accelerate the vehicle out of the station without drawing power from the wayside electric power source. The flywheel energy storage propulsion system has been installed on two New York City R-32 subway cars in place of the conventional propulsion equipment. The two cars have completed extensive testing at the Department of Transportation Test Center in Pueblo, Colorado. Extensive testing of the energy storage propulsion system cars is being carried out on the New York City Transit Authority system. At the conclusion of the test program the cars will be put into revenue service for reliability and energy saving evaluation.

Weinstein, CH (AiResearch Manufacturing Company); Institute of Electrical and Electronics Engineers Conf Paper 1975, pp 238-246; Presented at the 10th IEEE Industry Applications Society Annual Meeting, Conference Record, Atlanta, Georgia, September 28-October 2, 1975.; ACKNOWLEDGMENT: EI (EIX770200040); ORDER FROM: ESL

13 152800 1500 V, DC ELECTRIC RAILCARS FOR LINE "A" OF THE ROME METROPOLITAN RAILWAY [Elettromotrici a 1500 V c.c. per la linea "A" della Metropolitana di Roma]. A brief introduction gives characteristics of the line "A" design layout, the results achieved and principal characteristics of the railcar are given followed by a description of the railcar itself

with regard to both its mechanical and electrical parts. [Italian]

Ciuliani, D (STEFER, Rome, Italy) *Ingegneria Ferroviaria* Vol. 123 No. 3, Mar. 1976, pp 5-15; ACKNOWLEDGMENT: EI (EIX770200080); ORDER FROM: ESL

13 153063 TRAMWAYS AND TROLLEYS: THE RISE OF URBAN MASS TRANSPORTATION IN EUROPE. This book is an historical and statistical investigation of the growth of the European electric tramway industry between 1890 and 1910 with primary focus on France, Germany and Great Britain. Data is evaluated in terms of three basic sociological disciplines: Development, diffusion and public management of technology and innovation; patterns of entrepreneurship and economic activity; and the impact of transportation changes upon the urban environment. Conclusions are drawn concerning these and inferences are made about the future. Discussing technological innovation, it is observed that such movements that have vast consequences for society cannot be allowed to run wildly on the basis of what is presently cheapest and most dependable, without proper regard for long-term cost and related negative consequences.

McKay, JP (Illinois University, Urbana); Princeton University Press Monograph 1976, 282 pp, 16 Fig., 12 Tab., Refs.; ORDER FROM: Princeton University Press, 41 William Street, Princeton, New Jersey, 08540; ISBN-0-691-05240-9, DOTL HE3812.M33

13 153381 SYNCHRONOUS MOTOR RAIL-CAR PROPULSION. Development of ac motor drives for rail transit car propulsion has centered on the induction motor with pulsewidth modulated (PWM) inverter control. Interest in the induction motor as a replacement for the series dc traction motor stems from the simplicity of the squirrel cage rotor of the induction motor. In this article, the short-comings of PWM inverter-induction motor transit car drive are examined. It is shown that the synchronous, or brushless dc, motor drive can provide performance exceeding both the PWM inverter-induction motor and the conventional dc motor in the transit car application.

Bourbeau, FJ (General Motors Corporation) *IEEE Transactions on Industry Applications* Conf Paper Vol. 1A13 No. 1, Paper IOD-75-57, Jan. 1977, pp 8-17, 12 Fig., 20 Ref., 1 App.; Presented at the IEEE/IAS 9th Annual Meeting, Pittsburgh, Pa., 7-10 October 1974.; ACKNOWLEDGMENT: IEEE Transactions on Industry Applications; ORDER FROM: ESL

13 153382 INVERTER-INDUCTION MOTOR DRIVE FOR TRANSIT CARS. The advent of large power semiconductors has made it possible to apply inverters and ac motors to traction applications. Either synchronous or induction motors and several types of power converters can be considered. The induction motor and the pulsewidth modulated (PWM) inverter are selected as favorable for application to a transit car drive. A general method of sizing the PWM inverter and induction motor in terms of the car performance requirements is outlined. This method results in a minimum size inverter and allows optimization of system weight and cost. A discussion of wheel size effects and the optimization of regenerated energy is included.

Plunkett, AB Plette, DL (General Electric Company) *IEEE Transactions on Industry Applications* Conf Paper Paper IOD-75-58, Jan. 1977, pp 26-37, 18 Fig., 4 Ref., 1 App.; Presented at the IEEE/IAS 9th Annual Meeting, Pittsburgh, Pa., 7-10 October 1974.; ACKNOWLEDGMENT: IEEE Transactions on Industry Applications; ORDER FROM: ESL

13 153793 THE "SERIES 5000" ROLLING STOCK FOR THE MADRID METRO [Le materiel roulant series 5000 du Metro de Madrid]. To cope with increasing passenger traffic in a satisfactory manner, the MADRID Metro has recently purchased 65 two-car trainsets giving higher capacity, improved comfort, greater reliability and lower maintenance costs. These steel-constructed two-car trainsets weigh 64 t. They operate on a 600 V d.c. supply, can reach 90 km/h and are powered by four 210 kW monomotor bogies. The soundproofing and temperature control installations in the coaches are particularly well designed. The door-operating equipment is pneumatic. The underframes are of welded steel plate construction and the motors are fully suspended. Electric-pneumatic brakes are fitted. These trains have automatic driving and state of line display equipment. [French]

Tejero, R. *Revue Generale des Chemins de Fer* Feb. 1977, pp 97-102, 8 Fig., 1 Tab.; ACKNOWLEDGMENT: *Revue Generale des Chemins de Fer*; ORDER FROM: ESL

13 154398 RAIL TRANSIT ADVISORY BOARD. VOLUME 2. PROCEEDINGS. Representatives of all of the major rail rapid transit properties in the U.S. participated in an advisory board to review the technical and institutional problems connected with rail cars. The report presents the results of studies of the problems and feasible solutions in these areas as they apply to the rail transit industry.

General Motors Corporation Final Rpt. EP-76029, Sept. 1976, 123 pp; See also PB-262071.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263072/1ST, DOTL NTIS

13 154399 RAIL TRANSIT ADVISORY BOARD. VOLUME 1. EXECUTIVE SUMMARY OF PROCEEDINGS. Representatives of all of the major rail rapid transit properties in the U.S. participated in an advisory board to review the problems of operation and performance requirements, interchangeability between properties and cars, reliability and maintainability, and rail car suppliers manufacturing of components. A discussion of the feasibility of solutions which might be proposed is also included. (Color illustrations reproduced in black and white.)

General Motors Corporation Final Rpt. EP-76031, Sept. 1976, 22 pp; See also PB-262072.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263071/3ST, DOTL NTIS

13 154841 GUIDEWAY-VEHICLE COST REDUCTION. PART I: GUIDEWAY-VEHICLE PERFORMANCE AND COSTS. The cost and performance benefits of using improved suspensions in passenger railcars are investigated. Preliminary results from the first year of a two year study are presented. The primary objective is to determine if improved vehicle suspensions can reduce overall system cost by allowing lower

guideway maintenance standards. Cost determinations are limited to guideway annual maintenance and vehicle suspension installation and maintenance. The guideway/suspension system is divided into several areas which are analyzed separately. In Part I, transfer function models of passenger railcar and bus dynamics, and power spectral density models of guideway disturbances are developed. Preliminary guideway and suspension cost data are also analyzed.

Klinger, DL Cooperrider, NK Hedrick, JK White, RC Calzado, A; Arizona State University, Tempe, Department of Transportation Final Rpt. DOT/TST-76/95-1, July 1976, 159 pp; See also Part 2, PB-265 967.; Contract DOT-OS-50107; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265966/2ST, DOTL NTIS

13 154842 GUIDEWAY-VEHICLE COST REDUCTION. PART II: ACTIVE SUSPENSION FEASIBILITY. The cost and performance benefits of using improved suspensions in passenger railcars are investigated. Preliminary results from the first year of a two year study are presented. The primary objective is to determine if improved vehicle suspensions can reduce overall system cost by allowing lower guideway maintenance standards. Cost determinations are limited to guideway annual maintenance and vehicle suspension installation and maintenance. In Part II, an assessment of active suspension feasibility is made which includes the preliminary design of a new low power pneumatic concept. A preliminary suspension/guideway maintenance cost tradeoff is described which shows that active suspensions are cost effective for low vehicle density routes.

Klinger, DL Cooperrider, NK Hedrick, JK White, RC Calzado, A; Arizona State University, Tempe, Department of Transportation Final Rpt. DOT/TST-76/95-2, July 1976, 82 pp; See also Part 1, PB-265 966.; Contract DOT-OS-50107; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265967/0ST, DOTL NTIS

13 154855 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. The Annual Report reviews the fifth year's efforts of the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program. Three major hardware tasks were active during this reporting period: State-of-the-Art Car (SOAC), Advanced Concept Train R&D (ACT-1), and Advanced Subsystem Development Program (ASDP). The objective of this Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing transit vehicles that are as comfortable, reliable, safe, and economical as possible. Accomplishments for the year ending September 1976 include the following: Completed arrangements to further extend the operational demonstration of the SOAC vehicles to include nine months of revenue service on the Lindenwold High Speed Line of PATCO--The design, development testing and fabrication portions of the ACT-1 program are in the final stages with delivery of the first vehicle to DOT Transportation Test Center, Pueblo, Colorado, scheduled for February 1977.

Boeing Vertol Company, Urban Mass Transportation Administration Ann. Rpt. UMTA-IT-06-0026-77-1, Oct. 1976, 135 pp; See also PB-254 727.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266096/7ST, DOTL NTIS

13 155372 ROSTER OF NORTH AMERICAN RAPID TRANSIT CARS 1945-1976. This document is a compilation of data on rapid transit cars built between 1945 and 1976. It includes cars in the United States, Canada and Mexico. Data include cost, performance, dimensions, weights, electrical equipment, heating and ventilating systems, traction motors, propulsion equipment, lighting systems, and trucks and suspensions. The roster is broken down by authorities in alphabetical order, and has a further breakdown per transit authority in chronological order of transit car.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0121) UMTA-DC-06-0121-77-1, Jan. 1977, 254 pp; Contract DOT-UT-60004; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266620/4ST, DOTL NTIS

13 156216 SOLVENTLESS SILICONE RESIN INSULATES TRACTION MOTORS FOR MAJOR RAIL VEHICLE SYSTEMS. Resin is being used to impregnate the windings of traction motors manufactured for light and heavy rail vehicles in rapid transit systems. The results include improved protection for the windings from contamination, better heat transfer, and more rigid bonding of individual wires together into a solid mass that resists vibration and shock damage.

Immanuel, H (AiResearch Manufacturing Company) Boesel, WF *Insulation/Circuits* Vol. 22 No. 13, Dec. 1976; ACKNOWLEDGMENT: EI (EIX770400220); ORDER FROM: ESL

13 156873 TIME TO STANDARDISE LRT CAR DESIGNS. Despite the existence of only a small number of builders of specialized cars for light rail transit systems, no standard car has emerged suitable for the two basic types of LRT operation in the way that the American PCC design of the 1930's became widely accepted on both sides of the Atlantic. The author compares, contrasts and comments on 16 basic designs in use or proposed for Western Europe and the U.S., and suggests standards covering a six-axle car suitable for straight tramway networks and an eight-axle design with greater capacity for pre-metros.

Railway Gazette International Vol. 133 No. 5, May 1977, pp 180-185, 2 Tab., 8 Phot. ORDER FROM: ESL

13 157567 ARTICULATED TRAMS '2000 SERIES' OF THE ZURICH MUNICIPAL TRANSPORT AUTHORITY. From 1976 onward, the Zurich Municipal Transport Authority is putting a total of 60 articulated trams of the series 2001/2301 'Tram 2000' into operation. These vehicles, conceived as 'all-electric' vehicles, are equipped with electronic choppers and electronically controlled spring-loaded brakes. The author provides a concise but comprehensive description of the electrical part of the vehicle.

Baechler, U *Brown Boveri Review* Vol. 63 No. 12, Dec. 1976, pp 717-723; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 157577 ELECTRONIC CONTROL FOR THE MULTIPLE UNITS SERIES 472/473 [Elektronische Steuerung fuer die Triebzuege der Baureihe 472/473]. The train and braking control system and its electronic devices of the multiple

units series 472/473 for the rapid transit system in Hamburg, West Germany, are described. The conditions at the starting and braking and the nonskid and antislipping device are discussed. [German]

Eikermann, J *Elektrische Bahnen* Vol. 47 No. 12, Dec. 1976, pp 282-284, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 157586 CURRENT STATE OF DEVELOPMENT OF THE MINDEN-DEUTZ BOGIES [Zum Entwicklungsstand der Minden-Deutz-Drehgestelle]. The author stresses that bogies of the Minden-Deutz design have found wide application ever since their development was started and that bogies of the most different designs are in use of 21 countries in the networks of state railroads, private railroads and public transport operators. The article reports on the present state of development of the Minden-Deutz bogies and on the improvements and advances that have been made both to the bogie as a unit and to its various components. [German]

Eschenauer, P (Technical University of Hannover, West Germany) *Glaser's Annalen ZEV* Vol. 101 No. 2, Feb. 1977, pp 43-48, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 158073 STATE-OF-THE-ART CAR (SOAC) ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION HIGH-SPEED GROUND TEST CENTER VOLUME V11 POST-REPAIR TESTS. This document presents the test results from the State-of-the-Art Post-Repair Engineering Test Program conducted at the DOT High-Speed Ground Test Center, Pueblo, Colorado, from March 18th to 29th, 1974. The SOAC has been developed under UMTA's Urban Rapid Rail Vehicle and Systems Program to enhance the attractiveness of rapid rail transportation to the urban traveller. The test data continuity between the original HSGTC Engineering Tests and the Post-Repair Test was established. Test data of variations from the original data have not been significant in terms of overall vehicle performance. of overall vehicle performance.

Oren, R ; Boeing Vertol Company, (DOT-SCU-TA-74-16-V11) Final Rpt. UMTA-MA-06-0025-75-1, Nov. 1974, 202 pp; Study sponsored by Urban Mass Transportation Administration and contracted to Transportation Systems Center, Cambridge, Massachusetts.; Contract DOT-TSC-580; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-252337

13 159384 ENGINEERING TESTS FOR ENERGY STORAGE CARS AT THE TRANSPORTATION TEST CENTER. VOLUME IV. RIDE ROUGHNESS TESTS. The primary purpose of the tests documented herein was to demonstrate the principles and feasibility of an energy storage type propulsion system, and its adaptability to an energy storage type propulsion system, and its adaptability to an existing car design. The test program comprised four phases of tests on two New York City Transit Authority R-32 cars where the conventional propulsion system was replaced by an energy storage system. The four test phases were: verification of safe arrival, debugging procedures, performance verification tests, and expanded test program.

Curran, WT ;

AiResearch Manufacturing Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-6-4, May 1977, 168 pp; See also Volume 3, PB-269 402. Also available in set of 4 reports PC E10, PB-269 399-SET.; Contract DOT-TSC-838-4; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269403/2ST, DOTL NTIS

13 159602 MEANS FOR IMPROVING THE STEERING BEHAVIOR OF RAILWAY VEHICLES (ABRIDGMENT). Three specific means to improve the steering behavior of railway vehicles are under development. A new Canadian design is described which provides for a steering motion of the wheelsets in curves and a damping of the wheelset hunting. A modified conventional freight car truck is now being tested in which the parameters that govern curving and high-speed stability are virtually identical to those of the Canadian truck. However because these trucks use standard truck side frames, the radial curving is limited by the existing side frame clearances to about 4 deg of track curvature. A high speed transit car that uses a positive steering arrangement in addition to the basic construction feature of the truck designs described above is also outlined. Further highlights of these truck designs are outlined. Comments are also made on the truck steering mechanics. The truck designs described here can effect a considerable reduction in wheel wear, rail wear, truck component wear and fatigue, carbody component wear and fatigue, derailments, noise, traction power consumption, and constraints on the layout of rail transportation systems.

List, HA (Railway Engineering Associates, Incorporated) *Transportation Research Record* No. 614, 1976, pp 35-37, 4 Fig., 9 Ref.; This article appeared in TRB Research Record No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

13 162956 THE SERIES ER-22 W ELECTRIC TRACTIVE UNIT WITH RHEOSTATIC AND REGENERATIVE BRAKING FOR LOCAL TRAFFIC ROUND MOSCOW [Der Elektrotriebzug der Baureihe ER-22 W mit Widerstands- und Netzbremse fuer den Moskauer Nahverkehr]. A new electric multiple unit divided into four parts has been developed for the rapid transit system of the Moscow area of the Soviet capital. The basic principle associated with the development of this train from the mechanical and electric viewpoints are pointed out. This multiple unit, rated for overhead networks with 1500 v dc operates by dynamic braking as well as regenerative brakes, which are especially dealt with. The latter are considered in more detail. [German]

Dimant, J Zhivs, V *Elektrische Bahnen* Vol. 48 No. 4, Apr. 1977, pp 104-108, 1 Fig., 2 Tab., 3 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD, EI; ORDER FROM: ESL

13 162957 REGENERATION AND ASSURED RECEPTIVITY IN RAIL RAPID TRANSIT. Regenerative braking both saves energy and prevents tunnels becoming hot because of the thermal energy lost with non-regenerative braking. The traction network's permanent regeneration capacity is provided by means of shunt

mounted rheostats or by means of kinetic regenerators with fly wheels. The document is a thorough study of how such a traction system works with line voltage and current charts, details of the amount of energy regenerated, improvement in tunnel ventilation systems, dimensions of electric equipment and economic viability.

Metsch, WW ; American Society of Mechanical Engineers Conf Paper D/0-14, July 1976, 21 pp, 20 Fig., 18 Tab., 15 Ref.; Proceedings of the 4th Intersociety Conference on Transportation.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ASME

13 163279 PROBLEM OF EMERGENCY POWER SUPPLY ON METROPOLITAN RAILWAYS. DESCRIPTION OF THE POSSIBLE SOLUTIONS [Il problema della alimentazione di emergenze nelle ferrovie metropolitane. Descrizione delle soluzioni possibili]. The problem of the continuity of power supply on the underground metropolitan railways is considered. A review of the various possible solutions is given, bringing out, in particular, two systems based, respectively, on the adoption of inverters or direct current motors coupled with synchronous generators, very similar in principle, but very different from the point of view of technical realization. The technological content of these systems is, however, so high that both are in a position to guarantee an extremely high level of trustworthiness. [Italian]

Rizzo, M *Ingegneria Ferroviaria* Vol. 32 No. 2, Feb. 1977, pp 94-100; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 164415 REMOTE CONTROL OF ELECTRIC POWER SUPPLY IN THE MUNICIPAL RAPID TRANSIT SYSTEM. HISTORICAL DEVELOPMENT OF THIS TECHNOLOGY IN BERLIN, GERMANY, FROM 1930 TO 1975--ON THE OCCASION OF THE 75TH ANNIVERSARY SINCE THE ESTABLISHMENT OF THIS UNDERGROUND SYSTEM [Fernsteuerung der Stromversorgung im Stadtbahnschnellverkehr. Historische Entwicklung dieser Technik in Berlin von 1930 bis 1975--Aus Anlass des Fuenfund-siebzigaehrigen Bestehens dieser U-Bahn]. The operational network of the Berlin underground railroad lines has been extended to 100 km within 75 years. Growing power and energy demand of the multiple units called for an increasingly higher installed power level in substations with smaller distances. The economical and operational use as well as staff problems required the development of automation and remote control. A description is given, from the historical, technical and economical point of view, of the development from the very beginning of remote control to the operating control center installed according to the most modern technical aspects. [German]

Hoehn, H Hiedrich, G *Elektrische Bahnen* Vol. 48 No. 2, Feb. 1977, pp 37-46, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 164445 THE METRO AT ATLANTA [Le Metro d'Atlanta]. The Metropolitan Atlanta Rapid Transit Authority (MARTA) has ordered 100 coaches for the metro lines now being built in Atlanta, capital of Georgia (USA), from the "Societe Franco-Belge de materiel de Chemin de fer" (Franco-Belgian Railway Rolling Stock Company). Delivery will commence in June 1978

and the rolling stock is designed to meet specifications and requirements that are quite different from those generally encountered in Western Europe. The body of the coaches is similar in many respects to that of the MF77 Series of the Paris Transport Authority (RATP) and their common origins are obvious. They have an integral body and chassis without framework of sheet metalwork. The sides, underframe and roof consist of extruded aluminum sections welded together. The electrical equipment, supplied by Garrett and designed for the 750 V 3rd rail system, includes two direct-current traction motors on each bogie. The traction motor speed is controlled by thyristor chopper equipment. A dual braking system is provided using electric regenerative brakes and pneumatic friction brakes. [French]

Revue Generale des Chemins de Fer July 1977, pp 399-406, 3 Fig., 2 Phot. ACKNOWLEDGMENT: *Revue Generale des Chemins de Fer*; ORDER FROM: ESL

13 166445 GENERAL VEHICLE TEST INSTRUMENTATION EVALUATION. A General Vehicle Test System (GVTS) has been developed by the Transportation Systems Center, Cambridge, Massachusetts to facilitate rail transit vehicle testing at the Transportation Test Center (TTC), Pueblo, Colorado. This system was designed to be responsive to requirements specified in the publication GENERAL VEHICLE TEST PLAN (GVTP) for URBAN RAIL TRANSIT CARS, report number UMTA-MA06-0025-75-14. This report presents the results of evaluation tests carried out on the GVTS at the TTC, Pueblo, Colorado, in May 1975. The GVTS is an integrated instrumentation system consisting of transducers, signal conditioners, signal filters, interface and control electronics, a data acquisition system, signal monitoring and output devices, and all related hardware and software. The objective of this test series is to evaluate the performance of the instrumentation system under actual rail transit operating conditions. Parameters evaluated include vehicle current, voltage, acceleration/vibration pressure, pressure, temperature, displacement, and strain. The GVTS as tested provides 37 of the 48 required Standard Outputs described in the GVTP.

Babb, LV ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-12, UMTA-MA-06-0025-77-9, Mar. 1977, 214 pp; See also report dated September 75, PB-250575. General Vehicle Test Plan RRIS 03, 133090, 7701 Bulletin.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269598/9ST, DOTL NTIS

13 167086 EVALUATION OF FOUR DIFFERENT RAIL RAPID TRANSIT PROPULSION SYSTEMS. At UMTA request, APTA evaluated four different propulsion systems. Due to lack of precise estimates for acquisition, maintenance, and traction power savings, this analysis is qualitative and adheres to the guideline that system elements will be compared subjectively, based on known design features and conservative extrapolation. A comparison was made of Garrett's flywheel energy storage, GE's AC propulsion (pulse-width modulation-PWM), Delco's self-synchronous motor, and a regenerative chop-

per to determine life cycle costs and related factors that would impact on eventual selection and application for revenue service.

Greene, FS ; American Public Transit Association, Urban Mass Transportation Administration Final Rpt. UMTA/URRVS-77/01, Nov. 1976, 20 pp; Contract DOT-UT-60060; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271301/4ST, DOTL NTIS

13 167925 ENGINEERING TESTS FOR ENERGY STORAGE CARS AT THE TRANSPORTATION TEST CENTER. VOLUME I. PROGRAM DESCRIPTION AND TEST SUMMARY. The primary purpose of the tests documented herein was to demonstrate the principles and feasibility of an energy storage type propulsion system, and its adaptability to an existing car design. The test program comprised four phases of tests on two New York City Transit Authority R-32 cars where the conventional propulsion system was replaced by an energy storage system. The four test phases were: verification of safe arrival, debugging procedures, performance verification tests, and expanded test program. This report contains test data collected during the performance verification and expanded test program phases. Testing was conducted at the DOT Transportation Test Center, Pueblo, Colorado. The data was collected and processed in accordance with the General Vehicle Test Plan for Urban Rail Transit Cars.

Curran, WT ; AiResearch Manufacturing Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-6-1, UMTA-MA-06-0025-77-2, May 1977, 138 pp, 13 Fig.; Available in set of 4 reports PC E10, PB-269400-PB-269403. See also Volumes II-IV, RRIS 04 167926-167928 respectively; RRIS Bulletin 7801.; Contract DOT-TSC-8381; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269400/8SL, DOTL NTIS

13 167926 ENGINEERING TESTS FOR ENERGY STORAGE CARS AT THE TRANSPORTATION TEST CENTER. VOLUME II. PERFORMANCE POWER CONSUMPTION AND RADIO FREQUENCY INTERFERENCE TESTS. The primary purpose of the tests documented herein was to demonstrate the principles and feasibility of an energy-storage-type propulsion system, and its adaptability to an existing car design. The test program comprised four phases of tests on two New York City Transit Authority R-32 cars where propulsion system was replaced by an energy storage system. The four test phases were: verification of safe arrival, debugging procedures, performance verification tests, and expanded test program. This report contains test data collected during the performance verification and expanded test program phases.

Curran, WT ; AiResearch Manufacturing Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-6-2, UMTA-MA-06-0025-77-3, May 1977, 112 pp, 13 Fig.; Available in set of 4 reports PC E10, PB-269400-PB-269403. See also RRIS 04 167925, the first volume in RRIS Bulletin 7801 and Volumes III and IV, RRIS 04 167926-167927 respectively.; Contract DOT-TSC-838-2; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-269401/6SL, DOTL NTIS

13 167927 ENGINEERING TESTS FOR ENERGY STORAGE CARS AT THE TRANSPORTATION TEST CENTER. VOLUME III. NOISE TESTS. The primary purpose of the tests documented herein was to demonstrate the principles and feasibility of an energy storage type propulsion system, and its adaptability to an existing car design. The test program comprised four phases of tests on two New York City Transit Authority R-32 cars where propulsion system had been replaced by an energy storage system. The four test phases were: verification of safe arrival, debugging procedures, performance verification tests, and expanded test program. This report contains test data collected during the performance verification and expanded test program phases.

Curran, WT ; AiResearch Manufacturing Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-6-3, UMTA-MA-06-0025-77-4, May 1977, 91 pp, 13 Fig.; Available in set of 4 reports PC E10, PB-269400-PB-269403. See also Volumes I, II and IV, RRIS 04 167925, 04 167926 and 04 167928 respectively; RRIS Bulletin 7801.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269402/4SL, DOTL NTIS

13 167990 AC DRIVING SYSTEMS FOR RAILROAD CARS [Drehstrom-Antriebssysteme fuer Bahnfahrzeuge]. Various inverter systems used in conjunction with driving of railroad trains were investigated. An implemented system for dc feeding is described. This system is undergoing tests at a Berlin, Germany, subway double motor coach. Alternative installations are suggested for a universal locomotive of the West German railroads. [German]

Ciessow, G Goelz, G Grumbrecht, P *Technische Mitteilungen AEG-Telefunken* Vol. 67 No. 1, 1977, pp 35-43, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 167997 ANALYSIS OF ELECTRIFIED GROUND TRANSPORTATION NETWORKS. The analysis of a transportation network presents two special problems: the positions of its electrical loads are continually changing; and some or all of it may operate at dc while the parent network in which it is imbedded and from which it draws its power, operates at 60 Hz. When confronted with these problems conventional power system analysis procedures become either inapplicable or inconvenient to use. This paper presents alternative methods and computer algorithms that are better suited to the analysis of transportation networks.

Talukdar, SN (Carnegie-Mellon University) Koo, RL *IEEE Transactions on Power Apparatus and Systems* Vol. PAS No. 1, Jan. 1977, pp 240-247; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 168015 PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1976-1977 REPORT OF SURVEY COMMITTEE) CARS AND EQUIPMENT. This survey of the annual ASME report covers some of the major developments in rail freight and passenger equipment made public in the last calendar year. It covers

developments worldwide. In the freight area the main developments are aimed at transporting bulk commodities with some thought being given to multipurpose concepts. The passenger developments are continuing in LRVs, rapid transit, and commuters; however, long haul equipment is also being developed.

Manos, WP (Pullman Standard) ; American Society of Mechanical Engineers Conf Paper 77-WA/RT-5, 1977, 9 pp, 40 Fig.; Contributed by the Rail Transportation Division of ASME for presentation at the Winter Annual Meeting, Atlanta, Georgia, November 27-December 2, 1977.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

13 168115 CHOPPER EQUIPMENT FOR COACHES ON THE BRUSSELS METROPOLITAN RAILWAY [Les equipments a hacheurs des voitures du metro de Bruxelles]. The author starts by recalling the main design principles and general characteristics of the coaches and then describes the overall layout of the chopper equipment giving details of the main parts: chopper and its controls, motors and fittings. He shows how the solutions adopted are original and stresses how well the equipment is suited to the constraints of operating on a metropolitan railway. [French]

ACEC Revue No. 3-4, 1976, pp 3-22, 11 Fig., 5 Tab., 17 Phot. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Ateliers de Constructions Electriques de Charleroi, BP4, 6000 Charleroi, Belgium

13 169214 GENERAL VEHICLE TEST INSTRUMENTATION MANUAL. A General Vehicle Test System (GVTS) has been developed by the Transportation Systems Center to facilitate rail transit vehicle testing at the Transportation Test Center, Pueblo, Colorado. This system was designed to be responsive to requirements specified in the report General Vehicle Test Plan (GVTP) for Urban Rail Transit Cars (PB-250 575). The purpose of this manual is to describe the instrumentation system (Part 1) of the GVTS and the standardized techniques to be employed to ensure the acquisition of valid test data using the system. The GVTS includes measurement systems for vehicle voltage, current, acceleration/vibration, pressure, temperature, displacement, strain and test reference data. Each individual measurement system is described in detail in the Appendix of this document. This document presents a system overview of the entire GVTS as well as a summary of the instrumentation systems referenced to the applicable Standard Outputs of the GVTP. It also describes signal monitor and calibration equipment and electrical shielding and grounding techniques. Descriptions of the supporting documentation file, the inventory control system, and miscellaneous system notes are also included. References are listed in this report. A companion document, General Vehicle Test Instrumentation Evaluation (PB-269 598), reports the results of evaluative tests performed on the instrumentation systems.

Babb, LV ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-06-0025) Handbook DOT-TSC-UMTA-77, UMTA-MA-06-0025-17, Sept. 1977, 243 pp; See also PB-250 575.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274543/8ST, DOTL NTIS

13 169981 PARIS METRO CARS SET DESIGN STANDARDS FOR SERIES ALUMINIUM PRODUCTION. An aluminum transit car design which its builder finds costs less to construct than an equivalent steel design is being produced for Paris and Atlanta. Societe Franco-Belge will build 1,700 such cars in three slightly varying body configurations. The concept is based on long extrusions incorporating a large number of supports for fittings as well as for actual assembly and with longitudinal joints designed for simultaneous automatic welding. Details of the structural sections and of assembly processes are given.

Railway Gazette International Vol. 133 No. 12, Dec. 1977, pp 469-475, 2 Fig., 2 Tab., 6 Phot. ORDER FROM: ESL

13 169988 IEEE TECHNICAL PAPERS PRESENTED AT THE JOINT ASME/IEEE/AAR (ASSOCIATION OF AMERICAN RAILROADS) RAILROAD CONFERENCE, 1977. This volume contains eight papers dealing with technical aspects of rail transport, with particular emphasis on the Washington Metro system. Paper topics are: three-phase propulsion in diesel and electric locomotives for heavy freight and fast passenger service; computers in railroad control; rail analysis modeling; a feasibility study for the measurement of track modulus by railway track recorder cars; Washington Metro's rapid transit cars; Washington Metro automatic train control system; electrical power systems of the Washington Metrorail Transit System; and dynamic on-line destination scheduling.

Institute of Electrical and Electronics Engineers Conf Paper No. 77CH1237-71A, 1977, 59 pp; IEEE Tech Pap presented at the Jt ASME/IEEE/AAR (Assoc of Am Railroads) Railroad Conf Washington, DC, March 30-April 1, 1977. Individual papers from this conference are in RRIS Bulletin 7701 and can be found in the Corporate Author Index under the listing American Society of Mechanical Engineers.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 170875 PROPULSION SYSTEM PERFORMANCE REQUIREMENTS FOR GUIDED URBAN TRANSIT SYSTEMS. A methodology is presented for analyzing different performance levels, such as acceleration, deceleration, top speed and peak power to weight ratios, of transit vehicles. The optimization of these levels is desirable to attain certain performance objectives, including the maximization of travel time, capital costs, operating costs and energy consumption. Presented is a method which analyzes the trade-offs involved to achieve various levels of these objectives. The report describes the measures of propulsion system performance and the factors to be considered in their determination, and relates them to the design characteristics and parameters of a typical light rail transit (LRT) system. Additional factors which may affect the selection of performance parameters are discussed, namely the effect of curves, grades and spot speed restrictions. A set of values is recommended which could be used as design guidelines until more definitive studies can be performed on specific applications. /Author/

Dawson, WR Dalton, PM ; Ontario Ministry of Transportation & Communc, Can RR212, Aug. 1977, 27 pp, 26 Fig., 4 Tab., 7 Ref.; ORDER FROM: Ontario Ministry of Transportation &

Communc, Can, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8, Canada

13 172001 A EUROPEAN BREAKTHROUGH--20 YEARS' FATIGUE SIMULATED IN ONE MONTH ON AN ENTIRE PASSENGER COACH BODY [Premiere europeenne--La fatigue de 20 ans simulee en un mois sur une caisse complete de voiture a voyageurs]. For the first time in Europe a whole passenger coach body was subjected to accelerated fatigue tests. These tests, which simulated 20 years of regular service in one month, were carried out by the Brussels laboratories of the Belgian Association of Industry (AIB). The coach being tested was an Alusuisse prototype of which 1,000 aluminum units had been ordered for the renewal of the Paris Metro rolling stock. The tests confirmed the high fatigue resistance of this type of coach. [French]

Schweizer Alumin Rundschau/Revue Suisse de Alumin Vol. 27 No. 6, June 1977, pp 278-279, 2 Phot. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 172023 MOSCOW METRO TO DOUBLE IN LENGTH. With three lines under construction, plans now call for expansion of the Metro network serving the Moscow region from the present 164 km to 320 km, including an outer loop. Capacity is being expanded by improved interchange at central stations, while automatic operation and computer-aided traffic control should allow reduction of headways to 75 sec. New cars with light alloy bodies and chopper control are under development to reduce energy consumption.

Lebedev, MA (Moscow Metro Authority) *Railway Gazette International* Vol. 134 No. 1, Jan. 1978, pp 14-16, 4 Phot.; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: ESL

13 172654 THE DYNAMIC BEHAVIOUR OF BOGIE VEHICLES ON ROLLER END PLATES [Das dynamische Verhalten von Drehgestellfahrzeugen auf Rollschelben]. The paper reports on fundamental theoretical studies to back up experimental investigations on the limit of stability. The studies were conducted on a six-axle articulated rapid transit train, the running properties of which were measured. The model statements are investigated for testing bench for running qualities with two, four and six axles with new and worn roller end plate profiles. The influence of wear on the adhesion function, which cannot yet be quantified, was considered in the calculation by assuming a reduction of its initial trend. With this model statement, a two-axle roller testing bench is sufficient for determining the limit of stability if the influence of the shape of the wheel profile is determined with new and worn roller end plates. [German]

Krettek, O *Glaser's Annalen ZEV* Vol. 101 No. 8-9, Aug. 1977, pp 328-338, 29 Ref.; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 173056 POSSIBILITIES IN THE DEVELOPMENT OF RAILS FOR A HEAVY DUTY RAPID TRANSIT SYSTEM [Moglichkeiten der Schienenentwicklung fur einen Hochleistungsschnellverkehr]. A heavy-duty rapid transit system imposes additional requirements on rails.

The possibilities of developing air-hardened rail steels are discussed from the material point of view. The results obtained from tests conducted with company-manufactured rails of pearlitic steels, transformed steels, and low-carbon steels are disclosed. [German]

Heller, W *Technische Mitteilungen Krupp, Werksberichte* Vol. 33 No. 2, May 1975, pp 73-77, 6 Fig., 6 Ref.; ACKNOWLEDGMENT: Battelle Memorial Institute; ORDER FROM: ESL

13 173404 REGENERATIVE CHOPPER PROPULSION SYSTEM FOR MODERN TRANSIT TRANSIT. The regenerative chopper dc propulsion system offers a substantial economic saving over more conventional types of dc traction systems. A description of operation is presented for one of the various regenerative systems that is presently being used. A simplified economic analysis is then utilized to identify that the economic advantages of the system are readily achievable by the transit operator. The contribution of the separately excited dc traction motor to this economic gain is identified.

Kimball, JG (AiResearch Manufacturing Company) ; Society of Automotive Engineers Preprint n 770681, 1977, 12 pp; For Meeting, August 8-11, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 173405 THE U.S. STANDARD LIGHT RAIL VEHICLE--A PROGRESS REPORT. The U.S. Standard Light Rail Vehicle was designed by Boeing Vertol Company to replace the aging streetcars in several U.S. cities, and to provide an efficient vehicle for new light rail transit systems. The paper briefly describes the technical and design features of the LRV. It also describes the test program that was part of the development effort. The paper discusses test results achieved in testing and compares them with specification requirements. The paper discusses problems encountered during the test and development program. Finally the paper describes the initial introduction of the LRV into revenue service in Boston.

Cord, JM (Boeing Vertol Company) Norton, PR Society of Automotive Engineers Preprint n 770680, 1977, 12 pp; For Meeting, August 8-11, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 174388 WELDED CONSTRUCTION OF THE ET 472/473 TRAINS OF THE SUBWAY OF HAMBURG BUILT OF MALLEABLE ALUMINUM ALLOYS [Schweißkonstruktion aus Aluminiumknetlegierungen fuer die Triebzuege ET 472/473 der Hamburger S-Bahn]. The construction of the undercarriages, side panels, front panels, and roof of the subway cars of AlZnMg1 and AlMgMn alloys is described. The processes used were MIG, TIG, and resistance spot welding. By extensive use of extruded profiles, it was possible to adopt an economical design and to match the cross sections to the prevailing requirements. [German]

Boenisch, M (Messerschmitt-Boelkow-Blohm GmbH) *Schweissen und Schneiden* Vol. 29 No. 9, Sept. 1977, pp 375-378; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 174397 NEW TRAMS FOR MELBOURNE. ASEA is delivering electrical and mechanical equipment for 100 trams for Melbourne, Australia during the years 1974-1977. This article presents some information about the tram project. The background of this order is given, and then the main contractor and the customer are presented. The differences between the Gothenburg tram delivered by ASEA and the Melbourne tram are briefly discussed. Finally, a general presentation of the project is given, with the main emphasis on the traction components and their control.

Friden, L (Allmänna Svenska Elektriska, Sweden) Colman, R *ASEA Journal* Vol. 50 No. 4, 1977, pp 75-82; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 175035 COMFORT CRITERIA FOR PASSENGERS OF RAPID TRANSIT SYSTEMS [Beitrag zur Festlegung von Komfortkriterien fuer Insassen von Schnellbahnsystemen]. The possibility of determining a common comfort limit for passengers traveling on rapid transit systems was investigated. The impairment of comfort by mechanical vibrations is discussed for low frequencies and the supine, sitting, and standing position. The effects of linear acceleration on comfort are reviewed. [German]

Vogt, L ; Deutsche Forschungs-u Versuchsanst f Luft-u Raumft DLR-IB-355-75-08, 1975, 43 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-13966/4ST

13 175299 A TWO-DIMENSIONAL METHOD FOR CALCULATING UNSTEADY PRESSURE DISTRIBUTIONS ON RAILROAD TRAINS [Ein Zweidimensionales Verfahren zur Berechnung Instationaerer Druckverteilungen an Eisenbahnzuegen]. A method is discussed for calculating unsteady aerodynamic phenomena occurring upon the encounter of high speed railroad trains and on their entering a tunnel; it is based upon two-dimensional potential flow. A singularity method is used for calculation of the potential as a function of time and the contour velocity, incorporating source distributions on body contours (trains, tunnel walls). Tail contours are open to approximate effects of wake flow. The coefficient of the unsteady static pressure is formed by accounting for the potential variation in time. Longitudinal and lateral forces, as well as the moment, result from the integration of the pressure distribution. A FORTRAN program is described. [German]

Steinheuer, J ; Deutsche Forschungs-u Versuchsanst f Luft-u Raumft DLR-IB-151-77/8, May 1977, 92 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-14007/6ST

13 176701 WHAT A WAY TO GO. The author describes how Toronto's new 6.17-mi transit extension sets a pattern for efficient mass transit. Problems associated with the entrance design and noise reduction are discussed.

Myers, ET *Modern Railroads/Rail Transit* Vol. 32 No. 11, Nov. 1977, pp 56-59; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 176872 MULTIPLEXED CONTROLS ON UNDERGROUND TRAINS. As the sophistication of control and monitor functions on modern underground trains increase, so the limitations of

the conventional "point-to-point" wiring technique become more apparent. To overcome this problem, a time-division multiplexing system has been developed for possible incorporation on future London Transport trains. This paper outlines the philosophy and development behind the system.

Harding, MA *Institution of Electrical Engineers, Proceedings* Vol. 125 No. 1, Jan. 1978, pp 49-53, 9 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 176924 JANE'S WORLD RAILWAYS AND RAPID TRANSIT SYSTEMS, 1977, NINETEENTH EDITION. The book presents a worldwide survey of rail transport and gives detailed information in the following sections: manufacturers of locomotives and rolling stock; signalling and train control equipment, track maintenance equipment, and diesel engines; tabulated details of international railways; reports on world railway systems by country; rapid transit, underground and surface railways. Indexes are included which list general manufacturers of railway equipment, and worldwide operators of railway systems.

Goldsack, P, Editor ; Jane's Yearbooks Monograph No. 19, 1977, 580 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD-231967); ORDER FROM: Watts (Franklin), Incorporated, 730 Fifth Avenue, New York, New York, 10019

13 177182 EFFECT OF CONSTANT POWER TRACTION ON TRANSIT ELECTRIFICATION DESIGN. Modern transit vehicles with electronic feedback speed and torque control may have vehicle power demands which are independent of third rail voltage. Compared to the linear character of resistance controlled vehicles the constant power feature can have a dramatic effect on third rail voltage drop and substation power ratings.

Miller, RH (Bay Area Rapid Transit District) Fernald, GE Brockman, JJ ; Institute of Electrical and Electronics Engineers Conf Paper n 77CH1246-8-IA, 1977, 4 pp; Conf Rec IAS 12th Annual Meeting, Los Angeles, California, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 177184 STEERABLE STEEL WHEEL SYSTEMS AND WHEEL NOISE SUPPRESSION. Steel wheel/steel rail vehicles have a long and successful history in transportation; however, the irritating screech noise generated while negotiating sharp curves is a characteristic of these systems. This paper shows how steerable wheel systems can reduce curving noise, determines the necessary accuracy for effective noise reduction. The most effective method to reduce squeal is to provide accurate steering, and some methods of improving steering systems are suggested.

Bleedorn, TG (Pullman-Standard Car Manufacturing Company) Johnstone, B ; Institute of Electrical and Electronics Engineers Conf Paper n 77CH1246-8-IA, 1977, 7 pp, 5 Ref.; Conf Rec IAS 12th Annual Meeting, Los Angeles, California, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 177189 THREE-PHASE A.C. DRIVE SYSTEMS FOR TRACTION VEHICLES. AEG-TELEFUNKEN has examined various

static-converter systems for the drive of traction vehicles. A system constructed for d.c. supply is introduced. This is being tested in an underground railway two-car unit belonging to the Berliner Verkehrs-Betriebe (BVG). Alternative equipment arrangements are given for a universal locomotive of the German Federal Railway (Deutsche Bundesbahn).

Ciessow, G Goelz, G Grumbrecht, P *AEG/Telefunken Progress* No. 3, 1977, pp 88-96; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 177192 MODERN CHOPPER PROPULSION CONTROL SYSTEM FOR RAPID TRANSIT APPLICATIONS WITH HIGH REGENERATION CAPABILITY. This paper describes a rapid transit propulsion system with the following features: minimum size and weight; minimum contactor operation for mode changes; maximum regeneration commensurate with system capability; a fixed-frequency crystal-controlled chopper; and separately-excited traction motors with flashover protection. The equipment has been thoroughly tested on a flywheel system with most rapid transit system characteristics either duplicated or simulated. A prototype equipment was installed on a Chicago Transit Authority development car and run on the GE Test Track in Erie, Pa. Over one thousand trouble-free miles have been run.

Bailey, RB (General Electric Company) Williamson, DF Stitt, TD ; Institute of Electrical and Electronics Engineers Conf Paper n 77CH1246-8-1A, 1977, pp 417-427, 8 Ref.; Conf Rec IAS 12th Annual Meeting, Los Angeles, California, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 178480 PLASTICS FOR MASS TRANSIT VEHICLES. Polymeric material used in mass transit vehicles are: wall and ceiling panels, seats, cushions, fabrics, carpets, elastomers, ducts, windows and lighting diffusers, thermal and acoustical insulation, floors, electrical insulation, and cab ends and other exterior panels. The flammability aspects of plastics are considered a major factor in the choice of materials.

Litant, I (Transportation Systems Center) ; American Society for Metals Tech Rpt. N76-31, 1976, 5 pp; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 178691 SOUND RADIATION OF RAIL WHEELS AND THE TESTING OF SOUND-ATTENUATING WHEELS FOR LOCAL AND LONG-DISTANCE RAIL TRAFFIC [Die Schallabstrahlung der Schienenraeder und Erprobung schallgedaempfter Raeder fuer Fern-und Nahverkehr]. The rolling noise of trains is substantially reduced and the shrieking of wheels in the curves of local transport systems completely avoided by means of a new type of sound-attenuating wheel. The sound absorbers are of simple design, inexpensive, and are long-lasting. They are easily fitted to the wheel, and also wheels already in service can be equipped without difficulty. The absorber increases the weight of the wheel by only a few percent. [German]

Raquet, E Tacke, G *Eisenbahntechnische Rundschau* Apr. 1978, 5 pp, 19 Fig., 4 Ref.; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

13 178869 STATE-OF-THE-ART CAR ADVANCING RAPID RAIL TRANSIT. The State-of-the-Art Cars (SOAC) are designed to operate on urban rail rapid transit systems. These systems are characterized by: Heavy passenger volumes; frequent stops; exclusive right-of-way; steel rails; electric power; and multiple-unit operation. Currently, six U.S. metropolitan areas have rail rapid transit systems: Boston, Chicago, Cleveland, New York, Philadelphia, and San Francisco. In addition, Washington, D.C. is building a new rail rapid transit systems, and many cities such as Atlanta, Baltimore, and Buffalo are planning new systems. The SOAC has been developed to demonstrate the optimum in current technology. It represents today's best available technical know-how in rail rapid vehicle development. SOAC interior and wayside raise levels, ride quality, interior design, propulsion system, suspension system, auxiliary power and the HVAC system (heating, ventilating and air conditioning) are described.

Urban Mass Transportation Administration No Date, 26 pp, Figs., Photos.

13 178922 ENVIRONMENTAL CONTROL FOR A RAPID TRANSIT SYSTEM IN A TROPICAL CLIMATE. The need for rapid transit systems in tropical cities has brought into focus the problem of giving acceptable conditions underground when the ambient temperature is elevated and coupled with high levels of humidity. It is an economic problem to set reasonable comfort levels. The amount of power liberated within a tropical underground system is discussed and the size of air conditioning plant required for trains if these are used. Three general systems of dealing with the overall problems are discussed, together with the effect on the systems arising from the speed of the trains and the special problems created when stationary within the tunnels. The conclusions indicate that for tropical conditions a closed system underground is to be preferred without air conditioning on the trains. The use of power to achieve acceptable conditions is one of economics rather than a technical question, but cooling is expensive in energy for any underground system in the tropics.

Kibblewhite, GG *Institution of Mechanical Engineers Proceedings* Proceeding Vol. 192 No. 10, 1978, pp 171-178; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 179064 STRUCTURAL MATERIALS DESIGN FOR RAIL TRANSIT CARS. This paper discusses the detail design practice and computer analyses used to achieve the car body structures for the two vehicles designed and being manufactured by the The Boeing Vertol Company. These two cars are the United States Standard Light Rail Vehicle (SLRV), and the Chicago Transit Authority Vehicle (CTAV) Rapid Transit Car.

Dennis, MJ (Boeing Vertol Company) Schagrin, EB ; American Society for Metals Tech Rpt. N76-24, 1976, 7 pp; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 179151 SIMULATION STUDIES OF ENERGY SAVING WITH CHOPPER CONTROL ON THE JUBILEE LINE. Describes energy-consumption studies undertaken for the operation of rapid-transit services on London Transport's new Jubilee line.

Mellitt, B *Institution of Electrical Engineers, Proceedings* Vol. 125 No. 4, Apr. 1978, pp 304-310, 9 Tab.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 180265 DEVELOPMENT AND PERFORMANCE OF A SIMULATION PROGRAMME FOR A RAPID TRANSIT RAILWAY [Aufbau und Leistungsfähigkeit eines S-Bahn-Simulationsprogramms]. The authors describe a simulation programme developed with the aid of funds from the Federal Ministry of Transport and supported by the DB. The programme facilitates decision-making in respect of system-effective vehicles design, train operation, signal implementation and route layout. It can be applied with equal effectiveness to rapid transit systems, underground railways and tramway systems. Although it does not provide direct optimal solutions, it nevertheless allows-by means of repeated calculation sequences--the effect of specific measures to be examined likewise the quantitative relationships of the various system variables from which the optimal result for operator and user can be determined.

Krettek, O Lankes, P *Eisenbahntechnische Rundschau* Vol. 27 No. 6, June 1978, 5 pp, 3 Fig., 17 Ref.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

13 180329 REVIEW OF GUIDEWAY DESIGN CRITERIA IN EXISTING TRANSIT SYSTEM CODES. This paper is considered a necessary first step in preparing a new transit code. Basic design philosophies and criteria adopted by some of the light rail and heavy rail transit authorities in North America are reviewed and compared. The more familiar highway and railway transportation authorities are included for direct comparison. Relevant design criteria of the British Standards Institute are also included as a reference to European systems.

Dorton, RA (Ontario Ministry of Transportation & Communic, Can) Grouni, HN *American Concrete Institute, Journal of* Vol. 75 No. 4, Apr. 1978, pp 134-144, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 180334 HEAVY RAIL--"THE VILLAIN" STILL HOLDS THE KEY. The characteristics, role, planning, engineering and problem areas of rail rapid transit systems, as contrasted with other forms of higher speed and capacity mass transportation --light rail transit, people movers, busways, and exclusive bus lanes are discussed.

Salter, WO (Parsons, Brinckerhoff, Quade and Douglas, Inc) *Consulting Engineer* Vol. 50 No. 3, Mar. 1978, pp 66-72; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 180335 CONVERTER PROPULSION SYSTEMS WITH 3-PHASE INDUCTION MOTORS FOR ELECTRIC TRACTION VEHICLES. Converter systems are described, which neither drain reactive power from the supply line nor feed reactive power into the line. They also produce only a small amount of harmonics. These systems are very well suited for high power electric traction vehicles as well as for smaller vehicles, which are in service simultaneously in one district (e. g. rapid transit vehi-

cles), and for industrial locomotives. Test and production vehicles with 3-phase induction motors, test data and experiences in service of such vehicles are described.

Kielgas, H (Brown, Boveri, Germany) Nill, R ; Institute of Electrical and Electronics Engineers Conf Pap n 77CH1183-3 1A, 1977, pp 305-319, 18 Ref.; Conf Rec of Paper Presented at the IEEE/IAS (Ind Appl Soc) Int Semicond Power Converter Conf, Lake Buena Vista, Florida, March 28-31, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 180387 ELECTRICAL INTERFERENCE FROM THYRISTOR-CONTROLLED DC PROPULSION SYSTEM OF A TRANSIT CAR. Analysis and measurement of radiated and conducted electromagnetic interferences were performed on a transit car equipped with chopper-controlled dc propulsion system. The measured values of the radiated interference showed significant disagreement with the calculated values. It was determined from the analysis of the measured data that the voltage drop caused by the dc propulsion-current harmonics contributed to the discrepancies. Extensive tests showed that the interference levels generated from the chopper-controlled propulsion equipment are acceptable. However, it is felt that the existing and impending electromagnetic compatibility (EMC) standards are, in some instances, neither technically sound nor realistic. Suggestions are made for the improvements of standards and measurement procedures.

Chowdhuri, P (Los Alamos Scientific Laboratory) Williamson, DF *IEEE Transactions on Industry Applications* Vol. IA-1 No. 6, Nov. 1977, pp 539-550, 14 Ref.; ACKNOWLEDGMENT: EI, IEEE Transactions on Industry Applications; ORDER FROM: ESL

13 181789 PUBLIC HEARING BEFORE SENATE TRANSPORTATION AND COMMUNICATIONS COMMITTEE ON COMMUTER RAIL SERVICE IN NEW JERSEY HELD IN TRENTON, NEW JERSEY ON OCTOBER 11, 1977. The Committee examined what is being done to improve commuter rail service and performance. Examined were issues as regards progress on the electrification project for the North Jersey Coast Train, formerly known as the New York and Long Branch and the reasons for the proposed closings of grade crossings in Monmouth and Ocean counties and the process through which these closings are determined. It is well known that the performance of commuter rail service in New Jersey is inadequate. Riders of Amtrak are faced with proposed service cutbacks. The Committee has invited representatives from the state, Federal Government, Conrail, Amtrak, counties, labor organizations, and the riding public to examine commuter rail service and to discuss ways of improving it. The document contains statements from the Department of Transportation as well as statements from Amtrak and Conrail. (Portions of this document are not fully legible)

New Jersey Senate 1977, 70 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282108/OST

13 181988 A LIMITED INVESTIGATION INTO REGENERATIVE BRAKING AND ENERGY STORAGE FOR MASS TRANSIT SYSTEMS. This study examines the technical and economic aspects of a regenerative braking/flywheel energy storage subway system. In order to define the analytical models accurately, it was necessary to gather data on the trains, rail network, schedules, and ancillary equipment. Data on projected costs of flywheels, motors, rails, and other equipment were also gathered for use in the economic analysis. During this data gathering phase, it was decided that the Massachusetts Bay Transportation Authority (MBTA) Red Line would be the source of the most representative and complete data. The problem was to determine what, if any, combination of energy storage devices and high conductivity rails would yield a subway system with a lower life cycle cost. The primary goal of the study was to compare the system costs of wayside storage with those of on-board storage. Using data provided by MBTA, power levels vs. time and rail losses were calculated and used to determine the sizing and location of energy storage units. From the amounts of energy storage required, the costs of the flywheels and i/o equipment were calculated. Utilizing these modules for load leveling was also considered. However, since the energy storage required for load leveling is much greater than that required for regenerative braking, a separate study is needed to examine this in detail.

Eisenhaure, D O'Dea, S ; Draper (Charles Stark) Laboratories, Incorporated, Transportation Systems Center, National Science Foundation Final Rpt. DOT-TSC-UMTA-77-53, Mar. 1978, 47 p.; Grant; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-284611/1ST, DOTL NTIS

13 182094 THE UNITED STATES AND THE INTERNATIONAL MARKET FOR RAIL EQUIPMENT. The report deals with the international market for rail transit cars and the firms which manufacture the equipment, with emphasis on the position of the U.S. domestic segment of that market at the present time and in the foreseeable future. The U.S. transit car market has been penetrated successfully in recent years by Canadian, French, and Italian carbuilders. The author discusses the circumstances surrounding these events. The report discusses the following issues: (1) the commercial and economic outlook of carbuilders and component suppliers; (2) government funding of the rail passenger equipment market (worldwide); (3) the degree of interdependence that exists among the economies of the world, the corporations who manufacture and trade on a global scale, and the rail industry itself; (4) the U.S. domestic transit car market; and (5) the implications for public policy. This report is based mainly on a series of interviews and discussions with people drawn from the rail carbuilding industry, component supply companies, transit authorities, railroads, trade associations, and government agencies. Some conclusions drawn from this study are: (1) the principal problems faced by U.S. carbuilders were strongly in evidence well before the appearance of foreign competitors; (2) transit authorities and UMTA have been faced with rising transit equipment costs and a bid pattern which shows an alarming tendency for only one or two (or none) U.S. firms to bid; and (3) none of the sources consulted expect all U.S. carbuilders to disappear,

but most tend to regard a reduction in the number of carbuilders as inevitable.

Barber (Richard J) Associates, Incorporated, Urban Mass Transportation Administration, (UMTA-DC-06-0213) UMTA-DC-06-0213-78-1, Mar. 1978, 118 p.; Contract DOT-UT-80010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285613/6ST, DOTL NTIS

13 182585 DRIVE FOR RAILROAD VEHICLES OF MUNICIPAL MASS TRANSPORTATION WITH INDUCTION MOTORS [Pohon koljovych vozidel mestske hromadne dopravy s asynchronnimi motory]. The traction properties of an induction motor fed by a variable frequency from a thyristor converter are considered. The properties of the induction motor are derived from its impedance diagram reduced to a frequency of 1 cps. This measure eliminates the feeding frequency and the variable feeding voltage from the description of the properties of the motor. The method permits a simple derivation of the principal traction properties of the machine: the moment of the machine is proportional to the square of its current. The coefficient of proportionality between the square of the current and the moment depends on the rotor frequency, the parameters of the machine, and is independent of the feeding frequency and the voltage. The principles for an optimum control of the motor are derived. As a converter of frequency and output voltage, an inverter of voltage attached directly to the dc source is employed permitting both motor and generator operation. At lower output frequencies, the inverter is controlled by pulse-width-modulation; at higher frequencies by the method of rectangular control. Both methods are uniformly described by means of the three-dimensional Park vector, which permits a comparison and explains the physical principle of the control of the inverter. [Czech]

Cerovsky, Z Kamenicky, J *Elektrotechnicky Obzor* Vol. 66 No. 8, Aug. 1977, pp 463-473, 34 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 182594 TECHNOLOGY OF DC REGULATING UNITS IN VEHICLES USED FOR LOCAL TRAFFIC [Gleichstromstellertechnik in nahverkehrsfahrzeugen]. Use was made of the chopper control technique in conjunction with regenerative braking for the articulated multiple units delivered to the urban rapid transit system in Hanover, West Germany. This technique is explained with the aid of the example of the circuit used for the Hanover system. Guidelines are included for the rating and load of the main components. [German]

Voss, U *Elektrische Bahnen* Vol. 48 No. 7, July 1977, pp 162-167, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 182796 CALCULATION AND MEASUREMENT OF ELECTROMAGNETIC INFLUENCE ON TELECOMMUNICATION CABLES IN SUBWAY SYSTEMS BY POWER ELECTRONIC CIRCUITS. For the subway in Vienna/Austria electrical drives for air flow control are considered whose speed is controlled by power electronic circuits. The electric power line feeding the power electric circuits is mounted in parallel with the subway telecommunication cables over a length of close to six-hun-

dred meters. The current pulses--caused by the power electronic control--in the electric power line lead to induced voltages in the telecommunication cables. This paper provides a derivation of equations to calculate the induced voltages. A Fourier analysis of the current in the electrical power lines is performed. The difficult problem of calculating the induced voltages in the telecommunication cables is solved by the conform mapping. The real geometric configuration concerning magnetic field calculation. In this configuration, by different mathematical operations, the induced voltages can be calculated. Good comparison is found between calculation and measurement of induced (EMI) voltages.

Zach, FC (University of Technology, Austria) Demattio, R.; Institute of Electrical and Electronics Engineers Proceeding n 77CH1224-5EMC, 1977, pp 19-24, 1 Ref.; Second Electromagnetic Compatibility, Symposium and Technical Exhibit, Montreux, Switzerland, June 28-30, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 182797 INTERFERENCES IN TELEPHONE CIRCUITS DUE TO THYRISTOR CONTROLLED D.C. TRACTION. For efficient control of motors in the case of d.c. traction, a thyristor chopper is used. Prior to introduction of thyristor chopper control in the metropolitan railway system extensive measurements were made in three cities of Fed. Rep. of Germany. After a brief review of chopper control this paper deals with the inductive interference on telephone cables. In general it can be established that the interference in telephone cables is mainly due to the current harmonics from the rectifier station. Furthermore, as far as the induced voltage is concerned it makes practically no difference which type of control is being used, as long as the d.c. traction power is the same.

Das, GP (Siemens, Research Laboratory, W Germany) Schulz, J.; Institute of Electrical and Electronics Engineers Proceeding n 77CH1224-5EMC, 1977, pp 149-154, 8 Ref.; Second Electromagnetic Compatibility, Symposium and Technical Exhibit, Montreux, Switzerland, June 28-30, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 182802 POWER SUPPLY INSTALLATIONS OF THE SUBWAY IN MUNICH, WEST GERMANY [Energieversorgungsanlagen der Muenchner U-Bahn]. The energy supply system for traction and lighting and electric power is outlined. A description is given of the particularities of the electric protective system against corrosion and dangerous contact voltages of the dc operated subway which is linked up with the ac operated municipal railroad line at certain points. The experience gained on the existing lines which has been considered at the planning and construction of the new line is dealt with. [German]

Schemmel, H *Elektrische Bahnen* Vol. 48 No. 8, Aug. 1978, pp 198-205, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 182815 H-BAHN DEVELOPMENT-POINT OF DEPARTURE AND OBJECTIVE [Ausgangspunkt und Zielsetzungen der H-Bahn-Entwicklung]. The construction of efficient rapid-transit systems is of special importance in view of the increasing congestion of city streets and parking areas. The objective of the H-Bahn

development is to create a rapid-transit system running on a segregated guideway which is economic and quick to construct. Incorporating automatic control into the overall concept permits short headways, an efficient service and low personnel costs. [German]

Marten, F *Siemens Review* Vol. 52 No. 2, Feb. 1978, pp 60-63; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 182848 STRAY CURRENT CORROSION DUE TO THE PROPOSED NORTH-EAST TRAMWAY. This report which was prepared for the South Australian Department of Transport concerns conditions affecting currents along proposed N-E tram-line. Their effects on stray current are estimated by comparison with the Glenelg tram-line. This is done using two different variables: (I) relative energy required to move the traffic, and (II) relative currents at the peak traffic demand. The ratios are then applied to the cost (to the utilities) of stray current corrosion due to the Glenelg tram-line determined in a previous study.

Wenk, GJ; Australian Mineral Development Laboratories Monograph AMDEL Rpt No. 1205, Feb. 1978, n.p., 3 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-234101); ORDER FROM: Australian Mineral Development Laboratories, Flemington Street, Fremville, South Australia, Australia

13 183306 RAPID TRANSIT--NEW USE FOR HOT BOX DETECTORS. Modification of a standard railroad hot box detector for detection of hot inboard journals on rapid transit cars is described. Installations have been made at scanner sites 1500 ft in advance of the line's two terminals. A dragging equipment detector is also part of the inspection facility. Car maintenance costs have been cut and utilization increased. The hot box detector is now being studied as a method of monitoring traction motor conditions.

Progressive Railroading Vol. 21 No. 8, Aug. 1978, 3 pp, 6 Phot. ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

13 183512 RAIL RAPID TRANSIT AND ENERGY: THE ADVERSE EFFECTS (WITH CLOSURE). Because it is generally believed that transportation energy can be saved by diverting people from automobiles to rail transit, the United States is now building or planning a number of multi-billion-dollar rail systems. These new-generation rail systems were examined and found to be a net user of energy. The two main points prompting this conclusion are that (a) the energy invested in building a rail system is enormous and thus difficult to repay and (b) the possible savings in operating energy are small, or even negative, because most rail passengers are diverted from buses and buses are more energy efficient than modern rail systems. The analysis was done for San Francisco's Bay Area Rapid Transit (BART) system, but evidence is cited to show that the results are typical for other modern rail systems as well. To the extent that BART is atypical, it appears to be atypically efficient. The analysis takes into account the reduced demand for automobiles and buses because their passengers are diverted to rail and then calculates the energy saved because these conventional vehicles

are not built or driven and the roads on which they would travel are not constructed. It is concluded that even radical improvements in automobile diversion, rail patronage, and load factors would not significantly alter the results. /Author/

Lave, CA (California University, Irvine) Tennyson, EL, Discussor (Pennsylvania Department of Transportation) Holden, WHT, Discussor (Daniel, Mann, Johnson and Mendenhall) List, GF, Discussor (Pennsylvania University, Philadelphia) Usowicz, TW, Discussor Hawley, MM, Discussor (San Francisco Bay Area Rapid Transit District) *Transportation Research Record* No. 648, 1977, pp 14-30, 1 Fig., 8 Tab., 39 Ref.; This article appeared in *Transportation Research Record* No 648, Environmental and Conservation Concerns in Transportation: Energy, Noise, and Air Quality.; ORDER FROM: TRB Publications Off

13 183581 WIRELESS TRANSMISSION OF MEASURED VALUES FROM THE MOVING RAIL WHEEL [Drahtlose Messwertuebertragung vom rollenden Eisenbahnrad]. The Institute for Transport Planning and Route Construction (Railway and Tracked Local Transport) at the Technical University in Berlin has developed a system of Wireless transmission of measured values from the moving wheels of rail vehicles. For the first time this allows the detection on the wheel itself of the level and distribution of solid-borne noise as used in the study of wheel vibration. The influence of various parameters such as speed, spatial acceleration components, type of permanent way, rail condition where there is greater unevenness, etc., can be determined at the wheel. Some influences have been recorded and can be used to assess the effect of various parameters. The measured results can also be used for the investigation of various mechanisms which cause solid-borne noise in the rail/wheel system. This in turn allows determination of parameters of importance for altering the vibratory condition on rail vehicles. [German]

Heiss, P *Eisenbahntechnische Rundschau* Vol. 27 No. 7-8, July 1978, 4 pp, 5 Fig., 1 Tab.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

13 184159 SOME EXPERIENCES OF WEAR, CORROSION AND CRACKING IN WHEELSET COMPONENTS OF A RAPID TRANSIT RAILWAY SYSTEM. While fretting corrosion and wheelset cracking of axles have been overcome, deep fatigue cracks could form in axle bodies under exceptional circumstances. Ultrasonic testing must include the entire axle length. Quenching of an axle may extend the endurance of an axle containing a crack or other defect in the body and seems worthy of further investigation. London Transport's tests of various compositions and heat treatments of wheels and tires have shown nothing likely to eliminate formation of thermal cracks, although rim quenching shows some promise. Various factors in tread and flange wear are also discussed.

Shaw, J Ruty, FG (London Transport, England) American Iron and Steel Institute Tech Paper Volume 1, Oct. 1978, 29 pp, 21 Fig., 2 Tab., 9 Ref., 2 App.; Supported in cooperation with the Association of American Railroads, Federal Railroad Administration and Railway Wheel Association. Sixth International Wheelset Congress,

October 22-26, 1978, Colorado Springs, Colorado.; ACKNOWLEDGMENT: American Iron and Steel Institute; ORDER FROM: American Iron and Steel Institute, 230 North Michigan Avenue, Chicago, Illinois, 60601

13 184170 SOUND EMISSION OF RAILWAY WHEELS AND TESTS ON NOISE-DAMPED WHEELS FOR LONG-DISTANCE AND LOCAL RAIL TRAFFIC. Because noise emission of wheels is the major factor in total noise environment of railways, resonance absorbers were developed for application inboard of the wheel rim. Tests have shown rolling noise of mainline trains is considerably reduced and wheel screech of transit vehicles is eliminated. The absorbers are simple, easily installed and rugged.

Racquet, E Tacke, G (Krupp (Friedrich) Metallurgical Works, W Germany) ; American Iron and Steel Institute Tech Paper Volume 2, Oct. 1978, 13 pp, 19 Fig.; Supported in cooperation with the Association of American Railroads, Federal Railroad Administration and Railway Wheel Association. Sixth International Wheelset Congress, October 22-26, 1978, Colorado Springs, Colorado.; ACKNOWLEDGMENT: American Iron and Steel Institute; ORDER FROM: American Iron and Steel Institute, 230 North Michigan Avenue, Chicago, Illinois, 60601

13 186339 THE APPLICATION OF OPTIMAL CONTROL THEORY TO HYBRID ELECTRIC TRANSIT SYSTEMS [Master's thesis]. In an effort to minimize energy losses through the optimal control of an electric rapid transit system, three vehicle/flywheel configurations are modeled using the bond graph technique. Field and armature control of an on-board flywheel are presented along with field control of a station flywheel used in conjunction with a typical regenerative vehicle. Pontryagin's Minimum Principle is used to develop the optimal control trajectories for vehicle accelerations and decelerations. The time integral of mechanical and electrical losses is minimized as the cost function. Armature control of the hybrid vehicle and field control of the station flywheel are equally efficient in the reversible energy flow between vehicle and flywheel. Field control of the hybrid vehicle is slightly less efficient. The optimal trajectory for deceleration is nearly linear, but the optimal trajectory for acceleration, due to the effect of mechanical losses over a longer time period, is highly concave and differs radically from a typical transit acceleration. The vehicle weight and resistance in the armature windings have a large influence on system performance. (Author)

Keane, MJ ; Air Force Inst of Tech Wright-Patterson AFB OH AFIT-CI-78-113, Oct. 1977, 138p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A059365/7ST

13 188061 SOME STATIC AND DYNAMIC PROPERTIES OF RAILWAY WHEELS. To improve the understanding of wheel/rail noise generation, experiments were conducted on four railway wheels to determine their static and dynamic behavior. The railway wheels used were the Bochum wheel, the Acoustaflex wheel, the S.A.B. wheel and a standard railway wheel. The properties measured were their frequencies, modal damping ratios, and mode shapes. Deflec-

tion properties are also given. Two prototype wheels also included in the tests were found to produce higher damping ratios than any of the four established railway wheels.

Strasberg, L Perfect, N Elliott, GL (Ontario Ministry of Transportation & Communic, Can) ; American Society of Mechanical Engineers Conf Paper 78/WA/RT-4, July 1978, 8 p., 15 Fig., 3 Tab., 9 Ref.; Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Winter Annual Meeting, San Francisco, California, December 10-15, 1978.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

13 188090 REMOTE CONTROL EQUIPMENT FOR THE ELECTRIC POWER SUPPLY OF THE URBAN RAPID TRANSIT SYSTEM IN HAMBURG, WEST GERMANY [Neue Fernwirkanlage fuer die Energieversorgung der Hamburger S-Bahn]. For more than 35 years the electric power supply installations have been monitored and operated by a remote action installation. After many years in service the first installation no longer satisfied modern requirements. Therefore, October 1977, a new installation has been put into operation. A report is given on the remote action system with selective dialing technique and the main network control center. [German]

Gladigau, R Haupt, R *Elektrische Bahnen* Vol. 49 No. 1, Jan. 1978, pp 16-22, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 188095 OPTIMUM ENERGY-SAVING METHOD FOR TRAIN CONTROL AND TIMETABLE ALTERATION [Zur energieoptimalen Zugsteuerung und Fahrplanmodifikation]. Presentation of the results of theoretical and experimental research aimed at energy-saving in urban and suburban rail traffic. According to these studies, energy consumption may be reduced by 15 to 20 percent by using a microcalculator on board the motive power unit and modifying running plans. [German]

Horn, P Winkler, A *DET Eisenbahntechnik* Vol. 26 No. 8, Aug. 1978, pp 324-328, 5 Fig., 3 Tab., 10 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: VEB Verlag Technik, Oranienburgerstrasse 13-14, 102 Berlin, East Germany

13 188136 GLASGOW UNDERGROUND-DESIGN, DEVELOPMENT AND CONSTRUCTION OF THE NEW CARS. Designing the new cars was a question of scale. With only 33 cars required, it was desirable to use established technology, but the tunnel diameter and track curvature decreed that no existing design was suitable. The article describes areas of the cars made special to the 'mini' system to overcome tunnel and track constraints.

Botham, GJM (Metro-Cammell Limited) *Railway Engineer International* Vol. 3 No. 3, May 1978, 5 p.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 188306 COMBINED SIMULATION OF A RAPID TRANSIT SYSTEM. Three approaches to simulating a rail rapid-transit system are compared. The system is itself partly continuous in nature (equations of motion, for example) and partly discrete (dispatch of trains, for example).

The three approaches are (1) a basically continuous model modified to accept discrete events, (2) a basically discrete model modified to accept representations of continuous portions, and (3) a combined model designed to accommodate both the discrete and continuous parts. The third approach, combined simulation, is described in detail and is illustrated by its application to an 8-train system. The value of simulation for designing rapid transit systems and analyzing their problems is discussed. The benefits of combined simulation as compared to discrete and continuous simulation are enumerated. As an example, all three methods for modelling a simple station exchange process are presented.

Eichler, J (Ben Gurion University of Negev, Israel) Turnheim, A *Simulation* Vol. 30 No. 5, May 1978, pp 155-167, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 188325 TYNESIDE REPORT NO 7. This report, the seventh in a series dealing with all aspects of the Tyne and Wear metro project, describes the progress of the scheme following on from the governmental decision in December, 1976 that the project could go ahead as planned within the constraint that the cost of the scheme would not exceed ,161 M at November 1975 prices (the 1972 estimate was ,65 M). The special factor that caused most of the cost overruns is described as the decision by British rail and the tyne and wear PTE not to share tracks except in special circumstances, the fundamental reasons being in the field of overhead clearances and signalling. Problems of incompatibility are discussed, by reference to trains, tracks, electrification (1500 volts DC from overhead wires), routes and signalling. A map provides information on the metro and adjacent br lines, with details of station and control centre locations and other relevant data. Methods to be employed for train identification and control including the use of train-borne transponders, trackside interrogators, and closed-circuit television systems are described. Techniques to be employed for automatic fare collection are detailed, bearing in mind that most metro stations ('metrostops') will be unstaffed, and that there will be no barriers at the station entrances.

Price, JH *Modern Tramway and Rapid Transit Review* Vol. 41 No. 486, June 1978, pp 186-193, 3 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 236059); ORDER FROM: Light Railway Transport League, 49 Acfold Road, Handsworth Wood, Birmingham B20 1HG, England

13 188996 CURRENT RECOVERY BY REGENERATION BRAKING OF ELECTRIC VEHICLES IN A TRANSIT SYSTEM [Strom-rueckgewinnung durch nutzbremsen von Schienenfahrzeugen im Nahverkehr]. Feedback of the regenerated energy into the supply system during electric braking of motor vehicles reduces considerably the total energy consumption, especially for transit railway systems. Although this fact has been known for a long time, such regenerative braking has been of limited propagation due to the lack of suitable control devices which could be applied in an economic way. Power electronics nowadays offer possible creation of regenerative braking circuits using chopper control systems which are capable of accomplishing braking energy feedback into supply system within the

entire speed range of the vehicle. After explanation of the circuits being proposed the results of the energy feedback measurements during electric braking are detailed which have been carried out for the modern light rail vehicles of the Transport Authority Hannover. Based on the existing service conditions in Hannover an average energy amount of 25% compared with the consumption required during motoring will be resupplied into the overhead system during braking if chopper control technique is used. [German]

von Moellendorff, H (AEG-Telefunken Berlin, West Germany) Wagner, R *Elektrotechnische Zeitschrift, Ausgabe A* Vol. 99 No. 6, June 1978, pp 334-338, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 189739 TWO-COMPUTER SYSTEM CONTROLS THE SUPPLY OF ELECTRIC POWER FOR THE URBAN RAPID TRANSIT SYSTEM IN COPENHAGEN, DENMARK [Doppelrechnersystem Steuert die Energieversorgung der S-Bahn Kopenhagen]. The use of a duplex computer system as an aid in the operation of the Danish railroad power supply is described. The article deals with the restoration of the remote action system and the central switching station, and gives a glimpse into the operation and design of the installation and into the project realization. [German]

Hansen, JT (Danske Statsbaner, Denmark) Brodowski, E *Elektrische Bahnen* Vol. 49 No. 6, June 1978, pp 144-149, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 189769 NOISE MEASUREMENTS ON URBAN TRANSPORT RAIL VEHICLES (TRAMWAYS, URBAN RAILWAYS, UNDERGROUND) [Laermmessungen bei neuen Schienenfahrzeuge des Stadtverkehrs (Strassenbahnen, Stadtbahnen, U-Bahnen)]. No Abstract. [German]

Blennenmann, F Gross, K ; Bundesministerium fuer Forschung und Technologie DB: Dok 4830, 1978, 159 p., 42 Tab., 185 Phot., 38 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Bundesministerium fuer Forschung und Technologie, Forschungsauftrag, Cologne, West Germany

13 189813 OPTIMUM VIBRATIONAL DESIGN OF BOGIES FOR LOCAL TRANSPORT [Zur frage der Schwingungstechnisch Guenstigen Auslegung von Drehgestellen fuer Nahverkehrsbahnen]. The paper describes the performance of bogies and reports on the results of calculations dealing with problems in the field of the theory of stability and the traveling round curves. From these results a new bogie concept is derived which is illustrated by a schematic diagram. [German]

Krettek, O *Glaser's Annalen ZEV* Vol. 102 No. 7-8, July 1978, pp 218-227, 40 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 190303 INFLUENCE OF SYSTEMS OF OPERATIONS ON RAPID RAIL ENERGY UTILIZATION. The objective of this paper is to collectively quantify and assess the potential of new rapid rail hardware and operational techniques to reduce rail energy utilization. With regard to the desire to apply these concepts to urban rail as a generic mode, it is recognized that

in certain cases the impact of the application will be site dependent. However, the approach taken is one of bounding the overall energy improvements in order to assess exactly what can be expected in terms of future rapid rail energy utilization. Further, this assessment has been constrained to consider only operating energy plus those systems and operational techniques which have been proven as feasible candidates for reducing energy utilization.

Tucker, HL (Department of Transportation) *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 29-43, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 190503 IN-SERVICE PERFORMANCE AND COSTS OF METHODS TO CONTROL URBAN RAIL SYSTEM NOISE. INITIAL TEST SERIES REPORT. The purpose of this project is to determine the acoustic and economic effectiveness of resilient wheels, damped wheels, wheel truing, and rail grinding for reducing wheel/rail noise on urban rail transit systems. The project consists of a six-phase series of field tests being performed on the Southeastern Pennsylvania Transportation Authority System's Market Frankford Line, and in-depth interviews with management and operating personnel of the North American steel wheeled rapid transit systems regarding their experience with the above mentioned noise abatement procedures. This is the third report of this project. The first two reports, the Experimental Design and the Test and Evaluation Plan contained the procedures to be followed in conducting the project. This report includes: (a) the results of the testing performed in Phases I, II, and III including tentative recommendations; (b) changes which have occurred to the Experimental Design and to the Test Evaluation Plan; (c) economic data for the wheel types, rail grinding equipment, and wheel truing equipment under consideration; (d) a preliminary discussion of problems and enumeration of constraints which are relevant to use of these techniques on other systems; (e) a summary of remaining testing to be accomplished under the program including recommended changes to the Experimental Design or to the Test and Evaluation Plan. It has been determined that overall noise reduction obtained by use of the various techniques is limited by the noise of the propulsion system.

Shiple, RL Saurenman, HJ ; De Leuw, Cather and Company, Wilson, Ihrig and Associates, Incorporated, Transportation Systems Center Intrm Rpt. DOT-TSC-UMTA-78-32, Aug. 1978, 414 p.; Prepared in cooperation with Wilson, Ihrig and Associates, Inc., Oakland, CA. See also report dated May 76, PB-257200; Contract DOT-TSC-1053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288838/6ST

13 191406 NOISE DEGRADATION OVER TIME IN RAIL RAPID TRANSIT CARS. The purpose of this effort was to study the degradation of noise quality of selected cars over time, and to relate this degradation to treatment events if possible. To this end, three trains were observed monthly for a period of seven months in an extensive collection and analysis effort. The three car types studied were: IRT cars comparable to the R17; IRT cars (R17), with a special design feature the 'Traction Fault Detector'; and R46

cars. Because of the substantial measurement problems encountered, the project has in fact two sets of major results: (1) those relating to the novel data collection and analysis methods employed; and (2) those relating to wheel-rail interaction and degradation.

Slutsky, S McShane, WR Starace, JJ ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0002) Final Rpt. UMTA-NY-11-0002-79-2, Dec. 1978, 69 p.; See also PB-292 032.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292031/2ST

13 191407 NOISE ABATEMENT IN RAIL RAPID TRANSIT: EFFECT OF SOME VARIATIONS. Noise abatement in rail rapid transit is an expensive and complicated undertaking. Cost is minimized by selecting a proper mix of treatments to attain a specified noise objective, or target. Assessments of specific properties and development of an abatement methodology were accomplished in earlier works. In this report the abatement methodology is refined and a number of case studies conducted. This report focuses on changes in the system-wide treatment plan, the program cost, and the net impact due to such factors as: variations in discount rate; changes in abatement target level; introduction of new cars; prohibition of certain treatments, such as resilient wheels and steel el barriers; and specification of certain treatments on a categoric basis. In the course of the studies, it was found that a system average noise level index is rather insensitive to system changes. A measure based upon percent of system exceeding certain noise levels is developed. Programs for in-train abatement were developed for 1976 and 1985 car fleet compositions, and estimated to be comparable in net effect. A program costing in the order of \$5.0 million annual cost for in-train abatement was found to have the greatest abatement per unit cost, although additional abatement is achieved with additional money. Effects of changes in the relative importance of different noise sources were studied. Additional studies on in-community abatement are reported herein, as are some ancillary in-train studies.

McShane, WR Slutsky, S ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0002) UMTA-NY-11-0002-79-1, Dec. 1978, 163 p.; See also PB-292 031.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292032/0ST

13 191428 NOISE ASSESSMENT OF THE PORT AUTHORITY TRANSIT CORPORATION LINDENWOLD RAIL TRANSIT LINE. The report describes the noise climate on and near the Port Authority Transit Corporation (PATCO) Lindenwold High Speed Line. The PATCO urban rail transit line has approximately 14.2 miles of two-way revenue track (of which about four miles are in subway), and 12 stations. Noise level data is given for specific measurements made in cars, in stations, and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data are discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Spencer, RH Hinterkeuser, EG ; Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-45, Oct. 1978, 190

p.; Contract DOT-TSC-850; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292319/1ST

13 191429 NOISE ASSESSMENT OF THE SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY HEAVY RAIL TRANSIT SYSTEM. The report describes the noise climate on and near the Southeastern Pennsylvania Transportation Authority, (SEPTA), Broad Street Subway and Market-Frankford Elevated Line. The two SEPTA urban rail transit lines have approximately 22.6 miles of two-way revenue track (of which 13.1 miles are in subway), and 53 stations. Noise level data are given for specific measurements made in cars, in stations and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data are discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Spencer, RH Hinterkeuser, EG ; Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-46, Oct. 1978, 364 p.; Contract DOT-TSC-850; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292320/9ST

13 191431 NOISE ASSESSMENT OF THE GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY HEAVY RAIL TRANSIT SYSTEM. The report describes the noise climate on and near the Greater Cleveland Regional Transit Authority (RTA), formerly the Cleveland Transit System (CTS), Airport Line. The RTA urban rail transit line has approximately 19 miles of two-way revenue track (of which about one mile is in subway), and 18 stations. Noise level data is given for specific measurements made in cars, in stations, and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data are discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Spencer, RH Hinterkeuser, EG ; Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-44, Oct. 1978, 172 p.; Contract DOT-TSC-850; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292331/6ST

13 191435 NOISE ASSESSMENT OF THE BAY AREA RAPID TRANSIT SYSTEM. The report describes the noise on and near the San Francisco Bay Area Rapid Transit System (BART). BART has approximately 75 miles of two-way revenue track (of which 19.7 miles are in subway) and 34 stations. Noise data is given for specific measurements made in cars, in stations and along the non-subway wayside at appropriate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data is discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Wolfe, SL Saurenman, HJ Lee, PYN ; Boeing Vertol Company, Wilson, Ihrig and Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-78-43, Oct. 1978,

313 p.; Prepared by Wilson, Ihrig and Associates, Inc., Oakland, CA.; Contract DOT-TSC-850; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292397/7ST

13 191440 NOISE ASSESSMENT OF THE NEW YORK CITY RAIL RAPID TRANSIT SYSTEM. The report describes the noise climate on and near the New York City Transit Authority (NYCTA) urban rail system, including the Staten Island Rapid Transit Operating Authority (SIRTOA). Noise level data is also presented for the Port Authority Trans-Hudson (PATH) urban rail system. The NYCTA (including SIRTOA) urban rail system has 485 stations and approximately 246 route miles, of which 137 miles are underground. Noise level data are given for specific measurements made in cars, stations and along the above ground wayside at approximate locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data is discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

McShane, WR Slutsky, S Huss, MF ; Polytechnic Institute of New York, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NY-11-0010) Intrm Rpt. DOT-TSC-UMTA-78-53, Jan. 1979, 359 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292498/3ST

13 191670 A STUDY TO ACCOMMODATE THE ELDERLY AND HANDICAPPED ON EXISTING COMMUTER RAIL COACHES. The report examines the feasibility of making the existing Detroit-Pontiac commuter rail service more readily accessible by the elderly and handicapped. It examines three types of railroad coaches (1500, 4800, and 9600 series cars) currently owned by the Southeastern Michigan Transportation Authority (SEMTA) as well as existing rail stations in the overall analysis to provide rail service for the elderly and handicapped. The report is definitive toward the methods required to modify the interiors of these cars to accommodate the onboard handicapped passenger (including bathroom facilities). The report also presents innovative concepts to the problem of boarding/unloading the handicapped. Some of the conclusions presented are the following--(1) that present commuter rail facilities are not accessible for ingress/egress by the unassisted elderly and handicapped; and (2) that two of the three types of railcars owned by SEMTA can be modified to accommodate the elderly and handicapped providing that each station platform complement the proposed car modification. The guidelines used as reference material for this study were the Michigan 'General Rules' of the Construction Code Commissions Barrier Free Design Graphics. This report provides numerous diagrams depicting floor arrangements and the proposed modifications to these cars.

Klauder (Louis T) and Associates, Southeastern Michigan Transportation Authority, Urban Mass Transportation Administration, Michigan Department of Transportation, (UMTA-UTD-30) Final Rpt. UMTA-TUD-30-79-1, Dec. 1977, 79 p.; Prepared in cooperation with Southeastern Michigan Transportation Authority, Detroit. Sponsored in part by Michigan Dept. of State Highways and Transportation, Lansing; AC-

KNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292765/5ST

13 191677 NOISE ASSESSMENT OF THE CHICAGO TRANSIT AUTHORITY RAIL RAPID TRANSIT SYSTEM. The report describes the noise on and near the Chicago Transit Authority (CTA) urban rail transit lines. The CTA urban rail lines consist of approximately 86 miles of two-way revenue track (of which 9.6 miles are in subway) and 155 stations. Noise data are given for specific measurements made in cars, in stations, and along the non-subway wayside at selected locations. The rationale for choice of measurement sites and the methodology for arriving at the summary noise distributions from the data is discussed explicitly. Measurement and analysis instrumentation and procedures are also described.

Silver, ML Buchus, RC Priemer, R ; Illinois University, Chicago, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0025-79-8, Jan. 1979, 305 p.; See also report dated Sep 74, PB-238 113.; Grant DOT-UMTA-IL-11-007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292834/9ST

13 191730 PROCEEDINGS: SEMINAR ON THE USE OF COMPOSITE THIRD RAIL IN ELECTRIFIED TRANSIT AND COMMUTER RAIL SYSTEM. The seminar was organized at the request of UMTA to disseminate accurate information on, and experience with, composite (aluminum and steel) third, or contact rail, in wayside power distribution systems of electrified urban rail properties. The seminar provided the opportunity for the exchange of pertinent information among the suppliers, using properties, consultants and designers, potential users, and government agencies. This document contains the transcripts of the presentations made to the seminar participants, as well as the question-and-answer sessions which followed each presentation and the round table discussion of Thursday, September 15, 1977. Information pertinent to the seminar, but not available in detail at the time of the conference, is presented in a series of four appendixes, namely: A--Third Rail-Deicing; B--Welding Composite Rail on BART; C--Maintenance of Rails on BART; and D--Relative Costs of Composite and Steel Third Rail Installations. This document also provides a list of all participants and their addresses as of September 14, 1977, as well as a list of Electrified Transit Properties.

Decker, HD ; Pacific Consultants, Transportation Systems Center, Urban Mass Transportation Administration Proceeding UMTA-MA-06-0025-7813, Nov. 1978, 217 p.; Contract DOT-TSC-1289; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293317/4ST

13 191913 REALIZATION OF GRAVITY DRIVE IN METROPOLITAN RAILWAYS FOR LOW LOSS RECUPERATION OF KINETIC ENERGY OF VEHICLES WITHOUT LINEAR INDUCTION MOTOR. One of the advantages of the Cyclo Train gravity drive with a great slope lies in the possibility of a very flexible position of the line in the vertical plane and, additionally, in a high transport velocity (e.g., 32 km/h at 512 m distance between stops).

The disadvantage lies in the large tunnel depth and in the necessity of applying the linear induction motor with variable frequency, synchronous and asynchronous, respectively. If the maximum slope is limited to $100 \exp 0 / \infty$, it is possible to omit the linear induction motor and make the drive interact by friction between the wheel and the rail. If the distance between stops is increased from 512 m to 662 m, the mean transportation velocity of 32 km/h can be maintained. The maximum tunnel depth is reduced from 38 m to 21 m with stations provided in open hollows of 120 m length, inclusive of the open slopes, and with 2.5 m deep platforms to save space for traffic on the zero level. The maximum transportation rate is 12,000 persons per hour in one direction for platforms of 64 m length, 2.20 m width of the vehicles, and a sequence time of 90 s. If the platforms, arranged sideways of the tracks, have a width of 2.5 m, a total width of 10.0 m is needed for a station. This value would increase to 14 m for full profile trains. (ERA citation 04:013911)

Jung, V; Technical University of Karlsruhe, West Germany Oct. 1977, 26 p.; U.S. Sales Only.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; KFK-2531

13 194132 SHAKER HEIGHTS TRAMS TAKE SHAPE IN PISTOIA. The articulated light rail cars for the Shaker Heights lines of the Greater Cleveland Regional Transit Authority are under construction at Breda in Italy. The 48 two-unit vehicles are described; body construction, chopper propulsion system, controls, air conditioning and seating were worked out with North American suppliers to assure a minimum of error.

Railway Gazette International Mar. 1979, p 241, 1 Fig. ORDER FROM: ESL

13 194143 TYNE AND WEAR METRO. Tyne and Wear is described as the major conurbation of the north-east of England with a population of approximately 1.2 M, industrial in nature centred on the banks of the rivers Tyne and Wear, and the regional capital of a large mainly rural hinterland serving a population of about 2.5 M. Transportation problems within the region are reviewed, which led to the establishment of the metro concept and the introduction of the Tyneside Metropolitan Railway Act in 1973. The metro as described will form the backbone of Tyne and Wear's integrated public transport system. It will be 54 route kilometres long, comprising 41 kilometres of converted British rail suburban routes and 13 kilometres of new construction, about half of which is underground to provide accessibility to central Newcastle and Gateshead and to improve the cross-river link. Other new sections described include the byker alignment where metro will run through a major area of inner-urban revitalisation along what was to have been an urban motorway alignment. A new route through the centre of South Shields will replace the existing route which is no longer suitably located to serve a major residential area and link with a focus of the local bus network. In the north-east of Newcastle a freight line will be doubled to provide passenger service as far as Kenton Bank through a rapidly developing area. Reference is made to transport integration, pattern and frequency of service, engineering and engineering equipment-with a system voltage of

1500 volts DC from overhead equipment- and future plans. The first section of metro from Regent's Centre and West Monkseaton to Haymarket will open in the summer of 1979.

Howard, DF *Transport Management* Vol. 11 No. 2, Dec. 1978, pp 9-12, 2 Fig., 1 Phot., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-237972); ORDER FROM: FPL Transport Publications Limited, Green Lane, Balsall Common, Coventry, England

13 194634 SAFE BRAKING MODEL FOR A RAIL RAPID TRANSIT SYSTEM. Safe braking distance is an important consideration in signaling block design for rail rapid transit systems. Historically, block design has developed in accordance with empirically determined stopping distances from various operating speeds plus a safety margin, frequently 35 percent. Because of the impact of poor wheel/rail adhesion and vehicle equipment failures on actual train performance during braking, it became necessary to use a more comprehensive and scientific technique for determining safe braking distance requirements for block design. The safe braking model is an analytic approximation of the performance of automatic train protection equipment, its interaction with passenger vehicle propulsion and braking equipment, and the resulting train performance while decelerating from an initial speed to a stop. The safe braking model considers performance parameters of train control equipment, certain wayside and vehicle characteristics, and performance parameters of vehicle subsystems, and it provides an analytic tool for evaluating the impact of each on safe braking distance. In order to achieve a high level of confidence in the safe braking distance calculations, the safe braking model must be conservative, considering failure modes and worst-case equipment performance parameters which can affect train braking. This paper describes the safe braking model in terms of a train speed-distance profile during braking. The safe braking distance is described in terms of vehicle characteristics and components of the speed-distance profile. Input parameters required to define each component of the safe braking distance are identified, the safety impact of each is discussed, and typical values are presented.

Becher, MC (De Leuw, Cather and Company); Institute of Electrical and Electronics Engineers Tech Paper IEEE 79CH1454-8 1A, 1979, pp 47-53, 3 Fig., 8 Ref.; Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.; ACKNOWLEDGMENT: IEEE; ORDER FROM: IEEE

13 194641 NEW LOCOMOTIVE HAULED PUSH-PULL COMMUTER CARS FOR MASSACHUSETTS BAY TRANSPORTATION AUTHORITY. This paper provides a description of the technical details of locomotive hauled push-pull commuter cars being built by Pullman Standard for the Commuter Rail Division of the Massachusetts Bay Transportation Authority. It also provides a brief review of where the push-pull concept originated, its advantages, and its development over the past 20 years.

Curtis, RD (Pullman-Standard Car Manufacturing Company); American Society of Mechanical Engineers Conf Paper 79-RT-2, Jan. 1979, 9 p., 13 Fig., 1 Ref.; Contributed by the Rail Transportation Division of ASME for presentation at

the Joint ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

13 194656 INVESTIGATING THE COMPATIBILITY OF THYRISTOR-CONTROLLED DIRECT-CURRENT RAILWAYS WITH THE SIGNALLING AND COMMUNICATION EQUIPMENT. Detailed studies have shown that additional alternating currents result in the power supply systems when d.c. control technology is employed on local-transport rail vehicles, but the influence on the signalling, communication and data systems is small in view of the chosen dimensions of the vehicle equipments. By adopting suitable measures on the vehicle itself and on the affected railway subsystem, those plant components can be made compatible which were found to be inadequate in measurement of the S/N ratio. [German]

Wagner, R *Eisenbahntechnische Rundschau* Vol. 27 No. 12, Dec. 1978, pp 821-828; ACKNOWLEDGMENT: British Railways; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

13 194660 SOUND-ABSORBING RAILWAY WHEELS FOR METROPOLITAN PUBLIC TRANSPORT. Damping systems for railway wheels have meanwhile been developed to a level rendering possible a substantial contribution to the efforts made in adhering to and minimising the specified noise emissions of rail vehicles. Sound-absorbing wheels are an efficient means to suppress the noise in sharp curves. In addition, they result in a marked reduction of the rolling noise, while the increase in wheel mass is insignificant. [German]

Huebner, H *Glaser's Annalen ZEV* Vol. 102 No. 11, Nov. 1978, pp 336-342; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 194869 FLEXIBLE GUIDANCE FOR HIGH SPEED TRAMS [Elastische Fahrleitung fuer Schnell-Strassenbahnen]. Because of the increase in the driving speeds and the conversion of the earlier tramway systems into an attractive and modern city tramway, it is also necessary to modernise and adapt the guidance systems to the higher speeds. A modern system of this type, which has been developed in Switzerland, is fully described. [German]

Wittgenstein, M *Internationales Verkehrswesen* Vol. 29 No. 6, Nov. 1977, pp 399-401, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 307602), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

13 195059 SIMULATION SHOWS HOW CHOPPERS CAN SAVE ENERGY. Chopper-type controls cause lower energy loss for transit trains than does resistance control of traction-motor voltage. Because choppers do involve first cost and weight penalties, the reduction in electric power demand must be accurately predicted before rolling stock is ordered. These savings depend on physical characteristics of the route, pattern of service, power supply sectioning and maximum overvoltage to be tolerated.

Railway Gazette International Vol. 135 No. 4, Apr. 1979, pp 300-304, 7 Fig., 2 Phot., 9 Ref.

ORDER FROM: ESL

13 195061 THREE-PHASE AND SIMOTRAC COMBINED IN MUELHEIM. The prototype light rail vehicle delivered to Muelheim combines three-phase traction motors with a drive utilizing hollow axles called Simotrac and designed to save weight and space. A series of other light rail and rapid transit vehicles with three-phase motors are in service or on order for Germany and Austria.

Railway Gazette International Vol. 135 No. 4, Apr. 1979, pp 319-320, 1 Phot. ORDER FROM: ESL

13 195084 SERVICE IMPROVEMENT OF THE QUENCHABLE NONSYMMETRIC BRIDGE CIRCUIT IN MULTIPLE-UNIT TRAINS TYPE ET 420 [Betriebsertuechtigung der Loeschbaren Unsymmetrischen Brueckenschaltung (LUB) in den Triebzuegen ET 420]. The electric multiple units series ET 420 for West German urban rapid transit systems are equipped with phase angle control, which is operated as sequence control of two converter bridges in order to diminish the reactive power requirements. Some years ago three multiple units had been additionally equipped with a quenching circuit at one of the bridges in order to improve the power factor. It is shown how this installation has been gradually improved to meet operational requirements. [German]

Binswanger, M Pfister, F *Elektrische Bahnen* Vol. 49 No. 10, Oct. 1978, pp 270-276, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 195100 ELECTRIC BRAKING OF ELECTRIFIED URBAN TRANSIT VEHICLE. Problems connected with regeneration of electric energy are discussed and relationships are given for calculating the regeneration efficiency of electrified vehicles and the contact system, as well as the over-all regeneration efficiency. To increase the effectiveness of electric braking, electric traction motors of urban-transit vehicles must be operated in a regime realizing maximum braking capacity. Here in the high-speed range, for existing series of traction motors it is best to use a traction regime characterized by simultaneous variation in armature current and excitation current in a manner ensuring constant maximum voltage between commutator bars. For constant pairwise series-parallel connection of traction motors and follow-up resistive-regenerative braking at maximum permissible subway-car speed, regeneration efficiency is about 64% of the kinetic energy of the train, and is nearly independent of the load carried by a car.

Prolygin, AP Mosyagin, KG *Soviet Electrical Engineering* Vol. 48 No. 9, 1977, pp 12-18; ACKNOWLEDGMENT: EI; ORDER FROM: Allerton Press, Incorporated, 150 Fifth Avenue, New York, New York, 10011

13 196380 PROGRAMMABLE DIGITAL VEHICLE CONTROL SYSTEM. A programmable digital vehicle control system or PVDVCS is based upon a microprocessor and is designed to replace the hardwired discrete components traditionally used in the on-board control of automated rapid transit vehicles. The PVDVCS can easily be adapted for use in any automated transit system. A breadboard PVDVCS has been programmed to perform the basic longitudinal control system functions, including closed-loop

emergency braking, and has been subjected to closed-loop laboratory testing. Prototype tachometers and a seventh-order nonlinear analog computer simulation of motor, brake, and vehicle dynamics were used to close the control loop for test purposes; command scenarios were input manually. The test results demonstrate the feasibility of microcomputers in on-board vehicle control and show their capability to meet the performance requirements associated with a short headway (3 s) system.

Lang, RP (Boeing Company) Freitag, DB *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 80-87; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196407 COMPUTER APPLICATION IN RAPID TRANSIT. The report comprises 4 articles on the systems and up-to-date installations on the 4 following metropolitan railways; Hong Kong, Paris (RATP), Atlanta (MARTA) and London (London Transport).

Institution of Railway Signal Engineers Jan. 1979, pp 1-24, 16 Phot., 4 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Institution of Railway Signal Engineers, 1 Ashbourne Close, London W5, England

13 196460 CHOPPER CONTROLLED ELECTRIC CARS FOR NAGOYA MUNICIPAL TRANSPORTATION BUREAU. In Nagoya City, Nos. 1, 2, and 4 subway lines are now in commercial operation. To expand the urban traffic network, construction work on the No. 3 subway line with an overall length of about 20 km has been carried out. A section of 8 km was opened for service in March 1977. Eighteen cars (basically for four-car train formation), and a number of machines including chopper control equipment have been delivered for the No. 3 subway line. These electric cars were designed by utilizing up-to-date techniques and sophisticated electronic technology. Their semi-stainless bodies requiring no painting permit easy maintenance. Chopper control equipment with regenerative braking is adopted for energy saving. Air cooling equipment is mounted for better service to passengers. The car body design and chopper controller-salient features of these cars-are described.

Yuzurihara, S Kimura, K *Hitachi Review* Vol. 27 No. 7, Dec. 1978, pp 379-384; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196463 TRIP AVAILABILITY FOR RAPID TRANSIT SYSTEMS. Passenger acceptance of mass transit system depends on predictable travel times. The major sources of travel time uncertainty are passenger wait delays due to system loading and travel time delays due to failures. The second of these effects is treated analytically. Travel time distributions are developed for a typical automated group rapid transit network with a passenger load of 14,000 passengers per hour. In addition, an approximate availability solution is presented and compared to the analytical solution.

Sacks, IJ (California University, Livermore) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 106-113, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196518 APPLICATION OF NASA TECHNOLOGY TO A RAPID TRANSIT SYSTEM. NASA has established a new program in technology utilization. It involves fill time, on-site contact with the user and is presently being applied in the development of the Metropolitan Dade County (Florida) Rapid Transit System. The NASA Representative identifies technical problems while participating in daily activities and then draws on the agency's expertise to assist in solutions.

Preston, E (Transit System Development) Beck, PE ; Canaveral Council of Technical Societies Volume 1, Session 5, 1978, pp 11-14; Proceedings of the 15th Space Congress, Cocoa Beach, Florida, April 26-28, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: Canaveral Council of Technical Societies, Cocoa Beach, Florida, 32931

13 196522 OPTIMAL CONTROL OF ON-BOARD AND STATION FLYWHEEL STORAGE FOR RAIL TRANSIT SYSTEMS. The energy efficiency of rail transit systems using regenerative braking is enhanced by flywheel storage elements used to store energy not accepted by the wayside power rail. In this paper three storage system control concepts are examined: armature and field control of on-board flywheels, and field control of a station-based storage device. The energy recovery efficiency and performance characteristics of each system are determined subject to optimal control laws derived to minimize energy loss. The resulting control systems are bilinear, due to the use of separately excited DC traction and flywheel motors as continuously variable transmissions. The three systems yield similar energy recovery efficiencies for deceleration, with the advantages of each for practical applications discussed.

Sweet, LM (Princeton University) Keane, MJ *ASME Journal of Dynamic Systems, Meas and Control* Vol. 100 No. 4, Dec. 1978, pp 284-290, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196929 ENERGY PROBLEMS IN METROPOLITAN RAILWAYS. This paper reports the specific energy consumption per passenger-kilometer or per passenger-journey on typical metropolitan railways, discussing this in two parts--fixed installations and rolling stock. After citing measures taken to minimize energy consumption by traction and non-traction functions, there is discussion of regenerative braking, thyristors, reversible substations, ac induction traction motors and energy storage. Appendices include results of a survey of representative metropolitan railways, description of thyristor-controlled choppers and inertia storage equipment.

Hafters, GH (London Transport Executive) Hanocq, R ; International Union of Public Transport 1979, p 3b1-28, Figs., 3 App.; From the 43rd International Congress Helsinki, 10-15 June 1979 International Metropolitan Railways Committee.; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium

13 196937 SUBSTATIONS FOR THE POWER SUPPLY TO THE SAO PAULO METRO. Continuity of power supply is very important for an underground railway particularly during the frequent very short peak periods.

For this reason, when designing substations it is essential to carry out detailed investigations concerning power requirements, trend of power requirements and the peak loads likely to occur. Planning of the power supply system and the overall protection concept has to be guided by the operational load peaks. A problem which plays only a subordinate role in surface transport is the temperature rise of the air in the tunnel, resulting from energy losses and braking energy of the traction vehicles. Thus, the question of current recovery during braking cannot be solved solely from the viewpoint of economy with the cost of energy as parameter. Here it is also necessary to settle the questions of pollution control in the tunnel and the cost of ventilating the tunnel. The power consumption and the possible peak loads were calculated on the basis of the Sao Paulo Metro's envisaged timetable. This study showed that it must be possible to feed the energy back into the ac system if economical operation is to be guaranteed. The following substations are envisaged for distribution and transformation of the energy required: 3 transformer substations 88/22 kv; 10 rectifier substations for 22 kv, 850 v dc (two of which are equipped with static braking inverters); and 20 systems supplying power to the passenger stations, 22/0.48 kv.

Spatny, W *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 840-847; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196939 TEN YEARS OF THE BBC DIRECT DC CONVERTOR FOR SHORT-DISTANCE VEHICLES. This article describes some of the experience gained from the purposeful use of available technologies, and then describes the present direct dc convertor technology situation, with special emphasis on single-pulse convertor elements as part of the traction equipment for short-distance vehicles. Studies and tests on the first deliveries resulted in a basis being established for all further activities in this sphere. The low-loss, stepless convertors led without exception to improved utilization of the vehicles as a result of increased transport speed, while at the same time consuming considerably less energy.

Knapp, P *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 777-785; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196941 COMMUTATOR TRACTION MOTORS FOR LOCAL TRANSPORT SERVICES. This article deals in detail with commutator traction motors for local rail transport services. The methods of installation dictated by the various bogie designs and the trend in the design of these motors are described.

Haas, H *Brown Boveri Review* Vol. 65 No. 12, Dec. 1978, pp 786-794; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 196947 CONTROL OF LONDON TRANSPORT'S POWER SUPPLY DISTRIBUTION NETWORK. London Transport are responsible for providing power supplies for 233 route miles of the associated railroad network, these supplies being derived from their own power stations. The generated high voltage is supplied, via distribution switch-houses, to 109 substations where the incoming high voltage supplies are converted to the necessary outputs to supply the system, i.e. 630 v dc traction supplies, 125 Hz signal supplies,

compressed air, lighting and escalator supplies. The plant and control facilities are discussed.

Blake, JH Taylor, DS ; Institution of Electrical Engineers IEE Conf Publ n 161, 1978, pp 40-44 Int Conference on Centralized Control Systems, 2nd, London, England, March 20-23, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

13 197009 ACCELERATION AND PASSENGER COMFORT IN RAPID TRANSIT VEHICLES. Demonstrates theoretically that with properly controlled traction and braking profiles, considerably higher rates than are accepted at present would be perfectly feasible.

Hollingberg, PL *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, pp 51-53, 7 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 197010 BOGIE DESIGN FOR RAPID TRANSIT VEHICLES. No Abstract.

Higton, JA *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, pp 47-50, 17 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 197435 PREDICTION AND CONTROL OF NOISE AND VIBRATION IN RAIL TRANSIT SYSTEMS. The purpose of this report is to present a balanced introductory view of noise from rail transportation systems and its control, and to provide references to more specialized material. The emphasis is on urban transit systems. However, data on intercity passenger and freight trains are included. The noise environments treated include community noise and vibration near rail lines, vehicle interior noise of urban and intercity passenger trains, locomotive cab noise, and noise in stations and tunnels. For each environment, some or all of the following topics are addressed: measured noise and vibration levels and spectra; prediction and control of noise and vibration; measurement methods; and applicable standards, specifications, and criteria.

Kurzweil, LG Lotz, R ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-78-38, UMTA-MA-06-0025-78-8, Sept. 1978, 124 p., Figs., 8 Tab., Refs.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294968/3ST

13 197438 TRANSIT CAR PERFORMANCE COMPARISON STATE-OF-THE-ART CAR VS. PATCO TRANSIT CAR, NYCTA R-46, MBTA SILVERBIRDS. The first phase of this contract authorized the design, development, and demonstration of two State-Of-The-Art Cars (SOAC). This document reports on the gathering of comparative test data on existing in-service transit cars. The three transit cars selected for testing were the PATCO transit car, the NYCTA R-46 transit car, and the MBTA Silverbird transit car. These cars were instrumented and then run in simulated revenue service while data was gathered. The results of these tests are reported in this document in a comparative format with the SOAC data recorded at each of the properties. The SOAC was found to be superior to all three of these existing transit cars in the area of noise reduction. The SOAC ride quality is better than

the R-46 and the Silverbird, but not as good as the PATCO transit car. The SOAC propulsion system was inefficient while operating on the New York and Boston route structures, and only marginally better than the PATCO transit car in Philadelphia.

McNeal, C ; Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. D332-10008-1, UMTA-MA-06-0025-78-5, 7802, 112 p.; Contract DOT-TSC-580; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294985/7ST

13 197453 COST SAVINGS POTENTIAL OF MODIFICATIONS TO THE STANDARD LIGHT RAIL VEHICLE SPECIFICATION.

This report describes an assessment of the Standard Light Rail Vehicle (SLRV) specification to determine whether the relaxation or modification of some requirements could result in a significant reduction in vehicle costs. A Technique of Assessment by Structured Interviewing was applied to include judgments and ideas by each facet of the industry concerning modifications to the specification which would be acceptable and could reduce car costs. A five-stage filtering process was used to select 20 cost reducing modifications from an initial list of 640 candidate specification modifications. The large list resulted from an in-depth review of the current specification. The final set of 20 areas were analyzed quantitatively to estimate cost savings that might be realized. SLRV cost savings of 16 percent are shown to result by implementing the 15 specification modifications which are termed as having acceptable impact upon mission performance. The remaining five modifications have major impact upon mission performance (e.g., unidirectional operation, doors on only one side, simplified friction brakes, no articulation, and elimination of compressed air). Cost savings of 25 percent are shown to result from specifying a bidirectional, non-articulated car with simplified friction brakes and no compressed air and which also incorporates the 15 specification modifications with acceptable impact on mission performance.

McGean, TJ Elms, CP Cooke, FAF Bamberg, W Lea (ND) and Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-79-9, Feb. 1979, 173 p.; Contract DOT-TSC-1495; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295070/7ST, DOTL NTIS

13 197652 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. This sixth Annual Report describes the work accomplished and summarizes pertinent technical and design data. The objective of the Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe, and economical as possible. Three major hardware tasks were active during this reporting period, namely: the State-of-the-Art Cars (SOAC), the Advanced Concept Train (ACT-1), and the Advanced Subsystem Development Program (ASDP). Accomplishments for the year ending September 1977 included the following: Completion of the PATCO revenue service program; Delivery of the first ACT-1 car to the DOT Transportation Test Center; Fabrication and developmental testing of

the components for the Advanced Sub-systems Development Program including the self-synchronous propulsion system, the monomotor truck and the synchronous brake system.

Boeing Vertol Company, Urban Mass Transportation Administration Ann. Rpt. UMTA-IT-06-0026-78-1, Oct. 1977, 112 p.; See also PB-266096.; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295124/2ST

13 198280 LABORATORY EVALUATION OF CONCRETE TIES AND FASTENINGS FOR TRANSIT USE. This report was prepared as part of an ongoing research effort by the Urban Mass Transportation Administration (UMTA) to develop standard concrete ties for rapid transit use. The overall objective of this contract was to fabricate and evaluate, by laboratory tests, standard ties of different designs intended for transit use. Two tie designs, a pretensioned monoblock and a post-tensioned two-block, together with preliminary specifications for tie manufacture were developed in an earlier study by the Transit Development Corporation. Objectives of the investigation were to evaluate, by laboratory tests, the adequacy of: each of three fastening systems; each of the tie designs; and the assembled track components with ties supported on ballast and subjected to simulated rapid transit loading. Work performed to accomplish these objectives included fabrication of prestressed concrete ties and testing of ties, fastenings, and assembled track components.

Hanna, AN ; Portland Cement Association, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-79-24, Mar. 1979, 79 p.; See also report PB-297570.; Contract DOT-TSC-1442; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297533/2ST, DOTL NTIS

13 198283 MEASUREMENT PROGRAM FOR EVALUATION OF CONCRETE TIES AND FASTENINGS IN TRANSIT TRACK. This report outlines a measurement program to obtain data on the performance of standard tie designs and associated fastening systems under field service conditions. In addition, the program identifies limited data to be obtained from a wood tie track for comparison. Recommendations are presented for a measurement program for monitoring, over an extended duration, the performance of different cross tie track systems under typical transit conditions. The following topics are discussed herein: type of data to be collected; type of instrumentation to be installed; type of equipment required for data acquisition; test schedule; and criteria for evaluating test data. The recommendations presented in this report are applicable to wood and concrete cross-tie track systems.

Hanna, AN ; Portland Cement Association, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-79-18, Mar. 1979, 42 p.; See also PB-297533.; Contract DOT-TSC-1442; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297570/4ST, DOTL NTIS

13 198579 RAILROAD ACCIDENT REPORT, REAR END COLLISION OF CONRAIL COMMUTER TRAIN NO. 400 AND AMTRAK PASSENGER TRAIN NO. 60, SEABROOK, MARYLAND, JUNE 9, 1978. About 6:40 p.m., on June 9, 1978, Conrail commuter train No. 400 struck Amtrak passenger train No. 60, which was slowing to stop at a grade crossing at Seabrook, Maryland. Eight cars of train No. 60 and the three head cars of train No. 400 derailed. Sixteen crewmembers and 160 passengers were injured, and damage was estimated to be \$248,050. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the engineer of train No. 400 to perceive the train ahead and to properly apply the brakes in sufficient time to prevent a collision. Contributing to the accident was the failure of Amtrak to assure that the train crews were adequately trained. The causes of the large number of injuries in this relatively low-speed collision were the failure to maintain and service seats on the Amfleet equipment, and the injury-producing fixtures designed into the commuter cars.

National Transportation Safety Board
NTSB-RAR-79-3, Mar. 1979, 36 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294710/9ST, DOTL NTIS

13 198744 PRELIMINARY SPECIFICATIONS FOR STANDARD CONCRETE TIES AND FASTENINGS FOR TRANSIT TRACK. These revised specifications cover requirements for component materials, manufacturing procedures, and handling of mono-block and two-block concrete (prestressed) cross ties, pads, and insulators for rapid transit use. It also includes requirements for rail fastenings for securing running rails, and the inserts for anchoring both the rail fastenings and the traction power contact rail support bracket. These specifications are preliminary and will be modified, as necessary, on the basis of in-track tests. This report includes Appendix A: "Details of Concrete Ties", Appendix B: "Report of New Technology", and a Listing of References.

Hanna, AN ; Portland Cement Association, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-79/17, Mar. 1979, 50 p.; Contract DOT-TSC-1442; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297850/0ST, DOTL NTIS

13 198745 THE STATUS OF ADVANCED PROPULSION SYSTEMS FOR URBAN RAIL VEHICLES. Rheostatic control of dc traction motors has been in use for several decades. With the advent of power electronics, however, more efficient alternate propulsion systems have been developed. These include chopper controls, ac drive with induction motors, systems using onboard energy storage and ac drive with tubular axle motors. Of these concepts, chopper controllers have been in regular revenue service for several years while others are still under prototype testing. This report is a technology review of advanced traction systems. It is based on information and data gathered from propulsion equipment suppliers in Europe, Japan, and the United States. The report describes in detail the status of all these propulsion systems. The performance characteristics, the significant ad-

vantages and disadvantages and the deployment of the hardware in revenue service for all these systems is discussed. The report concludes with a general description of alternate traction motors and power converters.

Nene, VD ; Mitre Corporation, Urban Mass Transportation Administration Final Rpt. MTR-79W0022, UMTA-VA-06-0053-79-1, May 1979, 227 p.; Contract DOT-UT-9002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297980/5ST

13 199049 SELF-SYNCHRONOUS PROPULSION SYSTEM FOR RAPID TRANSIT RAILCARS-ADVANCED SUBSYSTEM DEVELOPMENT PROGRAM. No abstract available.

General Motors Corporation, Boeing Vertol Company, Urban Mass Transportation Administration Feb. 1978, 632 p., 3 volumes; Set includes PB-298770 thru PB-298772, RRIS 04 199050 thru 199052 respectively; Bulletin 8001.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298769-SET/ST

13 199050 SELF-SYNCHRONOUS PROPULSION SYSTEM FOR RAPID TRANSIT RAILCARS-ADVANCED SUBSYSTEM DEVELOPMENT PROGRAM. VOLUME I: PROGRAM SYNOPSIS. The objective of the overall Advanced Subsystem Development Program (ASDP) was to develop advanced subsystems suitable for application in existing or future transit cars. This report, Volume I, summarizes the content of Volume II, and follows essentially the same outline. Volume II discusses the program technical effort, program scope, objectives, and background; summarizes the design and testing efforts and problem areas; contains conclusions and recommendations; discusses system functional characteristics, train performance characteristics, major component design, interfaces, and product assurance; covers developmental, major component and system level testing; contains a description of the changes made during system testing; discusses the status of the final configuration; and addresses unresolved problems.

General Motors Corporation, Boeing Vertol Company, Urban Mass Transportation Administration, (UMTA-IT-06-0026) Final Rpt. R78-14-VOL-1, UMTA-IT-06-0026-79-1, Feb. 1978, 82 p.; See also RRIS 04 199049; Bulletin 8001. Also available in set of 3 reports PC E12, PB-298 769-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298770/9ST

13 199051 SELF-SYNCHRONOUS PROPULSION SYSTEM FOR RAPID TRANSIT RAILCARS-ADVANCED SUBSYSTEM DEVELOPMENT PROGRAM. VOLUME II: DETAILED TECHNICAL DISCUSSION. Development of the Self-Synchronous Propulsion System was conducted under the Advanced Subsystem Development Program (ASDP), which is a part of the Urban Rapid Rail Vehicle and Systems (URRV&S) Program sponsored by the Urban Mass Transportation Administration. The Self-Synchronous Propulsion System was one of the advanced subsystems that had been identified during the Advanced Concept Train (ACT) proposal evaluation as showing outstanding merit, and was planned to be developed for evaluation

by the Transit Authorities. The objective of the overall ASDP was to develop advanced subsystems suitable for application in existing or future transit cars. This report, Volume II, discusses the program technical effort, program scope, objectives, and background; summarizes the design and testing efforts and problem areas; contains conclusions and recommendations; discusses system functional characteristics, train performance characteristics, major component design, interfaces, and product assurance; covers developmental, major component and system level testing; contains a description of the changes made during system testing; discusses the status of the final configuration; and addresses unresolved problems.

General Motors Corporation, Boeing Vertol Company, Urban Mass Transportation Administration, (UMTA-IT-0026) Final Rpt. R78-14-VOL-2, UMTA-IT-06-0026-79-2, Feb. 1978, 421 p.; See also RRIS 04 199049; Bulletin 8001. Also available in set of 3 reports PC E12, PB-298 769-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298771/7ST

13 199052 SELF-SYNCHRONOUS PROPULSION SYSTEM FOR RAPID TRANSIT RAILCARS-ADVANCED SUBSYSTEM DEVELOPMENT PROGRAM. VOLUME III: APPENDIXES. The objective of the overall Advanced Subsystem Development Program (ASDP) was to develop advanced subsystems suitable for application in existing or future transit cars. This report, Volume III, contains appendix material which was considered either too bulky or too detailed to incorporate into Volume II. Appendixes A through G in Volume III are: Train Control Electronics (TCE) Flow Diagrams; Train Performance Analysis Computer Program; List of Drawings and Specifications; Diagnostics Unit RAM Memory Code Identification; Diagnostics Unit Subroutine Flow Diagrams; Motor Power Supply System, U.S. Patent No. 3,866,094; and Mapham Inverter and Analytic Model Description, respectively.

General Motors Corporation, Boeing Vertol Company, Urban Mass Transportation Administration, (UMTA-IT-0026) Final Rpt. R78-14-VOL-3, UMTA-06-0026-79-3, Feb. 1978, 129 p.; See also RRIS 04 199049; Bulletin 8001. cooperation with Boeing Vertol Co., Philadelphia, PA. Also available in set of 3 reports PC E12, PB-298 769-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298772/5ST

13 199064 WMATA RAPID TRANSIT VEHICLE ENGINEERING TESTS. TSC has been instrumental in preparing standardized test procedures for evaluation of rail transit vehicles, using the TTC's 9.1 mile Transit Test Track, with the objective of providing a common baseline for the comparative evaluation of rapid transit vehicles and vehicle systems. The test program reported herein was carried out by the TTC to the guidelines of these procedures. The test program data gave a comprehensive evaluation of the WMATA rapid transit car in the categories of Performance, Power Consumption, Spin/Slide Protection, Noise, Ride Roughness, Power System Interactions, and Simulated Revenue Service. Simmonds, KJ Henderson, FH ; Federal Railroad Administration, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-8, May 1979, 122 p.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-298978/8ST, DOTL NTIS

13 260417 BART PROTOTYPE CAR DEVELOPMENT PROGRAM, VOLUME 2, PROGRAM DETAILS. The report traces The Bay Area Rapid Transit District Rapid Transit Vehicle Program through the planning phase, design phase, and the development and prototype test phase. The program was established to enhance the attractiveness of rail rapid transportation to the urban traveler by providing a comfortable, reliable and safe car incorporating the latest engineering concepts. The report provides design justifications, testing highlights, and reasons for modifications and changes resulting from the prototype test program, sponsored by the Urban Mass Transportation Administration. This Volume 2, Program Details, provides the detailed technical material for Engineering personnel. /Author/

Rohr Corporation Final Rpt. UMTA-CA-06-0032, Mar. 1973, 271 pp; See also Volume 1, PB-223131/4.; ACKNOWLEDGMENT: NTIS (PB-222976/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-222976/3

13 262199 NEW GENERATION OF CARS. The U.S. Department of Transportation has been acting as a catalyst to further the state of the art in transit car technology and design. Two state-of-the-art cars (SOAC) are currently on tour to demonstrate to the transit operators and the public the best subway car industry can offer with existing technology. Designed to hold an average of 100 passengers and travel up to 80 mph, SOAC with lighting, climate control, quality of ride and noise control, sets a new standard in rail car design. The Advanced Concept Train (ACT-1) represents the next generation of rapid transit trains. One ACT-1 is powered by an energy storage flywheel propulsion system designed to conserve electric power. The new car is expected to reduce cost of operation and maintenance from about 55 cents to around 30 cents per car mile. An example of the program's use of standardization to benefit the maximum numbers is a new street-car called the Standard Light Rail Vehicle (SLRV), which will fit virtually all eight existing streetcar systems in the U.S. The first GT-E (gas-turbine-electric engine) commuter rail car, will appear on the Long Island Railroad and a flywheel energy saving device will also be tested on subway cars.

Gardner, J *Mass Transit* Vol. 1 No. 1, June 1974, pp 14-16

13 262573 STATE-OF-ART CAR DEVELOPMENT PROGRAM VOLUME I: DESIGN, FABRICATION AND TEST. As systems manager for the Urban Mass Transportation Administration's Urban Rapid Rail Vehicle and Systems Program, the Boeing Vertol Company is supervising the design, fabrication and testing of two new State-of-the-Art Cars (SOAC) with the objective of demonstrating the current state-of-the-art in rail rapid transit vehicle technology. Passenger convenience and operating efficiency are primary goals for the cars. Built by the St. Louis Car Division of General Steel Industries, the SOAC features a DC-DC chopper in the propulsion system, separately excited DC traction motors, all-steel construction (with molded fiberglass

ends), and vandal-resistant and fire-retardant materials in the interior. This volume, Volume 1 of a two-volume report, covers the development program through engineering testing; including data on design and performance, propulsion and braking, subsystems, test program, mockup and demonstration programs, and economic analysis. Volume 2 will report on operational tests and evaluations to be performed in revenue service in New York, Boston, Cleveland, Chicago and Philadelphia.

Boeing Vertol Company, (D174-10031-1) Final Rpt. UMTA-IT-06-0026-74-1, Apr. 1974, 182 pp; DOT-UT-10007; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235703

13 263162 BASIC PRINCIPLES AND GUIDE LINES FOR THE PLANNING AND CONSTRUCTION OF S-BAHN SYSTEMS. The integrated transport service is described toward which the planning and development of the S-Bahn Systems of large cities are oriented. In a review of the basic principles and guide lines for the planning and construction of S-Bahn systems, details are given of network models interchange facilities and location of stations. The special cases of monocentric and polycentric city regions are discussed. The alignment principles of horizontal and vertical alignment are set forth. In the design of platforms, the constituent parts should be designed and harmonized such that they comply with the operating requirements for short station stops of the S-Bahn trains, as well as with certain comfort criteria affecting passengers. The arrangement of the platforms and platform dimensions are discussed. The arrangement of platform entrances, facilities to overcome differences in level, and the width of access facilities are described. Weather protection, and passenger handling facilities are other aspects reviewed. Details are given of design criteria for tunnel sections and interchange stations. In a discussion of technical equipment for the automation of S-Bahn operation, consideration is given to basic technical equipment, continuous automatic train running control, computer control and train monitoring. A review of S-Bahn projects already realized of under construction, include systems in Munich, Hamburg and Frankfurt-on-Main. Construction methods for S-Bahn tunnels are discussed. conclusions based on the report are presented. The improvement of the quality of local public transport requires capital investment which the transport undertaking is often not able to sustain on its own. The success of a transport community if dependent on the systematic and intensified expansion of rapid transit networks in connection with high capacity park-and-ride facilities. Urban and regional transport plans should be continually harmonized with the land use and urban development plans.

Heise, H Wehner, L *Rail International* No. 4, Apr. 1973, pp 550-578, 13 Fig., 7 Ref.

13 264627 WHEEL/RAIL NOISE AND VIBRATION CONTROL. Reported here are the interim results of a program under the UMTA Urban Rail Supporting Technology Program to develop a basic understanding of urban transit wheel/rail noise generation for application to the evaluation and improvement of wheel/rail noise control devices. The report critically reviews existing analytic models and related experimental

findings for the wheel/rail dynamic system and for the three categories of wheel/rail noise generation: squeal, impact, and roar. The limitations found result in recommendations for the remaining work required. A compilation is presented of existing or promising wheel/rail noise control devices, their acoustic and nonacoustic effects. The relative severity of the three noise categories is compared by examining wayside noise data from numerous transit systems and railroads around the world, and by using a scale recommended here for rating urban transit wheel/rail noise, i.e., the peak A-weighted sound pressure level to which the receiver of interest is exposed. Squeal produces the most annoying noises followed closely by impact and roar. Lastly, methodology is presented for assessing the non-acoustic performance of wheel/rail noise control devices. The method is applied to an example in which it is assumed that resilient wheels are installed on all New York City Transit Authority cars.

Remington, RJ ; Bolt, Beranek and Newman, Incorporated, (MA-06-0025) IntrmRpt.7 UMTA-MA06-0025-74-10, May 1974, 176 pp; Contract DOT-TSC-644; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237012/OST, DOTL NTIS

13 267028 WABCO DATA ACQUISITION SYSTEM AC PROPULSION PROJECT. In June 1971, the Cleveland Transit System received a grant contract (Project OH-06-0006) from the Department of Transportation's Urban Mass Transportation Administration to test and evaluate on three rapid cars an AC propulsion system developed by the Westinghouse Air Brake Company (WABCO). The AC propulsion system incorporates a pulse width modulated inverter to convert constant voltage DC energy to variable frequency, variable voltage AC energy which in turn powers simple AC traction motors. This report describes the data acquisition system which was developed to measure, record and analyze performance data for the AC-powered rapid transit cars. This report is one of a series on various aspects of the project.

Smith, RD Cymbor, WP ; Cleveland Transit System Intrm Rpt. UMTA-OH-06-0006-73-1, Aug. 1973, 102 p.; Prepared by Westinghouse Air Brake Division, Westinghouse Air Brake Company (An American Standard Company) for Cleveland Transit System.; Contract OH-06-0006; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-223898/AS, DOTL NTIS

13 291117 RAIL VEHICLES FOR URBAN AND UNDERGROUND SERVICE. The paper briefly describes the commuter situation in most great cities of the world today, and gives some background as to why the situation has arisen. The basic elements of train movement are briefly considered with special reference to urban and suburban traffic, and the salient requirements from this are combined with other electrical, mechanical, and passenger amenity features to form a picture of the general requirements for this type of stock. Examples are given of modern stock designed to meet the requirements. The new high-density stock of British railways is described and reference is made to the London Transport Victoria Line stock with particular reference to

automatic train operation. Short descriptions are then given of north American practices, followed by a brief review of European developments. From these examples a general similarity in design emerges which very adequately meets the requirements of the commuter problem, and it is suggested by the author that an urban railway system in conjunction with other forms of street transport can provide a suitable overall solution to this modern and increasing problem. /TRRL/ Jowett, WG (British Railways Board) *Institution of Mechanical Engineers Proceedings* Proceeding Vol. 184 No. 3S, pp 1-19, 14 Fig., 2 Tab., 8 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 203062)

13 300571 ROLLING STOCK FOR MASS TRANSPORT [Materiale rotabile per trasporti rapidi di massa]. For the rail systems which represent the supporting element of the transport system in metropolitan areas, the rolling stock, with rare exceptions, is obsolete and causes dissatisfaction on the part of the users, giving rise to high operating costs. From this there arises the necessity for modernization, which essentially represents a problem of financing. The technical evolution of rail stock, today very rapid, must take account of traction requirements; of great significance was the introduction of electronics and the use of lightweight structures. For the means destined for commuter services, the deep comparison between the diverse possible solutions has made it possible to perfect a type of railcar with the body in light alloy and chopper equipment, characterized by a considerable flexibility of use and economical operation. A description of the new type of car, its design and mechanical and electronic equipment, is presented. [Italian]

Perticarioli, F *Ingegneria Ferroviaria* Vol. 33 No. 12, Dec. 1978, p 1039; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 300572 PROJECT "NEW CONSTRUCTION OF THE POWER LINE STATION AT STERNCHANZE" [Das Projekt Neubau der Netzleitstelle Sternchanze]. The power line station for the supply of dc electric power for the urban rapid transit system in Hamburg, West Germany, is discussed. Recently an electronic data processing system has been incorporated to provide control facilities. The realization of this project imposes new and interesting tasks on the persons concerned. A description is given of planning, organization and realization within the various stages of the project. [German]

Gladigau, R Haupt, P. *Elektrische Bahnen* Vol. 50 No. 1, Jan. 1979, pp 23-25, 2 Ref.; See also Vol. 50 No. 2, February 1979 issue.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 300579 IMPROVING PERFORMANCE IN RAPID TRANSIT SYSTEMS. Recognized reliability and maintainability techniques, developed by the aerospace industry, have been modified for application to the rapid transit industry. From the evaluation of existing and proposed transit systems, it is evident that through the application of design techniques and operating strategies, the Operational Dependability can be significantly increased. Quantum improvements in the state-of-the-art are not required. However, increased cooperation between manufacturers, designers, and those responsible for specification

preparation is necessary. Also, through better defined programs, more extensive testing, and inclusion of other techniques such as derating and redundancy, we should be able to provide the public with a more dependable, safe transit system while enabling the properties to maintain and operate the system more effectively.

Hunt, H (Kaiser Engineers) *ASCE Journal of Transportation Engineering* Vol. 105 No. 4, July 1979, pp 393-399, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 300617 PROCEDURE FOR THE OPTIMAL DISTRIBUTION OF ELECTRIC POWER (PROMETHEE) FOR THE METRO AT A FIXED LEVEL [Procedure de repartition optimale, pour le metro, a un horizon fixe, de l'energie electrique (PROMETHEE)]. An interactive system is described which is part of a more comprehensive process for managing the power supply system of the metro. Using a generator of feasible "line-assignments" the problem is formulated as a bivalent (0.1) linear program. To solve it, two approaches were successively studied. The first uses both linear programming and branch and bound (PSES). The second, by relaxing some constraints, combines a decomposition method of Dantzig and Wolfe with a subgradient method. The results obtained show a substantial improvement in the objective function which has been retained as representative of the cost of mean and long range planning. [French]

Sitruk, G Heurgon, E Present, M *RAIRO Recherche Operationnelle/Operations Research* Vol. 12 No. 4, Nov. 1978, pp 351-368, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 300619 FAILURE DATA ANALYSIS FOR TRANSIT VEHICLES. This paper describes an effort to create a data base for the reliability of transit vehicles and their components. Failure data on approximately 500 subway cars, 400 streetcars and 1100 buses was obtained from the Toronto Transit Commission. The results of the analysis of this data are summarized in this paper and reference to more detailed information is provided.

Singh, C (Ontario Ministry of Transportation & Communic, Can) ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1429-OR, 1979, pp 308-313, 6 Ref.; Proceedings of the Annual Reliability and Maintainability Symposium, Washington, D.C., January 23-25, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 300620 DETERMINATION OF TRANSIT SYSTEM DEPENDABILITY. This paper develops a passenger-based technique to calculate the overall system dependability (or, equivalently, system availability) of a rail rapid transit system, and demonstrates the technique by means of a numerical example, based on an actual transit system. The technique uses as dependability the proportion of passengers who complete their trip with no delay greater than a given tolerance limit, and takes into account dwell and blockage delays, operating policies in response to an incident, and passenger flow rates. The resulting technique is intended to tie together the various concepts of reliability, maintainability, failure modes and effects, etc., into a single measure of system performance.

Heimann, DI (Department of Transportation) ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1429-OR, 1979, pp 314-322, 3 Ref.; Proceedings of the Annual Reliability and Maintainability Symposium, Washington, D.C., January 23-25, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 300737 SINGLE-STEP AC MOTOR/INVERTER SYSTEM FOR RAPID TRANSIT VEHICLES. The paper describes the problems connected with a single-step inverter system for three-phase ac drives of tramcar units. The inverter is directly connected to the contact line and controls both the output frequency and the voltage. The most essential components of the drive are described: basic circuit configuration, traction motor, control scheme and circuit diagram of inverter. The drive operates without any contacts. The motor is controlled for the optimum rotor frequency and well utilised. Reducing the number of components, space requirements and weight of the inverter presents the main problem in the further development of the drive system. [German]

Kamenicky, J *Glaser's Annalen ZEV* Vol. 102 No. 2-3, Feb. 1979, pp 77-82; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 301201 PROTECTING STREETCAR ELECTRIC EQUIPMENT AGAINST OVERVOLTAGES. In recent years the Kalinin Lenin-grad Polytechnical Institute (LPI) has investigated internal overvoltages for the electric equipment of electric rolling stock. Some results of this research obtained for the type LM-57 car are given. The measurements were carried out by means of an automatic internal-overvoltage recorder. It is shown that overvoltages with amplitudes 2.1 KV (more than the operating test voltage) may be expected to occur more than 60 times a year in the power circuit of a streetcar protected by conventional type RMVU-0.55 arrestors; thus, nonlinear-resistance arrestors with improved characteristics must be developed and placed into service.

Alekseev, SA Khalilov, FK Shilina, NA *Soviet Electrical Engineering* Vol. 49 No. 3, 1978, pp 104-107; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 301307 EFFECT OF VARYING LIGHT-RAIL DESIGN STANDARDS. Light-rail transit (LRT) is a flexible transit mode that can be implemented in a variety of ways. This complicates the task of comparing it with other modes when carrying out the alternatives analysis required by the Urban Mass Transportation Administration to secure federal funding for fixed-guideway transit projects. A recent study for Santa Clara County, California, dealt with this problem by evaluating four possible variations in LRT design standards. This paper draws on the results of that study. It features a description of the study area and site conditions, a definition of the four LRT design standards considered, analysis of the different capital costs associated with each design standard, a discussion of the range of estimates of expected patronage, and a review of the resulting operating requirements and costs. The paper then presents a detailed comparison of the cumulative impact of these design differences on the cost-effectiveness

measures for the bus alternatives that were also analyzed in the Santa Clara County study. It was found that, while capital cost for LRT can vary significantly according to the assumed design standard, the cost-effectiveness measures for the bus alternatives that were also analyzed in the Santa Clara County study. It was found that, while capital costs for LRT can vary significantly according to the assumed design standard, the cost-effectiveness is primarily dependent on other factors. It is therefore concluded that alternatives analysis requires the study of only one LRT design standard to establish the relative advantages and disadvantages of transit mode alternatives for a given metropolitan area. /Authors/

Kudlick, W (De Leuw, Cather and Company) Minister, RD (Santa Clara County Transportation Agency) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 49-54, 6 Tab., 2 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

13 301320 THE DESIGN OF LIGHT-RAIL TRACK IN PAVEMENT. Many existing light-rail transit (LRT) networks and parts of some new ones require the construction of track in pavement. Sometimes this track is intended for joint use with street traffic or buses; in other places paved track is used in pedestrian areas or on medians. This paper describes the types of LRT track used in pavement in North America and Europe and suggests that the standards now in use in the United States may be in need of revision. There has been very little construction of LRT track in pavement in North America in the last 40 years. What little has been built has followed the traditional standards of the industry, which date from the earliest streetcar days, and has generally used girder rail, ties, and ballast set in concrete pavement. By contrast, most European LRT systems have adopted a basically different type of track for use in pavement. It is built without conventional ties and is mechanically separated from the street pavement structure. Such track is quieter and may also be less costly; it appears to warrant serious consideration for new U.S. installations. /Author/

Fox, GD (De Leuw, Cather and Company) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 130-136, 11 Fig., 4 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

13 301321 APPLICATION OF LIGHT-RAIL TRANSIT VEHICLES. Flexibility is the primary concept associated with light-rail transit (LRT). This flexibility includes its application, implementation, operation, and capacity and has clear implications for light-rail vehicle (LRV) design, since the capabilities of a vehicle selected for a specific system must meet the requirements of that system. The thesis of this paper is that all such LRT requirements can be met by a family of vehicle designs based on standardized subsystem componentry. System requirements are dealt with in four categories—capacity, geometry, performance, and impact; the vehicle components include the car-body alternatives; it is shown that the use of single-ended LRVs is desirable whenever system characteristics permit and that articu-

lation is properly used to solve clearance rather than capacity problems. The Toronto Transit Commission's ordering of new LRVs is used to illustrate the process of selecting vehicle attributes that meet the system requirements and the process of moving from a definition of desirable vehicle characteristics through development and testing to car delivery. The ability to derive several vehicle designs from the basic design is discussed in the context of ongoing development activities in order to prove the feasibility of the family-of-vehicles idea. /Author/

Gray, AR (Urban Transportation Development Corporation) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 137-141, 2 Fig., 3 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

13 301322 POWER SUPPLY FOR LIGHT-RAIL AND RAPID TRANSIT SYSTEMS IN GERMANY. The purpose of this paper is to define the present state of the art in the design of the power supply for light-rail and rapid transit systems in Germany. The scope includes the incoming alternating-current switchgear, rectifier direct-current switchgear, catenary, and third-rail systems, as well as the breaker on the light-rail vehicle. Attention is paid to the problems of coordinating the various components of standard design and of dealing with corrosion due to the leakage of current from the power supply. Experiences with various catenary designs and their interconnections in Germany are also described. This paper is limited to experience in Germany, and the underlying design criteria are based on German electrical regulations. Since the implementation and reliability of power supply for light-rail and rapid transit systems in Germany are considered to be highly successful, the data, views, and experience presented in this paper should be of interest in North America. /Author/

Wolff, G (Siemens A.G.) Waite, WB (Siemens Electric Limited) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 142-149, 18 Fig., 1 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

13 301323 TECHNOLOGY AND ECONOMICS OF REGENERATION FOR LIGHT-RAIL APPLICATIONS. Regeneration is one method of recycling a vehicle's surplus kinetic energy during braking. Regeneration is recuperative braking in which the recycled energy goes back to the vehicles' power supply system for use by other vehicles. Several propulsion systems that use regenerative braking have been applied and operated on direct-current electrified rail systems. The fundamental limitations on effectiveness that are beyond the propulsion designer's control are considered. The performance of an alternating-current induction motor system with an inverter and a direct-current series motor system with a chopper are explored to illustrate the present state of technology. Comparison is made with two other types of recuperative braking—flywheel energy storage and height changes in the route profile. The inefficiency of the former and the difficulty of construction of the latter are

noted. The industry's present interest in regeneration is questioned since it would have minimal economic impact but require complex propulsion hardware and extra maintenance costs. /Author/ Vutz, N (Klauder (Louis T) and Associates) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 149-160, 15 Fig., 4 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

13 301328 SOPHISTICATION AND COMPLEXITY VERSUS ECONOMY: THE PROBLEM OF GOLD-PLATING. Workshop participants noted the many mistakes made in the past decade in light-rail transit (LRT) and rapid transit planning and design that can be attributed to gold-plating (i.e. spending more than is needed to do the job). It was not quite apparent who was responsible for these mistakes. Although advances in LRT are desirable, the problem is in determining which advances are necessary and are cost-effective. It is noted that overdesign is often introduced early in the planning stages when system designs for civil engineering, railroad or rapid transit power supply, signalling, and fare collection are being selected. Experiences with LRT in Buffalo are quoted. Signaling was discussed and it was noted it would soon be possible to compare many aspects of actual systems in Canada and the U.S. Overdesign was discussed with respect to portions of Muni, the Washington Metro, and the Los Angeles proposals for rapid transit. Comments were also made on chopper control and power collection by means of pantographs or trolley poles.

Parkinson, TE (British Columbia Ministry of Municipal Affairs & H) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 171-172*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

13 301422 REDUCTION OF ENERGY REQUIREMENTS WITH REGENERATIVE BRAKING ON ELECTRIC VEHICLES [Energiebedarfssenkung durch Nutzbremsen bei Elektrofahrzeugen]. Comparative appraisals for different types of vehicles show that some 20 to 50% of energy can be saved by regenerative braking on railway vehicles in short-distance traffic. On the other hand, in the case of road vehicles, the energy saving is only 5 to 25% because of the higher resistance to forward motion of pneumatic tyres. [German]

Roeder, G *Elektrische Bahnen* Vol. 50 No. 4, 1979, pp 86-96, 2 Tab., 7 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 301607 PARAMETRIC ANALYSIS: A SKETCH-PLANNING TOOL. An analytical procedure to conduct sketch-planning analysis for exclusive transit facilities and its application in the Jacksonville, Florida, metropolitan area are described. Unlike detailed testing, in which the objective is to select a single recommended transportation scheme, the sketch-planning technique only screens alternatives to identify candidate transportation systems for more detailed testing. The method suggested for assessing the feasibility of rapid transit is termed parametric

analysis and generally conforms to the transportation planning process currently used throughout the nation. Two major differences are that the parametric analysis is usually conducted at a larger-than-zonal scale and, instead of computing a single modal split, assumes various transit capture rates. In addition, each transit technology is specified in terms of performance parameters such as minimum headways, speeds, and unit costs. The consequences for patronage, revenue, and cost can be determined for each capture rate and test situation, and thus the feasibility of exclusive transit facilities can be assessed. Parametric analysis provides a useful, cost-effective procedure for conducting rapid transit sketch planning. /Author/

Cherwony, W (Simpson and Curtin, Incorporated) Polin, L (Orange County Transit District) *Transportation Research Record* No. 707, 1979, pp 16-20, 1 Fig., 4 Tab.; This paper appeared in *Transportation Research Record* No. 707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

13 301821 ALUMINIUM TRAINSETS WILL INTEGRATE CROSS-PARIS SERVICES. Integration of commuter service over Paris rapid transit and French National Railways lines requires rolling stock capable of operating from two power supplies and variations in platform height. The hybrid design incorporates features from existing SNCF and RATP trainsets, and features lightweight bodies, chopper control and automatic changeover between 1.5 kV dc and 25 kV ac.

Railway Gazette International Vol. 135 No. 9, Sept. 1979, pp 827-829, 4 Phot. ORDER FROM: ESL

13 301831 FIRST LINE OF ATLANTA'S NEW TRANSIT SYSTEM OPENS. With lessons learned from San Francisco and Washington, D. C., Atlanta hopes to avoid some of the problems encountered by those cities in building and operating its new transit system. The first line of that system, known as MARTA for Metropolitan Atlanta Rapid Transit Authority, opens for passengers this month. When complete, the system will encompass 53 miles of rail line and 8 miles of busways served by 41 passenger stations. It is expected to provide some relief against a gasoline-starved transportation future; it will also help to revitalize parts of the deteriorating center city. Covered are facts about the subway section, elevated structures, trackwork, stations and the unique organization that designed and is building the system. Also, a sidebar article on restructuring the urban environment by planning the development of station sites is by Paul E. Potter, who worked as assistant director of design for general consultant Parsons Brinckerhoff/Tudor.

ASCE Civil Engineering Vol. 49 No. 7, July 1979, pp 77-82 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 301848 SIEMENS/DUEWAG H-BAHN SYSTEM. The design and operation of a high-level narrow slotted box beam rapid transit system using suspended vehicles of various sizes is discussed. The elevated beam guidance arrangement can be quickly erected but is usually best suited to modern surroundings as it is visually intrusive. Box section track beams provide a

protective envelope for the traction equipment, running surfaces and points. Support columns are needed at 30 M intervals on straight and 20 M intervals at curves and points. Vehicle sizes can vary from small 8 seater cabins to articulated vehicles with room for 50 seated and 152 standing passengers. The vehicles are controlled automatically at three levels. Vehicle headways, speeds and point operations are monitored at the safety level; traffic control level uses station computers and data transfer equipment between stations. The operations control level serves the system as a whole, monitoring the technical equipment and providing communications with vehicles.

Taplin, MR *Modern Railways* No. 5, 1979, pp 44-45, 3 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241519); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

13 302168 RAILVIEW: A REBIRTH OF PASSENGER CAR MANUFACTURING? Amtrak's president describes trends that he feels will create an increasing demand for new passenger cars and called for reestablishment of a major rail-car manufacturing capability in the U.S. Growing energy costs and prospects for coordination of public transport modes offer the prospect that rail passenger travel will increase.

Boyd, AS (Amtrak) *Railway Age* Vol. 180 No. 17, Sept. 1979, pp 94-97, 1 Phot.; ORDER FROM: ESL

13 302383 THE RIO DE JANEIRO SUBWAY SYSTEM-A CASE STUDY IN APPLYING THEORY TO PRACTICE. A case study of translation of theoretical developments (Friedman, 1975; 1976) to implementation procedures is outlined with specific reference to the Rio de Janeiro subway system. Within the overall framework of establishing the time schedule of trips of a single line that minimizes the average waiting time of passengers with possible generalization and extension to multi-line network, the present manuscript has the limited aim of developing a time table and determining the minimal number of trains required to keep up a given schedule of trips of a single line. The incorporation of a new ad-hoc procedure of "inclusion and exclusion trips" to and from an intermediate regulating station is a novel feature not included in the original Friedman model. This supplement characterizes an important physical attribute of the Rio de Janeiro system, namely, the limited train storage capacity at the terminal stations which is offset by virtual unlimited storage capacity at the intermediate regulating station. The case study has generated a procedure for creation and manipulation of large data bases in real life applications encountering practical constraints using a theoretically sound set of efficient algorithms.

Friedman, M (Arizona State University, Tempe) Cordovil, CAG (IBM Brazil) *Transportation Research. Part A: General* Vol. 13A No. 2, Apr. 1979, pp 125-134, 1 Fig., 2 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242473); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

13 302718 THE MASS TRANSIT EQUIPMENT SECTOR IN ONTARIO AND QUEBEC. The domestic mass transit equipment sector can best thrive by penetrating international markets. In order to be competitive in this market place, national consortia will have to be formed. This can only come about if the Federal government is willing to aid in the formation of national consortia, along with vehicle producers, transit operators, labour, consultants and other relevant interests. This conclusion is based on a detailed examination of the interests, problems and prospects for the equipment sector within Canada, North America and international markets. The study is divided into five parts. Part One presents an overview of the sector, identifying supplier-operator relationships and government involvement. Part Two discusses the roles of research and development in the sector. Part Three elaborates on the current state of the sector in Canada, including information from The Urban Transportation Equipment Industry in Canada, published by the Federal Department of Industry, Trade and Commerce. Part Four presents a range of strategies that the sector could adopt in marketing their products. All are based on collaborative actions by the interests that form the sector. Part Five provides a brief summary on the study. The appendix presents the results of the two surveys, notes on the one day seminar held on October 6, 1978; a copy of the transit property questionnaire and the bibliography.

Ginsberman, MG ; Toronto-York University Joint Program in Transp Res Rpt. No. 61, No Date, 61 p.; ORDER FROM: Toronto-York University Joint Program in Transp, 4700 Keele Street, Room 430 Osgoode Hall, Downsview, Ontario M3J 1P3, Canada

13 303210 ATLANTA RAPID TRANSIT CARS. The Metropolitan Atlanta Rapid Transit Authority (MARTA) is in the process of procuring cars. These cars are of welded aluminum extrusions, 75 feet long, and are powered by a chopper modulated 750 volt third rail propulsion system. Certain unique features are discussed in detail, including the method of body construction, reliability, noise levels, the cooling of propulsion equipment, and auxiliary voltage regulation. The test program is outlined and the significant results to data summarized. Most difficulties have been of a second order nature, but testing has taken longer than had been anticipated. A recommendation is made to provide more time for testing on future procurements, or to plan operations using other than new equipment.

Taylor, TS *Society of Automotive Engineers Preprints* SAE 790367, 1979, 11 p.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 303255 SIGNAL INTERFERENCE EFFECTS WITH CHOPPER CONTROLLED TRACTION. Rapid transit and commuter services operated with direct current usually have ac signaling systems that can be adversely affected by chopper propulsion controls that permit regeneration and reduce power consumption. Magnetic or conductive interference mechanisms are now well understood and it should be possible to write a specification that meets signal requirements without excessive increases in costs of propulsion equipment on the train. Tests by London Transport confirm that the solution lies

in specifying an adequate input filter, together with fail-safe control and monitoring of frequencies generated by the chopper.

Mellitt, B (Birmingham University, England) *Railway Gazette International* Vol. 135 No. 11, Nov. 1979, pp 999-003, 5 Fig., 1 Tab., 7 Ref.; ORDER FROM: ESL

13 303581 BART: THE ROAD IS STILL BUMPY, BUT THE GOAL IS IN SIGHT. While its most protracted labor dispute was taking place, Bay Area Rapid Transit was actively working to improve reliability, safety and capacity. In the wake of its tunnel fire, BART is investigating new types of seat upholstery and ways to inhibit the spread of flames and smoke in its cars and tunnels. Improvements in brake and traction components are to increase car availability. A Sequential Occupancy Release System is to supplement the original automatic train control to permit closer headways and cab signals will permit full-speed operation in cases of some central control failures. Fare gates are also being improved. Ahead will be additional track capacity and new computers which will be adjuncts to a completely new control system.

Middleton, WD, Consulting Editor *Railway Age* Vol. 180 No. 21, Nov. 1979, p 28, 4 Phot.; ORDER FROM: ESL

13 303656 BRITAIN'S MOST UNUSUAL METRO NEARS COMPLETION. The public transport system nearing completion in the United Kingdom's northeast capital of Newcastle-on-Tyne is described. The design features a rapid transit light rail system using electrical-powered Supertrams.

Stoddart, S *World Construction* Vol. 32 No. 7, July 1979, p 79; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 303859 ENERGY CONSUMPTION OF RAIL RAPID TRANSIT: AN ANALYSIS OF THE BART EXPERIENCE. This paper documents and analyzes the operating energy consumption of the San Francisco Bay Area's new rapid-transit system; it briefly compares BART's energy consumption with that of other rail rapid-transit systems and includes a partial analysis of energy consumption of BART, bus, and automobile in one travel corridor of the Bay Area using recent data on actual passenger volumes. Components of operating energy in BART that are considered are: station energy, maintenance energy, and traction energy. Basic conclusions are: in terms of energy consumed per seat-mile provided, BART is less fuel-efficient than bus but much more efficient than automobile; and in a major travel corridor of the Bay Area where much of BART's ridership come from buses, where automobile occupancy is high, and where BART's load factors in the peak period/reverse direction and off-peak are low, the actual energy savings due to BART are much smaller than the potential. And if the many new trips apparently induced by BART are taken into account, the net energy savings may be negligible.

Ellis, RH Sherret, A (Peat, Marwick, Mitchell and Company) ; Pergamon Press 1978, pp 397-417; From International Conference on Energy Use Management, October 24, 1977, Tucson, Arizona.; ACKNOWLEDGMENT: Energy Research Abstracts;

ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

13 303860 PUBLIC TRANSPORTATION: PATH AS AN EXAMPLE. The PATH rail-transit system (Port Authority Trans-Hudson system) is a 14-mile long, 70-year old heavy rail rapid-transit system operating in the New York Metropolitan area. The operational and technological programs to conserve energy in the last few years are described. The paper first concentrates on PATH itself, based largely on propulsion energy and utilization of the system. The second part reflects regional perspectives. PATH's primary energy source is electricity. Only insignificant amounts of other energy are consumed, primarily space heating at various maintenance facilities or for use in various vehicles operated by PATH. Data are sparse that identify the energy effectiveness of other rail-transit systems for peak versus off-peak services; but with some data, comparisons are made with PATH performance-other systems in the Northeast and some foreign systems. The simplest and quickest way to improve rail-transit's Btu-per-passenger-mile effectiveness is to adopt policies that would increase its utilization, the author says.

Smith, DT ; Pergamon Press 1978, pp 419-429
From International Conference on Energy Use Management, October 24, 1977, Tucson, Arizona.; ACKNOWLEDGMENT: Energy Research Abstracts; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

13 304078 STATIONARY FLYWHEEL ENERGY STORAGE SYSTEM SSB. The study investigates whether the braking energy expended on the projected down-grade tunnel section of the Stuttgart Stadtbahn can be economically rewon by means of a stationary flywheel storage system. A design concept was drawn up for a low-loss large flywheel store of up to 25 Mg rotating mass and the service life of forged steel flywheels investigated. The final design resulted in a system with a 5 Mg flywheel and field rheostat controlled dc motor as an electromechanical converter. Study of the energy flux ratios in the light railroad power network revealed that 680 MWh of electrical energy could be saved annually. Plant costs (without conversion) for a tested plant would amount to DM 962,000. With savings in power costs of 80,000 to DM 100,000 per year and depending on interest rates and on rates of increase in electrical current price the plant would be amortized in 12 to 22 years compared to an expected service life of more than 30 years. (ERA citation 04:030643)

Zwerenz, W Schauburger, H ; Maschinenfabrik Augsburg-Nuernberg AG Nov. 1978, 153 p.; U.S. Sales Only.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; BMFT-FB-T-78-11

13 304675 ENERGY STORAGE PROPULSION SYSTEM FOR RAPID TRANSIT CARS. TEST RESULTS AND SYSTEM EVALUATION. The principal objectives of this test program were to evaluate the ability of the Energy Storage (ES) System to: reduce propulsion energy usage; reduce propulsion power demands; and reduce tunnel heating caused by

propulsion energy use. This report describes the test and evaluation of the ES system for rapid transit cars. The characteristics of the system were investigated in the real world by installing the novel equipment under two New York City subway cars and operating the cars both under test track conditions and in revenue service on several lines of the New York City Transit System. Tunnel heating effects, power reduction, gyroscopic forces, and other characteristics were investigated and evaluated. Overall propulsion energy reductions of 14-26%, as compared with conventional equipment, were measured in revenue service operations. Further reductions should be attainable by this system, if improvements derived from this test program were to be incorporated into the equipment and control configuration. The authors state that the equipment tested under the two R-32 cars demonstrated that on-board flywheel energy storage is an impressive means for achieving major savings in transit car propulsion energy. Part II of this report describes the methods for applying the energy conservation data to rapid transit systems other than New York's. Appendixes are provided which give specific information on the New York subway routes and on the instrumentation used.

Raskin, D ; Metropolitan Transportation Authority (New York), Urban Mass Transportation Administration, New York State Department of Transportation, AiResearch Manufacturing Company, (UMTA-NY-06-0006) Final Rpt. UMTA-NY-06-0006-78-1, Oct. 1978, 136 p.; Sponsored in part by New York State Dept. of Transportation, Albany, and AiResearch Mfg. Co., Torrance, CA. See also report dated Sep 75, PB-249063.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300918/OST

13 304686 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MA., ON NOVEMBER 16-17, 1978. VOLUME VI: RAIL AND CONSTRUCTION TECHNOLOGY WORKSHOPS. The document is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Rail and Construction Technology. Part I deals with railcars and equipment and includes discussions of the rail technology R&D program, the rail system studies of the Congressional Office of Technology Assessment, and the problems connected with technology deployment. Part II, construction technologies, includes discussions of construction technologies and costs and the transit industry's views of UMTA's R&D program in this area. This volume contains five resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-6, Nov. 1978, 56 p.; See also Volume 5, PB-300990, and Volume 7, PB-300992.; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300991/7ST

13 304697 SLRV (STANDARD LIGHT RAIL VEHICLE) ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION, TRANSPORTATION TEST CENTER. FINAL TEST REPORT. VOLUME I-INTRODUCTION. The Standard Light Rail Vehicle (SLRV) is a 71-foot vehicle, articulated to negotiate curves down to 32-foot radius and designed to operate at speeds up to 50 mph. Although the basic configuration and performance is standardized, the current operating properties (Massachusetts Bay Transportation Authority and San Francisco Municipal Railway) have specified individual requirements for auxiliary equipment and passenger accommodation. Engineering testing on the SLRV was conducted by the Boeing Vertol Company at the Transportation Test Center in Pueblo, Colorado in accordance with the General Vehicle Test Plans (GSP-064), which are designed to provide the data necessary for quantitative comparison of different transit cars. This report presents the results of the series of tests conducted. The general objective of the test program was to establish a data baseline for the SLRV obtained in accordance with the General Vehicle Test Plans and to provide further experience in the use of the Test Plans in testing urban rail vehicles. Volume I contains a description of the SLRV Test Program and the vehicle, and a summary of the test results.

Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA7927VOL1, UMTA-MA-06-0025-79-3, Feb. 1979, 74 p.; See also RRIS 03 304696; Bulletin 8001. Also available in set of 4 reports PC E10, PB-301 145-SET.; Contract DOT-TSC-1062; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301146/7ST, DOTL NTIS

13 304698 SLRV (STANDARD LIGHT RAIL VEHICLE) ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION, TRANSPORTATION TEST CENTER. FINAL TEST REPORT. VOLUME II-PERFORMANCE AND POWER CONSUMPTION TESTS. The SLRV (Standard Light Rail Vehicle) is a 71-foot vehicle, articulated to negotiate curves down to 32-foot radius and designed to operate at speeds up to 50 mph. Although the basic configuration and performance is standardized, the current operating properties (Massachusetts Bay Transportation Authority and San Francisco Municipal Railway) have specified individual requirements for auxiliary equipment and passenger accommodation. This report presents the results of the series of tests conducted. The general objective of the test program was to establish a baseline for the SLRV obtained in accordance with the General Vehicle Test Plans and to provide further experience in the use of the Test Plans in testing urban rail vehicles. Volume II contains detailed descriptions and discussions of the engineering tests performed on samples of the SLRV.

Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA7927VOL2, UMTA-MA-06-0025-79-4, Feb. 1979, 66 p.; See also RRIS 03 304696; Bulletin 8001. Also available in set of 4 reports PC E10, PB-301 145-SET.; Contract DOT-TSC-1062; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301147/5ST, DOTL NTIS

13 304699 SLRV (STANDARD LIGHT RAIL VEHICLE) ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION, TRANSPORTATION TEST CENTER. FINAL TEST REPORT. VOLUME III-RIDE QUALITY, NOISE, AND RADIO FREQUENCY INTERFERENCE TESTS. The SLRV (Standard Light Rail Vehicle) is a 71-foot vehicle, articulated to negotiate curves down to a 32-foot radius and designed to operate at speeds up to 50 mph. Although the basic configuration and performance is standardized, the current operating properties (Massachusetts Bay Transportation Authority and San Francisco Municipal Railway) have specified individual requirements for auxiliary equipment and passenger accommodation. This report presents the results of the series of tests conducted. The general objective of the test program was to establish a baseline for the SLRV obtained in accordance with the General Vehicle Test Plans and to provide further experience in the use of the Test Plans in testing urban rail vehicles. Volume III contains detailed descriptions and discussions of the engineering tests performed on samples of the SLRV.

Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA7927VOL3, UMTA-MA-060025-79-5, Feb. 1979, 178 p.; See also RRIS 03 304696; Bulletin 8001. Also available in set of 4 reports PC E10, PB-301 145-SET.; Contract DOT-TSC-1062; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301148/3ST, DOTL NTIS

13 304700 SLRV (STANDARD LIGHT RAIL VEHICLE) ENGINEERING TESTS AT DEPARTMENT OF TRANSPORTATION, TRANSPORTATION TEST CENTER. FINAL TEST REPORT. VOLUME IV-DATA LOGS. The SLRV (Standard Light Rail Vehicle) is a 71-foot vehicle, articulated to negotiate curves down to a 32-foot radius and designed to operate at speeds up to 50 mph. Although the basic configuration and performance is standardized, the current operating properties (Massachusetts Bay Transportation Authority and San Francisco Municipal Railway) have specified individual requirements for auxiliary equipment and passenger accommodation. This report presents the results of the series of tests conducted. The general objective of the test program was to establish a baseline for the SLRV obtained in accordance with the General Vehicle Test Plans and to provide further experience in the use of the Test Plans in testing urban rail vehicles. The test program was divided into five categories: performance; power consumption; ride roughness; noise; and radio frequency interference.

Boeing Vertol Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA7927VOL4, UMTA-MA-06-0025-79-6, Feb. 1979, 67 p.; See also RRIS 03 304696; Bulletin 8001. Also available in set of 4 reports PC E10, PB-301 145-SET.; Contract DOT-TSC-1062; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301149/1ST, DOTL NTIS

13 304707 URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. ANNUAL REPORT. The report reviews the seventh year's efforts of the Urban Mass Transportation Admin-

istration (UMTA) Urban Rail Vehicle and Systems Program. It describes the work accomplished and summarizes pertinent technical and design data. The objective of the Program is to enhance the attractiveness of rail rapid transit to the urban traveler by providing him with transit vehicles that are as comfortable, reliable, safe, and economical as possible. Three major hardware tasks were active during this reporting period, namely: the State-of-the-Art Cars (SOAC), the Advanced Concept Train (ACT-1), and the Advanced Subsystem Development Program (ASD).

Boeing Vertol Company, Urban Mass Transportation Administration, (UMTA-IT-06-0026) D174-10052-1, UMTA-IT-06-0026-79-4, Oct. 1978, 99 p.; See also PB-295124; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301168/1ST

13 305826 INTERACTION BETWEEN NORTHEAST CORRIDOR ELECTRIFICATION PLANS AND SEPTA/NJDOT COMMUTER RAIL SERVICES. The report examines the effects on SEPTA and NJDOT commuter rail operations of NECIP plans to change the NEC electrification system from 11 kv/25 hz to 25 kv/60 Hz and to add catenary phase breaks every six to eight miles. Under the proposed NECIP plan, branch lines would remain at 11 kv/25 Hz. Commuter trains operating over the 25 kv/60 Hz system would require the addition of phase-break negotiating apparatus. Those operating on the branch lines as well would also require, automatic voltage changeover apparatus. Automatic train control would be required on all trains operating on the NEC. For the SEPTA system, most of the electrification would remain at 11 kv/25 Hz. However, trains providing service to Trenton, Wilmington and Chestnut Hill West would require the ability at both 11kv and 25 kv. At a minimum, the 232 Silverliner IV cars should be modified for dual-voltage operation.

Pollan, EB ; De Leuw, Cather-Parsons and Associates, Federal Railroad Administration Final Rpt. FRA/NECPO-80/3, Dec. 1979, 185 p.; Prepared in cooperation with Klaunder (Louis T.) and Associates, Philadelphia, PA.; Contract DOT-FR-76048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125040, DOTL NTIS

13 305884 PROCEEDINGS OF THE URBAN RAIL VEHICLE CRASHWORTHINESS WORKSHOP HELD AT CAMBRIDGE, MASSACHUSETTS ON APRIL 13-14, 1978. The first part of the document contains the research activities presented by the Calspan Corporation, Boeing Vertol Company, and Illinois Institute of Technology Research Institute; transit authority experience by Metropolitan Transportation Authority (MTA) of New York, Chicago Transit Authority (CTA), Metropolitan Atlanta Rapid Transit Authority (MARTA), and New York City Transit Authority (NYCTA); and the manufacturing industry experience by the Budd Company, Franco-Belge (France), and Boeing Vertol. The second part contains the proceedings from the two workshops, namely, crashworthiness and rail car design and test and evaluation; and the concluding remarks from the Office of Safety and Product Qualification (UMTA), and from the Transit Systems Branch (TSC). The major recommendations from the group fall into two categories: (1) The need for

(industry-wide) vehicle design engineering guidelines including structural criteria and passenger compartment criteria; and (2) The need for validating these criteria through programs of test and evaluation.

Madigan, RJ Chen, MM ; Pacific Consultants, Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-79-34, Oct. 1979, 272 p.; Contract DOT-TSC-1511; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-127327

13 305891 IN-SERVICE PERFORMANCE AND COSTS OF METHODS TO CONTROL URBAN RAIL SYSTEM NOISE. This study evaluates the acoustic and economic effectiveness of five methods of controlling wheel/rail noise and vibration on urban rail transit systems, namely: rail grinding, wheel truing, resilient wheels, ring-damped wheels, and welded vs. jointed rail. The noise reduction methods were tested under revenue operation conditions on the Market-Frankford Line of the Southeastern Pennsylvania Transit Authority rail transit system. In addition to the evaluation of these noise control methods, the study included an economic analysis of the long and short term costs of the control methods if implemented on typical U.S. urban rail systems. Life-cycle cost equations were developed for the control methods. This report summarizes noise, vibration, and cost results and compares the measurement results with similar studies.

Saurenman, HJ Shipley, RL Wilson, GP ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-43, UMTA-MA-06-0099-80-1, Dec. 1979, 131 p.; See also PB-288838. Prepared in cooperation with Wilson, Ihrig and Associates, Inc., Oakland, CA., and De Leuw, Cather and Co., Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-129216

13 308286 SINGLE-MOTOR BOGIES FOR METROPOLITAN TRAINS [Carrelli monomotor per metropolitana]. After listing the types of two-motor bogies in service on Italian metropolitan lines, the writer describes an experimental single-motor bogie, four units of which are in service on the Milan metro, and have covered a distance of over 100,000 km. This description is followed by comparisons with the main types of single-motor bogies in service on European metropolitan lines. [Italian]

Vigliani, U *Ingegneria Ferroviaria* Vol. 34 No. 7-8, July 1979, pp 485-495, 19 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 308443 AUTOMATIC DATA ACQUISITION AND PROCESSING OF TRAIN DECELERATION FOR RAPID TRANSIT TRAIN SYSTEMS. A microprocessor-based computer system has been developed for the dedicated acquisition of data associated with the deceleration characteristics of trains in a rapid transit system. The computer collects braking profiles (velocity and position) along a 4325-ft. section of track prior to station entry, at one-foot intervals. These data, occupying a volume of about 8K bytes per train, are stored on tape and transmitted to a remote microprocessor during

non-revenue periods. The remote computer archives these data, and performs data reduction and analysis. Results are useful as a monitor of braking performance, and enable a statistical inference of braking distances under various ambient and train-related conditions.

Rothbart, G (Science Applications, Incorporated) Fullwood, R Conde, HO ; Association for Computing Machinery Conf Paper Vol. 2 1978, pp 612-616; Proceeding Annual Conference ACM Washington, D.C., December 4-6, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: Association for Computing Machinery, 1133 Avenue of the Americas, New York, New York, 10036

13 308640 RAILROAD RESEARCH BULLETIN, AUTUMN 1977. VOLUME 4, NUMBER 2. This publication contains 1,269 abstracts of journal articles and research reports and descriptions of computer programs and magnetic data tapes. It also has 581 summaries of ongoing research activities in the railroad field. The material, selected from current railroad literature and other contemporary sources, covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for the abstracts and descriptions and the other for ongoing project summaries. This publication supplements material in the nine prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

Transportation Research Board, Federal Railroad Administration, (RRIS-7702) Bibliog. FRA/ORD-77/66, 1977, 366 p.; Contract DOT-FR-74193; ORDER FROM: Railroad Research Information Service, 2101 Constitution Avenue, NW, Washington, D.C., 20418

13 308641 RAILROAD RESEARCH BULLETIN, SPRING 1978. VOLUME 5, NUMBER 1. This publication contains 1,045 abstracts of journal articles and research reports and descriptions of computer programs and magnetic data tapes. It also has 531 summaries of ongoing research activities in the railroad field. The material, selected from current railroad literature and other contemporary sources, covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for the abstracts and descriptions and the other for ongoing project summaries. This publication supplements material in the 10 prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

Transportation Research Board, Federal Railroad Administration, (RRIS-7801) Bibliog. FRA/ORD-78/14, 1978, 324 p.; ORDER FROM: Railroad Research Information Service, 2101 Constitution Avenue, NW, Washington, D.C., 20418

13 308642 RAILROAD RESEARCH BULLETIN, AUTUMN 1978. VOLUME 5, NUMBER 2. This publication contains 1,195 abstracts of journal articles and research reports and descriptions of computer programs and magnetic data tapes. It also has 466 summaries of ongoing research activities in the railroad field. The

material, selected from current railroad literature and other contemporary sources, covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for the abstracts and descriptions and the other for ongoing project summaries. This publication supplements material in the 11 prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

Transportation Research Board, Federal Railroad Administration, (RRIS-7802) Bibliog. FRA/ORD-78/58, 1978, 336 p.; ORDER FROM: Railroad Research Information Service, 2101 Constitution Avenue, NW, Washington, D.C., 20418

13 308643 RAILROAD RESEARCH BULLETIN, SPRING 1979, VOLUME 6, NUMBER 1.

This publication contains 1078 abstracts of journal articles and research reports and descriptions of computer programs and magnetic data tapes. It also has 442 summaries of ongoing research activities in the railroad field. The material, selected from current railroad literature and other contemporary sources, covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for the abstracts and descriptions and the other for ongoing project summaries. This publication supplements material in the 12 prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

Transportation Research Board, Federal Railroad Administration, (RRIS-7901) Bibliog. FRA/ORD-79/15, 1979, 310 p.; Contract DOT-FR-74193; ORDER FROM: Railroad Research Information Service, 2101 Constitution Avenue, NW, Washington, D.C., 20418

13 308644 RAILROAD RESEARCH BULLETIN, AUTUMN 1979, VOLUME 6, NUMBER 2.

This publication contains 1,244 abstracts of journal articles and research reports and descriptions of computer programs and magnetic data tapes. It also has 467 summaries of ongoing research activities in the railroad field. The material, selected from current railroad literature and other contemporary sources, covers the entire range of railroading from technology to operations, management, economics and government involvement. Literature sources are worldwide. The material is arranged according to the RRIS classification scheme in two separate sections, one for the abstracts and descriptions and the other for ongoing project summaries. This publication supplements material in the 13 prior Railroad Research Bulletins which should be retained for a complete file of RRIS data.

Transportation Research Board, Federal Railroad Administration, (RRIS-7902) Bibliog. FRA/ORD-79/47, 1979, 350 p.; Contract DOT-FR-74193; ORDER FROM: Railroad Research Information Service, 2101 Constitution Avenue, NW, Washington, D.C., 20418

13 309885 PROBLEMS CONFRONTING U.S. URBAN RAILCAR MANUFACTURERS IN THE INTERNATIONAL MARKET. Five of nine urban railcar orders partially funded by the Urban Mass Transportation Administration were awarded to foreign firms during 1976-78. Foreign competition entering the U.S. railcar market has raised concerns about whether U.S. firms can compete and has prompted one U.S. firm to commission Gordian Associates Incorporated to study the issue. GAO reviewed the study's findings at the request of the Chairman, Subcommittee on Transportation and Related Agencies, Senate Committee on Appropriations. GAO found that U.S. firms submitted acceptable bids on only two of the five orders awarded to foreign firms. GAO agrees with Gordian that railcar markets in Europe, Japan, and Canada are closed to U.S. railcar firms and that, before a "Buy America" provision was included in recent transit legislation, the U.S. urban railcar market was open. GAO does not believe the study demonstrated that U.S. firms are at a competitive disadvantage.

General Accounting Office CED-79-66, July 1979, 110 p., 8 App.; ORDER FROM: General Accounting Office, Distribution Section, Room 1518, 441 G Street, NW, Washington, D.C., 20548

13 309954 WASHINGTON'S METRO IS THE SOLID-GOLD CADILLAC OF MASS TRANSIT. Citing overdesign and planning mistakes, the author points out that the Washington Metro's capital cost of \$7.2 billion exceeds that of the five other systems under construction in the U.S. in the 1970s and has ended up with a disproportionate share of federal mass-transit funds. The processes of benefit-cost analysis and alternatives analysis are discussed with reference to the Washington situation. Effects of political pressures are also described.

Nickel, H *Fortune* Dec. 1979, p 110; ORDER FROM: Time Incorporated, 541 North Fairbanks Court, Chicago, Illinois, 60611

13 309956 LONDON TRANSPORT'S EXPERIMENTAL TUBE TRAIN. LT is commissioning two 1973 tube stock double ended units fitted with thyristor control of the traction motors with regenerative and rheostatic braking to gain experience with this type of equipment for possible use on future rolling stock.

Lockhart, MA *Railway Engineer International* Vol. 4 N Nov. 1979, pp 57-60, 9 Fig.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 309979 THE DYNAMIC BEHAVIOR OF RAIL VEHICLES WHEN TRAVERSING SHORT-RADIUS CURVES AT HIGH SPEED [Ueber das dynamische Verhalten von Schienenfahrzeugen beim Durchfahren enger Gleisboegen mit hohen Geschwindigkeiten]. To study the effects of different parameters such as the profile of the wheels and rails, the type of truck, vehicle, wheel-base and propulsion system, the systems of vibration must be represented as a mathematical relation. Simplifications are necessary but should not affect the reliability. The vibrations of an articulated tram travelling at high speed on short-radius curves were studied by means of a mathematical model. [German]

Menck, D ;

Technical University of Aachen, West Germany DB:Dok 5062, 1979, 127 p., 16 Tab., 29 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Technical University of Aachen, West Germany, Fakultät fuer Maschinenwesen, D-5100 Aachen, West Germany

13 309994 ELECTRIC POWER SUPPLY AND OVERHEAD CONTACT WIRE SYSTEM OF THE URBAN RAPID TRANSIT NETWORK IN STUTTGART, WEST GERMANY [Stromversorgungs-und Fahrleitungsanlagen der S-Bahn Stuttgart]. Problems associated with the adaptation of all fixed installations of the electric traction are considered. A description is given of the connection of the entire region of power consumption with high-voltage railroad transmission lines, including recently built power stations. The concept and the technical solution of the electrical energy supply including the central substation, Stuttgart, as a focal point are explained. Design features of the tunnel overhead line and measures of adaptation for the overhead lines of the outer railroad lines are outlined. [German]

Borgwardt, H *Elektrische Bahnen* Vol. 33 No. 5, May 1979, pp 127-133, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 310635 DOOR LOCKING SYSTEM FOR PASSENGER COACHES. Locking of passenger coach doors against inadvertent or intentional opening during running has been decisively improved during recent years. The most important improvement involves the introduction of an electromagnetic door locking system which has been installed as a standard feature on rapid transit vehicles since 1971 and on express train coaches since 1976. Retrofitting programmes for older coaches are presently under way in combination with a centralised door closing facility, this system affords an almost absolute protection of the passenger against falling from a running train. Following an introductory analysis of the causes of accidents and a description of previous safety precautions, the paper describes the design and performance of the electromagnetic door locking system for double hinged doors and hinged sliding doors. [German]

Manson, HL *Glases Annalen ZEV* Vol. 103 No. 12, Dec. 1979, pp 430-434; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 310660 ALUMINUM COACH BODIES OF FULLY INTEGRAL CONSTRUCTION FOR SUBURBAN RAILWAYS [S-Bahn-Wagenkaesten aus Aluminium in Voll-Integral-Bauweise]. In this article the design and manufacture of an all-welded coach-body shell for the newly developed prototypes for the Rhein-Ruhr suburban railway are described. By the use of modern manufacturing process, through the choice of fully integral construction using very large extrusions, the most economical solution to date for the construction of aluminum railway vehicles has been increased somewhat in comparison to the differential-integral mixed construction used so far, it was possible in this way to considerably reduce the production costs, and specified minimum strength values were exceeded. [German]

David, W *Aluminium* Vol. 55 No. 7, July 1979, pp 452-456, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 310668 OPTIMIZATION OF POWER CONSUMPTION BY ELECTRIC TRANSPORT VEHICLES; CONTRIBUTION TO ON-BOARD INSTRUMENTATION IMPROVEMENT [Ottimalizzazione del consumo energetico nei trasporti elettrici: contributo al miglioramento della strumentazione di bordo]. The present trend towards a reduction of power consumption and research problems involved to rationalize power consumption by city electric transportation vehicles are considered. An analysis of vehicles under different conditions of movement and a comparison of different vehicles to select those best suited for specific utilization is briefly outlined. During the first phase of research, effort was centered on the design of power meters that would be best suited for installation on board vehicles and be sufficiently precise. The use of a microprocessor to arrive at a solution to this problem is described and results are summed up. [Italian]

Brandolini, A (Politec di Milano, Italy) *Alta Frequenza* Vol. 48 No. 5, May 1979, pp 243-247; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 310669 LONDON'S UNDERGROUND SYSTEM GOES OFF THE RAILS. London Transport is looking at means for preventing further deterioration of its aging subway facilities. Materials more resistant to vandalism are being used. Studies are being made of a means of "damp proofing" old tunnels, of sound barriers, of securement of tile linings and effects of passing trains on such finishes, and of fire-resistant materials.

New Scientist Vol. 85 No. 1192, Jan. 1980, p 318
ORDER FROM: IPC Magazines Limited, King's Reach Tower, Stamford Street, London SE1 9LS, England

13 310684 RAPID TRANSIT AND THREE-PHASE DRIVES. PROBLEMS, WISHES, POSSIBILITIES [Nahverkehr und Drehstromantriebe--Aufgaben, Wuensche, Moeglichkeiten]. DC operated vehicles and multiple units dominate in rapid transit systems. Traction motors with commutator are controlled either conventionally by resistors, which can be switched off step-by-step, or by electronic thyristor-choppers. The technical development now tends to three-phase traction motors. This step offers many advantages, for example economies in energy consumption and maintenance. The new traction technique, at present, offers many positive possibilities in vehicle production which cannot be fully appraised yet. The same applies to the interaction of vehicle techniques and the environment. [German]

Scholtis, G *Elektrische Bahnen* Vol. 77 No. 6, June 1979, pp 159-166, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 310686 ELECTRIC TECHNOLOGY FOR URBAN RAPID TRANSIT SYSTEMS [Elektrotechnik fuer S-Bahnen]. Urban rapid transit systems are characterized by such quality factors as rigid timetables, short intervals between two stops and high speed. Electrical engineering with its application fields, electric drives and controls, energy supply, protection of train running and train control has contributed most towards realizing these goals. The role of electrical engineering in this field in the past as well as in the future is discussed. [German]

Gladigau, R *Elektrische Bahnen* Vol. 77 No. 6, June 1979, pp 180-182; Also covered in Volume 77 No. 7, July 1979 issue, pages 209-211.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 310688 MASS PRODUCED NEW SUBWAY TWIN MOTOR COACHES FOR THE BERLIN TRANSPORTATION SERVICE [Die neuen U-Bahn-Doppeltriebwagen in Serienaufuehrung fuer die Berliner Verkehrsbetriebe]. After trial runs of four prototype twin multiple units for the underground line, the design was remodelled and in 1978 the production of the first series was started. The operational trial runs confirmed the total concept of the electric multiple unit. Therefore only a small number of alterations of the series version has been necessary in relation to the prototype version. [German]

Bogott, H *Elektrische Bahnen* Vol. 77 No. 7, July 1979, pp 196-198, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 310840 BALTIMORE TRANSIT: HALFWAY THERE. The Baltimore rapid transit system is expected to open its initial 8-mile line in 1982. The problems associated with planning, financing and construction are discussed. Details are given on the subway and elevated structures, track stations, power supply, cars, controls and future plans.

Middleton, WD, Contributing Editor *Railway Age* Vol. 181 No. 3, Feb. 1980, p 37, 3 Phot.; ORDER FROM: ESL

13 310842 RAIL RAPID TRANSIT SYSTEMS TECHNICAL REFERENCE REPORT #1. The results of six surveys of transit system facilities as prepared by APTA committees and subcommittees are reported. They include: APTA Communications Survey of both bus and rail facilities covering telephone, VHF and UHF radio, closed circuit television, public address systems, cable/carrier, teletype and other details; Ballast Questionnaire--Response Summary and General Information describing ballast materials, track structures, maintenance practices of North American rail transit systems; Evaluation of Four Different Rail Rapid Transit Propulsion Systems has appraisals of flywheel energy storage, pulse-width modulation propulsion system; self-synchronous motor, and regenerative chopper; Tabulation of Replies--Rail Survey of March 1975 with details of types, volumes and procurement of rail for rapid-transit and light-rail systems; Track & Right-of-Way Characteristics for Ballasted Track-Rolling Stock Characteristics-Operation Conditions; Statistical Information on Subway Systems-1975.

American Public Transit Association No Date, v.p.; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

13 311020 OVERHEAD URBAN-SUBURBAN TRANSPORT SYSTEMS. NOISE FACTOR AND THE REACTION OF LOCAL RESIDENTS [Nahverkehrssysteme in Hochlage. Geraeuschsituation und deren Beurteilung durch die Anlieger]. For reasons of security, high commercial speed and popularity, an effort is always made to put short distance railway passenger traffic on track without crossings. In urban

areas an uninterrupted track can only exist in a tunnel or on an overhead bridge support system. The overhead line is cheaper but could have adverse effects on the environment and the inhabitants because of the greater noise level. The reactions of residents to the overhead railway are studied here: how the noise nuisance affects them, how they judge it and what factors influence their judgment. [German]

Brandenburg, W *STUVA-Nachrichten* No. 46, 1979, pp 4-11, 5 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Telocken-Verlag, Romerstrasse 9, 4000 Dusseldorf 30, West Germany

13 311049 NEW APPLICATIONS OF THE TELOC-E ELECTRONIC SPEED MEASURING SYSTEM. A new range of equipment derived from the Teloc-E speed measuring systems, operates on a mixed digital-analog principle. These hybrid systems are particularly suitable for applications where the requirements are less exacting as regards the number of functions that have to be performed. Up to now they have mainly been employed for underground railways. Since these are usually equipped with automatic train control, the concept of the Hasler equipment has to be matched to the automatic system of the train in each case.

Zimmermann, P *Hasler Mitteilungen/Hasler Review* Vol. 12 No. 1, 1979, pp 14-19, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 311072 ELECTRIC LOCOMOTIVES, SUBURBAN TRAINS AND UNDERGROUND TRAINS. This paper recounts ASEA (Allmanna Svenska Elektriska Aktiebolaget) development of electric rail vehicles up to the modern thyristor-controlled locomotives, suburban trains, underground trains and trams. Extensive tests to evaluate the energy savings of a chopper car compared to a resistor controlled car under the same conditions have been run by Melbourne and Metropolitan Tramways Board, MMTB, during 1977. These tests demonstrated that a properly designed chopper car with the ASEA system for regenerative braking may consume nearly 40% less energy than equivalent conventional cars in normal revenue service. By applying modern technology and calculation methods to the design of rail vehicles it has been possible to supply the rail transportation industry with safe and energy-efficient high-performance-vehicles with improved ride and reduced maintenance.

Nilsson, LO (Allmanna Svenska Elektriska Aktiebolaget); Institution of Engineers, Australia Conf Paper 1979, pp 25-29; National Conference Publication of the Institution of Engineers, Australia, n 79/2, Electric Energy Conference, Preprint of Papers, Brisbane, Australia, May 17-18, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Institution of Engineers, Australia, 11 National Circuit, Barton, A.C.T., Australia

13 312068 ALUMINIUM COMPOUND CONTACT RAILS FOR SUBURBAN AND METROPOLITAN RAILWAYS [Rails de contact compound en aluminium pour chemins de fer suburbains et metropolitains]. Technical description of the aluminium compound contact rails which have been tested since 1978 on the Hamburg suburban railway and the Berlin metro. The rails, which will ultimately replace traditional steel conductor rails, will be used for the new

Hamburg-Harbour (50 km) and Berlin-Spandau (8 km) lines. [French/German]

Mier, G *Schweizer Alumin Rundschau/Revue Suisse de Alumin* Vol. 30 No. 12, Jan. 1980, pp 9-13, 7 Phot., 4 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 312085 CONTRACTOR MEETS CHALLENGE OF CABLING GLASGOW'S UNDERGROUND. Problems encountered in the installation of all cabling for railway traction, signalling and control are described. One contractor, Alex Robertson of Glasgow was responsible for the complete P.S. 2M contract. Work on the renewal and improvement of Glasgow's Underground, originally a cable-hauled system opened in 1896, electrified in 1935 using a 600V DC third rail configuration, began in 1977. Traffic control measures and pedestrianisation have increased the importance of the underground, which carried some 14 million passengers a year in 1977. It forms a key link with other parts of Glasgow's integrated passenger transport system. Trains are scheduled at three minute intervals, when fully operational, with a minimum time of 12 minutes between any two points on the circuit. Because of the small clearances in the tunnel, a computer program was used to calculate the optimum track line and to produce a "kinematic" envelope template which was clamped on to a railcar and used during the contract to check the clearance. Bad working conditions and a tight work schedule are other problems described.

Millbank, P *Electrical Review* Vol. 206 No. 8, Feb. 1980, pp 41-43, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 246285); ORDER FROM: IPC Business Press Limited, 35 Perymount Road, Haywards Heath, Sussex, England

13 312156 COMPUTER SIMULATION OF A FREQUENCY-CONTROLLED ELECTRIC DRIVE WITH A LINEAR ASYNCHRONOUS MOTOR [Modellirovanie na tsvm chastotno-upravlyаемого электропривода s lineynym asinkhronnym dvigatelem]. Frequency control of a linear asynchronous motor for rapid transit applications is simulated on a computer. Static and dynamic regimes of the motor are modeled by taking into consideration real magnetic circuit geometry. [Russian]

Boldyrev, GL (Leningrad Inst of Railroad Transport Eng, USSR) *Izvestiia Vysshikh Ucheb Zaved, Elektromekhanika* No. 6, June 1979, pp 517-523, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 312391 LONDON TRANSPORT TRAINS. This Paper describes the process of design and development and procurement of new trains for London Transport, who assume many of the functions of a prime contractor. The Paper gives a number of examples of features which are felt to reduce the maintenance cost or improve the reliability or safety of the rapid transit cars.

Smith, SF (London Transport); American Society of Mechanical Engineers Conf Paper 80-RT-4, Jan. 1980, 3 p., 3 Fig.; Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Joint Railroad Conference, April 9-10, 1980, Montreal, Canada.; ORDER FROM: ESL

13 312425 MULTIOBJECTIVE TRAJECTORY OPTIMIZATION FOR ELECTRIC TRAINS. A method is developed for generating Pareto efficient trajectories that provide optimal tradeoffs between two conflicting attributes--the total energy consumed and the total time taken to complete each trajectory. Straightforward formulations of the multiobjective optimization problem in these attributes are difficult to solve because of certain nonlinearities in train models and certain constraints on train trajectories. A discrete reformulation is developed to circumvent these difficulties and produce computationally feasible algorithms. The results from the algorithms can be used to develop operating strategies for existing systems and to compare hardware alternatives in planning new systems. An illustration is included.

Talukdar, SN (Carnegie-Mellon University) Koo, RL *IEEE Transactions on Automatic Control* Vol. AC-2 No. 6, Dec. 1979, pp 888-893, 21 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 312428 VIBRATION BEHAVIOUR OF THE MTC EXPERIMENTAL SUBWAY WHEEL. The natural frequencies, mode shapes, and mechanical impedances of a resilient type subway wheel are presented. An impact method which uses Fourier techniques to analyse the vibrations of the wheel is described. Several natural frequencies and mode shapes not previously reported are presented.

Strasberg, L (Ontario Ministry of Transportation & Communic, Can) Tiessinga, J Kono, K *Acoustics and Noise Control in Canada* Vol. 7 No. 3, July 1979, pp 4-15, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 312441 DESIGN AUTOMATIZATION OF D.C. ELECTROMAGNETIC DEVICES [Automatizatsiya proektirovaniya elektromagnitnykh mekhanizmov postoyannogo toka]. Computer-based system for design of electromagnetic devices is described. The example is given of designing electromagnet for magnetic levitation system of rapid transit. [Russian]

Nikitenko, AG Lobov, BN Bakhvalov, Yu A Alekseeva, GA *Izvestiia Vysshikh Ucheb Zaved, Elektromekhanika* No. 4, Apr. 1979, pp 310-317, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 312454 DESIGN AND IMPLEMENTATION OF ELECTRIC NETWORKS FOR TRACTION [Conception et realisation des reseaux electriques de traction]. After giving a brief historical sketch, the paper summarizes the present stage of development in electrification of railways, underground railways, tramways and trolley-buses in France. Information is provided regarding the choice of voltage level and regulations to which electric networks for traction are submitted. The differences between these networks and electric power distribution networks are enumerated. Finally, the paper gives the economical and technical conditions for a new electrification. [French]

Laurenceau, JN *Revue Generale de l'Electricite* Vol. 88 No. 9, Sept. 1979, pp 645-648; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 312455 CONVERSION FROM THREE-PHASE AC TO DC AND ITS RECENT EVOLUTION AT RATP [La conversion tri-phase-continu et son evolution recente a la RATP]. The characteristics inherent to an electric system of distribution for a city railway are noted. In the Underground Railway in Paris, the considerable kVA demands, the need for a high level security of supply, the limited space available for equipment and the problems of numerous hindrances affect to a large extent the choices of equipments as much for rectifier substations as for the associated HV, MV and LV networks. Particular attention must be paid to protective devices for safeguarding against faults on the dc circuits. All these equipments, fitted with local automatism, are remote-controlled and remote-monitored from a centralizing supervisory room. [French]

Lenoir, J (Paris Rapid Transit Authority) *Revue Generale de l'Electricite* Vol. 88 No. 9, Sept. 1979, pp 653-661; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 313099 IN-SERVICE PERFORMANCE AND COSTS OF METHODS TO CONTROL URBAN RAIL SYSTEM NOISE. SECOND TEST SERIES REPORT. The goal of the project is to provide sufficient information to allow a transit system with given track and car conditions and budgetary constraints to determine the mix of available noise control methods which will result in the greatest overall benefit. Included in this benefit evaluation is the reduction of noise radiated to adjacent communities and the reduction of patron noise exposure. This project is designed to provide information on both the long-term and short-term costs and effectiveness of various wheel/rail noise abatement procedures if implemented on typical urban rail systems in the United States. This interim report presents the results of the final four phases of a seven-phase test program to determine the acoustic and economic effectiveness of resilient wheels, damped wheels, wheel truing, and rail grinding for reducing wheel/rail noise on urban rail transit systems.

Saurenman, HJ; De Leuw, Cather and Company, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0099) Intrm Rpt. DOT-TSC-UMTA-79-33, Oct. 1979, 202 p.; See also PB-288 838, and PB-257 200. Prepared in cooperation with Wilson, Ihrig and Associates, Inc., Oakland, CA.; Contract DOT-TSC-1053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-132996, DOTL NTIS

13 313228 PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON ADVANCED PROPULSION SYSTEMS FOR URBAN RAIL VEHICLES, HELD AT WASHINGTON, DC. ON FEBRUARY 5-6, 1980. This conference proceedings report reflects the view that (on the basis of current R&D activities in the area of propulsion system designs) advances in control systems, motor design, thermal control techniques, diagnostics and energy efficient systems are realizable. The conference was structured to serve as a forum for the exchange of information among the various international organizations shaping the future of the industry. This conference report contains the papers prepared by experts around the world--

-Brazil, Finland, France, Germany, Japan, Sweden, United Kingdom, and the United States. The papers were jointly authored by propulsion equipment manufacturers and transit authority personnel to present both designer and user viewpoints toward the propulsion technology. This approach has emphasized the experience of propulsion equipment in the transit environment and presented its effects on transit system performance.

Mitre Corporation, Urban Mass Transportation Administration MTR79W00455, UMTA-VA-06-0053-80-1, Feb. 1980, 241 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-149099

13 313251 ACT-1: URBAN RAPID RAIL VEHICLE AND SYSTEMS PROGRAM. ENGINEERING TEST OF ACT-1 VEHICLE AT TRANSPORTATION TEST CENTER. This document contains a description of the ACT vehicles as delivered to UMTA, including major changes incorporated during testing at the Transit Test Center (TTC), in Pueblo, Colorado, and the rationale for these changes. The test program is described in detail and results are presented for checkout, adjustment, engineering, and acceptance testing of the ACT vehicles. These vehicle tests include: (1) crash attenuation; (2) performance tests, i.e., acceleration, speed regulation, deceleration, power consumption, thermal duty cycle, slip/spin efficiency, ride quality data, and acoustics data. The instrumentation system description is included in the appendix. The test program results in confirmation of significant achievements in vehicle operating efficiency; technology advances in component design and integration; and of considerations for passenger safety, security, and comfort.

Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10054-1, UMTA-IT-06-0026-79-6, Dec. 1979, 455 p.; See also PB80-155294; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-155286

13 313252 ACT-1: ADVANCED CONCEPT TRAIN DEVELOPMENT PROGRAM. SIMULATED DEMONSTRATION TEST REPORT. The Simulated Revenue Service Demonstration at the TTC consisted of two activities, namely: ACT-1 Operation and ACT-1 Maintenance. The simulated transit route was laid out on the UMTA Rail Transit Test Track at TTC--this route is a composite of routes in the originally planned demonstration cities. Every equipment malfunction that occurred was recorded for corrective action in the Vehicle Maintenance Log. The Maintenance Program used to support the ACT-1 cars during the Simulated Revenue Service Demonstration was based on the Maintenance Workbook Items accumulated during the initial test and adjustment running of the vehicles. The report concludes that the Simulated Revenue Service testing of the ACT-1 vehicle at the TTC demonstrated that the ACT-1 cars can be operated consistently with moderate maintenance support.

Boeing Vertol Company, Urban Mass Transportation Administration Final Rpt. D174-10050-1, UMTA-IT-06-0026-79-7, Mar. 1979, 39 p.; See also PB80-155286; Contract DOT-UT-10007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-155294

13 314003 AN INVESTIGATION OF RAIL RAPID TRANSIT CARBODY MATERIALS. The behavior of the three carbody materials commonly used in the United States, which are aluminum, low alloy high tensile steel, and stainless steel, is examined in this report and compared throughout the range of rapid transit and inter-city passenger rail service applications and operating environments in North America and Europe. Life cycle cost implications of each material in specific applications and environments were derived from a statistical analysis of the conditions of a representative, structured sample of 520 rapid railcars, which were selected for detailed, careful examination of the 21 critical points which together permit characterization of structural material behavior. The cars comprise a representative sample of carbody materials, construction techniques, operating environments, and years-in-service. A computer-input form was completed for each of the cars, making possible an intensive statistical analysis of the observed conditions and the collective experience of operators and carbuilders.

Morris, RE Black, G Scheirer, W ; Decision Group, Incorporated, Urban Mass Transportation Administration Tech Rpt. UMTA-IT-06-0175-80-1, Mar. 1980, 143 p.; Contract DOT-UT-70043; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-170970

13 314874 FAST MOVING WALKWAYS: THE PARIS TRANSPORT AUTHORITY'S TRAX [Les trottoirs roulants accelères: le TRAX de la RATP]. After reviewing the history of moving walkways, and listing the principal systems proposed, the writer, who is the inventor of TRAX, describes in detail the principles and operation of this fast walkway which can carry pedestrians at a speed of 12 km/h over several hundred metres. The article concludes with references to developments in the United States and elsewhere and a chronological list. [French]

Patin, P *Revue Generale des Chemins de Fer* Feb. 1980, pp 87-102, 20 Phot., 8 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 314896 FINANCING NEW YORK CITY'S PUBLIC TRANSIT SYSTEM. VOLUMES 1 AND 2. This two-volume report traces the history of transit operating revenues and expenditures in New York City and nationally, examining public transit funding in many U.S. metropolitan regions. The Federal mass transit operating subsidy program is discussed, along with shortcomings. The report offers alternative transit funding mechanisms for MTA. Fare structures for major U.S. transit systems and farebox revenue are also examined. Public transit strikes in the U.S. between 1973 and 1979 are described and the effects of the 1966 stoppage of NYCTA are described.

Program Planners, Incorporated No Date, n.p. A report presented to MTA Forum by Jack Bigel.; ORDER FROM: Program Planners, Incorporated, 230 West 41st Street, New York, New York, 10036

13 315150 MODERN TRAMCAR DESIGN IN WESTERN EUROPE [Moderna Spåravagnskonstruktioner i Väst Europa]. In this report modern tram-cars from 13 different transport

companies are studied. These companies are situated in the Netherlands, West Germany, Finland and Switzerland. Some trials have been undertaken to standardize the fleet of trams. The following conclusions could be drawn: (1) length of vehicle. Most modern trams are made with six or eight axles. (2) speed control. The trams are usually equipped with an electronic system which controls the acceleration and the deceleration of the vehicles. (3) monomotor bogies. The static adhesive weight is better utilized, and, when the problem with the transmission is solved, almost all trams are equipped with longitudinal motors which operate the two axles. (4) one-man-service or as in Basel and Zurich, self-service is introduced in most transport companies. (5) because of the vandalism some tram companies use only single trams. (6) feed-back. Only one of the trams studied is able to feed braking energy back to the overhead contact system. (7) variable floor height. Two of the transport companies have trams which have a variable floor height. [Swedish]

Kloow, L ; Linköpingens Tekniska Högskola Monograph LITH-IKP-R-132, May 1979, 231 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 246638), National Swedish Road & Traffic Research Institute; ORDER FROM: Linköpingens Tekniska Högskola, Institutionen för Konstruktions- och Produktionsteknik, Linköping, Sweden

13 316230 APPLICATION OF MICRO-PROCESSORS TO VEHICLE SPEED CONTROL SYSTEMS. The onboard speed control system of automated rapid transit vehicles receives a wide variety of legitimate commands from external sources. These commands occur at random intervals and include speed changes and commands to stop at a precise distance. These commands must be processed in such a manner that longitudinal acceleration and jerk of the vehicle are always within specified limits. One way to meet these requirements is to compute a command profile for each external command using a microprocessor. One of the tasks of UMTA'S AIRTRANS Urban Technology Program (AUTP) with the Dallas/Fort Worth (D/FW) Airport and Vought Corporation was to develop a speed control system employing a microprocessor. The system has been installed in the AIRTRANS system and has been demonstrated at the D/FW Regional Airport. This paper describes the development of the AUTP speed control system.

Sellers, DF (Vought Corporation) ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1484-51A, 1979, pp 304-306; Conference Record IAS Annual Meeting, 14th Paper presented Cleveland, Ohio, September 30-October 5, 1979; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 316236 RAPID TRANSIT EXPERIENCE WITH CHOPPER CONTROLLED DC MOTOR PROPULSION. BART cars using solid-state choppers and regenerative braking have accumulated about 154 million car mi since 1972, and are adding about 28 million additional car mi/yr. For the Feb. '78 to Feb. '79 year, the propulsion system MTBF was just over 500 h and contributed 37% of all vehicle failures. In the same period, the four-traction motor MTBF was 2174 h, which is more than twice its value of

several years ago. Modifications currently planned or in progress are expected to increase the propulsion system MTBF to about 800 h by 1981.

Brockman, JJ King, JH Kusko, A ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1484-51A, 1979, pp 338-345; Conference Record IAS Annual Meeting, 14th, Paper presented Cleveland, Ohio, September 30-October 5, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 316265 SURGE TESTING OF TRACTION MOTOR ARMATURES. Direct current traction motors operate in one of the most severe environments of any rotating electrical apparatus. Since the motors are used on transit systems, extremely high reliability is essential. This level of reliability can be increased by testing before the new or rebuilt armatures are installed. In order to test the bar-to-bar and coil insulation at relatively high voltage, either a high frequency or pulsed test must be used. Two approaches to this test have been developed and used by the various manufacturers. The first technique uses a standard current surge generator and pulses a span of bars in series between two probes connected to the commutator. The voltage drop across this span produces the bar-to-bar stress on the system. Insulation faults are detected and located by simultaneously comparing readings across two equal numbers of bars on a dual channel oscilloscope. The second technique uses a high current surge generator and tests a single pair of bars. The higher current level is required because of the lower inductance of a single coil. The advantage of this test is that it more closely approximates the operating condition of the armature. Also, since the voltage is not dropped across a group of bars, a uniform bar-to-bar distribution of voltage need not be assumed. Tests have shown that the voltage distribution using span testing is far from uniform. Location of any insulation fault is also facilitated by testing individual coils. Following the description of two test methods, a comparison of test results is made. The advantages of both techniques are discussed.

Shook, GL Schump, DE ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1510-7-EI, 1979, pp 65-67; Proceedings of the Electr Electron Insulation Conference 14th, Boston, Massachusetts, October 8-11, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

13 316278 MEANS TO ACHIEVE HIGH REGENERATION CAPABILITY IN A MODERN CHOPPER PROPULSION SYSTEM.

The chopper technique has now been used in mass transit propulsion systems for approximately ten years. Literature is abundant with articles about chopper theory, principles and features, and therefore these generalities will not be dealt with further here. This paper concentrates on the regeneration issue, partly through an analysis of the line receptivity and how the external factors, the feeding network, affect the result, but chiefly by discussing the implications of various solutions used in the propulsion package, and what measures can be taken to improve the regeneration figure, based on the experience in Sweden and elsewhere. The presentation is accompanied by calculations and results from underground and streetcar services.

Tornerud, G ;

Institute of Electrical and Electronics Engineers Tech Paper IEEE 80CH1567-7 IA, 1980, pp 27-34, 18 Fig., 7 Tab., 5 Ref.; Presented at the 1980 Joint ASME/IEEE/AAR Railroad Conference, April 9-10, 1980, Montreal, Canada.; ORDER FROM: IEEE

13 316279 THE COUPLING OF PROVEN RELIABILITY AND MODERN PERFORMANCE ON BOSTON'S NO. 4 AND NO. 12 RAPID TRANSIT CARS. With the advent of sophisticated, state-of-the-art transit systems, there appears to have arisen an attendant trade-off between reliability and performance. Typically, forced to prioritize, most operating properties will opt for reliability. Specification requirements for the new No. 4 and No. 12 MBTA rapid transit cars dictated the use of propulsion and braking systems whose reliability had been demonstrated throughout the years. The specification also required, however, the integration of these systems into a cohesive unit that exhibited modern day ride performance. This paper provides a brief description of each of the subject vehicles, and then traces the technical history of the endeavor to blend the electrical and pneumatic braking systems' tractive effort outputs into a uniform deceleration rate without the use of complex system feedback and interface networks.

Frandsen, FW (Klauder (Louis T) and Associates) ; Institute of Electrical and Electronics Engineers Tech Paper IEEE 80CH1567-7 IA, 1980, pp 35-40, 3 Fig., 1 Tab.; Presented at the 1980 Joint ASME/IEEE/AAR Railroad Conference, April 9-10, 1980, Montreal, Canada.; ORDER FROM: IEEE

13 316537 OPTIMISATION METHODS FOR ELECTRIC TRACTION VEHICLE DRIVING [Optimalizacni metody rizeni elektrickyh trakcnich vozidel]. The author underlines the importance of methodology in research into optimal driving of tractive units from the energy point of view. Using a mathematical model of a metro train, he goes over the methods used hitherto and describes a new, more efficient system based on the gradient method. This method was successfully used for calculating optimal driving from the energy point of view for trains on the Prague metro. [Czech]

Janacek, J *Zeleznicni Technika* Vol. 10 No. 1, 1980, pp35-37, 1 Fig., 2 Tab., 10 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Zeleznicni Technika, Prague, Czechoslovakia

13 316548 ELECTROTECHNOLOGY IS A "PRIME MOVER". Recent developments are surveyed in transit facilities: electric automobiles, electronic engine control, automated group rapid transit, fuel-economical gas-turbine buses, micro-processor control for rail transit propulsion. Also presented are Japanese and West German projects for magnetic levitation trains and new electronic navigation aids.

Kaplan, G *IEEE Spectrum* Vol. 17 No. 1, Jan. 1980, pp 69-74; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 316565 CHOPPERS AFFECT OPERATION OF AF TRACK CIRCUITS. Interference has been observed on US metros between the

latest chopper-controlled trains and coded track circuits used for train detection as well as cab signals and ATO. The most dominant interference mechanism is inductive coupling between equipment carried on the car and the loop formed by the rails and axles under the car. Currents induced in this loop can result in transient "track clear" indications as a powered car passes over the impedance bond separating adjacent track circuits. A joint government-industry working group is developing ways of quantifying and controlling the problem.

Frasco, LA *Railway Gazette International* Vol. 136 No. 4, Apr. 1980, pp 291-294; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 316592 CALCULATING THE ENERGY CONSUMPTION FOR AN UNDERGROUND RAILWAY, AND METHODS OF OPTIMIZATION [Calcolo del consumo di energia per una ferrovia metropolitana e metodi di ottimizzazione]. In this study on the optimization of energy consumption on underground railways, the author proposes: (a) a method for arriving at energy consumption-journey time expressions by an analytical rather than numerical resolution of the differential equations of motion; (b) a simplified analytical method for determining the energy consumption-journey time ratio by reference to a simplified motion diagram; and (C) an optimisation procedure which, based on the values obtained at (a) or (b) will give the distribution of journey times on the various sections, which produce the minimum energy consumption for a pre-fixed commercial speed on the line. A numerical example is presented. [Italian]

Cascetta, E *Rivista della Strada* Vol. 58 No. 460-461, Nov. 1979, pp 949-964, 5 Fig., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246968); ORDER FROM: Casa Editrice la Fiaccola, Via Ravizza 62, Milan, Italy

13 316743 PHILADELPHIA: HELP IS ON THE WAY--AND NONE TOO SOON. Southeastern Pennsylvania Transportation Authority has been forced to emphasize capital projects for line extensions rather than getting funds for maintenance of existing facilities. This has meant that rapid-transit and light-rail operations are confronted with equipment shortages until new cars are delivered and some old ones rebuilt; an elevated transit line must also be completely rehabilitated. SEPTA contracts with Conrail for an extensive commuter service which is to be further expanded upon completion of a major downtown tunnel on a line extension to Philadelphia International Airport.

Kizzia, T, Associate Editor *Railway Age* Vol. 181 No. 13, July 1980, p 34, 2 Phot.; ORDER FROM: ESL

13 318036 METROPOLITAN ATLANTA'S RAPID TRANSIT SYSTEM: PROBLEMS AND PROGRESS. Progress and performance is good on Metropolitan Atlanta's rapid transit system, but GAO found (1) ineffective administration of the railcar contract, (2) inadequate contract provisions and recordkeeping procedures for proper warranty management, and (3) replacement of public housing at costs exceeding the appraised value. Better guidance from the Urban Mass Transportation Administration could have eliminated, or at least lessened, the

management weaknesses. The report includes GAO recommendations for more Urban Mass Transportation Administration input into rapid transit authority procedures and practices. Dissemination of the management experiences on this project to other transit authorities may avoid future problems.

General Accounting Office PSAD-80-34, Apr. 1980, 31 p.; Report to the Congress.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-167315

13 318088 BART AND METRO--RAPID TRANSIT FOR THE SAN FRANCISCO AND WASHINGTON, DC. AREAS 1964-MARCH, 1980 (CITATIONS FROM THE NTIS DATA BASE). The two-section bibliography is devoted to the development of rapid rail mass transportation in two major metropolitan areas. The first section contains citations referring to BART, the San Francisco Bay area rapid transit system in California. Section two refers to the combined subway and surface transit system for the District of Columbia and outlying areas in Maryland and Virginia. Materials in both sections cover line siting, policies and planning, cars and power systems, stations and trackwork, human factors, travel patterns, and public attitudes. Attention is given to financing, revenue, maintenance, local impact, and environmental impact, as well as fare collection, noise, and legislation. Local and regional needs are discussed. (This updated bibliography contains 351 abstracts, 23 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Apr. 1980, 358 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-808140

13 318423 U. S. TRANSIT TRACK ASSESSMENT AND RESEARCH NEEDS. The overall objective of the study is to help expand and systematize the current search for improvements in transit track. The study was initiated to identify new technology and research tasks that may help increase the performance, reliability, and safety of urban rapid transit systems, and to help ensure that track research provides maximum benefits to the transit industry. Track problems and practices were investigated at transit properties in the United States, and technology was studied in the transit industry and other industries in the United States and Europe. Throughout the study, information was sought on the best technological practices currently available and on improvements that may be obtained through systematic research. This report describes track conditions; current practice in track design, construction, maintenance, and inspection; potential opportunities for improvements; favorable technology that is available but not commonly used in transit track systems; and research and support tasks to fill identified needs. The report also describes the evaluation of research and support tasks for relative importance, the analysis of their costs and benefits, and a recommended implementation plan for a track research program.

Cunney, EG Boyd, PL Woods, JA ; ENSCO, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-41, Dec. 1979, 211p; Prepared in cooperation with London Transport International Ltd. (England); Contract DOT-TSC-1502; ACKNOWLEDGMENT:

NTIS; ORDER FROM: NTIS; PB80-196892

13 318459 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME II. DESIGN AND ANALYSIS. PART B. VLACS EVALUATIONS. This report contains design and analysis results from UMTA's Vehicle Lateral Control and Switching (VLACS) Project of the Automated Guideway Transit Technology (AGTT) Program. The objective of the VLACS project is to develop lateral control and switching systems which will reduce the cost and improve the performance of these systems on automated transit vehicles. The VLACS project tasks include a review of existing lateral control and switching technology, detailed mathematical modeling, analysis, simulation, detailed hardware studies, experimentation with alternative designs, and development of guideline specifications for VLACS systems. In this report, lateral control system models are developed for wire-follower, wall-follower active, and wall-follower passive lateral control systems, including the vehicle, lateral position sensors, and actuators. Vehicle dynamic models are developed for vehicles having Ackermann steering geometry and for vehicles with wagon-wheel steering. AGT vehicle models developed include ten-degree-of-freedom models used for ride quality analysis and simpler three-degree-of-freedom models used for lateral control system design and analysis. Part B of this report contains systems evaluations.

Fry, CM McHugh, T Greeson, J ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final Rpt. OTIS-TTD-VLACS-050B, UMTA-IT-06-0156-79-3, Mar. 1980, 528p; See also Volume 2, Part A, PB80-199730, and Volume 3, PB80-199755. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199748

13 318490 PROPOSED ANALYSIS METHODOLOGY FOR RAIL CAR PROPULSION SYSTEM SELECTION. This report proposes a rail car propulsion system selection methodology based on life cycle costing. The objective of the proposed methodology is to provide transit operators with a practical method of calculating propulsion system life cycle costs to be used in bid evaluation of different rail car propulsion and control system technologies. If life cycle costing is to become part of the car acquisition process, it is important that the methodology is known and accepted by the suppliers and purchasers. The analysis methodology as presented here is to some extent based on previously applied methods and includes results from new work performed for this project. In this report, recent railcar propulsion system procurement practices and other related information were reviewed, and discussions were held with propulsion system suppliers and various operating systems. Results of this research were used in the development of the propulsion system evaluation and selection methodology, and the structured application of life cycle costing.

Bamberg, W Eldredge, D ; Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration Tech Rpt. UMTA-IT-06-0229-80-1, May 1980, 50p; Contract DOT-UT-60069; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-201460

13 318517 INCREASED RAIL TRANSIT VEHICLE CRASHWORTHINESS IN HEAD-ON COLLISIONS. VOLUME I. INITIAL IMPACT. A specific goal of safety is to reduce the number of injuries that may result from the collision of two trains. In Volume I, a two-dimensional analytic simulation model of the leading cars of two impacting transit car consists is formulated. This model is capable of simulating the mechanics of head-on initial impact of two transit cars on straight level track. Specifically, the model is capable of establishing the critical parameters which govern whether the cars crush, override, or crush with subsequent override. This simulation model is used to assess impact control devices currently in service, such as anticlimbers, couplers, and draft gear. The report also presents a detailed experimental test plan for evaluating the strength and effectiveness of future designs of impact control devices which has been developed.

Hahn, EE ; IIT Research Institute, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-80-17-1, June 1980, 70p

See also Volume 2, PB80-205743.; Contract DOT-TSC-1052-1; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-205727

13 318518 INCREASED RAIL TRANSIT VEHICLE CRASHWORTHINESS IN HEAD-ON COLLISIONS. VOLUME IV. TRAIN USER'S MANUAL. A specific goal of safety is to reduce the number of injuries that may result from the collision of two trains. In Volume IV, a computer code for the simulated crash of two railcar consists is described. The code is capable of simulating the mechanics of head-on impact of two consists on straight level track. The simulation is limited to two dimensions, namely a vertical plane containing the length of the track. The user can model the individual car components or cars in a complex or as simple a manner as is warranted by the simulation results desired. Although specifically developed for transit cars, the code can also be used to simulate freight trains or intercity passenger trains.

Hahn, EE ; IIT Research Institute, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-804, June 1980, 233p

See also Volume 1, PB80-205727.; Contract DOT-TSC-1052-4; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-205735

13 318519 INCREASED RAIL TRANSIT VEHICLE CRASHWORTHINESS IN HEAD-ON COLLISION. VOLUME II. PRIMARY COLLISION. A specific goal of safety is to reduce the number of injuries that may result from the collision of two trains. In Volume II, an analytical model in two dimensions, longitudinal and vertical, of the primary collision of two impacting urban railcar consists is formulated. This model includes the formulation of the leading cars developed in Part I of this program, and the distribution of mass and nonlinear force-deformation relationships existing among major structural sub-assemblages. This model also is capable of determining the extent of crushing and/or override suffered by the individual cars in the consists, as well as the time histories of displacement, velocity, and acceleration in both the longitudinal and vertical direc-

tions. Methods are developed for generating the dynamic force-deformation relationships for structural sub-assemblages comprising the critical modules of railcars. These methods include finite-element analysis, scale modeling, and full-scale testing procedures including specifications for required testing equipment and instrumentation.

Hahn, EE Walgrave, SC Liber, T ; IIT Research Institute, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-80-17-2, June 1980, 80p; See also Volume 4, PB80-205735; Contract DOT-TSC-1052-2; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-205743

13 318957 MEASUREMENT OF WHEEL/RAIL FORCES AT THE WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY. VOLUME I. ANALYSIS REPORT. Under the direction of the Urban Mass Transportation Administration (UMTA), measurements of wheel/rail forces were made in August 1979 by the Transportation Systems Center (TSC) with the assistance of Battelle Columbus Laboratories to determine the causes of excessive wheel/rail wear experiences by the Washington Metropolitan Area Transit Authority (WMATA) Metrorail System during its first three years of operation. In addition to measuring the absolute magnitude of the wheel/rail forces, it was the intent to compare alternative methods for relieving wheel/rail wear at WMATA and other transit properties. Measurements of the wheel/rail forces were made at the Washington National Airport Test Site and the Brentwood Shop Test Site. This report describes the results of that effort.

Phillips, C Weinstock, H Greif, R Thompson, WI, III ; Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-80-25-1, UMTA-MA-06-0025-80-6, July 1980, 48p; Contract DOT-MA-06-0025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-212772

13 318960 NOISE CONTROL FOR RAPID TRANSIT CARS ON ELEVATED STRUCTURES: PRELIMINARY INVESTIGATION OF VEHICLE SKIRTS, UNDERCAR ABSORPTION, AND NOISE BARRIERS. In the report, procedures to reduce the propulsion system noise of urban rail transit vehicles on elevated structures are studied. Experiments in a laboratory use a scale model transit vehicle to evaluate the acoustical effectiveness of noise barrier walls, vehicle skirts, and undercar absorption. These experiments assume that the propulsion system noise is the only source of noise. Field measurement of urban rail transit vehicles at the Port Authority Transit Corporation (PATCO) in New Jersey provide additional data to compare the noise from elevated-structure and at-grade track sections. The results show that vehicle skirts and undercar absorption can provide a cost-effective noise reduction alternative to noise barriers if the propulsion system is the dominant noise source. The scale model results are only approximate and must be verified by full-scale demonstration tests. However, the potential value of the results can be demonstrated by applying the measured noise reductions in octave bands to the actual measured noise spectrum of the PATCO vehicle.

Hanson, CE Schafer, M Towers, D Eldred, K ; Bolt, Beranek and Newman, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0099-80-4, Apr. 1980, 61p; Contract DOT-TSC-16611; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-213077

13 318963 ROSTER OF NORTH AMERICAN RAPID TRANSIT CARS, 1945-1980 SECOND EDITION. The document is a compilation of data on rapid transit cars built or currently on order between 1945 and 1980, and in service as of July 1980. It includes cars in the United States, Canada, and Mexico. Data includes cost, performance, dimensions, weights, electrical equipment, heating and ventilating systems, traction motors, propulsion equipment, lighting systems, and trucks and suspensions. The Roster is organized by alphabetical order. Within each section, the cars are listed in chronological order and includes cars of the following transit systems: BART-San Francisco Bay Area Transit Authority; BRTS-Baltimore Regional Rapid Transit Authority; CTA-Chicago Transit Authority; GCRTA-Greater Cleveland Regional Transit Authority; MARTA-Metropolitan Atlanta Rapid Transit Authority; MBTA-Massachusetts Bay Transportation Authority; WMATA-Washington Metropolitan Area Transit Authority; MDCTA-Metropolitan Dade County Transportation Administration; MUCTC-Montreal Urban Community Transit Commission; NYCTA-New York City Transit Authority; PATCO-Port Authority Transit Corporation; SEPTA-Southeastern Pennsylvania Transportation Authority; STC-Sistema de Transporte Colectivo Organismo Publico Descentralizado; and TTC-Toronto Transit Commission.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0121) UMTA-DC-06-0121-80-1, July 1980, 299p; See also First Edition, PB-266 620; Contract DOT-UT-60004; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-213564

13 319640 INTERMODAL TRANSPORTATION GARAGE FACILITY. A regional rapid transit terminal has been designed to integrate various transportation modes for the South Braintree Extension of the Massachusetts Bay Transportation Authority. The South Quincy Rapid Transit Station and Garage is one of the first, if not the first, transit facility constructed that has direct access to the converging point of three major highways. This facility provides long-term parking for 1,800 cars in two garages separated by a concourse, which is the focal point of all activity. The highway ramp system which connects to the garage has the capacity for handling 1,130 cars/hr in the peak commuter hours. A community parking area for 390 cars, with access only from the local streets, is provided for the exclusive use of local residents. The bus terminal permits the picking up or discharging of 12 buses simultaneously, accommodating both local transit buses and private buses from local communities. The design permits the addition of an extra platform.

Pacelli, AJ (Massachusetts Bay Transportation Authority) *ASCE Journal of Transportation Engineering* Vol. 106 No. 4, July 1980, pp 401-413, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 319648 RETROFIT NOISE CONTROL OF RAPID TRANSIT CARS. Describes a retrofit noise control study for existing, electric-powered transit cars currently operated by the New York City Transit Authority. The study focused on a test car considered to be representative of the fleet, that was outfitted with monitoring equipment and operated through a series of experiments. The dominant noise-producing components were determined and the important noise and vibration transmission paths located. Simple, easy-to-implement treatments that would reduce the noise levels to acceptable levels were recommended. Some of the recommendations included better side-door and end-door seals, increased floor mass, and quieted traction motor fans.

Remington, PJ (Bolt, Beranek and Newman, Incorporated) Wittig, LE *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 419-441, 18 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 319672 VARIABLE FREQUENCY TRACTION DRIVE WITH INVERTER FED INDUCTION MOTOR FOR RAPID TRANSIT ELECTRIC TRAINS. Direct current motors are going to be replaced by variable frequency inverter-fed-asynchronous motors thanks to their undeniable advantages. It goes without saying that the electric equipment is to be devised as a whole, in order to reach a real optimization for the design of each component. An explanation is provided for the choices that must be made in order to obtain the optimization of the two basic components of this traction system, that is the inverter and the asynchronous motor.

Giubergia, S (Ansaldo, Italy) Rossi, C Tortello, E Institution of Electrical Engineers Conf Paper No. 179, 1979, pp 98-101, 2 Ref.; IEE Conference Publication, International Conference on Electric Variable-Speed Drives, 2nd, London, England, September 25-27, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

13 319679 PROCEEDINGS OF THE WORKSHOP ON RAILWAY AND TRACKED TRANSIT SYSTEM NOISE, 2ND, 1978. Twenty papers by various authors deal with railway and tracked transit system noise. Major topics covered are: sources and mechanisms of noise generation--its control and parameters influencing the noise; other sources, including maintenance noise, freight yards, locomotive noise, station noise; sources and propagation of vibration; propagation of railway noise--barriers and effects of topography; vehicle interior noise--sources and comfort; and, community response to noise--criteria effect on sleep. All papers are abstracted.

Journal of Sound and Vibration Vol. 66 No. 3, Oct. 1979, pp 295-506 Workshop held October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 319935 DEVELOPING A STANDARD TRANSIT TIE.... UMTA, through Transportation Systems Center, has sponsored development of universal concrete cross ties for North American transit track. Design, preparation of prelimi-

nary specification and laboratory testing extended from 1975 through 1979. Two types, a monoblock and a two-block design, were developed which could be used with any of three fastener systems. Field testing was delayed when it was found U.S. transit track specifications would not accommodate the "standard" ties and possible alterations are being studied.

Witkiewicz, PJ *Railway Track and Structures* Vol. 76 No. 6, Aug. 1980, p 38, 1 Phot.; ORDER FROM: ESL

13 319981 DEVELOPMENT TRENDS IN ELECTRIC TRACTION FOR LOCAL TRANSPORT SERVICES. A distinction is made in public rail transport services between rapid transit, underground, urban railways and tramways with their different roles in respect of carrying capacity, distance between halts, service speed and distinctive operating areas within the cities, in the region, or in inter-urban services. Common to all is the wish to provide an attractive service with respect to passenger comfort and convenience, traction dynamics and profitability, i.e., a low level of expenditure on upkeep and energy. New railcars must meet these requirements to a high degree. Lightweight construction, new types of drive, electronic controls, new ideas on heating and ventilating as well as other developments make an important contribution. The successful efforts of the Association of Public Transport Enterprises to standardize many vehicle features and components will be taken into account in the further developments and will also have an influence on the design of new vehicles for foreign railways. [German]

Scholtis, G *Eisenbahntechnische Rundschau* Vol. 29 No. 4, Apr. 1980, p 277; ACKNOWLEDGMENT: British Railways; ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

13 322012 ELECTRIC TRACTION FOR RAIL-BOUND RAPID TRANSIT SYSTEMS [Antriebstechnik fuer den Schienennahverkehr]. The development of electric traction equipment for tramways, light rapid transit and underground railways was greatly influenced in the last 20 years by semiconductor technology. This produced semiautomatic electronic running and braking controls, as well as the d.c. choppers and three-phase equipment. The d.c. chopper equipment permits continuous and low-loss control of motor voltage both for running and braking, with even good control of regenerative braking. With three-phase traction, the conventional d.c. motor is replaced by a maintenance-free squirrel-cage induction motor. [German]

Wagner, R Gathmann, H Voss, U *ETG-Fachberichte* No. 4, 1979, pp 195-209; Schienenverkehr-Zukunft mit Vernunft, Fachvortrag, Hamburg, Germany, June 12-14, 1979; ACKNOWLEDGMENT: EI; ORDER FROM: VDE-Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12, West Germany

13 322019 RAIL VEHICLES FOR RAPID TRANSIT SERVICE [Schienenfahrzeuge fuer den Nahverkehr]. The requirements with regard to the design of rail vehicles for rapid transit concerning comfort, efficiency and environment. The descriptions of already built tramcars, subway cars and suburban trains are given as examples for vehicle design, car-body construc-

tion, interior design of vehicle and drivers cab as well as construction of modern bogies are briefly considered. A brief look at the future developments is presented. [German]

Frederich, F *ETG-Fachberichte* No. 4, 1979, pp 180-194, 13 Ref.; Schienenverkehr-Zukunft mit Vernunft, Fachvortrag, Hamburg, Germany, June 12-14, 1979; ACKNOWLEDGMENT: EI; ORDER FROM: VDE-Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12, West Germany

13 322029 ECONOMIC VALIDATION OF NEED FOR DEVELOPMENT AND INTRODUCTION OF STREET CAR ARRESTORS WITH IMPROVED CHARACTERISTICS. Problems pertaining to the fault rate or traction and auxiliary streetcar electric motors is considered for faults produced by various factors, including surge voltages. The economic necessity for development and introduction of nonlinear-resistance arrestors with improved characteristics is demonstrated.

Alekseeva, RM Alekseev, SA Khalilov, FK Shilina, NA *Power Engineering (USSR Translation)* Vol. 49 No. 12, 1978, pp 99-102; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 322035 SECOND GENERATION U. S. RAIL TRANSIT SYSTEMS: PROSPECTS AND PERILS. Commitments that have been made to construct a "second generation" of new rail systems in four urban areas-- Atlanta, Georgia, Baltimore, Maryland, Miami, Florida and Buffalo, New York are discussed. The authors emphasize the prospects and perils that lie ahead for these systems in the context of national and local expectations for rail transit and the experience of the first generation rail transit systems of San Francisco, California (BART) and Washington, D.C.

Skinner, RE, Jr (Voorhees (Alan M) and Associates, Incorporated) Deen, TB *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 17-32, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 322055 THREE-PHASE DRIVES--THE MANY ADVANTAGES WHICH PASSENGER URBAN TRANSIT CAN OBTAIN. The author shows that three-phase electric traction embodies among its advantages the squirrel-cage induction motor which has higher efficiency than the comparable dc machine. Thyristor control gives power variations, braking and speed/torque characteristics by varying the frequency. Experience data on three-phase induction traction motors are presented and new rapid transit vehicles are outlined.

Scholtis, G *Rail Engineering International* Vol. 8 No. 4, Oct. 1979, pp 122-126; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 322529 SYMPOSIUM ON ADVANCED TECHNIQUES IN URBAN AND SUBURBAN RAILWAYS [Simposio sobre tecnicas avanzadas en los ferrocarriles urbanos y suburbanos]. This work in 3 volumes contains the papers presented at the AIT Symposium held in Madrid from 20 to 22 May 1980. The Symposium examined all present-day aspects of rail transport in towns and their suburbs: rolling stock; infrastructure construction, both permanent way and

fixed installations; energy consumption; protection of the environment; and operation. [Spanish]

Asociacion de Investigacion del Transporte UIC Cat 89 0 1, May 1980, 825p, 24 Tab., 410 Phot., 64 Ref., 2 App.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

13 322566 TYNESIDE REPORT 8. PART 1: ROLLING STOCK. This article is part of a series of three describing: (1) the rolling stock, (2) the construction and (3) the operation of the Tyne and Wear Metro. The Metro is of standard BR width track, using a 1500 volt DC overhead catenary. There will be 90 metro cars used, each with 84 seats per car and a crush capacity of 272 passengers. Opening of the doors installed in a 1.3 M wide aperture will be by passengers after the trainman has operated a door release button at a station. The doors can only be closed by the driver. Superb riding quality has been achieved by the use of an air body suspension and a rubber axle suspension. Drivers are able to couple and uncouple metrocars from their cabs without shunters. Control equipment, based on the air/oil camshaft uses automatic acceleration. Braking is mainly rheostatic, supplemented by electro-pneumatic disc brakes and electro-magnetic track brakes. Electronic equipment measuring the speed of each independent axle, protects the car against wheel-spin during acceleration and braking. Safety devices fitted include a passenger emergency brake and an emergency door handle. For abstracts of parts 2 and 3 of this article see IRRD nos 248773 and 248774.

Haywood, PG Price, JH *Modern Tramway and Light Rail Transit* Vol. 43 No. 509, May 1980, pp 150-156, 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 248772); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

13 322787 A MANUFACTURER'S VIEW OF THE TRANSIT MARKET. With only one survivor among five firms that had produced transit cars in the U.S. in the past decade, the author observes that foreign competition did not drive U.S. firms out of the market but rather moved to fill the vacuum produced when U.S. carbuilders quit. While operators need stable manufacturers to produce reliable cars which can be supported throughout their entire life cycle, suppliers need also a market which they can afford to serve. Barriers to such a stable, profitable transit-car market include absence of a consistent policy at DOT and UMTA; the sealed, low-bid procurement policy which is required; the use of detailed specifications which inhibits designer innovation; and absence of uniformity among cars of various systems.

Schlemmer, CJ (General Electric Company) *Transit Journal* Vol. 6 No. 3, 1980, pp 5-12; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

13 322804 COMPETING FOR THE LIGHT-RAIL VEHICLE MARKET. After the UMTA-sponsored Standard Light Rail Vehicle program ended in failure, North American operators looking for new light rail vehicles looked to technology evolving in Canada through the Urban Transit Development Corp. and to LRV

technology existing in Europe and Japan. Details are given for the single-unit and articulated vehicles being offered to and being bought by North American transit properties.

Middleton, WD, Contributing Editor *Railway Age* Vol. 181 No. 18, Sept. 1980, p 56, 4 Phot.; ORDER FROM: ESL

13 323229 SHARPLY-CURVED METROS OFFERED CHEAP CROSS BRACED BOGIE. Many metro and light rail operators experience severe flange and rail wear in sharply-curved routes. To overcome this problem it is necessary to get the axles to adopt a radial attitude on sharp curves. British Rail's Research & Development Division has taken the successful cross-braced freight bogie and adapted it for rapid transit use by incorporating an improved secondary suspension and redesigning the frame to accommodate traction motors. Two of these bogies are undergoing extensive running trials.

Illingworth, R *Railway Gazette International* Vol. 136 No. 8, Aug. 1980, pp 692-694; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

13 323232 NEW CONDUCTOR RAIL DESIGN. A conductor rail of revolutionary design is now the subject of a manufacturing feasibility study by two British companies. It could be commercially available by 1984. The rail is free from icing problems and designed for use on very high speed inter-city routes as well as urban railways.

Ogilvie, JR *International Railway Journal* Vol. 20 No. 8, Aug. 1980, p 38; ACKNOWLEDGMENT: International Railway Journal; ORDER FROM: ESL

13 324411 INDUCTION MOTOR PROPULSION SYSTEM FOR TRANSIT CARS. The paper describes the inverter-controlled induction motor driving system for transit cars and the results of the running tests. The system is found to have many merits suitable for electric car drive.

Katta, T (Teito Rapid Transit Authority) Tsuboi, T Ibamoto, M Shimizu, Y *Hitachi Review* Vol. 29 No. 1, Feb. 1980, pp 19-24, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 324412 LIGHT WEIGHT CARBODY FOR ADVANCED URBAN MASS TRANSIT RAIL CARS. The paper describes light weight mass transit car with air conditioning equipment, with specific reference to the carbody. It also refers to the results of strength analysis of the carbody structure by the three dimensional FEM as well as to riding quality evaluation, noise control, and the air conditioning system.

Tanaka, M Terada, K *Hitachi Review* Vol. 29 No. 1, Feb. 1980, pp 7-12, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 324450 PROGRESS IN RAILWAY MECHANICAL ENGINEERING (1979-1980 REPORT OF SURVEY COMMITTEE)-CARS AND EQUIPMENT. This survey of the annual ASME report covers some of the major developments in rail freight and passenger equipment made public in the last calendar year. It covers developments worldwide.

Hawthorne, KL (Association of American Railroads Technical Center) Fisher, FG (STV Engi-

neers); American Society of Mechanical Engineers Conf Paper 80-WA/RT-11, 1980, 14p, 39 Fig.; Contributed by the Rail Transportation Division of the American Society of Mechanical Engineers for presentation at the Winter Annual Meeting, Chicago, Illinois, November 16-21, 1980.; ORDER FROM: ESL

13 324901 DISC BRAKES FOR MASS TRANSIT. In mass transit operations like streetcar-, underground-and metro-operations the braking performance is of utmost importance. Depending on the type of service and type of brake system the requirements on the disc brake as service brake and emergency brake may be very high. The thermal and mechanical performance of the disc is, however, influenced by the choice of disc material, the effectiveness of the cooling and design. This paper discusses the requirements of the mass transit operations, the performance limits of disc brakes and the factors influencing these performance limits. The results are founded on extensive laboratory and service tests and computer analysis, which are reported.

Cavell, BG Saumweber, CE Berndt, P Gerich, R *Institution of Mechanical Engineers Conference Pub Conf Paper* 1979-11, 1979, pp 195-205; International Conference on Railway Braking, University of York, England, September 26-27, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Mechanical Engineering Publications Limited, 1 Birdcage Walk, Westminster, London SW1H 9JJ, England

13 324902 COPPER DISC BRAKES ON THE ADVANCED CONCEPT TRAIN I. The friction brake system components described in the paper were developed on behalf of the United States Department of Transportation for the Advanced Concept Train I (ACT I), a 220-passenger rapid transit rail vehicle. The choice of chrome copper as disc material and disc-associated friction lining was made to meet severe friction-brakes-only operating mode and utilizes the high friction coefficient and diffusivity of chrome copper. Results from dynamometer tests and from a limited program of rail trials corresponded well with predictions contained in the thermal analysis. Braking rates were maintained and occasionally exceeded during simulated round trip tests at disc surface temperatures to 850 K.

Chary, HH (AiResearch Manufacturing Company) Miner, DK Yang, MS *Institution of Mechanical Engineers Conference Pub Conf Paper* 1979-11, 1979, pp 207-215; International Conference on Railway Braking, University of York, England, September 26-27, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Mechanical Engineering Publications Limited, 1 Birdcage Walk, Westminster, London SW1H 9JJ, England

13 324906 BRAKING SYSTEMS FOR RAPID TRANSIT VEHICLES--WITH PARTICULAR REFERENCE TO LONDON TRANSPORT PRACTICE. The paper outlines the distinctive braking requirements of rapid transit vehicles, following which the various elements of a complete braking system are examined and recent trends described. The interaction with other developments, such as Automatic Train Operation, is discussed and examples of modern systems are described.

Ware, DK (London Transport) *Institution of Mechanical Engineers Conference Pub Conf Paper*

1979-11, 1979, pp 277-281; International Conference on Railway Braking, University of York, England, September 26-27, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Mechanical Engineering Publications Limited, 1 Birdcage Walk, Westminster, London SW1H 9JJ, England

13 324911 MEASUREMENT OF ENERGY SAVING BY REGENERATIVE BRAKING IN RAILBORNE TRACTIVE UNITS [Messung der Energieersparnis durch die Nutzbremse bei Schienengebundenen Triebfahrzeugen]. Tests performed in Hanover, West Germany, involving trial runs under service conditions, are reported. The purpose of these tests was to check the results of theoretical investigations about the level of energy savings due to the use of tractive units with regenerative braking. The energy savings measured were between 24% and 29%. The influence of vehicle design, timetable and the feeding conditions within the energy supply network are discussed. [German]

Moellendorff, H von (AEG-Telefunken) *Elektrische Bahnen* Vol. 78 No. 1, Jan. 1980, pp 21-25, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 324937 SYSTEM FOR THE ACCURATE CALCULATION OF ENERGY LOSSES IN A DIRECT CURRENT TRACTION NETWORK [Verfahren zur genauen Berechnung der Energieverluste in einem Gleichstrom-Traktionsnetz]. To estimate regenerative braking performance it is necessary to evaluate what amounts of energy can be saved. Losses in the fixed equipment are examined first of all. In the urban railway system studied there was found to be little difference between operating with or without regenerative braking as far as losses in the supply system and the return current were concerned. If, with the regenerative braking system the return current cannot be used by trains on the same section of overhead line, much greater losses are to be expected. Practically 30 to 48 percent of the energy used during acceleration can be recovered during regenerative braking. [German]

Heijst, T Hamels, D *Elektrische Bahnen* Vol. 78 No. 7, July 1980, pp 170-179, 9 Phot., 9 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 324941 REGENERATIVE BRAKING OF ELECTRIC MOTIVE POWER UNITS [Nutzbremmung von elektrischen Triebfahrzeugen]. From the running diagram of a motive power unit and the energy balance sheet drawn up in parallel, it is seen that the introduction of regenerative braking is mainly advisable for tractive units in short-distance traffic. Suburban rolling stock is generally equipped with d.c. tractive units, for which a detailed explanation of the technique of fitting the regenerative brake is given. Numerous measurements conducted on the installations described confirm that considerable energy savings (20 to 30 percent) can be made on trams, urban railways and metropolitan railways. To conclude, the corresponding technique for a.c. motive power units is described.

Wagner, R *Siemens-Energietechnik* Vol. 2 No. 7, 1980, pp 284-288, 6 Phot., 5 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Springer Verlag, Heidelberger Platz 3, 1000 Berlin 33, West Germany

13 325285 URBAN RAIL NOISE ABATEMENT PROGRAM DIGEST. Transit operators, transit patrons and communities have all expressed concern over rail transit noise and indicated that its reduction should have priority. The UMTA Urban Rail Noise Abatement Program has assessed the dimensions of this problem to identify, develop and test noise abatement technology, and to share such control techniques with transit systems, suppliers, manufacturers and others concerned with urban rail noise. The Program consists of three major areas: Noise Assessment in which the mechanics of noise transmission and methods of acoustic measurement are described; Technology Development and Evaluation in which the various types of wheel/rail noise are described along with damping systems, as well as the problems of elevated structures, subway tunnel vibration, ground-borne noise and propulsion system noise.

Urban Mass Transportation Administration
UMTA-MA-06-0099-80-3, May 1980, 37p, 14 Fig., Photos.; ORDER FROM: NTIS

13 325446 MULTIPLEXING CAN REDUCE ON-TRAIN CABLING. Techniques used to transmit several controls and indications over a few pairs of wires are being applied by London Transport to multiple-unit trains. Though distances are short, multiplexing not only cuts the number of inter-car and inter-unit jumpers, it also reduces the space and weight of cabling within each car. Two batches of rolling stock have used multiplexing for indications only, and experiments are being carried out with controls also. Lessons learned from 1973 subway cars include the need to separate electronic decoding and processing equipment from the indication panel in the cab, as the failure modes are essentially different.

Harding, MA *Railway Gazette International* Vol. 136 No. 12, Dec. 1980, p 1066, 3 Fig., 2 Phot.; ORDER FROM: ESL

13 325886 ROLE OF INNOVATIVE ENGINEERING IN RAIL OPERATIONS. Engineers were deeply involved in both construction and operation of early railroads. The situation has changed today to the degree that it is suggested that the best solutions to operating problems may not be employed. Three different examples of innovative engineering solutions to the problems on a major commuter railroad are given: development of a chemical toilet servicing system, productivity of the inspection function, and energy conservation. The need for familiarity of all types of engineering, need to really understand operation, and the need to sell new concepts within the institutional structure are stressed.

Eisele, DO (Long Island Rail Road); American Society of Civil Engineers 1980, pp 138-147; Proceedings of the Special Conference-Broadening Horizons, Transp and Dev Around the Pacific, Honolulu, Hawaii, July 21-23, 1980.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE

13 325895 DC CONTROL FOR RAPID TRANSIT TRANSPORTATION [Gleichstromsteller fuer Nahverkehrsfahrzeuge]. The development of urban transportation in the last years has been characterized by replacement of electromechanical components by electronic ones. The paper deals with the output control in dc-supplied vehicles carried out by a thyristor circuit which is reliable and easy to maintain. [German]

Hohmuth, G Klotz, H Uthoff, R *AEG/Telefunken Progress* Vol. 69 No. 5-6, 1979, pp 202-209, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

13 325897 CURRENT COLLECTION AT CONTACT LINES BY CONTROLLED TROLLEYS [Stromabnahme von Fahrleitungen ueber Gesteuerte Stromabnehmer]. The high-speed electric-drive rail cars are usually provided with the trolley powering, since this solution is both economical and compatible with the existing systems. However, a considerable improvement of the dynamic characteristics of the line/trolley system is required. The paper discusses some of the solutions. [German]

Hammerschmidt, H (Technical University of Munich, West Germany) *Messen und Pruefen* Vol. 15 No. 12, Dec. 1979, pp 968-971, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: Hans Holzmann Verlag KG, Gewerbestrasse 2, Postfach 460, 8939 Bad Woerishofen, West Germany

13 325929 DESIGNING WORKSHOPS WITHIN METRO PARAMETERS. Good workshop design is essential to ensure the smooth day-to-day running of a metro, as poor maintenance will immediately affect car availability. The Layout and equipment chosen for the workshops of the Hong Kong and Caracas metros show how tough operating requirements can be met.

Sheldon, J *Railway Gazette International* Vol. 136 No. 9, Sept. 1980, pp 770-774, 3 Fig., 1 Tab., 8 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

13 326305 MASSACHUSETTS BAY TRANSPORTATION AUTHORITY BLUE LINE VEHICLE EVALUATION. The report presents the results of engineering tests carried out on a pair of rapid transit cars for the Massachusetts Bay Transportation Authority. The tests were performed at the Transportation Test Center, Pueblo, Colorado, from April 1979 through October 1979. The scope of the test program included an evaluation of performance, ride quality, and interior and wayside noise, using standardized test procedures; special engineering tests were made to evaluate energy conservation methods and three types of experimental brake shoes. The tests showed that the vehicles met their design specification requirements with some deficiencies, notably in emergency braking rates. An energy conservation technique was evaluated, in which response characteristics of the vehicle propulsion system were modified to reduce energy needs due to aerodynamic drag at high speeds. Several potential energy-saving configurations were identified, with minimal impact on round-trip times. The experimental brake shoes tested were found to give performance comparable to the original equipment at normal operating speeds for the MBTA Blue Line, but were inferior at higher speeds.

Balaster, A Arnold, G Simmonds, K Francis, K Federal Railroad Administration, Urban Mass Transportation Administration Final Rpt. FRA/TTC-80/05, July 1980, 241p; Contract DOT-FR-67001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-102949, DOTL NTIS

13 326306 MEASUREMENT OF WHEEL/RAIL FORCES AT THE WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY. VOLUME II. TEST REPORT. Measurements of wheel/rail forces were made in August 1979 by the Transportation Systems Center (TSC) with the assistance of Battelle Columbus Laboratories to determine the causes of excessive wheel/rail wear experiences by the Washington Metropolitan Area Transit Authority (WMATA) Metrorail System during its first three years of operation. In addition to measuring the absolute magnitude of the wheel/rail forces, it was the intent to compare alternative methods for relieving wheel/rail wear at WMATA and other transit properties. Measurements of the wheel/rail forces were made at the Washington National Airport Test Site and the Brentwood Shop Test Site. This report describes the results of that effort. The study found that for tight gage, the average flange force between the leading outer wheel and the high rail of an 800-foot radius curve was 9400 pounds, unworn cylindrical profile; 6300 pounds, unworn tapered profile; and 7900 pounds, worn cylindrical profile. For widened gage, the average flange force was 6300 pounds, unworn cylindrical profile and 5500 pounds, unworn tapered profile. On the basis of these results, it was recommended that cylindrical wheels be replaced by tapered wheels and tight gage curves be widened to standard gage.

Ahlbeck, DR Harrison, HD Tuten, JM; Battelle Columbus Laboratories, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Intrm Rpt. DOT-TSC-UMTA-80-2511, July 1980, 95p; See also Volume I, PB80-212772.; Contract DOT-TSC-1595; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-103327

13 326815 RAPID TRANSIT SYSTEMS. JUNE, 1976-MAY, 1980 (CITATIONS FROM THE ENERGY DATA BASE). Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 094 citations.)

Van Put, W; New England Research Application Center, National Technical Information Service NERACEDBNT0666, June 1980, 108p; Sponsored in part by National Technical Information Service, Springfield, VA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-854961

13 326816 RAPID TRANSIT SYSTEMS. AUGUST, 1974-JUNE, 1980 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 200 citations.)

Van Put, W; New England Research Application Center, National Technical Information Service NERACEI NT0666, June 1980, 196p; Sponsored in part by National Technical Information Service, Springfield, VA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-854953

13 326817 RAPID TRANSIT SYSTEMS. SEPTEMBER, 1975-JUNE, 1980 (CITATIONS FROM THE NTIS DATA BASE). Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 200 citations.)

Van Put, W ; New England Research Application Center, National Technical Information Service NERACUSGNT0666, June 1980, 240p; Sponsored in part by National Technical Information Service, Springfield, VA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-854946

13 326818 RAPID TRANSIT SYSTEMS. JUNE, 1974-MAY, 1980 (CITATIONS FROM THE INTERNATIONAL AEROSPACE ABSTRACTS DATA BASE). Research reports from global sources are cited concerning the testing, evaluation, planning and economic impact of urban and intercity rapid mass transit systems. Citations include analyses of the availability and efficiency of different systems such as railways, electric-powered vehicles, air cushioned vehicles, monorails, busses and subways. (Contains 189 citations.)

Van Put, W ; New England Research Application Center, National Technical Information Service NERACIAANT0666, June 1980, 164p; Sponsored in part by National Technical Information Service, Springfield, VA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-854938

13 328276 LIGHT RAIL APPLICATION AND DESIGN. The purpose of the report is to document an investigation of overseas Light Rail practice undertaken as part of the Preliminary Design of the Adelaide Northeast Light Rail Project. The report combines a broad appreciation of the application of Light Rail and other public transport modes in selected cities, with the investigation of design and other details of specific relevance to the Northeast project and other potential applications of Light Rail technology in Adelaide.

Norley, KT ; South Australia Director-General of Transport Dec. 1979, 222p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-124620

13 328364 THE FEASIBILITY OF RETROFITTING LIFTS ON COMMUTER AND LIGHT RAIL VEHICLES. The objectives of this study were to determine if lift retrofit applications to rail vehicles are technically feasible, and if so, the extent to which existing bus lift technology can be utilized. This report examines some of the technical issues associated with the retrofitting of lifts for elderly and handicapped passengers on light and commuter rail vehicles. There are four major sections to this report. The first section develops the inventory of light rail (LR) and commuter rail (CR) vehicles in the U.S. by number and type. It addresses the characteristics of rail vehicles that differentiate them from buses and makes preliminary indications of which vehicles might be preferable candidates for lift retrofits. The second section assesses the existing bus lift technology. Descriptions of lift designs and operation obtained from manufacturers are presented. The third major section of this report develops the interface requirements between lifts and vehicles based on existing vehicle characteristics and on lift kinematic concepts. The final section examines ancillary issues of lift retrofits on rail vehicles, such as ancillary hardware modifications, safety and liability concerns, and concerns about costs and sources of required funding.

McInerney, FT ; Technology Research and Analysis Corporation, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-80-39, Sept. 1980, 139p; Contract DOT-TSC-1711; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-130684

13 329937 THE DEVELOPMENT OF ENERGY/SAVING VEHICLES. Electrically powered railway transportation systems have a high energy efficiency and are therefore likely to become increasingly important in the future for both freight and passenger traffic. ASEA's development work in the field of locomotives, multiple-unit trains and tramcars is described.

Nordin, T *ASEA Journal* Vol. 53 No. 4-5, 1980, pp 51-58, 13 Fig.; ORDER FROM: ESL

13 330150 NEW LIFE FOR RESILIENT WHEELS. A simplified design by SAB involves a V-shaped rubber-ring assembly claimed to reduce substantially noise and vibration produced even by the firm's other resilient wheel design when used under transit and intercity passenger equipment.

Progressive Railroading Vol. 24 No. 1, Jan. 1981, pp 83-84, 1 Phot. ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

13 330159 POSITIVE FASTENING FOR SEPTA TRACK. Southeastern Pennsylvania Transportation Authority is rehabilitating the track structures on its Frankford elevated rapid transit line. Heavier rail and Pandrol fasteners are used on both the wooden-tie track and on the segments where a new concrete invert is now installed to eliminate stub wooden ties.

Progressive Railroading Vol. 24 No. 2, Feb. 1981, pp 80-82, 6 Phot. ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

13 330168 RAPID TRANSIT TIME AND ENERGY REQUIREMENTS (ABRIDGMENT). The results of an analysis to compare the trade-off between time and energy in the propulsion of a rapid transit train are discussed. Faster schedules consume more energy but reduce other operating costs and are an asset in attracting riders. Methods of reducing energy consumption, mainly by recovery of all or part of the kinetic energy used, are also described. (Author)

Holden, WHT (Daniel, Mann, Johnson and Mendenhall) *Transportation Research Record* No. 760, 1980, pp 15-18, 3 Tab.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

14 041620 A PRESCRIPTION FOR BART. As the result of a sequence of mishaps and incidents occurring in the automated operation of the Bay Area Rapid Transit (BART) system since partial revenue service was inaugurated last September 11, considerable skepticism has been expressed by many sources as to the safety of this ultrasophisticated mass-transit system. These critical evaluations led to the empaneling of a select three-man committee to report on the safety of the BART ATC system. In brief, the panel did not find the system's present mode of operation unsafe, but said the present system would not provide adequate passenger safety under full-scale operation, and recommended modifications and redesign to correct the deficiencies.

Friedlander, GD ; Institute of Electrical and Electronics Engineers Vol. 10 No. 4, Apr. 1973, pp 40-44; ACKNOWLEDGMENT: IEEE Spectrum; ORDER FROM: IEEE, Repr PC

14 043538 BIGGER BUGS IN BART. Six months in partial service have raised questions about BART's automation and its safety features. On October 2, 1972 a computer-controlled BART train overshot the Fremont station and plunged the lead car onto a sand bank. The cause was a malfunction of a crystal oscillator on board the lead car. This article reviews some of the problems that have occurred, and summarizes some of the reports that have been released. A report by State Legislative Analyst Alan Post has two principal stipulations: (1) that BART's service be without adequate checks and with train control deficiencies, and (2) that BART was overcharged for the system engineering and construction-management services. Post's report explains that the low-power circuit in the tracks may not detect a train under certain conditions. BART has run 28 million passenger miles in automatic mode with manual block as backup for train separation. Present operations, according to BART, are fully automatic more than 95% of the time. A report by Battelle Institute concluded that under normal conditions the system appears to operate in a manner that is not unsafe; under conditions of single malfunctions no clearly defined unsafe operating condition was identified, and that the operating safety of the vehicle system depends on redundant rather than fail-safe circuits. The article also presents some of the reactions of the consultants and of the supplier of the automatic control system. The article notes that off-the-shelf mechanical wheel scrubbers may solve the train detection problem. The article concludes with some findings of a blue ribbon panel.

Friedlander, GD, Senior Staff Writer *IEEE Spectrum* Mar. 1973, pp 32-37; ACKNOWLEDGMENT: IEEE Spectrum; ORDER FROM: IEEE, Repr PC

14 044201 TWO-WAY RADIO COMMUNICATION MASS TRANSPORTATION DEMONSTRATION PROJECT. Existing equipment prior to the demonstration required that train crews descend to the tracks to report trouble, while police had to rely on conventional telephones available only in station clerks' booths. A variety of alternative mobile systems and components were considered, including train-to-wayside intercom systems currently used in Chicago, Toronto, and London. These proved too limited in scope for the complex New York City subway

network. A portable, transistorized transmitter/receiver was judged ideal, particularly for the policemen who required compact, durable equipment. The engineering, operation, and maintenance of the selected system is documented. The improved communications were evaluated primarily in terms of reduced train delays and police reaction time. The latter was demonstrated to be particularly effective. Message delays between police dispatchers and transit patrolmen were reduced by 99%, and the ratio between crimes and arrests improved by 8% during daylight hours and rose to 95% at night. Overall operational efficiency also showed substantial improvement. The average number of train delays per month decreased 41%, and the average duration of such delays decreased 9% in the test area as compared with the system as a whole. Ridership within the test area was also shown to increase during the demonstration. It is concluded that overall, the project was successful enough to warrant the use of two-way radio equipment throughout the New York subway system. Appendices deal with capital and overhead costs for the project, and requirements for extension of the system to other divisions of the subway network.

New York City Transit Authority, (Ny-mtd-8) ; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr PC, Microfiche; PB-177048, DOTL NTIS

14 047272 STANDARD LIGHT RAIL VEHICLE SPECIFICATION. The report gives a brief introduction to electric railway systems and discusses the need for developing new rail car. The objective was to design a standard light rail vehicle that could be used by many different cities, based on the belief that a standard design would increase the market for such a vehicle and lower its production cost. The report reviews project organization, selection of vehicle size, potential purchasers, and preparation of the technical specifications and contact documents.

Massachusetts Bay Transportation Authority Final Rpt Feb. 1973, 45 pp; Contract DOT-MA-06-0015; ACKNOWLEDGMENT: NTIS (PB-220773/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-220773/6, DOTL NTIS

14 047396 BART-NEW CONCEPT IN PUBLIC TRANSPORTATION. General outline of the features and operation of the first line of the new San Francisco Bay Area Rapid Transit System.

Buehler, JP *Traffic Engineering* Vol. 43 No. 6, Mar. 1973, pp 10-17; ACKNOWLEDGMENT: EI (EI 73 085376); ORDER FROM: ESL, Repr PC, Microfilm

14 047486 STANDARDS FOR LIGHT RAPID TRANSIT CARS. Growing interest in intermediate-capacity forms of urban transport has caused many cities to search for light rapid transit vehicles based on tramcar technology. The author shows how two parallel streams of development, based on the American PCC concept and the European articulated car, have come together in the Boston/San Francisco design.

Walker, PJ *Railway Gazette International* Vol. 129 No. 2, Feb. 1973, 3 pp; ORDER FROM: ESL, Repr PC, Microfilm

14 047487 SEMI METRO IN THE NETHERLANDS. Of the three principal cities of the Netherlands only The Hague has declared its intention to base its future transport policy on an intermediate-capacity form of rapid transit. Yet although Rotterdam has an expanding metro network and Amsterdam is building its first line, both cities are developing intermediate secondary systems based on existing tramway technology.

Railway Gazette International Vol. 129 No. 5, May 1973, 2 pp; ORDER FROM: ESL, Repr PC, Microfilm

14 047884 ELECTRIC EQUIPMENT IN THE TUNNEL SECTIONS OF THE STREET-CARS IN STUTTGART, WEST GERMANY [DIE ELEKTRISCHEN ANLAGEN IN DEN TUNNELSTRECKEN DER STUTTGARTER STRASSENBAHNEN]. Details about the streetcar system are presented, with emphasis on the electric equipment used. Steps taken to provide protection facilities against excessive contact voltages and stray current corrosion are discussed. The low-voltage, telephone, TV, remote control, radio and loudspeaker equipment is described.

Mueller, F *Elektrische Bahnen* Vol. 44 No. 4, Apr. 1973, pp 74-82; ACKNOWLEDGMENT: EI (EI 73 041298); ORDER FROM: ESL, Repr PC, Microfilm

14 047988 THE USE OF ELECTRONIC SYSTEMS WITH A VIEW TO IMPROVING THE OPERATION OF SURFACE PUBLIC TRANSPORT. This paper summarizes the replies of 79 transport operations to a questionnaire on the subject of electronic systems used to improve the operation of surface public transport.

Cabeza, MC, Director de la Explotacion (FC Metropolitano de Barcelona) ; International Union of Public Transport Proceeding May 1973, 23 pp, 3 App; 40th International UITP Congress on International Commission on Traffic and Urban Planning, The Hague, May 6-12, 1973.; ORDER FROM: International Union of Public Transport, 19 Avenue de L'Uruguay, Brussels, Belgium Repr PC

14 048160 SLAB TRACK FOR RAPID TRANSIT. To avoid the costly and time-consuming task of preparing holes for fixings in a concrete slab, the Koln transport undertaking has developed a method of tracklaying in which a concrete beam is poured beneath rails and fixings already positioned on temporary supports.

Railway Gazette International Vol. 129 No. 7, July 1973, 2 pp, 2 Fig; ORDER FROM: IPC Transport Press, Repr PC

14 048236 PROBLEMS OF FIVE-STOREY UNDERGROUND STATION IN TOKYO. To ease suburban traffic congestion in the Tokyo metropolitan area, which is aggravated by urban sprawl, quadrupling of tracks has been going on in five directions radially from the city centre, on the Japanese National Railways 3 ft 6 in. gauge Tokaido, Chuo, Tohoku, Joban and Sobu Lines, under the first, second and third five-year plans since 1957 and the ten-year plan started in 1969. The Chuo, Tohoku and Joban Lines projects are already complete, greatly helping to alleviate congestion.

Modern Railways Vol. 30 No. 297, June 1973, pp 236-237, 8 Fig

ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England Repr PC

14 050135 CENTRALIZED CONTROL OF THE UNDERGROUND (METRO) SYSTEM IN PARIS, FRANCE [LES COMMANDES CENTRALISEES DU METRO URBAIN DE PARIS]. The authors give an outline of the centralized train movement control systems and describe the modern systems developed and used on the Paris Metro.

Majou, J Giry, P Raphanel, A *Revue Generale des Chemins de Fer* Vol. 92 May 1973, pp 305-320; ACKNOWLEDGMENT: EI (EI 73 045070); ORDER FROM: ESL, Repr PC, Microfilm

14 050346 STANDARDISATION OF TRANSIT CARS: PROGRESS TOWARDS A REALISTIC GOAL. Efforts to standardize rolling stock designs for suburban and urban services have seldom met with success, but North America provides two outstanding examples of what can be done in the PCC tramcar and the Budd rail diesel car. More recently the MTA has been able to achieve a high level of standardization in ordering new equipment of New York's commuter lines and transit systems, while the U.S. government is trying to raise technical standards for transit cars to a new level through its SOAC and ACT programmes.

Ronan, WJ, Chairman and Chief Executive Officer (New York State Metropolitan Transportation Auth) *Railway Gazette International* Vol. 129 No. 9, Sept. 1973, pp 345-348; ORDER FROM: IPC Transport Press, Repr PC

14 050419 TRAIN DETECTION PROBLEM STILL PLAGUES BART. Engineers at the Bay Area Rapid Transit (BART) District are exploring new solutions to the train detection problem delaying the service through the transbay tube to San Francisco, now scheduled for May 1974 (ENR 8/30 p. 14). The California Public Utilities Commission (PUC), which will not allow BART to route trains to and from Oakland through the tube until the problem is solved, has concluded that the wheel scrubbers installed last spring are not a cure.

Engineering News-Record Vol. 191 No. 5, Oct. 1973, 1 pp; ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020 Repr PC

14 050538 BART TIGHTENS SAFETY ON CONTROLS. The San Francisco Bay Area Rapid Transit (BART) District has installed electronic recorders on its trains to check on the control system in response to a report that claims the system does not consistently detect all trains on the 39 miles of track that are now open.

Hammond, DG *Engineering News-Record* Vol. 190 No. 8, Feb. 1973, 1 pp; ORDER FROM: McGraw-Hill, Incorporated, 221 Avenue of the Americas, New York, New York, 10020 Repr PC

14 050646 RATP RESEARCH AND PLANNING OF UNDERGROUND RAILWAY OPERATING METHODS [ETUDES DES PROJETS DE LA R.A.T.P. CONCERNANT LES METHODES D'EXPLOITATION DES LIGNES DE METRO]. 1967 saw the beginning of an era of concrete achievements in the automa-

tion of the RATP (Paris Transport Authority). These achievements affected the various sectors of operations in general, particularly traffic monitoring and control, power distribution, terminus line switching, automatic driving, ticket checking and issuing; they enable the best use to be made of the underground railway as such and therefore to improve and increase the service it provides. Modernization schemes of this scope can only be introduced after they have been investigated thoroughly by simulation on a computer. In this article the authors, who are RATP officials, explain the research tools employed (simulation models) and their field of application (in particular, train and traffic movement), they consider the technical developments which enable line capacity and transport conditions to be improved, and in conclusion describe the experiments with and the projects for traffic regulation (programmed departure, hourly scheduling and headway). They state that favourable results have already been obtained and there are good grounds for predicting considerable improvements in the future. [French]

Perrin, JP Ronsin, A Essig, P, Directeur du Reseau Ferre (Paris Transport Authority) *Revue Generale des Chemins de Fer* July 1973, pp 441-449, 5 Ref; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

14 050655 I HAVE SEEN THE FUTURE AND IT WORKS. This article presents the authors' impressions of rapid transit systems and commuter railroads in London, Paris, Munich, Molding, Rome, Madrid, and New York, with references to Venice, Perugia, and Pompeii. Most of the systems visited involve conventional technology well utilized rather than any exotic new technology. The author points out that while 21 new rapid transit systems are under construction in the world, only one is in the U.S. (Washington Metro).

Dusenbury, G *Railway Age* Nov. 1973, p 48; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

14 050740 SAFETY METHODOLOGY IN RAIL RAPID TRANSIT SYSTEM DEVELOPMENT. The report records the results of a study by the National Transportation Safety Board of the October 2, 1972, accidental derailment of a BART train and of the significant management and institutional approaches used to achieve safety as they influenced this system. The purpose of focusing attention on the cause and effect impact of this subject matter on the safety of the BART hardware system is to make this experience available to other municipalities who are implementing or are contemplating the development of a new rail rapid transit system. The report recommends abandonment of the fail-safe concept, and an organized disciplined approach to accomplishing rapid transit system safety, through the application of current safety management and engineering concepts.

National Transportation Safety Board Special NTIS-RSS-73-1, Aug. 1973, 43 pp; ACKNOWLEDGMENT: NTIS (PB-223157/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223157/9

14 051301 INFORMATION FLOW IN THE BART CONTROL COMPUTER SYSTEM.

The control system for San Francisco's Bay Area Rapid Transit (BART) consists of several levels of control: a primary level operated by equipment at each passenger station and a secondary level accomplished by the central computer control system. This paper describes the control capabilities of each level of control and the ways in which the two work together to control and optimize the movement of trains on the system.

Matteson, LG (Westinghouse Electric Corporation); American Society of Mechanical Engineers 73-ICT-32, 1973, 4 pp; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

14 051313 AUTOMATIC TRAIN OPERATION. This selective bibliography covers 75 articles on automatic train control, many of them in journals and from reports not covered by RRIS. The articles are from the middle sixties to the early seventies, and most are from European or Japanese sources.

International Union of Railways, BD Sept. 1973, 41 pp; ORDER FROM: International Union of Railways, BD, 14 rue Jean Rey, 75015 Paris, France Repr PC

14 051408 THE WASHINGTON METRO AUTOMATIC TRAIN SUPERVISION SYSTEM.

The Washington Metro will be operated as a fully automated rapid transit system. Normal system operation will be controlled by the Automatic Train Control System which is comprised of the Automatic Train Protection, Operation and Supervision subsystems. This paper is divided into two parts: Part I provides an overview of system operation, including the role played by each of the subsystems in providing control of train separation and train speed, route security, control of acceleration and station stopping, and maintenance of schedules through computer-directed performance level and dwell adjustments. Part II provides a detailed description of the Automatic Train Supervision system and the methods employed by the computer software to exercise supervisory control of the system. The major programs and the software-hardware interface which provide the supervisory functions for train and terminal operations are described. A discussion of the strategies employed during major service disruptions closes the paper.

Hillman, HD (Gibbs and Hill, Incorporated) Cerbins, OH (TRW Systems Group); American Society of Mechanical Engineers Paper 73-ICT-79, Sept. 1973; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

14 051444 ATC EQUIPMENT FOR NEW SOBU LINE CARS OF JNR. The Sobu Line of the Japanese National Railways (JNR) recently added an underground section connecting Kinshicho Station to Tokyo Station, and the new section went into service in July 1972. This article describes the Type TS-7 automatic traffic control (ATC) equipment for electric railcars adopted on the new underground line. This ATC equipment employs a triple-system totally digital ring-calculation system and features high accuracy, high reliability, and fail-safe performance. The most outstanding feature is the ring calculation system which makes dynamic control possible. It is composed of fewer parts and simpler circuits, still

ensuring high reliability and positive detection of faults. As such the ring calculation system is expected to find wide application.

Takaoka, T (Hitachi Limited) Yasunami, M *Hitachi Review* Vol. 22 No. 9, 1973, pp 390-398; ACKNOWLEDGMENT: EI (EI 74 057473); ORDER FROM: ESL, Repr PC, Microfilm

14 051528 TELECOMMUNICATIONS RESEARCH IN THE UNITED STATES AND SELECTED FOREIGN COUNTRIES: A PRELIMINARY SURVEY. A preliminary investigation has been carried out on the command and control of rail transportation, both in the U.S. and overseas. An overriding consideration of rail transportation is safety, both for reasons of preservation of human life and for the high cost of a failure in potential damage to property. As such, railway signaling has evolved not only in a "fail-safe" mode, but in one where innovation must pass a series of slowly ascending levels of trial before being generally accepted in the industry. The second consideration is that of low R&D funding levels. In recent years gross investment in rail transportation has been low as the high technology fields of air and space have preoccupied governments.

National Academy of Engineering Vol. 2 June 1973; Report to NSF by Panel on Telecommunications Research, Committee on Telecommunications, NRC.; Contract NSF H-1221; ORDER FROM: NTIS, Repr PC, Microfiche; PB-222082, DOTL NTIS

14 051558 TRACK CIRCUITS FOR MODERN RAPID TRANSIT SYSTEMS. Track circuits have been used in American Railroads for over a hundred years. Although the basic idea (use of rails as part of detection circuit) remains the same, changes in implementation have been made constantly to meet new requirements and to take advantage of advances in technology. In modern rapid transit applications track circuits must meet certain requirements in performing their function of train detection and broken rail protection. The track circuits must operate reliably without insulating joints and with lightweight cars using disk brakes. As modern rapid transit systems use chopper controlled propulsion systems the track circuits have to be designed for operation without interference from chopper harmonics. Track circuits without insulating joints result in problems which must be solved for safe and reliable operation.

Kalra, P (Bechtel Corporation); American Society of Mechanical Engineers Paper 73-ICT-62, Sept. 1973, 8 pp, 9 Fig, 3 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

14 052077 DISAPPEARING STAFF FORCE THE PACE OF AUTOMATION. Much has already been done by London Transport to automate the signalling, driving and fare collection functions, but staff shortages disrupted scheduled services in 1973 as never before. The use of one-man crews is being extended, but the need to find acceptable and safe ways of operating trains with no crew on board is now pressing; further automation is essential if urban transport is not to come to a halt for lack of staff.

Maxwell, WW (London Transport Executive) *Railway Gazette International* Vol. 130 No. 1, Jan. 1974, 4 pp, Photos; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

14 052080 CONTINUOUS AUTOMATIC TRAIN CONTROL ON MUNICH S-BAHN.

The German Federal Railway has already introduced continuous ATC on some of its main lines, but the greater traffic density on its Munich S-bahn network has justified the cost of a more sophisticated version known as LZB 110, which comes into limited operation next month. Dipl.-Ing. E. J. Kohler of Siemens describes how this system will ultimately replace colourlight signalling, which would remain in a standby capacity.

Kohler, EJ *Railway Gazette International* Vol. 130 No. 1, Jan. 1974, 3 pp, 2 Phot., 3 Ref.; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

14 053761 SUPER-TRAMWAYS FOR EDINBURGH?

Growth in the swing of informed public opinion towards improved public transport rather than the disamenity and pollution implied by unrestricted growth of individual or private car transport is indicated by a report produced by the Scottish Association for Public Transport, which has evolved from the former Scottish Railway Development Association. This Study Paper No. 4 concerns Edinburgh and the options for transport in the Scottish capital and sharply disagrees with the views expressed by consultants. The consultants evaluated alternative strategies for Edinburgh in 1971; a conventional rail service was outlined and a more detailed but incomplete study of a limited light rail system, but both were rejected in favour of an 'enhanced bus system'. Following the keen interest shown in light rapid transit (LRT) or a super-tramway system in the Tyneside PTE, it is of interest that Option B in these plans is for higher capital investment in a service designed to serve a greater portion of the population.

Klapper, CF *Modern Railways* Vol. 31 No. 304, Jan. 1974, 2 pp, 2 Fig; ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England Repr PC

14 054130 ANALYTICAL APPROACH TO RAILWAY SIGNAL BLOCK DESIGN.

Originally intended for rapid transit systems, it is also applicable to any rail system where high-speed, short-headway characteristics are required to maintain a smooth and efficient flow of passengers of goods. Analytical techniques are used to select system speed commands using a cost-benefit analysis; to determine the speed-location operating profile; to locate signal block boundaries; and to determine signal logic. Four computer programs are used to calculate station dwell times, to simulate train performance, to calculate safe braking distance, and to determine headway. These programs determine the highest feasible speeds, consistent with civil design restrictions, at which trains can travel while at design headways. The algorithm for block layout then ensures that the minimum number of blocks will be used to provide the design headway subject to all system limitations. Program inputs include car character-

istics and track profile, user demand statistics, and the design headway.

Weiss, DM Fialkoff, DR *ASCE Journal of Transportation Engineering* Proc Paper Vol. 100 No. TE1, #10369, Feb. 1974, 13 pp; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

14 054283 AUTOMATIC TRAIN CONTROL FOR MADRID METRO. Automatic train protection and operating system by Westinghouse Brake & Signal in conjunction with Dimetal S.A. is being installed on Lines 1 to 5 and new lines 6 and 7. A.T.P. is coded carrier signal system and A.T.O. is signals sensed by bogie-mounted coils giving stopping distance, gradient and coasting orders.

Rail Engineering International Vol. 4 No. 2, Feb. 1974, p 70, 1 Fig; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

14 054302 THE TRAMCAR-AN ELEGANT SOLUTION TO URBAN TRANSPORT. A short review of the 140-year history of tramcars (or street railways) and speculations on possible future applications.

Klapper, CF *Engineering* Vol. 213 No. 11, Nov. 1973, 3 pp; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL, Repr PC, Microfilm

14 054762 PROSPECTUS FOR A PRELIMINARY STUDY OF LIGHT RAIL TRANSIT APPLICATIONS FOR SELECTED TEXAS CITIES. This paper outlines some of the advantages of the Light Rail Transit concept. These are lower initial cost than full rail rapid transit, lower operating costs and better service than buses, and an ability to influence urban development toward linear rather than sprawl. Fort Worth, El Paso, and San Antonio are suggested as potential cities for LRT.

Henry, L, Executive Director; Texas Association for Public Transportation Nov. 1973, 6 pp, 1 App; ORDER FROM: Texas Association for Public Transportation, 2408 Ware Road, Austin, Texas, 78741 Repr PC

14 056823 SYSTEMS OF COMMUNICATION BETWEEN TRACK AND TRAINS ON PARIS SUBWAYS [LES SYSTEMES DE TRANSMISSION ENTRE LA VOIE ET LES TRAINS DU METRO DE PARIS].

The first transmission devices used in the past to transmit signals between the tracks and the trains are briefly recalled. With a view to increasing the traffic and improving the control and ease of train driving, new transmission systems have been introduced. In the case of the Paris Metro network, 14 transmission systems are currently in use. They are briefly described. [French]

Besacier, G *Automatisme* Vol. 18 No. 10, Oct. 1973; ACKNOWLEDGMENT: EI (EIX740205696); ORDER FROM: ESL, Repr PC, Microfilm

14 056825 TELEPHONE EQUIPMENT IN THE MUNICH SUBWAY. Author describes the most important telephone equipment of the latest state of the art as used for the operational systems of the Munich subway in West Germany.

Hilscher, G *Reports on Telephone Engineering* Vol. 8 No. 4, July 1973; ACKNOWLEDGMENT: EI (EIX740103050);

ORDER FROM: ESL, Repr PC, Microfilm

14 056878 PERSPECTIVES FOR LIGHT RAPID TRANSIT IN BRITAIN. Because more than 20 years has elapsed since tramway development in Britain ceased, industry has had to draw on experience from abroad to meet the newly-expanding demand for light rail technology. Two prototype cars now taking shape for Tyneside provide a testbed not only for that network but also for other light railway and tramway schemes now being studied.

Railway Gazette International Vol. 130 No. 5, May 1974, pp 185-188, 2Fig., 1 Phot. ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

14 057329 DERAILING AMERICA--GM'S MARK OF EXCELLENCE. This article considers the environmental consequences of the abandonment of urban rail systems, which resulted in millions of commuters switching to autos and requiring construction of superhighways. The case of the Pacific Electric Railway in Los Angeles is reviewed.

Arrow, L, Co-Director (Highway Action Coalition) *Environmental Action* Vol. 5 No. 21, Mar. 1974, pp 3-7, Figs.; ORDER FROM: Environmental Action Incorporated, 1346 Connecticut Avenue, NW, Room 741, Washington, D.C., 20036 Repr. PC

14 057410 BLOCK SIGNAL INSTABILITY IN RAPID TRANSIT HEADWAY CONTROL. The headway control for a high speed transportation system where vehicles are moving along guideway is studied. The guideway is divided into blocks and the block signal is used for vehicles' speed control. The instability of the measured block signal is investigated. A method is devised to extract the actual block signal from the measured block signal.

Jen, RT Hung, JC ; Institute of Electrical and Electronics Engineers pp. 867-873, 3 Ref.; Proceedings of the Southeast Conference, Reg 3 Conf, Louisville, Kentucky.; ACKNOWLEDGMENT: EI (EI 74 604480); ORDER FROM: ESL, Repr PC, Microfilm

14 057485 MUNI: THE SECOND SYSTEM. The San Francisco Municipal Railway is the second heaviest public transportation carrier in the United States after the New York system. The system is presently undergoing a \$205 million renewal program that will give San Francisco the most modern light rail system outside of Europe as well as a new fleet of trolley coaches and diesel buses.

Myers, ET *Modern Railroads* Vol. 29 No. 6, June 1974, pp 60-62; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

14 057502 GERMANY AUTOMATES ITS RAILS. This article bites off a chunk of German Federal Railway (DB), suburban commuter lines (S-Bahnen), and urban mass-transit systems (U-Bahnen) technology that is so complex that it is difficult for the reader to understand in an article of limited length--unless it is somewhat "digested" in content. Therefore, presented here

is a broad-brush overview of the railway signaling techniques, track-to-train communications, and safety systems that have evolved in the Federal Republic since the end of World War II.

Friedlander, GD *IEEE Spectrum* Vol. 11 No. 7, July 1974, pp 73-77, 5 Fig.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

14 057504 PICC-VIC: ON, OFF, NOW ON AGAIN--OR IS IT? The 19th century bequeathed the Greater Manchester area the biggest railway network outside London. Unfortunately the network was--and still is--divided. The former Lancashire and Yorkshire Railway Company built most of the northern network based on Victoria Station. The London and North Western Company built most of the southern network. The two halves are still run separately. The Picc-Vic project is quite simply planned to bridge that gap. And until last August the scheme was moving forward steadily on the basis of detailed costing and survey work following an agreed transportation strategy for the Greater Manchester area.

Surveyor-Public Authority Technology Vol. 143 No. 4278, June 1974, 6 pp, Photos. ACKNOWLEDGMENT: Surveyor-Public Authority Technology; ORDER FROM: IPC Building and Contract Limited, 32 Southwark Bridge, London SE1, England Repr. PC

14 057886 PREDICTION AND CONTROL OF RAIL TRANSIT NOISE AND VIBRATION--A STATE-OF-THE-ART ASSESSMENT. The report contains results of a review of current technology for the prediction and control of urban rail transit noise and vibration, with primary emphasis on the parameters affecting propagation paths. Included are tools for the prediction of wayside noise and vibration adjacent to both at-grade and elevated transit track, groundborne noise propagation from subway tunnels, and noise in cars and in stations. In addition, several noise and vibration control techniques are evaluated including resilient rail fasteners, floating slabs, noise barriers, elevated structure enclosures, structural damping, and acoustical treatment of stations and tunnels.

Manning, JE Cann, RG Fredberg, JJ ; Cambridge Collaborative, Incorporated, (UMTA-MA-06-0025) Intrm Rpt. Apr. 1974, 252 pp; Contract DOT-TSC-643; ACKNOWLEDGMENT: NTIS (PB-233363/1); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233363/1, DOTL NTIS

14 071615 TRAMWAYS OF WESTERN GERMANY. The second edition of this pocket-size handbook of basic information on tramway systems in West Germany brings the account up to date with notes on Stadtbahn and semi-metro plans and progress. The book is useful also as a survey of fare collection systems and rolling stock builders.

Taplin, MR ; Light Railway Transport League Book; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: Light Railway Transport League, 64 Grove Avenue, Hanwell, London W7 3ES, England Repr. PC

14 071841 ATA RAIL TRANSIT CONFERENCE HELD IN SAN FRANCISCO, CALIFORNIA ON APRIL 14 AND 16, 1974. POWER AND SIGNALS SESSIONS. Three of the papers relate to power and train control systems for rail rapid transit and Pastor describes the state of the art of automatic train control systems. Engle's paper refers to the environmental problems relative to electronic equipment. The Ledsham paper relates to Thyristor Chopper train controls with regenerative power capability and the Toronto test program with this equipment. The Mombach paper discusses NYCTA study of the relative ability of four different types of subway signal cable to function during a fire and the relative toxicity of their combustion products. Mr. Kalkhof studies the cross bonding of running rails to improve the negative return path for propulsion current, and to minimize electrolysis to adjacent structures.

Pastor, GJ Engle, CH Mombach, JG Ledsham, HT Kalkhof, C ; American Transit Association Paper ATA/RT-74/3, Aug. 1974, 131 pp; Prepared by Bay Area Rapid Transit District, New York City Transit Authority, Hewlett Packard, Inc., and Toronto Transit Commission. Paper copy also available in set of 3 reports as PB-234 823-SET, PC\$12.00.; ACKNOWLEDGMENT: NTIS (PB-234826/6); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234826/6, DOTL NTIS

14 072003 THE URBAN SUBWAY [Le metro urbain]. The report provides an in-depth description of the Paris Subway System. The Paris system, with 16 lines totalling 110 miles, provides a safe, frequent, high density and uniquely priced transportation network. Some of the topics discussed are: Stations built near street surfaces using the Belgian method, Trains on rails and on tires, The utilization of 750 V DC power supply by the third rail. Progressive installation of automatic command and central control, High frequency telephone communications, Safety, Passenger admission system, Traffic optimization, Maintenance, Health requirements, Evolution towards fully automated ticket sales and control, and Detailed statistical and technical data on the types of cars being used is provided. [French]

Paris Regional Metro System June 1973, 48 pp, 52 Fig.; ACKNOWLEDGMENT: TSC; ORDER FROM: Paris Regional Metro System, Paris, France Repr. PC

14 072451 AUTOMATION ENSURES SAO PAULO METRO'S LINE CAPACITY. Opening in September 1974 and designed for a throughput of 80,000 passengers per hour, the Sao Paulo metro relies on a high degree of automation. Westinghouse Electric has designed a system which separates the functions of safety, operation and central supervision, and provides corrective strategies in the event of delays or malfunctions.

Railway Gazette International Vol. 130 No. 9, Sept. 1974, pp 351-352 ORDER FROM: XUM, Repr. PC

14 072492 SYSTEMS PARAMETERS AND THEIR AFFECT ON AUTOMATIC TRAIN CONTROL SYSTEM DEVELOPMENT. In order for an Automatic Train Control System to function within the total complex of a rapid

transit system, the ATC designer must be aware of and make adjustment and allowance for the various other elements of the system which can place restrictions on the ATC design and operation. These and other system parameters take on many shapes and forms and in many cases are not as apparent as some of the parameters. Changing any of the critical systems characteristics can have far reaching effects on the total system.

Swithers, FG (De Leuw, Cather and Company); Institute of Electrical and Electronics Engineers, (74 CHO 833-41A) Proceeding Part 1, 1974, pp 516-519; This paper was presented at the Ninth Annual Meeting of the IEEE Industry Applications Society, Pittsburgh, Pennsylvania, 7-10 October 1974.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

14 072493 THE ARCHITECTURE OF COMMAND AND CONTROL SYSTEMS FOR MODERN RAPID TRANSIT. Automatic Train Control comprises three subsystems: Automatic Train Protection, Automatic Train Operation and Automatic Train Supervision. ATP performs the vital safety functions. ATO controls propulsion and braking, ATS operates the transit system so it effectively provides the transportation service that is its sole reason for existence. The author noted that the rapid transit trend today is for more sophistication in the centralized control function. This control stabilizes system operation and provides dependable and expeditious service. A dollar invested in command and control can save many dollars of expenditure on rolling stock and fixed plant. There is also the potential for saving operating labor.

Freehafer, JE (General Railway Signal Company) Institute of Electrical and Electronics Engineers, (74 CHO 833-41A) Proceeding Part 1, 1974, pp 507-515, 9 Fig., 5 Ref.; This paper was presented at the Ninth Annual Meeting of the IEEE Industry Applications Society, Pittsburgh, Pennsylvania, 7-10 October 1974.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

14 080788 WATCH FOR A BOOM IN LIGHT RAIL. Cities too small for full-scale rapid transit, yet too big to rely on buses alone, are discovering an intermediate alternative. A number of U.S. and Canadian cities are looking at lightly used freight lines or the remnants of old interurban systems as the right-of-way for routes separated from street traffic. The examination of the potential by planners and administrators is detailed.

Kizzia, T *Railway Age* Vol. 175 No. 15, Aug. 1974, pp 16-21, 5 Phot.; ORDER FROM: XUM, Repr. PC

14 083059 FIXING BART. This article deals with the retrofits, primarily the backup for the automatic train protection system which has been installed at a cost of \$1.3 million and stems from the Bay Area Rapid Transit's "Blue Ribbon Panel" report. The principal problems and disagreements centered on the original procurement procedures and on the selection and implementation of the automatic train control (ATC) system. The supplier of BART's primary train protection subsystem stands firm in its insistence that this is an unnecessary elaboration.

Friedlander, GD *IEEE Spectrum* Vol. 12 No. 2, Feb. 1975, pp 43-45;

ORDER FROM: ESL, Repr. PC, Microfilm

14 083064 THE COLOGNE PRE-METRO. After it was decided that buses would be inadequate for major cross-city service, the Cologne government made two major decisions: (1) It would not finance a full-scale rapid transit subway system; (2) That since a segregated right-of-way was required, this should not be at street level and should be operated with the same vehicles as the streetcar system that remained in the other areas of the urban region. As this subway light-rail system has been built, it has always been designed so various sections should be complete without leaving unfinished structures even when funds were short. An additional constraint was that historic buildings were not to be endangered. The article describes the construction of the cut-and-cover subway and the erection of elevated segments using prefabricated components.

Dubbel, R (Koelner Verkehrs - Betriebe AG) *Union Internationale des Transports Publics, Revue* Vol. 23 No. 4, 1974, pp 284-288; ORDER FROM: Union Internationale des Transports Publics, Avenue de l'Uruguay 19, B-1050 Brussels, Belgium Repr. PC

14 083084 URBAN TRANSPORTATION--ANOTHER ALTERNATIVE. A WORLD-WIDE SURVEY OF LIGHT RAIL TECHNOLOGY. Light Rail Transit is intermediate between bus transit and full subway rapid transit. Light Rail Transit has higher capacity and speed than bus, and lower capital cost than full subway rapid transit. This report surveys the use of Light Rail Transit around the world, compares Light Rail Transit to both bus transit and full subway rapid transit, and highlights the advantages of Light Rail Transit.

Taylor, SF; Heritage Foundation, Incorporated Book 1974, 55 pp, 6 Fig., 43 Ref.; Public Policy Studies #10.; ORDER FROM: Heritage Foundation, Incorporated, 415 Second Street, NE, Suite 308, Washington, D.C., 20002 Orig. PC

14 083929 AN EVALUATION OF INTERMEDIATE-CAPACITY TRANSIT TECHNOLOGY. In recent times considerable effort has been made to develop and apply new or existing transit technology to provide capacity in the 6,000 to 20,000 persons per hour per direction range. Technologies in this range have been termed intermediate-capacity transit systems (ICTS) and include such systems as light rail transit, personal rapid transit, light guideway transit, etc. Typically these systems cost approximately one-third to one-half that of heavy rapid transit on a per-mile basis. The purpose of this paper is to provide a framework in which ICTS can be evaluated for a given city.

Finn, N Morrall, J *Traffic Engineering and Control* Vol. 15 No. 15, July 1974, 6 pp; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL, Repr. PC, Microfilm

14 084725 KEEPING UP WITH BART. The elaborate communications system of the Bay Area Rapid Transit is discussed. There are over 300 communication channels used in the wire line system in addition to the four radio channels. All intelligence, voice, automatic train control, digital transmission for remote control and indications of malfunctions are all integrated into the communication net.

Lee, DY *Communications* Oct. 1974, pp 12-18, 4 Phot.; ORDER FROM: Communications Publishing Corporation, 1900 West Yale, Englewood, Colorado, 80110 Repr. PC

14 084929 THE WAY IN L.A.. In November, 1974 Los Angeles voters rejected a tax to fund rapid transit system in the region. This forced the urban planners to redevelop the transit plans using existing right-of-ways and conventional equipment. It is now hoped that an integrated commuter system will be in operation in about two years that will use light rail vehicles and conventional railway coaches.

Modern Railroads Vol. 30 No. 1, Jan. 1974, pp 62-65 ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

14 096554 REBIRTH OF THE STREETCAR. Like the old streetcar, newly designed light rail vehicles are capable of moving large numbers of people efficiently. The reappearance of this old transit idea in a new form is due to a combined Government and industry program. Both entities see the streetcar as one answer to the urban-transportation dilemma in our cities, caused by too few transit riders.

Aronson, RB *Machine Design* Vol. 46 No. 29, Nov. 1974, pp 20-22; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL, Repr. PC, Microfilm

14 096676 AN ASSESSMENT OF THE APPLICATION OF ON-LINE COMPUTERS TO CONTROL OF AN UNDERGROUND RAILWAY-A SIMULATION STUDY. This paper describes the method and summarizes the results of work within the operational research department of London Transport to assess the benefits that on-line computer control of signals on the Northern and Victoria lines would bring to passengers. From a simulation study it was concluded that reduction in travel times, waiting times and overcrowding could be achieved by computer control. In the simulation, travel time from Modern to Kings Cross was reduced by 1 min and passenger waiting time at stations reduced by up to 11 sec. The improvement derives mainly from better integration of conflicting movements. The total benefit to passengers over the Northern line is estimated to be 64,000 p.a. In addition there is the possibility of an increased revenue to London Transport from generated traffic. /Author/TRRL/

Levene, SM Weston, JG London Transport (London Transport) *Transportation Research* Vol. 8 No. 2, Apr. 1974, pp 123-135, 8 Fig., 3 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 210872S); ORDER FROM: ESL, Repr. PC, Microfilm

14 097302 CAR CITY TO PEOPLE CITY (OR TAMING THE TRUCK). This report is essentially a non-technical study of how to resolve Manhattan Island's traffic problems and in doing so to return the island to the people. The use of Light Rail Transit is advocated by the report as being superior to buses and as giving more convenient neighborhood service than subways.

Kneiling, JG; Kneiling (JG);

ORDER FROM: Kneiling (JG), P.O. Box 1128, Church Street Station, New York, New York, 10008 Repr. PC

14 098066 SELTRAC OPERATING CONTROL SYSTEM FOR LOCAL TRANSPORT [Die Betriebsablaufsteuerung SELTRAC fuer Nahverkehrssysteme]. The SELTRAC (registered trademark) operating control system has been developed by SEL for tracked urban transport applications such as underground and rapid transit railways and also large cabin systems. The modular hardware and software allows the degree and extent of system automation to be extended step by step as required. Full automation can be achieved in several stages, starting from a purely monitoring system. Described here are the basic operating concept, operating sequences and possible alternatives, also vehicle distribution in the network and planning of the running schedules. Even with a high degree of automation a central controller is required, and his workplace and scope for action are described. In conclusion there is a description of the layout and function of a SELTRAC demonstration system. [German]

Dobler, KU *Eisenbahntechnische Rundschau* Vol. 24 May 1975, pp 181-186, 5 Fig.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra[Verlag, Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

14 098659 GETTING READY FOR THE MUNI METRO. Major events and factors crucial to the San Francisco Municipal Railway system are described. This system which will integrate urban and regional transit networks, will have a fleet of 55-mph Light Rail Vehicles and a brand new or largely rebuilt, largely graded separated rail system that will permit reductions in overall running times ranging from a third to nearly half. The retainment and requirement of 5 heavily used street railway lines operating in the city's principal thoroughfare, and the new BART-built Market Street (principal thoroughfare) subway are seen as key elements in the development of the municipal railway system. Surface improvements provided for by the system are described. An innovative feature for the upgrade program for existing trackage, was the establishment of a reserved median strip for rail lines in place of trackage in paved street areas. The construction of a new shop facility and the new fleet of 100 articulated Boeing-Vertol cars are briefly described. The gradual and carefully tested introduction of the Muni and its integration with regional BART system are outlined.

Middleton, WD *Railway Age* Vol. 176 No. 11, June 1975, pp 26-32, 2 Fig., 1 Phot.

14 098660 LRV A WORLD OVERVIEW. The light rail transit mode is defined (as an evolutionary mass transit mode based on established technology, which offers a variety of services and an effective means to control operating costs), its successful operation in many cities (212 in 35 nations) is noted, and the most common approach to its establishment (upgrade existing street car systems by tackling fixed facilities and vehicles) is outlined. The removal of trolleys and substitution of buses, the survival of the streetcar in European cities, the automated rapid rail and personal rapid transit systems, the ease of negotiation of 5 or 6 percent grades by light rail vehicles, and total route segregation in some cities are

briefly reviewed. Vehicle technology for this system of transportation is outlined. Longer vehicles which offer high passenger/driver ratio may be utilized.

Taylor, SF (Sanders Associates, Incorporated) *Mass Transit* Vol. 2 No. 6, June 1975, pp 7-9, 10 Phot.

14 099206 A LOOK AT THE LIGHT SIDE. Light rail transit is a very popular concept in North America at the moment. Transit planners like light rail because it is not experimental like some rapid transit systems. It is also cheaper to install than a subway system. However, despite the great interest in light rail no new systems are being built in North America at the moment, although several are planned. The main development in light rail has been the new car design for replacing old equipment on the San Francisco and Boston systems. The article gives a brief summary of existing and proposed light rail systems in the United States and Canada.

Modern Railroads Vol. 30 No. 6, June 1975, pp 52-54 ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

14 099307 ANOTHER ALTERNATIVE: THE CASE FOR LIGHT RAIL, PART 1. The objectives of providing better mass transit through conventional means (bus, heavy rail transit and personal rapid transit) are examined, and the possibilities of increasing system efficiency by incorporating light rail rapid transit into the overall plan is explored. A discussion the physical characteristics of light rail cover aspects of the vehicle, the operator, fare collection, design criteria and standardization, right-of-way, stations, controls and communication. Light rail's basic characteristic is versatility, and it can be used effectively in: basic service supplemented by bus; supplement to high capacity rapid transit; rapid transit feeder service; high-speed suburban service; and short haul intercity service. Light rail's capability to meet fluctuating traffic demand is discussed and comments are made on light rail as an instrument for integrated public transportation.

Taylor, SF (Sanders and Thomas, Incorporated) *Transit Journal* Vol. 1 No. 2, May 1975, pp 15-34, 3 Fig., 13 Ref.; ORDER FROM: American Transit Association, 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

14 099812 SEPTA'S RED ARROW DIVISION: TRACTION IN THE LIMELIGHT. The three routes of the Southeastern Pennsylvania Transit Authority which qualify for light rail transit status serve suburbs to the west of the center city. All connect with the elevated/subway system at the SEPTA 69th Street Terminal. Details of the operation, physical plant and cars are given in this article.

Zimmermann, KR *Passenger Train Journal* Vol. 7 No. 4, Apr. 1975, pp 15-17, 5 Phot.; ORDER FROM: Passenger Train Journal, 29 East Broad Street, Hopewell, New Jersey, 08525 Repr. PC

14 099813 FIRST BART-NOW MUNI METRO. San Francisco is transforming its conventional streetcar operation, the Municipal Rail-

way, into a light rail transit system in conjunction with a new center city access through the tunnels built for Bay Area Rapid Transit. The goal is a transit service comparable with the most modern tramways in western Europe. Changes and improvements include new cars, extended routes and upgraded service facilities.

Anderson, J *Passenger Train Journal* Vol. 7 No. 4, Apr. 1975, pp 13-14, 5 Phot.; ORDER FROM: Passenger Train Journal, 29 East Broad Street, Hopewell, New Jersey, 08525 Repr. PC

14 099835 POINTS AND TRAFFIC LIGHTS UNDER COMMON CONTROL USING VETAG. A trial installation of Philips' Vetag (vehicle tagging) equipment will be made in Amsterdam following a policy decision on adopting a standard method of automatic control of tramway switches and traffic lights. Vetag functions to detect, identify and locate selected vehicles in a stream of road traffic and is adapted to automation of LRT or streetcar signalling which must operate without external supervision. Vetag consists of three basic units--an interrogator installed along the roadway, a detection loop in the roadway surface and a transponder underneath each vehicle.

Meyer, F *Railway Gazette International* Vol. 131 No. 5, May 1975, pp 193-194, 1 Phot.; ORDER FROM: ESL, Repr. PC, Microfilm

14 099836 41ST CONGRESS. A series of articles on light rail transit is introduced by a comment of the president of the International Union of Public Transport in which he sees the urgent need to develop and exploit cheaper ways of providing reserved tracks free from congestion caused by road traffic. The articles: Koln-Bonn LRT route will be completed in three years; Designing a car for the tramway/metro transition; All aboard the LRT bandwagon; US and Canada develop standard trams.

Belin, R (International Union of Public Transport) *Railway Gazette International* Vol. 131 No. 5, May 1975, pp 173-174, 1 Phot.; 41st Congress of the International Union of Public Transport, held in Nice, France May 25, 31, 1975.; ORDER FROM: ESL, Repr. PC, Microfilm

14 127617 SPOORPLAN (GEOGRAPHICAL TYPE) INTERLOCKING SYSTEM SPDRS U FOR URBAN RAILWAYS. Urban railways are characterized by short distances between stops, identical vehicle type overground and underground lines as well as close headway. For railways showing essentially these features, Siemens has developed and in several cases already placed in service the Spoorplan interlocking system SpDrS U. The building block technique of such interlocking systems considerably facilitates planning making available of building blocks, and assembly. The fail-safe function of all building blocks and their co-operation have passed successfully the inspections of the supervising authorities. The authors deal in detail with principle and function of this Spoorplan interlocking system.

Hadeloff, D Meier, J *Siemens Review* May 1975, pp 183-184, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

14 127635 APPRECIATION OF THE POTENTIALITIES AND LIMITATIONS OF COMPUTERIZED CONTROL OF LINEAR TRANSIT SYSTEMS. The paper considers the theory of safe stopping on a trackway and the problem of station delay accretion from the viewpoint of control requirements and performance. It is shown that existing control methods relying on trackside-sensing equipment only is limited in scope and requires on-board supplementation if substantial headway reduction is to be achieved. A control equation is suggested similar to that used in practice by car-drivers which should allow this reduction to be achieved using existing technology.

Brain, RR (Brain and Associates) ; Institute of Engineering Proc Paper 1974, pp 130-134, 17 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: Institute of Engineering, Sydney, Australia Repr. PC

14 127637 AUTOMATIC TRAIN CONTROL AND COMMUNICATIONS FOR WASHINGTON METRO. The automatic train control and the communication systems for the Washington Metro rail are outlined.

Greenway, JP (Washington Metropolitan Area Transit Authority) Sheldon, RH *Communications Society Newsletter* Vol. 12 No. 6, Nov. 1974, 8 pp, 11 Fig., 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

14 127868 DESIGN PHILOSOPHIES IN AUTOMATIC TRAIN CONTROL. Two broad categories of automatic control have emerged in 15 years of rapid transit automation, identified by use of track circuits or separate conductors for the ground-to-train communications channel. Continental Europe has favored a wide-band link which gives flexibility in allocating functions to lineside and on-train equipment, but places heavy reliance on reliability of electronic logic. North American practice, represented by the Washington Metro, is to build up a control hierarchy from elements which can function independently in the event of failure.

Freehafer, JE (General Railway Signal Company) *Railway Gazette International* Vol. 131 No. 10, Oct. 1975, pp 377-382, 3 Fig.; ORDER FROM: ESL, Repr. PC, Microfilm

14 127912 NON-STOP ON THE TYNESIDE EXPRESS. This article is concerned with the construction of the first stage of the Tyneside metro. Monorails and minitrains were considered but rejected as offering no real advantages, and London style heavy tube trains discarded in favour of 27M long articulated cars in a light rapid transit system. A 75 percent government grant has been approved. The system is being fully integrated with other forms of transport, and a study has shown the system as giving an eleven percent return over an all-bus system. The author discusses the form of stations followed by an account of the construction of the first stage with particular reference to the problems encountered. Boulders prevented the use of a full-face tunneling machine and shields and roads headers are being used from both ends. Methods will be adjusted to suit ground conditions, and particular care is being taken to ensure the stability of overhead buildings. The methods include the specification of compressed air in some areas and,

the use of small explosive charges to remove siltstone. Tolerance in line, grade and circularity is only 30mm overall. The gateshead side of the river is riddled with old mine shafts, and requires special methods. These include drilling and grouting from above and the pneumatic stowing of pfa/cement and stone/cement grout. /TRRL/

FERGUSON, H *New Civil Engineer* No. 142, May 1975, pp 19-21, 2 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 214550); ORDER FROM: Institution of Civil Engineers, 91-93 Farringdon Road, London EC1M 3LE, England Repr. PC

14 128148 "SUPERTRAM" NETWORK TO SPEED TYNESIDE TRAVELLERS. The author discusses the "supertram" network at Tyneside and what it will involve. The decision to adopt a rapid transit system is considered feasible due to the combination of traffic congestion and government aid. The track will require a bridge across the river Tyne, tunnelling beneath the city centre and some re-alignment of part of the track already present from the river route towards the city. The cost of the phases of work is quoted. An overhead electrification system was selected because of greater safety. The 2-track Tyne road bridge will soon go out to Tender; the bridge is a through truss design connecting directly with a tunnel at the cliff face. A viaduct is also used and a test track is under construction. The electronically operated "Supertram" was chosen for its quietness and freedom from fumes; the train will run directly to shopping areas, hospitals and schools. Buses are expected to be used to transport people to the rapid transit systems and interchanges for public and private transport. /TRRL/

Atkinson, I *Contract Journal* Vol. 265 No. 4996, June 1975, pp 28-29, 1 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 214480); ORDER FROM: IPC Building and Contract Journals, Limited, 32 Southwark Bridge, London SE1, England Repr. PC

14 128887 OCCUPANCY DETECTION TECHNIQUES FOR TRANSIT SYSTEMS. A relatively simple and inexpensive method of verifying one of the most crucial functions in transit systems, that of continuous verification of train location is presented. While the system described is based primarily on hardware implementation, it would be relatively easy to implement the off-train logic using redundant minicomputers and software logic. While more sophisticated techniques could be developed, many present and future systems could adapt themselves to this technique, thereby increasing their reliability and safety.

Barpal, IR (Westinghouse Transportation Division) *IEEE Transactions on Industry Applications* No. 1, 74 CHO 833-41A, 1974, pp 319-322; IEEE Ind Appl Soc. 9th Annual Meeting, conf record, Pittsburgh, Pennsylvania, October 7-10, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE, Repr. PC

14 129195 UNDERGROUND RADIOTELEPHONIC TRANSMISSION BY RADIANT HIGH FREQUENCY CHANNEL [Unterirdische Funkübertragung mit abstrahlenden Hochfrequenzleitungen]. In long subways, such as underground railway tunnels, radiant high fre-

quency channels are necessary for sending the electrical signals covering conversations between mobile transmitters and receivers, and to transmit and receive them through the split armature of these radiant channels. For such radio-telephonic transmission, particular use is made of metric waves and, as regards construction, several solutions are possible. The authors present the multiple-channel radiotelephonic installations of the Hanover Underground, which have proved their worth. [German]

Breitenbach, O Stitz, G *Elektrische Bahnen* Vol. 46 No. 7, July 1975, pp 155-163, 7 Fig., 1 Tab., 6 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL, Repr. PC, Microfilm

14 129418 DENVER LOOKS TO LRV TO SAVE GAS, TAXES, AMENITIES. In looking at future growth patterns, Denver is planning a multi-modal transit system, with steel-on-steel as the probable mode for trunk routes. This article describes the planning process which has focused attention on light rail. The goal, by the year 2000 is approximately 73 miles of fixed guideways with 44 stations. A map shows the proposed system and table indicates the projected elements of cost.

Ellsworth, KG *Railway Age* Vol. 176 No. 21, Nov. 1975, pp 30-31; ORDER FROM: ESL, Repr. PC, Microfilm

14 129608 LIGHT RAIL TRANSIT SYSTEMS. This compendium of information on Light Rail Transit (LRT) systems operating in 23 cities throughout Europe and North America, describes types of LRT (such as tram, semi-metro, and pre-metro), vehicle types, city characteristics, and government policies relating to such systems. The systems described were predominantly radial network configurations serving center city, and mostly confined within a 5 km radius. Increasing use was noted of tunnel sections in the center city as well as pedestrian mall service. There was also extensive modal integration. The broad range of LRT fleets consist of single, articulated and trailer units. Observations are also recorded of the vehicle ability to serve both low and high level platforms, monitoring and signal prioritization, honor-type fare collection, performance, ridership, operating costs, and subsidy sources specific to each country.

General Motors Corporation Aug. 1975, 151 pp, Figs., Tabs.; ORDER FROM: General Motors Corporation, Twelve Mile and Mound Roads, Warren, Michigan, 48090

14 129804 LIGHT RAIL TRANSIT: A MODERN RENAISSANCE. The evolution of light rail transit from the earliest street railways is traced. Between the demise of the electric interurban and streetcar systems and the resurgence in urban rail transit, the concept of light rail was lost. The rediscovery is not now motivated by sentimentality, but on the inherent advantages of this technology. Rapidly increasing costs in heavy rail development and uncertainty about new transit technology served to spark the new interest. It offers the opportunity to initiate rail transit development at rather modest costs. The flexibility of light rail technology allows transit service, system capacity and available resources to be traded off in a variety of ways.

Mills, JR *Transportation Research Board Special Reports* No. 161, 1975, pp 3-6; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129805 LIGHT RAIL TRANSIT: 1975 USAGE AND DEVELOPMENT. A worldwide survey of light rail transit systems and specific details of many of these operations are included. General principles of the application of light rail technology are derived from some of these applications. The author notes that the design and subsystem components for the guideway, as well as the power distribution technology exist presently. The vehicle necessary to implement this technology is currently in design or is being manufactured in Belgium, Germany, Switzerland, Canada and the U.S.

Rogers, LH (Institute of Public Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 7-13, 1 Tab., 1 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129806 THE URBAN MASS TRANSPORTATION ADMINISTRATION VIEW OF LIGHT RAIL TRANSIT. This paper addresses the issues of how the Urban Mass Transportation Administration views light rail transit, what future role UMTA sees for this technology in American cities, and what considerations lead UMTA to sponsor a Light Rail Transit Conference. Although UMTA recognizes the virtues of the light rail concept, it does not see this as a panacea for urban mobility problems. It is believed that light rail may be a major solution to the search for less costly, more efficient and more environmentally attractive transportation systems that can economically serve the dispersed land use and travel patterns of metropolitan areas.

Orski, CK (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 14-15; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129807 LIGHT RAIL TRANSIT: AN URBAN TRANSPORTATION ALTERNATIVE. The Urban Mass Transportation Administration expects federal policy for investment in major urban transportation projects to lead to a rational allocation of limited resources. This is not a new concept and analysis on the basis of cost effectiveness by both federal and local agencies should encourage more cities to consider light rail as an alternative. Light rail on exclusive right of way can be an attractive competitor to the automobile.

Herringer, FC (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, pp 16-18; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129808 PHYSICAL, OPERATIONAL, AND PERFORMANCE CHARACTERISTICS OF THE LIGHT RAIL MODE. An overview of the light rail mode is presented. General characteristics and application of the mode are described, emphasizing the versatility of its guideway, the railway track. Physical characteristics of the right-of-way and ranges of dimensions for right-of-way and vehicles are discussed. Stations are discussed briefly. Basic technical simplicity of the light rail mode is pointed out as a significant virtue. Operating characteristics (both maximum running speeds and typical average operating speeds) are indicated. Acceleration of typical vehicles is noted. Frequency of service is discussed, and ranges for various traffic control systems are given. Riding quality and visual impact are pointed at as being favorable. Capacity of light rail lines is given as a few thousand to 12,000 passengers/h. In special cases, a high of 18,000 passengers/h can be achieved by using multiple-unit trains of 3 or more cars. Choices a designer has to attain maximum capacity are stated. Capital costs of contemporary new light rail systems are given as ranges of costs for various configurations. It is concluded that light rail transit is a medium-cost mode providing a medium level of capacity at medium speeds that can find application in many corridors or areas in medium and larger sized urban areas. It is pointed out that light rail is an existing mode with proved capabilities that needs little or no new research and development.

Vigrass, JW (Port Authority Transit Corporation) *Transportation Research Board Special Reports* No. 161, 1975, pp 19-25, 5 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129812 PLACE OF LIGHT RAIL TRANSIT IN THE FAMILY OF TRANSIT MODES. The paper attempts to clarify concepts and terminology of urban transit systems. Modes are defined by type of right-of-way, system technology, and type of service and operation. Right-of-way is shown to be the most important single feature determining mode performance and cost. Advantages of partial or full separation of transit from surface traffic are defined. The basic features of system technology are analyzed. Guided systems are compared with driver-steered systems; rail systems are compared with rubber-tire guided systems; and manually driven systems are compared with automated systems. With respect to operations, it is pointed out that commuter transit should be a supplement to, not a substitute for, regular transit. An analysis of optimal vehicle

size shows that, for guided systems that are in use or may be operational in the near future, minimum vehicle capacity should be 40 to 50 spaces. Based on this analysis of mode components, it appears that potential light rail applications are in medium-sized cities as carriers serving major routes and in large cities as a supplement to rapid transit. In large cities with low densities, light rail transit or light rapid transit (fully grade-separated light rail transit) also has potential for application. Small cities and special services may sometimes also use this mode. The following rights-of-way are best suited for light rail street and highway medians, railroad rights-of-way, aerial structures, and, in downtown areas, short tunnel sections.

Vuchic, VR (Pennsylvania University, Philadelphia) *Transportation Research Board Special Reports* No. 161, 1975, pp 62-76, 6 Fig., 1 Tab., 11 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129814 ELECTRIFICATION AND CONTROL SYSTEMS FOR LIGHT RAIL SYSTEMS. This paper provides a broad overview of available electrification and control system technologies for new light rail systems. It is intended for groups with widely diverse backgrounds ranging from city planners to economists and consequently does not deal with detailed, specific, technical design parameters. The portion on electrification is subdivided into sections on power generation, distribution, and collection on the light rail vehicle. The portion on control systems is broader and is divided first into propulsion control on the vehicle and then into systemwide operational control features that are further subdivided into sections on control on the vehicle, control among a number of vehicles, control as a central status reporting area, and automation. The paper concludes with general recommendations for a typical light rail system but recognizes that conditions might require additional or fewer optional features. This is done to emphasize the flexibility and adaptability of light rail systems.

Touton, RD, Jr (Klauder (Louis T) and Associates) *Transportation Research Board Special Reports* No. 161, 1975, pp 86-92; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129817 OPERATING A LIGHT RAIL SYSTEM. The most important parts of a transit operation-movement and control of vehicles-are discussed. Scheduling and control of trains in a hypothetical system are described. Examples of movement and control in light rail systems in Boston, Newark, Shaker Heights, and Cleveland are given.

Korach, RS (Port Authority Transit Corporation) *Transportation Research Board Special Reports* No. 161, 1975, pp 111-114; This article is extracted from Light Rail Transit, Proceedings

of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129821 LIGHT RAIL TRANSIT SOCIAL COSTS AND BENEFITS. This paper identifies the social aspects of light rail transit and categorizes them according to the viewpoints of the rider, those on the wayside, the community, and the contributor of capital funds. The physical characteristics and service qualities of light rail transit accumulate to benefits that are judged to outweigh the social costs. Highlighted is the light rail transit attribute of serving a greater number of persons' travel needs through extensive distance covered for a given investment, frequent stations, easy access, and short door-to-door travel time. The ability of light rail transit to condense the amount of time between ground breaking and operation of service is stressed. This is credited to simpler construction enabled by need for narrower rights-of-way, use of sharper curves and steeper gradients, and tolerance of grade crossings. The ability of light rail transit to evolve at a later date, through additional investment, into conventional rapid transit is acknowledged. The paper draws conclusions from a 1960 study in Frankfurt, Germany, that served as the springboard for the now extensive development of light rail transit networks throughout Europe. Instances of specific social aspects are cited.

Thompson, GJ *Transportation Research Board Special Reports* No. 161, 1975, pp 147-158, 2 Tab., 82 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129822 LIGHT RAIL TRANSIT SYSTEM EVALUATION. Evaluation of a light rail transit system involves many considerations that are specific to sites or systems and cannot be treated in a general study. However, it is possible to establish a value for reductions in running time relative to reductions in direct operating cost, savings in passenger time, and increases in net system revenue. These values, which depend on passenger volume, can be related to capital cost improvements. These include eliminating on-street running, eliminating grade crossings, instituting high-platform loading, and varying fare-collection systems. Brief comments are included on other factors of system evaluation including reliability, safety, and provision for future growth. The paper concludes that, although certain intensive improvements are likely to be justifiable, these must depend on a more detailed system-specific evaluation. In general it suggests that the planning and design of light rail transit should keep the system as simple as possible and, on the surface, avoid automatic application of rapid transit or railroad standards-and costs.

Parkinson, TE *Transportation Research Board Special Reports* No. 161, 1975, pp 159-166, 4 Tab. This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted

by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129823 PUBLIC CONSIDERATIONS OF THE ECONOMICS AND MARKETING OF LIGHT RAIL TRANSIT. The term light rail transit is defined for its use in this paper. This paper is concerned with that type of rail transit that permits electric operation of rail vehicles, singly or in trains, and is capable of subway, elevated, at-grade, and in-street operation on any given route. Economics and marketing are related in the same manner that revenue and expense are related. Adaptation of the service to maximize public response cost will confer public benefits to both the user and the taxpayer when more costly alternatives are relieved or avoided. The unique aspects of light rail transit in developing and conferring benefits are reviewed and analyzed. Light rail transit is often less costly and more convenient than full-scale rapid transit; it is often more efficient, attractive, and economical than conventional bus transit within its proper area of operation.

Tennyson, EL (Pennsylvania Department of Transportation) *Transportation Research Board Special Reports* No. 161, 1975, pp 167-172, 2 Ref.

This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

14 129970 AN AUTOMATIC BLOCK SYSTEM OF A NEW TYPE GIVES FOR THE PRE-METRO A MODERN SOLUTION TO THE PROBLEM OF PUBLIC TRANSPORT IN VILLAGES OF AN AVERAGE IMPORTANCE [Un block automatique de type nouveau fait du pre-metro une solution moderne au probleme des transports en commun dans les villes de moyenne importance]. In order to attain its objectives transit must fulfil A certain number of conditions of which the main are: comfort, speed and frequency. The first part of the paper describes how to optimize the commercial speed and how to obtain, by A rational block system, a short vehicle headway, at the same time ensuring safety. The notions of mobile block, fixed block and buffer block are dealt with and illustrated by suitable applications. The second part gives a detailed description of the solution chosen for the Brussels pre-metro: four aspect block system controlled by logic fail-safe devices based on fully static technology, duplicated by pinpoint speed control using inductors and pick-up coils. The pre-metro so designed appears to be better able to solve public transit problems in medium size cities than does the traditional metro system. The covering abstract for the conference is IRRD no 215903. [French]

Brichaux, M *Traffic Control and Transportation Systems Conf Paper* 1974, pp 507-518, 6 Fig., 5 Phot.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 215933); ORDER FROM: North-Holland Publishing Company, 335 Jan van Galenstraat, Amsterdam, Netherlands Repr. PC

14 130793 SAFE TRAIN SEPARATION IN MODERN RAPID TRANSIT SYSTEMS. Modern rapid transit systems are equipped with automatic train control, slip-spin control, brake assurance system and emergency braking system. Therefore, the reaction times and operating conditions are more predictable and the braking distances can be calculated with a high degree of confidence. This paper describes a computer model for designing speed profiles in a transit system to optimize headway and average speed characteristics without compromising safety margins. The model may also be used to calculate safety margins when the transit system operates under impeded mode conditions.

Kalra, P (Bechtel Corporation); American Society of Mechanical Engineers 75-ICT-11, July 1975, 5 pp, 4 Fig.; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Atlanta, Georgia, July 14-18, 1975.; ACKNOWLEDGMENT: ASME; ORDER FROM: ASME, Repr. PC

14 131223 LIGHT RAIL TRANSIT. This bibliography comprises a large number of entries relating to experience in various cities and describing new equipment, characteristics on infrastructure and operating systems, projects now being implemented etc.

International Union of Public Transport Bibliog.; ACKNOWLEDGMENT: International Union of Public Transport; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PC

14 131317 ANOTHER ALTERNATIVE: THE CASE FOR LIGHT RAIL. PART II. This article explores the cost factors and the planning and development of light rail and includes a worldwide survey of light rail technology.

Taylor, SF *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 45-63, 5 Fig., Tabs., 11 Ref.; ORDER FROM: American Public Transit Association, 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

14 131807 LIGHT RAIL TRANSIT: OUT OF HISTORY INTO NEW SOLUTIONS FOR URBAN MOBILITY. The potential of light rail transit to provide a new urban transport mode was considered at a 3-day conference. Development of light rail systems has been more rapid in countries where streetcar lines are still available than in the U.S., where most of the railway street industry was wiped out as highway construction advanced. Nonetheless, transportation planners are becoming more aware of the versatility of light rail systems with respect to location. Options for location are discussed, as are such aspects as community benefits and design characteristics.

Taylor, SF (Sanders and Thomas, Incorporated) *Transportation Research News* No. 60, 1975, pp 2-5, 1 Fig., 4 Phot.; ORDER FROM: TRB Publications Off

14 132243 FULL SPEED AHEAD FOR THE SUPERTRAM. This brief article is concerned with the likely future of supertrams and is based on a recent conference on light rail transport held in Philadelphia. Interest in this mode of transport has been fostered by energy and environmental factors, rapidly increasing costs of conventional

rail rapid transit systems and an unexpected reaction against the difficulties of introducing advanced technology to public transport. Reference is made to the problems of BART, maglev, PRT and skybus to illustrate this point. The author points out that after 40 years of steady abandonment of trams, there is now a dramatic reversal. Extensive tramway upgradings have occurred in Germany, USSR and the Netherlands, and wholly light rail systems have been constructed at Tyneside, Utrecht, Edmonton and the Ruhr. An outline is given of this system (supertram) which employs small light vehicles designed for sharp curves and steep hills with rapid acceleration and frequent stops. Details are given of the German supertrams and of their system of payment which is designed keep manpower to a minimum. Tram systems are compared with bus systems and underground railways, and have the advantages over underground railways of being more flexible and less costly to construct, but require special priority measures to be able to compete with buses. It is said that in general light rail seems best for peak hour volumes of 6000 to 20000 and total daily volumes of at least 20000. Below that buses are better and above that the full underground is probably better. /TRRL/

New Scientist Vol. 67 No. 961, Aug. 1975, p 324, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 215735)

14 132887 THE "SNELTRAM", A REORIENTATION ON INTERURBAN TRAMS [De "Sneltram", een Herorientatie omtrent Interlokale Trams]. The "Sneltram" is no panacea for solving all traffic and transport problems, but a means of filling the gap left by the railway and the metro on the one hand and the bus on the other hand. The report sets out the many possibilities of the "Sneltram". This modern tram is a quality transport system: comfortable, regular, relatively quick, safe, aesthetically justified and causing a minimum of pollution. /TRRL/ [Dutch]

Kaper, HP ; N.V. Nederlandse Spoorwegen R&D Rpt. June 1975, 68 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: Institute for Road Safety Research (IRRD 216259); ORDER FROM: N.V. Nederlandse Spoorwegen, IIE Hoofgebouw, Moreelsepark, Utrecht, Netherlands; PB8051

14 132942 TYNESIDE METRO-THIS RAPID TRANSIT HAS A GOOD CHANCE OF CATCHING UP WITH MOTORISTS. A new metropolitan transport system in Great Britain is outlined. The system's core is 34 miles of standard gage electric tramroad, most of it used by British Rail. The author looks at the Tyneside metro and its likely impact.

Merchant, M *Surveyor - Public Authority Technology* Vol. 146 No. 4356, Dec. 1975, 4 pp; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

14 133290 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. SIGNALS AND COMMUNICATION. The main purpose of signaling is to provide safety and headway for rapid transit operations. This is accomplished by installing and interconnecting thousands of components of signal equipment into a coordinated system that, in all phases,

stresses safety. There are three (3) main classifications of signals: automatic signals, approach signals and home signals. The purpose of the manual is to assist in standardizing the procedures involved in furnishing and installing of equipment to establish a signal system.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-5, Mar. 1975, 245 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251646/6ST, DOTL NTIS

14 134546 THE A.T.C. (AUTOMATIC TRAIN CONTROL) AND A.P.B. (ABSOLUTE PERMISSIVE BLOCKING) SYSTEMS IN AUTOMATIC TRAIN RUNNING [Los sistemas A.T.C. y A.P.B. en la conduccion automatica de trenes]. A paper read by the author at the Symposium on automatic train running, held in Madrid in March 1975. The author describes in particular the Societe Alsthom's A.P.B. symmetrical signalling system, for which the continuous track circuit serves as a basis. This system offers attractive new possibilities in automatic train running and signalling. He also describes the S.C.A.R. safety system (Systeme de conduite automatique par rapport a la vitesse limite), also developed by the Societe Alsthom for the Lyons Underground. [Spanish]

Lebrun, M ; Asociacion de Investigacion del Transporte-AIT No. 6, Oct. 1975, pp 4-23, 12 Phot.; ACKNOWLEDGMENT: UIC; ORDER FROM: Asociacion de Investigacion del Transporte-AIT, Madrid, Spain

14 136404 TRACK CIRCUITS AND NEGATIVE BONDING. The paper discusses cross-bonding of running rails to improve negative return path for propulsion current and to minimize electrolysis to adjacent structures. A standard application method is investigated to prevent interaction with railway train control systems when rails are used simultaneously for single rail track circuits or double rail track circuits. Application to audio frequency track circuits is discussed, and the effect of cross-bonding on broken rail protection is examined.

Kalkhof, C (New York City Transit Authority); American Transit Association Proc Paper ATA/RT-74/1,2,3, 1974, pp 80-117; Am Transit Assoc (ATA) Rail Transit Conf, San Francisco, California, April 14-16, 1974. Power and Signals Sess. Available from NTIS, PB-234824, PB-234825, PB-234826.; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS

14 136408 SAFETY AND AUTOMATIC TRAIN CONTROL FOR RAIL RAPID TRANSIT SYSTEMS. The paper partially summarizes a Department of Transportation study. The study describes the state-of-the-art in rail rapid transit system automatic train control, assesses the safety-related interrelations between the train control system, functions of the human operator and other portions of the total system, and makes recommendations, based on current experience, to aid the process of planning, funding approval, design, implementation, test, safety certification and operation of new systems or modifications of existing systems.

Pastor, GJ (Transportation Systems Center); American Transit Association ATA/RT-74/1,2,3, 1974, pp 1-11; Presented at the Am Transit Assoc Rail Transit Conf., San Francisco, Calif., Apr. 14 and 16, 1974, Power and Signals Sess. NTIS Nos. PB-234 824; PB-234 825 and PB-234 826.; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS; DOTL NTIS

14 136566 RECOMMENDED PREREQUISITES FOR REPLACING CABS WITH SOR IN THE BART TRAIN CONTROL SYSTEM. An evaluation is given of the prerequisites for the replacement of the train control system for the Bay Area Rapid Transit (BART). The Sequential Occupancy Release System (SOR) has several potential advantages for long-range improvement over the currently used Computer Augmented Backup System (CABS): (1) better resolution capability--train occupancy information for more than 1500 individual blocks can be displayed; and (2) better maintenance capability--an automatic problem reporting system is compatible with the SOR system. SOR will, however, have some shortcomings with respect to certain operational problems, failsafe reliability, and failure detection. It is concluded that SOR, used as a backup system, can provide a level of safety comparable to that provided by CABS.

Scalise, DT Evans, DM Elischer, VF Louis, R ; California University, Berkeley July 1975, 12 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-3776, DOTL NTIS

14 136568 EVALUATION OF BART, AUGUST 3 TEST FOR TRANSBAY SERVICE. A full-scale performance test is reported of the Computer Augmented Backup System (CABS) for the Bay Area Rapid Transit (BART). The test, involving 36 trains, was performed to analyze the original computer augmented train control system as it would operate in a failure situation. Recommendations for improved automatic safeguards were made to achieve two objectives: (1) to improve the CABS ability to automatically maintain a one-station separation between trains; and (2) to have the protection revert to that provided by the basic Automatic Train Control system for the worst case that could arise in the computer augmented system.

Scalise, DT Evans, DM Wiley, KG Louis, R ; California University, Berkeley Aug. 1974, 24 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-3774, DOTL NTIS

14 136569 BART TRAIN CONTROL SUBSYSTEM: SUMMARY AND STATUS OF RECOMMENDATIONS FOR CABS AND THE TRANSBAY CROSSING. Progress is reported on the effort to evaluate the Computer Augmented Backup System (CABS) proposed for the Bay Area Rapid Transit (BART) transbay service. A summary of recommendations resulting from a detailed study, the status of these recommendations, and conclusions with respect to the CABS system development are presented. Findings and recommendations on the CABS hardware and software already adopted and those intended for future action are reviewed.

Scalise, DT Evans, DM ; California University, Berkeley July 1974, 19 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-3773, DOTL NTIS

14 136570 BART TRAIN CONTROL SUBSYSTEMS: CABS AND SOR FOR THE TRANSBAY CROSSING. Preliminary progress is reported on two control subsystems of the Bay Area Rapid Transit (BART): (1) the Computer Augmented Backup System (CABS); and (2) the Sequential Occupancy Release System (SOR). CABS is an interim system for train separation to be used until the SOR Backup System is activated. CABS was analyzed, failure modes of both software and hardware were studied, and preliminary suggestions of corrective measures are made.

Scalise, DT Evans, DM ; California University, Berkeley May 1974, 18 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-3772, DOTL NTIS

14 136571 BACKUP SYSTEM TO BART AUTOMATIC TRAIN CONTROL SYSTEM LEADING TO TRANSBAY CROSSING. PROGRESS REPORT, MARCH 1974. A program was begun to: (1) investigate problems of the Bay Area Rapid Transit District (BART) Automatic Train Control (ATC) system; (2) evaluate tentative corrective strategies; and (3) provide technical evaluations of other system matters. BART ATC problem areas include train detection and collision avoidance resulting from lost occupancy indications. Corrective measures, referred to as the Backup System, were developed to add additional memory capability to the ATC for the last detected position of all trains. Additional efforts are being made to measure the performance of the ATC and to evaluate the logic equations and the traffic-simulation programs.

Scalise, DT Evans, DM ; California University, Berkeley Mar. 1974, 26 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-3771, DOTL NTIS

14 138362 AN ECONOMIC ANALYSIS OF TRAIN CONTROL. This report represents the completion of project which deals with the economics of rapid transit train control. Information dealing with rapid transit control systems from all parts of the world is used for the development of a computer program to analyze costs of an automatic vs. manual train control system. The Train Control Analysis Program (TCAP) utilizes actual data from a rapid transit operator. This data can be from an existing manual system which is considering automation, or it may be a system in the planning phases, which is trying to determine the proper transit control to utilize. Once the data has been entered through the computer terminal keyboard, an analysis is made. The program operates in a time sharing mode so that it is very convenient to change certain input parameters and observe the corresponding analysis immediately. This program can be used to determine what the above benefits may cost in relation to a less sophisticated system. The results of this analysis may be used in the decision making process of selecting an adequate control system.

Goldstein, L ; Polytechnic Institute of New York, (UMTA-74-11-2) Res. Rpt. UMTA-NY-11-0009-74-3, May 1974, 187 pp; Sponsoring agency is UMTA, DOT; Contract NY-11-0009; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-254226/4ST, DOTL NTIS

14 139490 THE RESURGENCE OF LIGHT RAIL TRANSIT. With the development of a new Standard Light Rail Vehicle there has been an increased interest in light rail systems for community mass transit. Light Rail Transit systems can be tailored to the needs of communities having too many passengers for successful busing and too few for an elaborate metro system. Existing systems, ranging from street running lines to private right-of-way cars, illustrate the diverse roles possible. Among many uses for the intermediate capacity light rail systems are: off loading subways; feeding and cross-connecting areas to subways, light car service for initial use on lines expected to grow to metro status; supporting special products such as entertainment centers.

Lenow, M *ASCE Journal of Transportation Engineering* Vol. 102 No. TE2, No. 12131, May 1976, pp 229-242; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 139535 DUTCH CITIES BEGIN TO DEVELOP THE TRAM. A long period of decline eliminated trams from all but the three principal cities of Holland, but these networks are now being expanded and Utrecht is planning a new line. The tram is seen as a much cheaper alternative to the heavy metro, but more important is the way better management of street traffic to give trams priority is slowly tipping the balance against competing private transport. Trams have a higher passenger/crew ratio than buses.

Saher, WFK *Railway Gazette International* Vol. 132 No. 7, July 1976, p 259, 3 Fig., 4 Phot.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL

14 139938 AUTOMATIC TRAIN CONTROL IN RAIL RAPID TRANSIT. The history of train control technology has seen extensive, but not complete, replacement of the human operator by machines. The increasing reliance on automation, both on existing transit systems and those under development, raises several basic issues about this application of technology. Questions about the safety, operational advantages, cost effectiveness and institutional factors associated with automation were raised by the Transportation Subcommittee of the Senate Committee on Appropriations in conjunction with federally supported rail rapid transit projects. This report deals with the degree of automation which is technically feasible, economically justifiable, or otherwise appropriate for rail rapid transit. Divergent opinions are included and, where the subject matter is controversial, an attempt has been made to present a balanced treatment.

United States Congress May 1976, 238 pp, Figs., Tabs.; ACKNOWLEDGMENT: United States Congress, NTIS; ORDER FROM: GPO, NTIS; GPO-052-070-03479-3, DOTL RP, PB-254738, DOTL NTIS

14 141500 SINGLE TRACK WORKING. This paper examines the possibility of employing sections of single track for two-way operation of autotrams and metros in urban areas. A comparison between head-on and alternate operation, shows the former to be preferable for routes with long links and short waiting times. Alternate operation is advantageous when the link transit time is the same or only slightly more than the waiting time and a high frequency service is desired, and when the mean journey length is short. A cost analysis shows that for routes with

moderate passenger flows, elevated or tunnelled track and reasonably even and close station spacings, substantial overall cost savings can be achieved with a single track system: /TRRL/

Gillie, RF ; Warwick University, Lanchester Polytechnic No. 27, Working Paper 27, Feb. 1976, 21 pp, 13 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 220816); ORDER FROM: Warwick University, Urban Transport Research Group, Coventry, England

14 143927 LIGHT RAIL TRANSIT: STATE OF THE ART REVIEW. Operational experience in cities of Western Europe and North America suggests that light rail is a viable transit alternative for U.S. cities as well. This state-of-the-art review seeks to establish a common level of understanding of light rail transit among planners, community leaders and decision makers. Contemporary planning concepts of light rail are reviewed and a description is provided of guideways, stations, hardware, operations and costs. The report examines the developmental trends of the last two decades which caused the revival of light rail in some western countries. The review focuses on the range of transit services offered by light rail, the utilization of a range of right-of-way opportunities along its routes, the lower investments and the potential for staged deployment associated with this mode.

Diamant, ES ; De Leuw, Cather and Company, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0103-76-1, 1976, 312 pp; Contract DOT-UT-50009; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256821/OST, DOTL NTIS

14 144068 IN-SERVICE PERFORMANCE AND COSTS OF METHODS FOR CONTROL OF URBAN RAIL SYSTEM NOISE. EXPERIMENTAL DESIGN. This report presents an experimental design for a project to evaluate four techniques for reducing wheel-rail noise on urban rail transit systems: (a) resilient wheels, (b) damped wheels, (c) wheel truing, and (d) rail grinding. The design presents the project questions to be answered: (1) What reduction in noise can be achieved by the techniques, individually and in combinations? (2) What are the costs of the techniques? The design gives data requirements for acoustic testing on the Southeastern Pennsylvania Transportation Authority Market-Frankford Line, as well as requirements for collection of non-acoustic data covering all United States rapid transit systems. It prescribes methods for analysis of the data, means for drawing inferences to answer the questions posed, and formats for presentation. The design requires that the findings of the completed study be presented in a manner such that the information can be used by transit system personnel who may not have a background in acoustics or cost analysis.

Holowaty, MC Saurenman, HJ Rosen, SM ; De Leuw, Cather and Company, Wilson, Ihring and Associates, Incorporated, (DOT-TSC-UMTA-76-11) Intrm Rpt. UMTA-MA-06-0025-764, May 1976, 100 pp; Work sponsored by UMTA, DOT; Contract DOT-TSC-1053; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-257200, DOTL NTIS

14 145172 CLR-V-CANADIAN LIGHT RAIL VEHICLE. This booklet looks at light rail transit in Canada. The new Canadian Light Rail Vehicle (CLR-V) incorporates major design features emphasizing adaptability for light rapid transit operations. Other features provide for a more efficient and longer vehicle life, improvement in passenger comfort and convenience, and reduction in environmental noise.

Urban Transportation Development Corporation No date, 13 pp, 3 Fig., 8 Phot.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

14 147589 RAILWAYS ENTER AN ERA OF CHANGE. This article discusses the problems which have plagued CN and CP Rail in recent years. It suggests solutions to the problems such as more modern facilities, better scheduling and rapid transit. It also looks at Light Rail Transit, the economic case for lightweight rolling stock, railway research in Canada and the northern railway option.

Engineering Journal (Canada) Vol. 59 No. 2, Mar. 1976, 20 pp, Figs., Tabs., Photos. ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: ESL

14 147831 TRAINS REPLACE TRAMS UNDER BRUSSELS. After a lengthy build-up time with pre-metro operation, this month sees inauguration of full metro services on the central east-west line of the Brussels rapid transit network from Place St. Catherine to Tomberg and Beaulieu. G. Cudell, Chairman of the Brussels Metro Authority, explains that plans for two eastward extensions of the metro are at an advanced stage, but indicates that further metro construction is unlikely in the foreseeable future.

Railway Gazette International Vol. 132 No. 9, Sept. 1976, pp 343-44. ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

14 148026 TORONTO ADDS TWO NEW PEOPLE MOVERS. The author describes the Advanced Light Guideway Transit (ALGT) and the Canadian Light Rail Vehicle which are to be incorporated into Toronto's public transport system. ALGT is a monorail, steel-wheeled system using a combination of linear induction motor and steerable axles. The Canadian light rail vehicle is a modern tramcar, 15 M long, with the possibility of multi-unit operation and capable of running on conventional street tracks or, at higher speeds, along its own right of way. A brief account is given of previous transportation experiments in the city and plans for extensions to the present system are described. /TRRL/

Hayward, D *New Civil Engineer* No. 202, July 1976, 4 pp, 1 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 221404)

14 148264 OVERVIEW OF EUROPEAN LIGHT RAIL DEVELOPMENT AND ITS SIGNIFICANCE IN NORTH AMERICA. The paper discusses the development of transit planning concepts in Europe as they relate to light rail systems, and shows how these concepts are intertwined with the parallel development of technology and operating techniques. Of particular interest are those areas in which a consensus

appears to have developed, such as in the design of vehicles and the treatment of grade crossings and intersections. In the past few years two forms of light rail are becoming discernable. These are typified by the high performance, high investment systems, and by a recent variation which seeks to achieve comparable performance by a low impact, low investment approach, relying heavily on exclusive transit lanes and signal pre-emption.

Fox, G (De Leuw, Cather and Company) ; American Society of Mechanical Engineers Conf Paper Paper P&P-26, 1976, 8 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

14 149008 TYNE AND WEAR METRO-A MODERN RAPID TRANSIT SYSTEM. The paper outlines the processes which gave rise to the rapid transit proposals for Tyneside, and the development of these into the Tyne and Wear metro. The concept of a fully integrated public transport system, capable of making a significant contribution to local movement and land use is explained, and the feasibility of introducing metro over a significant part of the existing British rail network detailed. A technical description of the metro includes civil engineering, signalling and communications, and electrification. The rolling stock is described in detail. The paper concludes with sections on finance and organization. /Author/ /TRRL/

Howard, DF *Institution of Mechanical Engineers Proceedings Analytic* Vol. 190 No. 18, 1976, pp 121-136, 4 Fig., 10 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 233662); ORDER FROM: ESL

14 149506 TRANSPORTATION YEAR OF TRAVAIL: ALTHOUGH SOME PROJECTS WERE HALTED OR DELAYED NEW URBAN AND MAINLINE SYSTEMS ARE PROCEEDING. The effect of adverse economic conditions on all forms of transportation is briefly discussed, and the observation is made that although some projects were halted or delayed, new urban and mainline systems are proceeding. Urban mass transit is considered to have been crippled even though transit technology has progressed. Automatic train operating systems in Montreal and Italy are described. The control systems also consist of an automatic train protection subsystem and an automatic train supervision subsystem. A West German Train-guidance System for a rapid transit network is also described. Another example of progress is the supertram concept (consisting of a 2-unit articulated vehicle carried on 3 bogies) of the lightweight rapid-transit system of Newcastle, England. Two minisized electric cars marketed in the U.S. are outlined, and comment is made on the return of the trolley car.

Friedlander, GD *IEEE Spectrum* Vol. 13 No. 1, Jan. 1976, pp 73-75, 1 Phot.

14 149942 RAILROAD NOISE RESEARCH PROGRAM [Onderzoekprogramma railverkeerslawaai]. This report gives a list of the research planned with respect to railways, trams and underground railways. The list was drawn up by the Interministerial Commission on Noise Nuisance (I.C.G.) with a view to coordinating the research projects commissioned by the national

government to support its policy on rail traffic noise. The research programme comprises research into practicable methods of measuring the noise emitted by rail traffic, research on the relation between the amount of noise emitted and its effect, measurement of vehicle noise emission, emission caused by shunting activities, zoning systems, criteria for new stock, research on the noise of warning installations and signal horns, and on noise emission from stations, listing of noise-sensitive receivers, financial consequences, and an investigation into vibration caused by rail traffic. The entire research programme includes 14 projects. /TRRL/ [Dutch]

Ministerie van Volksgezondheid en Milieuhygiene. RL-H, Aug. 1976, 12 pp; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV60005E), TRRL (IRRD 224115); ORDER FROM: Ministerie van Volksgezondheid en Milieuhygiene, Dr. Reyersstraat, Leidschendam, Netherlands

14 152678 FAILURE MODE AND EFFECT ANALYSIS FOR SYSTEM SAFETY ASSURANCE OF ELECTRONIC CONTROLS. The need to achieve the highest levels of train safety while offering fast service with short headways leads to specification of automatic train control (ATC) as a major subsystem of rapid transit operations. Specifications recognize potential consequences of malfunction on quality of service and safety. The automatic train protection function of the ATC system must not only have acceptable failure rates but any failures which do occur must not degrade safety. The author discusses analyses of the fail-safe function: Failure mode and effect analysis (FMEA) as applied to electronics, electrical/electronic safety analysis. The way in which General Railway Signal applies these methods is described.

O'Neill, J ; General Railway Signal Company Apr. 1976, 6 pp, 1 Fig., 1 Ref.; ORDER FROM: General Railway Signal Company, GRS and West Avenue, Rochester, New York, 14602

14 152785 EVALUATION OF INTERMEDIATE CAPACITY TRANSIT SYSTEMS. This paper is concerned with the evaluation of intermediate capacity transit system (ICTS). The overall objective is to examine those technologies suitable for application to cities of 1/2 to 1 million population, and to present a framework for the evaluation of the systems when applied to such cities. The framework proposed is comprehensive but simple, using a linear rating technique to compare each system against set standards and objectives, with a subjective assessment of qualitative factors. The technologies evaluated provide capacity in the 6,000 to 20,000 persons per hour per direction range, cost approximately 1/3 to 1/2 that of heavy rapid transit on a per-mile basis and include such systems as light rail transit, light guideway transit and bus transit. The application of the framework is illustrated with an evaluation of candidate transit technologies for the City of Calgary which is typical of North American cities of approximately 500,000 population.

Morrall, J (Calgary University, Canada) Finn, N Institute of Electrical and Electronics Engineers, (75CH0999-31A) Conf Paper 1975, pp 247-256, 16 Ref.; Presented at the 10th IEEE Industry Applications Society Annual Meeting, Conference Record, Atlanta, Georgia, September-October 2, 1975; ACKNOWLEDGMENT: EI (EIX770200041); ORDER FROM: ESL

14 153049 LIGHT RAIL TRANSIT IN THE CANADIAN CONTEXT. INTRODUCTION AND OVERVIEW. This paper is a brief introduction and overview of the factors and aspects of Light Rail Transit technology, its application considerations, a progress report on the LRT system being implemented as well as the conception of an LRT system incorporating technological advancements.

Eggleton, PL (Transportation Development Agency); Roads and Transportation Association of Canada Proceeding Sept. 1975, pp 133-136
 Proceedings of RTAC Annual Conference, Calgary, Alberta, 1975.; **ACKNOWLEDGMENT:** Roads and Transportation Association of Canada; **ORDER FROM:** Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

14 153052 SELECTING AN URBAN LIGHT RAIL VEHICLE FOR EFFICIENT OPERATION AND UTILIZATION. Selection of the best design for a Light Rail Transit system is a complex process. The designer is faced with an array of right-of-way options, station designs, fare collection schemes, and alternative vehicle designs. Vehicle selection is determined principally by passenger requirements, operations design, fare collection arrangements and station designs with cost, service and operating efficiency as the main measures of performance. This paper discusses the design of light rail transit vehicles including the technology, cost and efficiency.

Clark, GA (Urban Transportation Development Corporation); Roads and Transportation Association of Canada Proceeding No. 7, Sept. 1975, pp 137-159, 5 Ref.; Proceedings of RTAC Annual Conference, Calgary, Alberta, 1975.; **ACKNOWLEDGMENT:** Roads and Transportation Association of Canada; **ORDER FROM:** Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

14 153053 EDMONTON'S NORTHEAST LIGHT RAPID TRANSIT PROJECT: LRT IMPLEMENTATION PROGRESS IN THE CITY OF EDMONTON. This paper discusses whether the intermediate-capacity transit line is economically viable and acceptable in the community-social sense. In terms of capacity, the studies underline a problem inherent in coping with large peak passenger-handling capacities by conventional full-scale bus services (in the order of "a bus per minute" flows)-that of high operating cost very susceptible to inflation.

MacDonald, DR (City of Edmonton, Alberta, Canada); Roads and Transportation Association of Canada Proceeding No. 7, Sept. 1975, pp 161-167, 1 Fig.; Proceedings of the RTAC Annual Conference, Calgary, Alberta, 1975.; **ACKNOWLEDGMENT:** Roads and Transportation Association of Canada; **ORDER FROM:** Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

14 156220 TRAIN AND TRAFFIC CONTROL SYSTEMS FOR SUBWAYS. Automatic control of trains has so far been discussed principally in terms of control of individual trains. As far as control techniques are concerned, the target seems to have been achieved. Meanwhile, with the

successive introduction of practical supervisory systems that control train groups from the ground, progress is being made worldwide in the commercial application of a new type of highly efficient train control system by combining the ground-based system with the train-mounted system through a data transmission system. The high efficiency of the new system could never have been realized by individual ground or trainboard systems. This paper describes recent developments and examples of automatic train control systems with specific reference to the system for the Sapporo Municipal Transportation Bureau's Tozai Line. In this system, trains are automatically operated by transmitting data to them by very high frequency radio from the ground-based computer-aided traffic control system.

Ishida, S Takaoka, T Oshima, H Kariya, S Noumi, M Ebina, T *Hitachi Review* Vol. 25 No. 8, Aug. 1976; **ACKNOWLEDGMENT:** EI (EIX770400166); **ORDER FROM:** ESL

14 156221 TRAFFIC CONTROL SYSTEMS FOR RAILWAYS. Railways in Japan are shouldering ever-growing responsibilities as a means of public conveyance. Urban traffic particularly for commuters is expected to increase further in density. Consequently, speedier and more accurate operations are required for train traffic. And to secure safe and smooth transportation, new systems will be needed. Against such a background, this paper describes the latest results in computer-aided traffic control systems and outlines a few newly developed systems.

Kawai, Y Kubo, Y Oshima, H Kariya, S Kobayashi, M *Hitachi Review* Vol. 25 No. 8, Aug. 1976, n.p.; **ACKNOWLEDGMENT:** EI (EIX770400167); **ORDER FROM:** ESL

14 157572 AUTOMATIC FIXED-POINT BRAKING FOR MULTIPLE-UNIT TRAINS OF THE MILAN UNDERGROUND RAILWAY. The author describes the automatic fixed-point braking system installed on 90 trains operating on the Milan underground. The very simple and reliable equipment is producing remarkable good results, although the rolling stock is not equipped with particularly quick-acting brakes designed for fixed-point braking.

Riondel, P *Brown Boveri Review* Vol. 63 No. 12, Dec. 1976, pp 758-762; **ACKNOWLEDGMENT:** EI; **ORDER FROM:** ESL

14 157952 TECHNOLOGY TRANSFER--TRANSPORTATION. The Technology Utilization Program of the National Aeronautics and Space Administration aims to transfer space-related technology to the solution of non-space problems. One of the areas is transportation. Members of SRI Technology Applications Team routinely work with a user community comprising, among others, DOT and the railroads. Rail industry needs addressed by the team included: the need for early warning of impending roller bearing failure; detection of residual stresses in wheels and rails; dynamic relationships between cars and track; quieting of diesel locomotive exhaust; fire-resistant construction materials and improved management techniques (for the rapid-transit industry).

Anyos, T Brown, I Lizak, R Loomis, A Wilhelm, J; Stanford Research Institute Biann Rpt. SRI-PYU-3670, NASA-CR-153272, Apr. 1977, 211 pp, Figs., Tabs., 6 Ref., 5 App.; Contract

NAS-2-9318; **ACKNOWLEDGMENT:** Stanford Research Institute, NTIS; **ORDER FROM:** Stanford Research Institute, 333 Ravenswood Avenue, Menlo Park, California, 94025 NTIS; N77-27034/6ST, DOTL RP

14 159903 FORWARD TO LIGHT RAIL TRANSIT. The papers presented in this report cover a wide range of subjects related to light rail transit including a description of system concepts, such as performance characteristics of such transit; comparison with other modes; and applications. The technology and operational aspects of light rail transit are treated in a set of papers that address permanent way requirements, electrification and control systems, and U.S. and foreign vehicle developments. Of major significance are the economic considerations of light rail transit. A number of papers also discuss the various costs of construction, operation, and maintenance as well as social costs and benefits. The observation is made that the current trend to move away from a unimodal solution to a system that blends a number of discrete transit elements, each of which is closely tailored to demands and local conditions, should make light rail transit desirable for cities that require a fixed guideway system.

Patricelli, RE (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 161, 1975, 2 pp; **ORDER FROM:** TRB Publications Off

14 159904 INTRODUCTION TO LIGHT RAIL TRANSIT. The papers published here were presented at the National Conference which was designed to put forward the basic characteristics of light rail transit, and the techniques of applying it to improve transportation and the quality of urban life. The first session established the rationale for considering light rail transit from among several modes, and worldwide developments in light rail transit were described. The second session (on system concept) described specific characteristics that give light rail transit a place in the public transportation spectrum. How such transit coordinates with other modes was an important aspect of this session. Physical and operating characteristics were discussed in the third session; both fixed facilities and vehicle received extensive coverage. Economics (cost and revenue potential) were examined, and the beginnings of a method for selecting an optimum urban transport system that uses various modes were formulated in the fourth session. The final session, which considered the potential of light rail transit in the institutional context of contemporary American society, indicated that tangible effort must be made in the U.S. to emulate the developments in Canada and Europe if the true potential of this mode is to be realized.

Taylor, SF (Saunders and Thomas, Incorporated) *Transportation Research Board Special Reports* No. 161, 1975, pp 1-2; **ORDER FROM:** TRB Publications Off

14 163247 A PECULIARITY OF RAILWAY SIGNALLING: THE OVERLAP [Une particularite de la signalisation ferroviaire: l'overlap]. After giving a concise historical background to railway signalling, the author defines overlap and the different ways of achieving it in practice; with the automatic block, the overlap involves there being a protective zone down the line from

each block signal and this effects the block signal control for the section immediately up the line. The author then refers to uses of overlap on the metropolitan railways in London, Paris, Munich, Nuremberg and discusses the purpose of the system. [French]

Besacier, G *Revue Generale des Chemins de Fer* Vol. 96 Apr. 1977, pp 226-232, 11 Fig., 7 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

14 163278 DISCONTINUOUS INDUCTIVE DEVICE FOR THE AUTOMATIC STOPPING OF TRAINS AND THE RECOGNITION OF THE LOCATION OF THE PLATFORM FOR LINE "A" OF THE METROPOLITAN RAILWAY [Dispositivo induttivo-discontinuo per l'arresto automatico del treno ed il riconoscimento dell' ubicazione delle banchina per la linea "A" della Metropolitana di Roma]. After a brief introduction on the necessities of utilization, a description is given of the characteristics and the working principles of the equipment in question. Lastly, brief mention is made of the other applications of VIATRON II. [Italian]

Catanoso, I (STEFER, Rome, Italy) Solimini, G *Ingegneria Ferroviaria* Vol. 31 No. 12, Dec. 1976, pp 11-18; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 163300 COMMUNICATION SYSTEM CUSTOM DESIGNED FOR THE MONTREAL METRO RAPID TRANSIT SUBWAY. This system utilizes radiating coaxial cable to provide communications between: (a) subway trains and the Control Center; (b) subway trains; (c) maintenance personnel with portable units and trains, other maintenance personnel, or to the Control Center; (d) the Control Center and passengers on a selected train. Particular emphasis is given to the following: (a) an overview description of the rapid transit operation; (b) the radio communication requirements generated by the Montreal Metro Community (Montreal Urban Community); (c) a brief description of the system designed to conform to the communications requirements; and (d) a description of several special custom features of the system.

Leech, ER (WABCO, Union Switch & Signal Division) Outlaw, WT; Institute of Electrical and Electronics Engineers Conf Paper 77CH1176-7VT, 1977, pp 137-143, 4 Ref.; Presented at the 27th IEEE Vehicle Technology Group Annual Meeting, Orlando, Florida, March 16-18, 1977; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 164008 EDMONTON LIGHT RAPID TRANSIT—FIRST IN CANADA. The development of the Edmonton Rapid Transit (ERT) System is reviewed, the light rail vehicles used are described, and salient features of the signal and control system and grade crossings are noted. Conventional 1435 mm gauge tracks were introduced into an existing right-of-way. The light rail vehicles consists of six-axle, articulated, double-ended, multiple-unit vehicles of a standard design. The signal and control system selected for the ERT line provides automatic protection against collision between trains and against overspeeding on curves and crossing approaches. Nine grade crossings will be protected by existing devices as well as by devices initiated by the ERT

train operator. To minimize disruption of high-way traffic and avoid queued vehicles on the crossing, the ERT Signal System will be interfaced with a computerised traffic detection and control system operating adjacent signalled high-way intersections.

Parkinson, TE *Transit Canada* Vol. 13 No. 4, July 1977, pp 4-12, 3 Tab., Photos.

14 165803 TRANSPORTATION NEEDS OF THE ELDERLY AND HANDICAPPED. The current state of the transportation services available in the Toledo urbanized area was reviewed. While many services are offered, the services provided were exclusive rather than inclusive in their clientele. The number and location of the elderly/handicapped in the urbanized area was estimated and plotted by census tract. It was found that the elderly tend to concentrate in residential areas around the Toledo CBD, while handicapped tend to reside throughout the urbanized area. Specific transportation constraints were analyzed as to how they affect the mobility of the elderly/handicapped and were prioritized. Alternative service, equipment, and revenue strategies were reviewed to determine their applicability in meeting these constraints. A recommended transportation solution for the Toledo urbanized area promulgates a subscription service for the handicapped operated by TARTA using barrier-free, retro-fitted transit vehicles. To better utilize existing services, the study recommended bus shelters, improved information services, and continued cooperative inter-agency planning effort to improve transit services for the elderly/handicapped in the urbanized area. /Author/

Toledo Area Regional Transit Authority, Toledo Metropolitan Area Council of Governments UMTA OH-09-0023, May 1977, 96 pp, Figs., Refs.; The preparation of this report has been financed through a grant from DOT, Urban Mass Transportation Administration.

14 166482 ALTERNATIVE CONCEPTS FOR UNDERGROUND RAPID TRANSIT SYSTEMS: EXECUTIVE SUMMARY. A study was performed for the Office of the Secretary of the U.S. Department of Transportation to determine if construction costs and operating energy requirements of future high-performance underground rail mass-rapid-transit systems can be decreased while maintaining or improving service. The alternative design approaches studied were limited to well-established design concepts which differ from those used in the BART (San Francisco), WMATA (Washington, D.C.) and MARTA (Atlanta) systems. They include: gravity assist; over/under tunnels; over/under and short stations; various subway train propulsion configurations; and optimized operational control policies. Comparisons were made of several system designs for a specific route and patronage structure. These comparisons indicate that it is practical to significantly reduce construction costs and operational energy requirements of modern underground systems while improving service by incorporating alternative concepts. Without any attempt at optimization, savings in capital costs in excess of 24% and savings in energy as high as 70% in traction effort and 88% in braking are shown to be achievable. The Executive Summary briefly describes the purpose, approach, and results of the study.

Dayman, BJ Heft, RC Kurtz, DW Macie, TW Stallkamp, JA; Jet Propulsion Laboratory, Office of the Secretary of Transportation, National Aeronautics and Space Administration Final Rpt. DOT/TST-77-31, P-51-520, Mar. 1977, 38 pp; Contract DOT-AS-60019; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270102/7ST, DOTL NTIS

14 167598 INNOVATIVE SCHEDULING FOR THE BAY AREA RAPID TRANSIT SYSTEM. ABRIDGMENT. This paper explains the scheduling constraints imposed by both the computer automated block system (CABS) logic and the track geometry of the Bay Area Rapid Transit (BART) system in the Oakland area, which is called WYE because the track configuration is like a Y. The alternative schedules that were developed within these constraints to ameliorate the excess passenger demand on the Concord-Daly City route are also presented.

Harmon, FE (Bay Area Rapid Transit District) Wong, PJ (Stanford Research Institute) *Transportation Research Record* No. 627, 1977, pp 1-4, 4 Fig.; From TRB Record 627, Rail Transit.; ORDER FROM: TRB Publications Off

14 167600 AT-GRADE CROSSINGS OF LIGHT RAIL TRANSIT. ABRIDGMENT. The purpose of this paper is to provide a methodology for analyzing and estimating the effect of semiexclusive LRT line on motor-vehicle traffic. Four major concerns are identified: The expected level of impact on traffic; the improvements required in terms of added lanes; And, the minimum grade separation requirements. This type of analysis may provide the transportation planner with the tool by which the grade separation requirement could be minimized, or staged to some future year for the cases in which the motor vehicle flow was estimated at the time of the analysis would exceed the capacity, the additional ROW for crossing improvement was unavailable or too costly, or totally grade-separated intersections must be considered. The results of this analysis indicate that the deployment of LRT semiexclusive lines in fringe areas is a feasible alternative to transit lines that are totally grade-separated, fixed guideways. This analysis also indicates that, for LRT systems planned for multicar operations at high service frequencies, locating transit stops at grade crossing is desirable to reduce traffic impact.

Morag, D (De Leuw, Cather and Company) *Transportation Research Record* No. 627, 1977, pp 7-10, 3 Fig., 1, Tab, 2 Ref.; From TRB Record 627, Rail Transit.; ORDER FROM: TRB Publications Off

14 167980 OPTIMUM STATION SPACING ON A RAILROAD LINE [Interstation optimale sur une ligne de chemin de fer]. The author makes a theoretical study of a model for building a railroad line or a metropolitan railroad in a given area taking the minimization of the passenger's journey time as the optimization criterion. Such a model enables the repercussion of the various solutions considered to be tested in relation to the cost of infrastructure, rolling stock and operations. [French]

Mehrazine, H (Teheran University, Iran) *Revue Generale des Chemins de Fer* Vol. 96 Feb. 1977; ACKNOWLEDGMENT: EI, Revue Generale des Chemins de Fer; ORDER FROM: ESL

14 168071 APPROACH TO THE PLANNING AND DESIGN OF TRANSIT SHELTERS. For a transit patron, the transit shelter is one of the most easily recognizable elements of the transit system, but, at present, this type of transit-interface facility is considered simply for its cosmetic value. This attitude creates a weak link between the transportation system and its users and can threaten the viability of the urban transit system. This paper presents the theses that transit shelters have a more significant role in the community and in the transit system than being just a windbreak or weather-protection device; that they are an interface point with the system and should protect, comfort, inform, and guide the user; that they should blend into the surroundings but still be visible; and that they should not be isolated or passive agents. The paper sets forth an innovative approach to the planning and design of shelters and describes what a shelter facility is versus what it ought to be. It also describes the types of activities that are involved in the development of the transit shelter and the types of functional social financial physical and user issues that should be considered. The benefits that can be derived through the use of this approach are discussed. /Author/

Bodmer, LA (Sink (James M) Associates) Reiner, MA (Chicago Regional Transportation Authority) *Transportation Research Record* No. 625, 1977, pp 48-53, 3 Fig., 1 Tab., 10 Ref.; This article appeared in *Transportation Research Report No. 625, Transit Planning and Operations*; ORDER FROM: TRB Publications Off

14 168076 TRAFFIC-CONTROL MEASURES AT HIGHWAY-RAILWAY GRADE CROSSINGS WITH PROVISIONS FOR LIGHT RAIL TRANSIT. Railway rights-of-way in cities are attractive alternatives for transit corridors, but, for modes that are not fully grade-separated, such as light rail transit systems, there may be problems with combined railway and transit crossings of arterial streets. This situation has been studied in Edmonton, Alberta, where a light rail transit line is under construction. The surface portion of this line is along the railway right-of-way, and as a result, the operation of its eight grade crossings is regulated by railway authorities. The short headways of light rail transit could cause frequent disturbances to the road traffic that operates at a saturation during peak hours. This paper illustrates the method used for the analysis of the problem and discusses the surveys conducted. The basic principles governing the solutions to the grade-crossing problem are (a) the coordination of adjacent signalized intersections in such a way that the impact of the crossing closure is minimized and the system recovers shortly after the closure, (b) the integration of light rail transit scheduling and control with traffic control, i.e., restricting the closures to the periods of minimum impact on road traffic, and (c) the use of special features to increase safety. /Author/

Schnabegger, J (Edmonton Transportation Planning Branch, Canada) Tepley, S (Alberta University, Canada) *Transportation Research Record* No. 628, 1977, pp 6-11, 9 Fig., 9 Ref.; This article appeared in *Transportation Research Record No. 628; Lighting, Visibility, and Railroad-Highway Grade Crossings*; ORDER FROM: TRB Publications Off

14 170080 STREAMLINED SYSTEM OF SURFACE GUIDED URBAN TRANSPORT [Donzept einer Oberflächen-Stadtbahn]. General outline of the proposed system which, combined with the possible use of existing tram tracks, is characterized by: The building of stations with platforms the level of which is displaced cross-wise in relation to the traffic flow so that the traffic should not be obstructed when the trams are stationary, and simplified multiple-unit articulated rolling stock. [German]

Leimbach, KR *Verkehr und Technik* Vol. 30 No. 8, Aug. 1977, pp 302-305, 4 Fig., 1 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Schmidt (Erich) Verlag, Herforder Strasse 10, 4800 Bielefeld, West Germany

14 170469 AUTOMATIC TRAIN CONTROL FOR RAIL RAPID TRANSIT SYSTEMS. Most all rail rapid transit systems operate on a block signal approach for the basic train detection and protection system. This block system is described and two laws implicitly used in a control system are discussed. It is shown that these two laws are used as the basis for the hierarchical control system concept. Automatic train control systems are described for several current rail systems. References are discussed which indicate the future of this technology and the research areas which need to be pursued.

Goodson, RE (Purdue University); Institute of Electrical and Electronics Engineers *Proceeding* Vol. 1 N 77CH 1220-3CS, 1977, pp 481-488, 8 Ref.; Proc of the Jt Autom Control Conf, San Francisco, California, June 22-24, 1977; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 170569 SUPERTRAM: TYNESIDE'S METRO GATHERS MOMENTUM. The Tyne and Wear Metro—a cross between a railway and tramway system—is the first purpose-built urban transport system to be installed in a major British city for perhaps half a century. Project construction was stopped in May 1976 for a reappraisal of costs and benefits. Now it is going ahead, with the first section of the line due to open in early 1979.

Aldous, T *New Scientist* Vol. 76 No. 1079, Nov. 1977, 3 pp; Part 2 in RRIS 23 172644; RRIS Bulletin 7802.; ORDER FROM: IPC Magazines Limited, 66-69 Great Queen Street, London WC2E 5DD, England

14 170930 AUTOMATION IN RAPID TRANSIT CONTROL: THE STATE OF THE ART. The purpose of this report is twofold. First and foremost, it is intended to serve as a "primer" on automatic train control for rapid transit systems. Secondly, the report is to provide an insight into the potential and realizable benefits of automatic train control. Constraining factors and considerations are discussed. A special attempt is made to introduce practical considerations into the assessment of automatic train control for rapid transit systems. It is hoped that the information and the considerations brought forward in this report will aid in the assessment of future systems. /Author/

Abrahamsohn, GA Heti, G Chan, HK; Ontario Ministry of Transportation & Communc, Can Sept. 1977, 173 pp, Figs., Tabs., 2 App.

14 172644 SUPERTRAM: METRO'S WELL-TRIED TECHNOLOGY. PART 2. Tyne & Wear Passenger Transport Executive's "Super-Tram" will come into service on the first 12 km. of its 54 km. Metro network in about 18 months' time. Author discusses Metro's technology—its rolling stock, signaling and ticketing arrangements—and looks at some of the major civil engineering works which are turning an underused conventional suburban railway into a modern rapid transit system tailored to the needs of 1980s Tyneside.

Aldous, T *New Scientist* Vol. 76 No. 1081, Dec. 1977, pp 630-632; Part 1 in RRIS 23 170569; RRIS Bulletin 7801.; ORDER FROM: IPC Magazines Limited, 66-69 Great Queen Street, London WC2E 5DD, England

14 173415 A SIMULATION STUDY ON THE UTRECHT-NIEUWEGEIN TRAMWAY LINE [Simulatiestudie smeltram Utrecht-Nieuwegein]. Simulation may be a good tool, when one wants to get insight into the operation of a future transport system. This technique has been applied to the tramway line between Utrecht and Nieuwegein in order to get an impression of the extent of the variation in the travel times and its sensitivity to the traffic control at the intersections along the line and the location and size of the tram doors. Setting up a good simulation takes years, especially due to the construction of a valid model. This problem has been avoided by connecting some existing reliable models with each other. The simulation was tried out with good results on a tram line in The Hague. [Dutch] Breuers, PN *Verkeerskunde* Vol. 28 No. 12, 1977, pp 561-564; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands

14 173575 THE URBAN RAILROAD SITUATION. Growth of our cities around rail facilities has often resulted in incompatibilities between the railroads and communities in metropolitan core areas. Explored in the following is the development of the current urban railroad situation; some specific areas of incompatibility in central cities are presented, and certain relationships to ensure the success of the solutions are considered.

Moore, JR Viser, BB (Bartholomew (Harland) and Associates) *Transportation Engineering* Vol. 47 No. 6, June 1977, pp 29-33; ACKNOWLEDGMENT: General Motors Research Laboratories; ORDER FROM: Institute of Transportation Engineers, 1815 North Fort Myer Drive, Suite 905, Arlington, Virginia, 22209

14 174636 RAIL TRANSIT [Transportation research record]. The 7 papers deal with the following areas: Innovative scheduling for the Bay Area Rapid Transit system; procedure for optimizing rapid transit car design; at-grade crossings of light rail transit; impact of transit line extension on residential land use; evaluation of alternative station spacings for rapid transit lines; design of elevated guideway structures for light rail transit; and model for cost-effective maintenance of rail transit vehicles in urban mass transit systems.

Harmon, FE Wong, PJ Huss, MF Roess, RP Morag, D; Transportation Research Board, Washington, D.C. TRB/TRR-627, 1977, 35p; Library of Congress catalog card no. 77-608311;

ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274537/OST

14 176923 LIGHT RAPID TRANSIT. The phrase light rapid transit (lrt), together with alternative descriptions such as intermediate rapid transit (irt), or pre-metro has been used to describe those rail systems which were neither full or 'heavy' rapid transit systems, eg. the London underground, the Paris metro and the Munich u-bahn, nor conventional modern tramway systems. The author discusses the development of such systems and suggests that there are two main reasons for the interest in and development of these 'intermediate' systems: one to reduce the cost of a rapid transit system, and the other as an intermediate step to the achievement of a full rt system involved as this is with the necessity to provide for complex signalling systems, intrusive overhead equipment and larger cars. The author describes recent visits to Antwerp, Brussels, Cologne, Hannover and Frankfurt undertaken to study the current state-of-the-art in such transit systems, and to see if any principles or guidelines for more general application are discernible. In particular, does LRT have a place in Britain? The objectives, approach and systems are briefly described and contrasted. As a result of this study it is suggested that there are clearly two lines of development: the pre-metro system as being developed in Brussels, and the lrt systems as being developed as an end in themselves in Antwerp, Cologne/Bonn, Hannover and Frankfurt. Such developments are discussed, and the question 'do lrt systems have anything to offer in the British scene' is considered in relation to the Tyneside metro.

Hellewell, S *Traffic Engineering and Control Analytic* Vol. 18 No. 11, Nov. 1977, pp 532-537, 4 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-231958); ORDER FROM: ESL

14 177158 TELEPHONE EQUIPMENT FOR SAO PAULO'S SUBWAY SYSTEM. This article describes the telephone systems used in the administrative and train control networks of the Sao Paulo (Brazil) subway, the first section of which went into service in September 1975. The subway is being equipped with an up-to-date communications system which has been designed for greater efficiency and operational reliability.

Goncalves, M (Siemens, Brazil) *Telefon Report* Vol. 13 No. 1, Sept. 1977, pp 44-47; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 177181 SAO PAULO METRO E-W LINE INNOVATIONS. This paper describes the vehicles, track design, stations, and control system of the planned east-west line of the Sao Paulo (Brazil) Metro, scheduled to begin partial service by January 1980. Three objectives have been followed in the specifications for the E-W line. The first objective is to increase the reliability and availability of equipment on the E-W line. This is to be achieved by increasing the reliability of the equipment itself and by providing different levels of operation so that service can be continued under degraded conditions when equipment failures occur. The second objective is to increase the proportion of equipment manufactured in Brazil to 60% of total cost. The third objective is to reduce the cost per kilometer of the E-W line as far as possible.

Costa, BL Kalra, PS ;

Institute of Electrical and Electronics Engineers Conf Paper n 77CH1246-8-IA, 1977, 5 pp; Conf Rec IAS 12th Annual Meeting, Los Angeles, California, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 177186 TECHNOLOGY SELECTION AND DEVELOPMENT FOR AN INTERMEDIATE CAPACITY TRANSIT SYSTEM. The objective of the Intermediate Capacity Transit System (ICTS) program is the development and implementation of a transit mode which offers a high degree of community acceptance and high service levels for urban applications in the capacity range of 5,000-15,000 pphpd. Elevated and at-grade guideways will be used as much as possible in lieu of underground construction to reduce system capital costs. The primary emphasis on urban integration has led to stringent requirements for minimum wayside intrusion. Features of the ICTS include steel-wheel on steel rail suspension, steerable trucks, alternating-current propulsion, and moving-block train control. The government of Ontario has funded a three year, \$55.5M development program to design, construct and test a prototype system. The ICTS program includes the development of advanced electrical systems for longitudinal control of the vehicle, specifically, high power inverters and complex microprocessor applications in braking and signalling.

Renfrew, RM (Urban Transportation Development Corp Ltd, Canada) ; Institute of Electrical and Electronics Engineers Conf Paper n 77CH1246-8-IA, 1977, pp 935-945; Conf Rec IAS 12th Annual Meeting, Los Angeles, California, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 178146 THE TROLLEY SUBWAY OF FORT WORTH REVISITED. Civil engineer transit planners can find valuable lessons in the successful operation of a trolley subway by a department store in Fort Worth, Texas. Qualities of ingenuity, economy, efficiency, and craftsmanship could have application also in big city transit.

Schumacher, R (New York City Department of Transportation) *ASCE Engineering Issues-J of Prof Activities* Vol. 104 No. 2, Apr. 1978, pp 107-113; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 178155 TYPE 200E TELEPHONE SYSTEM FOR PUBLIC TRANSPORT ORGANIZATIONS. The type 200E telephone system offers flexible and economic solutions for the expansion of private communications networks for railways, inland waterways, highway departments and other public transport organizations. Using established ESK modules, a line of telephone systems for between 30 and 200 extensions have been created allowing local and long-haul dialing in the private networks of public transport organizations.

Franzen, D *Siemens Review* Vol. 44 No. 8, Aug. 1977, pp 372-376; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 178527 SPEED INPUT AND CONTROL FOR AUTOMATICALLY CONTROLLED RAIL VEHICLES. The author describes the method of the speed input for vehicles such as

employed in the SELTRAC system, and also the controller structures used in the vehicle computers. As typical example of the arrangement, the equipment of the Berlin Transport Authority's Type A3L is described. [German]

Uebel, H *Eisenbahntechnische Rundschau* Vol. 27 No. 1-2, Jan. 1978, 3 pp; ACKNOWLEDGMENT: British Railways; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

14 178540 THE EIGHTIES: A NEW RAIL ERA--PROCEEDINGS OF THE BIENNIAL CIGGT SEMINAR ON RAILWAY RESEARCH. This is the proceedings of a conference on railway research sponsored by CIGGT on January 29 and 30, 1978. The following are included: Railway Electrification Panel; Passenger Service Panel; Track Systems and Rolling Stock: A Light, Steerable Axle Truck for Rail Passenger Vehicles, G. Soblewski and D. Gilmore; the Dilemma of Passenger Rail in Canada, J. Lukasiewicz; Surface Freezing of Coal Cars, P.H. Oosthuizen; Reduction of Impact Damage in Automatic Marshalling Yards, C.N. Kerr; Problems of Track Support, G.P. Raymond. Cost and Economics: Railway Costing Through the Looking Glass, P.M. Bunting; Costing Track Wear, M.D. Roney; Costing Rail Wear with Replacement Value, C. Schvier and R.W. Lake; Railway Cost Estimation Under Peak-Loading Conditions, J.M. Hartwick and J.T. Bernard; Econometric Forecasting of Railway Freight Demand, G.R. Sparks. Propulsion, Communications and Control: Linear Induction Motors for Transit Systems, G.E. Brown; Linear Synchronous Motor Propulsion for Urban Systems, G.R. Slemmon; Guided Radar for Obstacle Detection on the Railways, N.A.M. Mackay, A. Benjamin and D.J. Clarke; Inductively Coupled Signal Transmission for Long Freight Trains, G.J.M. Aitken. Operations Analysis: An Analytic Model for the Analysis of Congested Railway Lines, G.W. English; A Line Capacity Model, E.R. Petersen; Computer Simulation of Derailment During Grade Crossing Collisions, D.B. Cherchas, et al; Spinality in Transportation Networks, F.E.F. Dunford and E.R. Corneil; Project Control Using Network Analysis, M.C. Lockhart and C.E. Law. Freight Systems: An Arctic Railway--1977 Perspective, R.G. Maughan and R.W. Lake; The Ferchibal Transportation Study, P. Charron and Leclerc; Costing the Transportation of Western Canadian Coal to Thunder Bay, C.J. Boon; Advanced Systems: Development of the Train Location, Identification and Control System, R. Pomeroy; Testing and Evaluation of the Prototype LRC Passenger Train Equipment, I. Tomaka and P.L. Eggleton; A Systems Approach to the Development of an Intermediate Capacity Transit System, R. Giles; Status of Magnetically Levitated High-Speed Guided Ground Transportation, N.E. Rudback, A.R. Eastham and W.R. Hayes; Shinkansen--The Japanese "Bullet" Train, C.E. Law. Panel on Research and Development for the 80's.

Lake, RW, Editor Schvier, C Arnold, SN ; Canadian Institute of Guided Ground Transport Proceeding CIGGT-78-5, Apr. 1978, 472 pp, Figs., Tabs., Refs.; This is the proceedings of a conference sponsored by CIGGT on railway research, held January 29-30, 1978.; ACKNOWLEDGMENT: CIGGT; ORDER FROM: CIGGT

14 178745 SOME AESTHETIC CONSIDERATIONS IN LIGHT RAIL DESIGN. Concern over the visual impacts of LRT remains one of the obstacles to a more general acceptance of the mode. Nor is this concern unjustified; for often, in the past, once a project had been approved, scant attention was paid by transit engineers to the appearance of LRT overhead and trackway. Yet all the fixed elements of LRT, trackway, overhead, and stations, are amenable to visual improvement if some of the principles of visual design, widely used in other fields, are applied. This paper outlines and illustrates some of the concepts that lie behind the installation of visually satisfactory and operationally functional LRT facilities, and suggests that closer coordination is needed between technical specialists and urban designers. /Author/

Fox, GD (Tri-County Metro Transportation District of Oregon) *Transportation Research Record* No. 662, 1978, pp 17-22, 15 Fig., 2 Ref.; This article appeared in the *Transportation Research Record* No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

14 178947 TYNE & WEAR METRO DEFINES A CONTROL PHILOSOPHY. In 1979 8 km of Britain's first modern light rail system will commence operations in the northern suburbs of Newcastle-upon-Tyne. LRT practice in Germany and Belgium was the starting point in minimizing staff while keeping capital costs down. Although the 55-km network will be signaled throughout and stations will be monitored by CCTV from a central control room, routes will be set automatically through interlockings according to destination data derived from approaching trains.

Hamer, D *Railway Gazette International* Vol. 134 No. 6, June 1978, 5 pp, 2 Fig., 3 Phot.; ORDER FROM: ESL

14 179153 ECMT. ROUND TABLE 38 (PARIS, 24-25 MARCH 1977). POSSIBILITIES OFFERED BY CERTAIN TRADITIONAL TECHNIQUES FOR URBAN TRANSPORT. TRAMS AND TROLLEYBUSES [CEMT. Table ronde 38 (Paris, 24-25 mars 1977). Possibilités offertes par certaines techniques traditionnelles pour les transports urbains. Trams et trolleybus]. After a short historical review of rail-borne public transport and its competitors, the author studies what is actually required of local public transport. Respect for the environment and easy access to the town centre are two essential elements for assessing a public transport system, which, to be efficient, must have its own right of way. The author advocates "express trams" in medium-sized towns. [French]

European Conference of Ministers of Transport SNCF Cat 01 N310, 1978, 78 pp, Tabs., Photos.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: OECD Publications Center, 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006

14 179843 BOSTON'S COMPUTERIZED TRAFFIC CONTROL SYSTEM. To cope with serious traffic congestion on streets in the City of Boston, Massachusetts, a traffic signal control system which serves the demands of both private vehicles and public transit is being implemented. The initial project provides for control of Massachusetts Avenue, a principal north-south arterial

in Boston. All phases of the system will be under the supervision of the central computer located in a control center in Boston City Hall. The project is designed for expansion to include other locations, and Commonwealth Avenue is currently being added to the system. The nature of traffic operations on city streets requires that the control system be flexible to respond to the irrational and often unpredictable demands and conditions that occur, including double and triple parking. To provide this flexibility the system has been designed for alternative modes of operation, with changes and variations to these modes programmed as software items in the computer. A daily statistical printout, both tabular and graphic, with be produced automatically giving volume, occupancy, speed and stop data. In addition, the central control will have the capability of monitoring local controllers, sampling detectors, and stop-line presence detectors to determine whether they are functioning normally. Special detection equipment senses the movement of buses on Massachusetts Avenue and the central control computer then adjusts the timing of signals to accelerate traffic flow in approaches occupied by buses. In Commonwealth Avenue the system will include priority for street cars (trolley cars and light rail vehicles) which operate in the median. New trolley priority hardware and control logic have been developed for the Commonwealth Avenue trolley line. The control logic, uses two specially designed features to facilitate trolley movements through signalized intersections and eliminate conflicts with normal street traffic. Phase flipping is built into traffic signal controllers which permit the transit vehicle to effect changes in phasing in order to allow the traffic computer an additional degree of freedom. The second unique feature of the control logic is use of successively updated and narrowed predictions of trolley car arrival in a time window at downstream intersections with far side transit stops. /Author/

Brant, AE, Jr Casper, GW ; International Road Federation Proceeding Oct. 1977, pp 185-186; This paper was presented at the 8th IRF World Meeting, Tokyo, Japan, October 16-21, 1977. Full text also written in Japanese.

14 180311 REMOTE CONTROL OF THE R.A.T.P. ELECTRICAL ENERGY DISTRIBUTION SYSTEM. Structure of the electric power supply network for the subway system (Metro) in Paris, France, is described. The power is supplied by the Electricite de France nationally connected system directly at 63 kv from 8 supply points and at 225 kv from one supply point. Later two further 225 kv points will be added in 1977, and two additional points in 1979, all spread throughout Paris in order to diversify the supply sources. Operational and functional details are discussed, along with data processing and control facilities.

Guittard, J Trotin, G ; Institute of Electrical and Electronics Engineers Proceeding n 77CH1257-5 Reg 8, 1977, 7 pp; EUROCON '77-Eur Conf on Electrotech, Conference Proceedings on Commun, Venezia, Italy, May 3-7, 1977. Volume 1 Papers 1,2, and 5.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 180333 LIGHT RAIL TRANSIT AWAITS GREEN LIGHT. Some background, typical examples and current programs of the light rapid rail transit systems' concept are discussed.

Taylor, SF (Sanders and Thomas, Incorporated) *Consulting Engineer* Vol. 50 No. 3, Mar. 1978, pp 73-77; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 182595 AUTOMATIC CONTROL OF TRACKBOUND VEHICLES. Increased railway safety can be achieved by using modern electronic control techniques, such as the SELTRAC system for urban transport systems. On-board equipment for this system has been undergoing trials in Berlin. The control center transmits data such as expected position, maximum permissible speed, and recommended speed to the vehicle and the onboard control system compares this with the measured values. Any discrepancies are corrected by forwarding control signals to the speed control or braking systems. The paper deals with the techniques and especially the safety factors involved.

Uebel, H *Electrical Communication* Vol. 52 No. 4, 1977, pp 279-282, 5 Ref.; ACKNOWLEDGMENT: EI, International Aerospace Abstracts; ORDER FROM: ESL

14 182763 ELECTRICALLY POWERED PUBLIC TRANSPORTATION SYSTEMS [Elektrisk Kollektivtrafik i Medelstore Staeder: en Dokumentation]. In December 1977 a seminar was conducted at the University of Linkeoping on the subject of electrically powered public transportation systems. During this seminar a general discussion took place on the various aspects of such systems, and the resulting report deals with the following topics: demand specification for public transportation systems in medium sized cities; energy and environmental aspects on city traffic; the Gothenburg tramcar study; tramcar traffic in Norrkoeeping (a report); development of light railway vehicles; the Linkoeeping case-light railway system; the uppsala case-a trolleybus study; trolleybus system in Linkoeeping-cost estimation. In the last three chapters of the report, a detailed economic comparison is made with other conventional bus systems, in regard to fixed costs, running cost of the various vehicles, depreciation of assets etc. Finally, a detailed technical description is given of some of the vehicles discussed at the seminar. /TRRL/ [Swedish]

Lamberg, K Persson, B Kullbjer, T Olsson, T Sjoestedt, L Hultgren, K Hansson, BI ; Linkoeeping University, Sweden Monograph Dec. 1977, 39 pp, 7 Fig., 4 Tab., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-233497), National Swedish Road & Traffic Research Institute

14 183289 A MONITORING STUDY OF RAIL COMMUTING ON MERSEYSIDE: 1974 TO 1976. The authors took advantage of marked changes in transport costs--in petrol in 1974, in rail fares in 1975/76--to examine their effects on the patterns of commuting. They were particularly interested in substitution to public transport effects of increased petrol prices from the viewpoint of their wider study of energy consumption in surface passenger transport. The paper describes the data collection procedures in the study area and the monitoring data collected over two seasons, autumn to spring, 1974/75 and 1975/76. Its major findings include a significant

temporary increase in rail commuting in 1974 with a real increase of some 70 percent in the pump price of petrol, and travel decision evidence that a substantial majority of relatively new rail commuters had decided to commute by rail for more complex reasons than simple comparison of the time and money costs of travel by alternative travel modes. The monitoring data are also compared with those for rail commuting in the Merseyside conurbation as a whole. Factors which might have affected the monitoring data are examined, also the sensitivity of demand for rail commuting to increased out-of-pocket private transport costs, qualified estimates of cross-elasticities are presented. The study findings are discussed.

Maltby, D Lawler, K Monteath, IG (Salford University, England) *Traffic Engineering and Control* Vol. 19 No. 6, June 1978, pp 278-282, 2 Fig., 7 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-233750); ORDER FROM: ESL

14 183613 RAILWAYS IN THE URBAN CONTEXT [Le chemin de fer et la ville]. Railway implantation in cities generally dates from the 19th century, and the locations chosen at that time do not always correspond to present-day requirements. The process of adapting to urban environment is hampered by numerous obstacles and the SNCF, after the many large-scale streamlining operations carried out in the past, has now drawn up property-policy guidelines for the future. [French]

LeGrand, M *Transports* No. 233, June 1978, pp 274-280, 9 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Editions Techniques et Economiques, 3 rue Soufflot, 75005 Paris, France

14 184602 TRAFFIC PLANNING FOR LIGHT RAIL TRANSIT. Planning for light rail transit in San Diego highlighted the need for special, detailed traffic engineering analysis as part of the transit design effort. While LRT offers significant cost-savings potential in an intermediate transit demand situation, it has attendant traffic impacts that bear close scrutiny. Such was the case in San Diego where 28 at-grade crossings and 1.6 miles of on-street operation were encountered. Conclusions resulting from the San Diego work, as reported on here, include the following: The traffic impact brought about by an LRT-traffic crossing, or by LRT operating on-street, must be examined over the entire area of influence—not just for the isolated intersection or street segment where the project is centered. Where an LRT stop is located near an intersecting roadway, Offset, far-side stops are least detrimental to the crossing traffic level of service, while offset, near-side stops are most detrimental to crossing traffic. With regard to on-street LRT operation, Mixed traffic environment is extremely detrimental to both LRT and auto levels of service; if parallel auto traffic is permitted, some physical or operational barrier should separate the LRT path; passenger boarding/deboarding areas require special attention due to safety considerations—the resulting treatment of vehicular traffic may be predicated on the placement of these waiting areas; prohibition of left turns by parallel vehicular traffic (in same flow direction as well as opposing flow) is a desirable safety measure, and mitigating measures must be viewed in terms of their appearance

relative to urban design impacts. Automatic gate protection has been shown to be superior to other types of warning devices. /Author/

Larwin, TF, Director of Planning (San Diego Metropolitan Transit Development Board) Rosenberg, H (City of San Diego, California); Institute of Transportation Engineers 1978, pp 236-242, 2 Fig., 4 Tab., 7 Ref.; Paper from Compendium of Technical Papers, Institute of Transportation Engineers 48th Annual Meeting, August 6-10, 1978, Atlanta, Georgia.; ACKNOWLEDGMENT: Institute of Transportation Engineers; ORDER FROM: Institute of Transportation Engineers, 1815 North Fort Myer Drive, Arlington, Virginia, 22209

14 184943 LIGHT RAIL TRANSIT IN MEXICO CITY. This paper presents an evaluation of the light rail transit system in Mexico City. It sets forth the effectiveness of the light rail transit mode as one of the several transport options offered to the ten million residents of Mexico City and details the operations of four of the principal routes emanating from the center of the city. The paper points out the advantages of Mexico City's light rail transit system in that it penetrates into small communities, passes easily through narrow and winding streets in the old sections of the city, and offers transport at surface level through those parts of the city more recently upgraded without polluting the areas either chemically or esthetically. The light rail transit mode operates with public fares at 30-60 percent lower than comparable alternatives in public transit.

Rogers, LH (Congressor PanAm de Ferrocarriles); Institute of Transportation Engineers Conf Paper 1977, pp 552-557, Refs.; Compend Teq Paper 47th Annual Meeting of the Institute of Transportation Engineers, 4th World Transp Eng Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Institute of Transportation Engineers, 1815 North Fort Myer Drive, Arlington, Virginia, 22209

14 185220 THIS IS LIGHT RAIL TRANSIT. This illustrated brochure was prepared for distribution at the National Conference on Light Rail Transit in Boston. Its short illustrated sections discuss: What Is Light Rail Transit, Right-of-Way, Vehicles, Stations, Operations, Cost, Development, Advantages.

Transportation Research Board Aug. 1977, 16 p., Photos.; This brochure has been compiled by the TRB Committee on Light Rail Transit for distribution at the National Conference on Light Rail Transit, Boston, MA, August 28-31, 1977.; ORDER FROM: TRB Publications Off

14 188169 PLAN REFINEMENT STUDY FOR THE COMMUTER RAIL IMPROVEMENT PROGRAM. This study provides a thorough analysis of commuter rail and other feasible alternatives for transit service to Boston's suburbs, indicating the best alternative for each commuter rail corridor and whether and in what form the Commuter Rail Improvement Program (CRIP) should be continued. Impacts of each alternative on operating costs, capital costs, ridership, revenues, traffic flow and regional economic considerations have been estimated.

Central Transportation Planning Staff Final Rpt. MA-09-0001, Jan. 1979, 127 p., Figs., Tabs;

ORDER FROM: Central Transportation Planning Staff, 27 School Street, Boston, Massachusetts, 02108

14 188344 EDMONTON'S NORTH EAST LIGHT RAIL RAPID TRANSIT LINE. The 14 papers, along with introduction and summary, constitute the proceedings of a conference on light rail transit as installed in Alberta's capital city. Five papers deal with tunnels and other civil engineering works; other papers treat signaling, station architecture, electrification, training, security, marketing and an overview of the project.

Alberta University, Canada Proceeding June 1978, n.p.; ACKNOWLEDGMENT: Alberta University, Canada; ORDER FROM: Alberta University, Canada, 89th Avenue and 114th Street, Edmonton, Alberta, Canada

14 194633 SITE-SPECIFIC ANALYSIS OF REGENERATION ON THE PATCO AND PAT CASTLE-SHANNON TROLLEY LINES. The use of regeneration as an energy conservation strategy was studied on the Delaware River Port Authority's Lindenwold Line (PATCO) and the Port Authority of Allegheny County (PAT) Castle-Shannon Trolley Line. These transit systems are quite different from each other in both operating and physical characteristics; the former characteristic of a commuter railroad and the latter a light rail vehicle system. The energy management simulation model, developed at Carnegie-Mellon University over the past two years, was used to realistically duplicate the operation of the systems under conditions of no regeneration and regeneration with both natural and assured receptivity. Although these two systems differ physically and operationally, energy savings on a percent basis under conditions of assured receptivity without on-board storage are rather similar—PATCO (28-32%), PAT (30-35%). On-board storage presents less savings—PATCO (25%), PAT (23%)—principally because of the additional weight required of the storage devices and associated control. Under conditions of natural receptivity, savings are smaller—PATCO (5-9%), PAT (10-12%). There are so many physical and operational parameters in a transit system which can affect the energy savings upon application of regeneration, that it is both necessary and desirable to do site-specific studies of this type when planning regeneration capability for either a new or existing transit system.

Uher, RA (Carnegie-Mellon University); Institute of Electrical and Electronics Engineers Tech Paper IEEE 79CH1454-8 IA, 1979, pp 37-46, 16 Fig., 5 Tab., 11 Ref.; Presented at the 1979 Joint ASME/IEEE/AAR Railroad Conference held April 12-14, 1979, Colorado Springs, Colorado.; ACKNOWLEDGMENT: IEEE; ORDER FROM: IEEE

14 194645 "CLOSE HEADWAY" OPERATION FOR BAY AREA RAPID TRANSIT (BART). The original decision to signal BART for 90-sec headways was based on limited data collected mainly under "dry" and simulated adverse track conditions. Subsequent natural condition testing demonstrated that the corresponding 2.7 mph/sec design brake rate assumption could not be relied on in "wet" or rainy weather; and, consequently, BART has had to operate with station-to-station separation of

trains and severe speed reduction penalties. The above restrictions have, at times, caused a well-publicized throughput problem for the transit system. An initial test program was conducted by BART in the winter of 1975, making possible identification of important variables influencing train braking performance. However, firm conclusions regarding safe stopping distances could not be reached based on the 1975 data. In order to solve BART's stopping distance problem and provide "close headway" operation to the public as originally promised, a major full-scale test program was conducted during the winter months of 1977-1978 to accurately determine train braking performance under adhesion-limited conditions. This program made use of some basic concepts from the statistical theory of experimental design. The main results and conclusions of this study, recommending safe and efficient "close headway" operation for BART, is the subject of this paper.

Leon, GB (Science Applications, Incorporated) Brumberger, NA (Bay Area Rapid Transit) ; American Society of Mechanical Engineers Conf Paper 79-RT-6, Jan. 1979, 12 p., 14 Fig., 9 Tab., 9 Ref.; Contributed by the Rail Transportation Division of ASME/IEEE Railroad Conference, Colorado Springs, Colorado, April 24-25, 1979; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

14 195720 ADVANCEMENTS IN AUTOMATIC TRAIN CONTROL FOR RAPID TRANSIT SYSTEMS. A versatile and proven solid-state train control system has been operating on the Paris Metro since 1970. An updated version of this system is now being offered in the U.S. Unique features of this system are: track circuits for train detection that have a block detection accuracy better than one foot with continuously-welded rail, and are virtually immune to propulsion return-current harmonics; a highly flexible two-way data link between the trains and the wayside using a remote inductive antenna; and extensive use of lightweight, fail-safe solid-state relays in both wayside and carborne equipment.

Petrie, DM (Boeing Company) Milnor, RC ; Institute of Electrical and Electronics Engineers Proceeding IEEE n 78CH1346-6 IA, 1978, pp 397-400; Conference Rec IAS Annual Meeting 13th, Toronto, Ontario, October 1-5, 1978; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 196379 RAIL-TRANSIT PEOPLE-MOVER HEADWAY COMPARISON. For many years, the General Railway Signal Company has supplied control systems for conventional rail transit. Headways for these systems range from minutes or hours down to as low as 75 s. In the last few years, the company has supplied control systems for people-mover applications in which minimum headways of 10-20 s have been achieved. There are many factors working together to permit achievement of this large reduction in headway. These factors are identified and evaluated for their impact on capacity. The fundamentals underlying the disparity in headway are discussed from the viewpoint of potential for increased capacity of rail transit.

Auer, JH (General Railway Signal Company) *IEEE Transactions on Vehicular Technology* Vol. VT-2 No. 1, Feb. 1979, pp 28-35, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 196714 A GREEN LIGHT FOR ADVANCED TRAIN CONTROLS. Second generation train control functions include automatic train supervision (ATS) with computers monitoring train location and performance to modify stopping times and running time between stations. Systems developed in the U.S., Britain, France and Germany are described and compared. Transposed cables, moving blocks, centralized computer control and microprocessors are used in various combinations to achieve various levels of sophistication.

Kalra, PS (Bechtel Corporation) *IEEE Spectrum* Vol. 16 No. 2, Feb. 1979, pp 44-49, 4 Fig.; ORDER FROM: ESL

14 196948 CENTRALISED SIGNALLING CONTROL AND SUPERVISION OF THE SERVICES ON THE LONDON UNDERGROUND. It is the policy of London Transport to supervise the operation of its railroad services from central control rooms, each covering at least one line. The lines are, where possible, operated independently of each other so that a disruption in any part of the system is contained, leaving the remainder unaffected. Each room is connected to local signaling interlockings which normally operate individually in an automatic mode. If there is a disruption, delays are minimized by regulating the service from the central control room. Traffic regulators in these rooms are able to coordinate the routing of trains through the various local interlockings; each traffic regulator is provided with a control console from which changes may be carried out.

Heaton, MW ; Institution of Electrical Engineers IEE Conf Publ n 161, 1978, pp 72-75; Int Conference on Centralized Control Systems, 2nd, London, England, March 20-23, 1978; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

14 197011 TRAM TO SUPERTRAM. "Light rapid transport" is essentially an upgraded tramway: in the popular idiom it is a "supertram". Its role is between the ordinary street-running transport mode (the bus) and the fully-equipped rapid transit system (the underground).

Joyce, J Prigmore, BJ *Electronics and Power* Vol. 25 No. 3, Mar. 1979, pp 207-211, 12 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

14 197888 RELIABILITY IMPROVEMENT OF BART TRAIN CONTROL. Results of a two-year effort of a task group to improve the reliability of the Bay Area Rapid Transit district's vehicle-borne Automatic Train Control equipment are reported. The effort included modifications to the train control equipment designed both by the manufacturer and by the task group. It also included the development and implementation of improved maintenance test procedures and equipment. A significant constraint on this effort was the need to maintain, and where necessary, improve the fail-safe nature of the train control system. Particular attention was paid to reducing the fraction of maintenance diagnoses which resulted in a No Trouble Found report; at the start of the task-team effort, these represented half of the revenue service failures of this system. A substantial improvement in the maintenance capability and decrease in service failures has resulted from this effort.

Turner, DB ; California University, Berkeley, Department of Energy CONF-790303-1, June 1978, 22 p.; 29. IEEE Vehicular Technology Conference, Chicago, IL, USA, 28 Mar 1979; Contract W-7405-ENG-48; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; LBL-8288

14 198186 EVALUATION OF SIGNAL/CONTROL SYSTEM EQUIPMENT AND TECHNOLOGY. TASK 1: ASSESSMENT OF SIGNAL/CONTROL TECHNOLOGY AND LITERATURE REVIEW. The report presents the results of an investigation to obtain an assessment of the present technologies in use throughout the world for railroad signals and control systems applicable to high-speed passenger trains. Questionnaires were developed and sent to foreign and domestic railroads, rapid transit systems, and manufacturers of signal and control equipment. Railroads, transit systems and manufacturers were visited and interviewed. Many hundreds of articles and technical papers were researched. Over 250 were cataloged, translated and cross-indexed to form a complete technical library. This inventory data has been arranged to permit a logical review of all known technology in relation to each type of railroad signal or control system or subsystem(s).

Taylor, SF Marshall, JF Schultz, CM Whalen, RB ; STV, Incorporated, Dyer (Thomas K), Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-78/39.1, Dec. 1978, 191 p.; Prepared in cooperation with Kentron, Inc., Dallas, TX. See also RRIS 06A 160400; Contract DOT-FR-773-4236; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296494/8ST, DOTL NTIS

14 199131 EVALUATION OF SIGNAL/CONTROL SYSTEM EQUIPMENT AND TECHNOLOGY. TASK 2: STATUS OF PRESENT SIGNAL/CONTROL EQUIPMENT [Final rept. Oct 77-Jan 79]. The report presents the status of present signal/control equipment in service on passenger rail routes in the United States and in foreign countries. It also provides an evaluation comparison of the features of signal and control systems currently used by selected domestic and foreign major operating railroad/transit systems. The report was developed from a literature review, visits to domestic and foreign railroads, discussions with railroad signal engineers, transportation personnel and from data gathered from domestic and foreign railroad/transit systems.

Taylor, SF Marshall, JF Schultz, CM Whalen, RB ; STV, Inc., Pottstown, PA. *Federal Railroad, Administration, Washington, DC. Office of Research, and Development. FRA/ORD-78/39.2, Jan. 1979, 122p; Prepared in cooperation with Dyer (Thomas K.), Inc., Lexington, MA., and Kentron International, Inc., Dallas, TX. See also Task 1, PB-296 494. n; Contract DOT-FR-773-4236; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299891/2ST

14 223944 STANDARD LIGHT RAIL VEHICLE SPECIFICATION PROJECT. THE REPORT GIVES A BRIEF INTRODUCTION OF ELECTRIC RAILWAY SYSTEMS AND BACKGROUND ON THE NEED FOR DEVELOPING NEW RAIL CAR DESIGNS WHICH LED TO THE STANDARD LIGHT

RAIL VEHICLE SPECIFICATION PROJECT. THE OBJECTIVE OF THE PROJECT WAS TO DESIGN A STANDARD LIGHT RAIL VEHICLE THAT COULD BE USED BY MANY DIFFERENT CITIES, BASED ON THE BELIEF THAT A STANDARD DESIGN WOULD INCREASE THE MARKET FOR SUCH A VEHICLE AND LOWER ITS PRODUCTION COST. THE REPORT REVIEWS PROJECT ORGANIZATION, SELECTION OF A VEHICLE SIZE, POTENTIAL PURCHASERS, AND PREPARATION OF THE TECHNICAL SPECIFICATIONS AND CONTRACT DOCUMENTS. THE REPORT CONCLUDES WITH A STATEMENT ON THE IMPLEMENTATION OF THE SPECIFICATION, AND WAYS IN WHICH THE PROJECT OBJECTIVE HAS BEEN ACCOMPLISHED. /UMTA/

Massachusetts Bay Transp Authority, Urban Mass Transp Admin, Dot /US/ Final Rept Feb. 1973, 42 pp; ACKNOWLEDGMENT: UMTA

14 241785 INVENTORY, EVALUATION AND SYSTEM PLANNING OF THE SAN FRANCISCO MUNICIPAL RAILWAY POWERPLANT. THIS REPORT DEALS WITH A PROPOSAL TO MODERNIZE SAN FRANCISCO MUNICIPAL RAILWAY'S (MUNI) EXISTING POWERPLANT. MUNI OPERATES AND MAINTAINS SEVEN SUBSTATIONS (BRYANT, DOWNTOWN, RICHMOND, SAN JOSE, TURK, WEST PORTAL, AND OUTER MISSION) AND THE DISTRIBUTION SYSTEMS FOR TROLLEY COACHES AND STREETCARS. AN ANALYSIS OF OPERATIONAL PROCEDURES AND MAINTENANCE FUNCTIONS OF THE POWERPLANT SHOWED THE SYSTEM'S FLEXIBILITY TO BE LIMITED BY THE WEST PORTAL AND OUTER MISSION SUBSTATIONS, ELECTRICALLY ISOLATED FROM THE DISTRIBUTION SYSTEM. THE FIVE ROTATING MACHINERY SUBSTATIONS CONTAIN OUTDATED EQUIPMENT, EXPENSIVE TO OPERATE AND TO MAINTAIN, AND FOUR OF THE SUBSTATIONS CONTAIN ABANDONED EQUIPMENT. INTERIOR LIGHTING BEING INADEQUATE, OPEN-FACED SWITCHGEAR CONSTITUTES HAZARDOUS OPERATING CONDITIONS FOR THE POWERPLANT OPERATORS. THE FIRST PHASE COINCIDES WITH BARTD OPERATION IN SAN FRANCISCO AND COMPLETION OF THE MUNI SUBWAY UNDER MARKET STREET AND IN THE TWIN PEAKS TUNNEL; IT ENTAILS REDUCTION OF TROLLEY COACH LINES AND EVENTUAL ELIMINATION OF STREETCAR LINES, DECREASING POWER LOAD REQUIREMENTS OF VARIOUS EXISTING SUBSTATIONS, PARTICULARLY BRYANT, RICHMOND, AND TURK SUBSTATIONS. SOLID STATE RECTIFIER TYPE ELECTRIFICATION EQUIPMENT IS RECOMMENDED FOR THE MARKET STREET-TWIN PEAKS RAPID TRANSIT LINE; THIS ELECTRIFIED SYSTEM UTILIZES A THIRD RAIL FOR SUPPLYING POWER TO THE RAPID TRANSIT TRAIN. THE PRESENT TWIN PEAKS SUBSTATION WOULD BE RETAINED AND THE OUTER

MISSION SUBSTATION (750 KW) WOULD BE RELOCATED TO SUPPLY POWER TO THE NEW RAPID TRANSIT RAILCAR FACILITY. THE DOWNTOWN, TURK, BRYANT, RICHMOND, AND SAN JOSE SUBSTATIONS MAY BE SCRAPPED, WITH THE 600 V D.C. POWER SOURCE OF THE TROLLEY COACH LINES, NOW SERVICED BY THE PRESENT MUNI SUBSTATIONS, BEING SUPPLIED BY THE RAPID TRANSIT SUBSTATIONS. THE PROJECTED PHASE OF THE PROGRAM PROPOSES TWO ADDITIONAL RAPID TRANSIT LINES. THE SUNSET CORRIDOR RAPID TRANSIT LINE REQUIRES TWO SUBSTATIONS AND THEIR ASSOCIATED EQUIPMENT; THE RICHMOND CORRIDOR RAIL RAPID TRANSIT LINE REQUIRES FIVE NEW SUBSTATIONS AND THEIR ASSOCIATED EQUIPMENT. THE TROLLEY COACH LINES BEING SERVICED BY THE PACIFIC GAS AND ELECTRIC COMPANY SUBSTATIONS PRIOR TO THE LATTER LINE BEING INSTALLED, WOULD BE SUPPLIED BY THE RAPID TRANSIT SUBSTATIONS; THE SUBSTATION PACKAGES, THE SILICON RECTIFIER TYPE WHICH CONTAINS THE NECESSARY A.C. AND D.C. SWITCHGEAR, TRANSFORMERS, ETC., CAN BE PLACED IN TUNNEL VAULTS OR IN PROPOSED PASSENGER STATIONS. THE SUBSTATIONS WOULD BE SUPPLIED FROM TWO INDEPENDENT 15KV A.C. 3-PHASE FEEDERS TO PREVENT OUTAGES; SUFFICIENT D.C. CIRCUITS ARE PROVIDED TO SUPPLY THE THIRD RAIL WITH MANUAL DISCONNECTS AT THE RAIL FOR MAINTENANCE OR REPAIRS. /UMTA/

Fmc Corporation Aug. 1966; ACKNOWLEDGMENT: UMTA

14 300550 BANFIELD TRANSITWAY PROJECT. The basis for its recommendation for a light-rail transit system serving downtown Portland and its eastern suburbs is explained by the Tri-Met staff in this report. Evaluation of 5 alternatives from continuation of conventional bus service through transit lanes on expressways and separate busways to light rail are examined in terms of operating cost, capital cost, ridership, operating considerations, regional growth, community impact, downtown impact, community support and energy consumption.

Tri-County Metropolitan Transp District of Oregon Aug. 1978, 79 p., 24 Fig., 12 Tab., 4 App.; ORDER FROM: Tri-County Metropolitan Transp District of Oregon, Planning and Development Department, 4314 SE 17th Avenue, Portland, Oregon, 97202

14 300561 TOWARDS A FULLY-AUTOMATED LONDON UNDERGROUND. In the decade since the Victoria line opened, microprocessors have greatly advanced prospects for automating urban railways at acceptable cost. Signaling and power supplies can be centrally supervised using Visual Display Units by staff relieved of routine functions while Automatic Revenue Collection will cut losses from fraud. The major boost to service quality will come from unmanned trains that can maintain frequent service at "unsocial" hours in an era of chronic

staff shortages. Each new group of LT cars brings full automation a step closer by providing the necessary hardware and software components.

Maxwell, WW (London Transport Executive) *Railway Gazette International* Vol. 135 No. 6, June 1979, pp 522-526, 8 Phot., 2 Ref.; ORDER FROM: ESL

14 300586 SIGNALLING PROVIDES FOR AUTOMATION. Description of the signaling equipment and automated systems used on urban and suburban railway lines in the Amsterdam area.

International Railway Journal Apr. 1979, p 44, 9 Fig., 2 Phot. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013

14 301195 POSSIBILITIES OF AUTOMATIC CONTROL SYSTEMS INCORPORATED IN ELECTRIC TRACTION EQUIPMENT, THEIR COMMAND SEQUENCE AND EXAMPLES OF SIGNAL TRANSMISSION USING LIGHT GUIDES [Möglichkeiten der Automatik in Elektrischen Traktionsausruestungen, ihr Befehlsablauf und Anwendungsbeispiele der Befehlsuebertragung Mittels Lichtleiter]. Following an outline of the developments in the control of electric motor vehicles, especially for local transport, an automatic traction control equipment is described. The important signals to be processed, such as current setting, load compensation, slip-slide protection and power control of series and induction traction motors are discussed. The principal features of a signal transmission system using light guides are mentioned and described by means of examples. [German]

Eckermann, G *Glaser's Annalen ZEV* Vol. 103 No. 2-3, Feb. 1979, pp 114-124; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 301298 EVOLUTION OF LIGHT-RAIL TRANSIT. Social, economic, and governmental needs frequently dictate changes in the use of urban transport technology. It is the evolution of public belief and policy that most influences the development of any technology. Overdependence on petroleum fuels for transport and industrial growth has cast doubt on long-term options for continued urban life-styles and mobility. There is a need now for planning and deployment of new light-rail transit (LRT) systems. LRT, like all forms of transport, must be judged on its benefits and social costs to both users and nonusers. A look at Ghent, Hannover, Mannheim, Zurich, and Utrecht can show the transit planner how five cities have developed and used their LRT services in a manner that provides greater accessibility for all citizens as well as less direct pollution and easier adaptability to the existing urban setting. The technology of LRT is simple when innovative planning and engineering are used. /Author/

Rogers, LH (Institute of Public Administration) *Transportation Research Board Special Report* Conf Paper No. 182, 1978, pp 4-8, 1 Ref.; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301299 CURRENT TRENDS: PROBLEMS AND PROSPECTS OF LIGHT-RAIL TRANSIT. The difficult task of rescuing our urban transit systems from several decades of neglect has only started. Among the obstacles to transit improvements is our deeply rooted double standard for different types of expenditures: Purchase of wasteful items by consumers is considered to move the economy but the use of public funds, even for the construction of very useful projects, is often criticized as wasteful. Another serious obstacle to the development of rail transit in our country has been a lack of expertise in the planning, technology, and operation of these modes. We have virtually invented a new mode: unreliable rail transit. A concerted effort must be made to apply the technical skills that this technology requires to fully realize its great potential. A major step toward that goal would be made if the Urban Mass Transportation Administration would redirect some of its efforts from the development of exotic modes (some of which have little potential) toward the modernization of standard rail and bus technologies. In spite of these obstacles, light-rail transit (LRT) has recorded significant advances. It is now broadly recognized as a serious contender for major transit improvements in many medium-sized and large cities. Its modernization in Europe is continuing, new LRT systems are under construction in Canada, and several U.S. cities are actively planning or designing new LRT systems. There is also a major potential for extensive deployment of LRT in the large cities of developing countries that has not been fully recognized yet. President Carter has promised to pursue three important goals: to revitalize cities, to decrease unemployment, and to increase energy efficiency; if he takes a correct path toward these goals, we should see construction of LRT in a number of our cities in the near future. /Author/

Vuchic, VR (Pennsylvania University, Philadelphia) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 8-12, 1 Ref.* This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301300 ISSUES IN THE IMPLEMENTATION OF LIGHT-RAIL TRANSIT. A conference on light-rail transit (LRT) invariably seems to draw out a highly explicit discussion about car design, the existence of rights-of-way for construction, and the great disparities between European advances and those in the United States. This paper suggests that, despite the high degree of competence that the technical community can claim in advocating LRT implementation, it is all little more than an academic exercise if the local, state, and national political realities are not recognized as integral aspects of implementation. The discussion in this paper is based on a survey conducted on a national scale of the key political figures in those states or areas considering LRT, as well as many key members of the agency and consulting staffs. The paper calls attention to the essential weaknesses inherent in current efforts to revitalize LRT as a primary element in urban transportation. /Author/

Leonard, GB (Los Angeles County Board of Supervisors) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 12-15* This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technol-

ogy.; ORDER FROM: TRB Publications Off

14 301301 SAN FRANCISCO'S MUNI METRO, A LIGHT-RAIL TRANSIT SYSTEM. This paper describes improvements that are being made in San Francisco's light-rail (streetcar) transit system, the Muni Metro. The new dual-level Market Street subway accommodates Muni on the upper level and the Bay Area Rapid Transit System on the lower level. The new articulated light-rail vehicles, designed to serve the needs of both San Francisco and Boston, are described. In order to provide facilities for storage and maintenance of these vehicles, a new rail center is being constructed. The design of this facility was a particular challenge because of constraints imposed by the small size of the urban site used. Virtually all surface tracks in the city are being replaced. Muni had hoped to develop special transit rights-of-way in conjunction with the rerailling projects but encountered a political snag in the process. The power supply system that provides Muni's electrical power is unique, and the facilities it uses are also being upgraded. Finally, several route extensions contemplated by Muni are described. The new Muni Metro system is scheduled to be in full operation in late 1979. /Author/

Bei, R (San Francisco Municipal Railway) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 18-23, 3 Fig.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301302 EDMONTON'S NORTHEAST LIGHT-RAIL RAPID TRANSIT LINE. Edmonton's light-rail transit (LRT) line has a total length of 7.2 km, 1.6 km of which is in subway. The line goes from the central business district (CBD) to the northeast sector of the city and uses the Canadian National Railways right-of-way. The project was approved at \$65 million and is currently below estimates as well as ahead of schedule. The LRT line is the result of a balanced transportation plan that was finally adopted in 1974 to serve a city of nearly 500,000. The subway portion has two underground stations with full mezzanine floors. The mezzanine floors are part of an overall pedestrian system and connect with the basements of adjacent buildings. The subway was built to accommodate the largest standard subway car. The equipment specifications for the 14 articulated cars were based on performance and proven reliability. The construction methods used caused a minimum of interference in the CBD. Since relatively small portions were let successively, local contractors were able to use proven techniques to handle the work on a fixed-price basis. Despite the severe inflation of 1975 and 1976, costs were kept within reasonable limits. The proposed service will provide 5-min headways in the peak hour, giving a capacity of 5000 passengers/h. At midday the headway will be 10 min. The LRT line will be fully integrated with the bus transit system, and timed transfers will be provided between bus and rail. The LRT line in Edmonton makes use of available opportunities and provides the least expensive solution to the transportation problems of the northeast sector and its rapid residential development. /Authors/

MacDonald, DL (Rapid Transit Project, Alberta, Canada) Bakker, JJ (Alberta University, Canada)

Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 23-27, 2 Fig.; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301303 CALGARY'S LIGHT-RAIL TRANSIT SYSTEM. This paper describes some of the background to the development of the South Corridor light-rail transit (LRT) line in Calgary. Characteristics of the city, the corridor, and the existing transit system are also presented. The results of a recent study undertaken to determine the type and timing of transit improvements are briefly summarized. Alternatives studied in detail included LRT, busways, and exclusive bus lanes; LRT was selected and implementation has begun. Finally, the paper describes the vehicles and route chosen.

Kuyt, WC Hemstock, JD (Calgary, City of, Canada) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 27-32, 6 Fig., 2 Tab., 3 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301304 BUFFALO'S LIGHT-RAIL RAPID TRANSIT SYSTEM. The 1976 agreement in principle by the Urban Mass Transportation Administration (UMTA) to participate in the financing of Buffalo's \$336 million light-rail rapid transit (LRRT) project was the culmination of almost 10 years of planning by the Niagara Frontier Transportation Authority and the western New York community for an integrated bus and rail rapid transit system. At least 5 more years of design development and construction lie ahead. This agreement also marked the end of a lengthy, and often frustrating, alternatives analysis process that helped to guide UMTA's development of federal policy on major urban mass transit investments. Buffalo will be the first U.S. city to have a completely new rail transit project that features the advantages of light-rail technology. This paper describes the LRRT project and reports on the results of the alternatives analysis process. Comparative cost-effectiveness statistics for various transit alternatives are included in the paper. The current phase of project development (general architecture and engineering) is described, and a schedule is given for the completion of the system. /Author/

Knight, KG (Niagara Frontier Transportation Authority) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 32-38, 7 Fig., 1 Tab.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301305 LIGHT-RAIL TRANSIT IN PITTSBURGH. The \$228 million Early Action Program conceived by the Port Authority of Allegheny County in 1969 and funded by the local, state, and federal governments in 1970 was intended to end the seemingly endless series of biennial transit studies and begin the construction of a countywide rapid transit system on an incremental basis. It was to use various technologies, including existing trolleys, exclusive busways in the east and south, and the Transit Expressway (Skybus)—rubber-tired computer-

controlled vehicles tied to an exclusive guideway--in the South Hills sector. Perhaps no rapid transit effort, especially the Transit Expressway element, has undergone as close public and technical scrutiny as has the Early Action Program. The inability to implement the program expeditiously resulted in the Urban Mass Transportation Administration's suspension of further action in the South Hills sector in October 1974. In 1975, key representatives of local and state governments as well as the Port Authority began working together to break the deadlocked argument about a fixed-guideway transit system for the South Hills corridor. An independent consultant was selected to perform the final alternatives analysis. When the South Hills alternatives analysis was completed and the recommendation of light-rail transit (LRT) technology was accepted in March 1976, a community consensus had been achieved. As a result, the Port Authority amended the Early Action Program to substitute LRT for the rubber-tired vehicles on the Transit Expressway and is proceeding with engineering and environmental impact studies with the objective of having the first stage of the LRT system operational in the South Hills sector by the Early 1980s. /Author/

Hardy, TC (Port Authority of Allegheny County, Pittsburgh) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 38-42, 3 Fig., 2 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301306 LIGHT-RAIL TRANSIT: LESS CAN MEAN MORE. Perhaps the single most appealing and most useful characteristic of light-rail transit (LRT) is its inherent flexibility. Yet engineers and planners have sometimes overlooked the opportunities that accrue from this flexibility and have tried to use LRT to create a system as much like conventional rapid transit as possible at less than rapid transit's cost. This paper explores LRT's flexibility to operate in a conventional rapid transit environment, as well as its ability to not operate in a rapid transit environment. LRT is also at home in contexts more typical of the bus mode. This provides for a broad range of designs between these two extremes and allows optimal design choices to be accommodated. Design options considered in this paper include right-of-way treatment, approaches to fare collection, grade and curvature alignments, high-versus low-level platforms, signal and vehicle-protection requirements, and trade-offs between speed and capacity. /Author/

Straus, P (San Francisco Municipal Railway) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 44-49, 9 Fig., 2 Tab., 10 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301313 FORT WORTH'S PRIVATELY OWNED SUBWAY SYSTEM. For the past 14 years a small subway system has been carrying passengers into and out of the central business district (CBD) of Fort Worth, Texas. It has two unique features: It is privately owned, and passengers ride it for free. In the early 1960s, two merchants in Fort Worth hit on the idea of providing subway service to their downtown

department store from a large parking lot on the banks of the nearby Trinity River. They bought second-hand electric trolley cars from Capitol Transit Company of Washington, D.C., modified them extensively, dug a tunnel from the edge of the parking lot to the lower level of their store, and began operating the subway in February 1963. Tandy Corporation bought the department store in 1967 and continued to operate the subway, which carried nearly 15,000 passengers/d. Tandy is now rebuilding the subway cars to give them a squared-off configuration and many refinements. Introduction of these refurbished cars will coincide with the opening of Tandy Center--an eight-block complex of office buildings and shopping malls in downtown Fort Worth that the subway system will serve. There has been some preliminary exploration of the feasibility of extending the subway system several blocks south through the CBD. This short-haul do-it-yourself subway system has proved that shoppers and downtown workers can be induced to leave their automobiles in a fringe parking lot and ride into the heart of the city by light-rail transit. /Author/

Scott, PD (Tandy Corporation) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 88-91*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301314 EVALUATIONS OF OPERATING LIGHT-RAIL TRANSIT AND STREETCAR SYSTEMS IN THE UNITED STATES. The goal of the research presented in this paper is to evaluate how closely each of the light-rail transit (LRT) and streetcar systems in the United States approaches the LRT concept. Both LRT and streetcar systems are evaluated because the usual pattern of development, here as in Europe, has been for streetcar systems to be upgraded gradually to LRT standards. Of the surviving networks, several run largely on reserved rights-of-way and closely approach the LRT concept; others are clearly street-car operations that possess few true LRT characteristics. Highlighting the strengths and weaknesses of existing systems should be helpful to those planning new LRT installations. The paper also stresses two of the most important qualities of LRT systems: (a) flexibility in right-of-way location and its concomitant, the ability to improve segments of systems on an incremental basis, and (b) ability of systems constructed in a trunk-and-branches pattern to provide both line-haul and collection and distribution functions, thus giving most patrons a single-vehicle ride. /Author/

Schumann, JW (Klauder (Louis T) and Associates) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 94-103, 10 Tab., 23 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301315 OPERATIONAL IDIOSYNCRASIES OF A SUBWAY-SURFACE SYSTEM. The objectives of this paper are to acquaint the reader with the behind-the-scenes activities that constitute the day-to-day operations of Philadelphia's subway-surface system and to pinpoint techniques and methods that new systems could

adopt to avoid some of the problems SEPTA faces. The paper discusses daily operations, service interruptions, training, accident prevention, and support activities. The problems discussed are accompanied by a discussion of the solutions adopted or those that would be adopted if there were adequate funds and local cooperation. Specific recommendations for new systems are summarized. /Author/

Boscica, JF (Southeastern Pennsylvania Transportation Authority) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 103-107, 2 Fig.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301317 CONTROL OF LIGHT-RAIL TRANSIT OPERATIONS IN EDMONTON. The first line of Edmonton's light-rail transit (LRT) system is currently being completed. The underground portion of the line in the downtown area connects to a surface portion that shares its corridor with a major railway line. Interactions between the railway, LRT, and other transportation modes have created problems in the areas of safety, roadway capacity, and regularity of service. This paper describes the approach taken in Edmonton to overcome these problems. The new transportation management system, which is in its initial stages of implementation, is a major tool in minimizing the negative impacts of LRT. The system focuses on the establishment of LRT controls that, in addition to the categorical requirements of safety, must guarantee optimum use of the LRT tunnel, which in turn depends greatly on the regularity of service on surface portions of the LRT line, and integration with other transportation modes in terms of safety, coordination of scheduling between LRT and buses, and minimization of disruption to all modes at the nine grade crossings. In general, the flexibility of LRT operations and the implementation of an integrated transportation management system has enabled cost-effective solutions to be developed. /Author/

O'Brien, W (Edmonton Transportation Planning Branch) Schnablegger, J (Edmonton Traffic Operations Branch) Tepley, S (Alberta University, Canada) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 115-119, 8 Fig., 3 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301318 LIGHT-RAIL TRANSIT SIGNALING. This paper presents considerations regarding conventional signal systems that should be helpful to people planning a light-rail system. Attention is first directed to establishing the need for a signal system, including a discussion of its advantages and disadvantages on the basis of the technical, operational, economic, labor, and regulatory elements involved. A definition of conventional signal systems is provided, and the various types of systems are explained on the basis of their capabilities. Safety and failure modes are addressed as the key issues in any signal-system design. To illustrate the importance of all these factors, a comprehensive description of the new San Francisco Municipal Railway's subway signal system is presented, and conclusions are then drawn as to the general design concepts required for other future light-rail systems. /Author/

Burgin, EA (Klauder (Louis T) and Associates) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 119-123*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301319 USE OF RAILROAD RIGHTS-OF-WAY FOR LIGHT-RAIL TRANSIT SYSTEMS. This paper describes the conditions that are required for railroad rights-of-way to be usable for light-rail transit. Some of the locational characteristics of desirable rights-of-way are described. A method for analyzing railroad use and physical characteristics is presented. Several solutions to problems in using railroad rights-of-way are outlined. The design parameters for joint use of rights-of-way are explored. /Author/

Schwartz, A Wilkins, JD (Chase, Rosen, and Wallace, Incorporated) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 124-130, 3 Fig., 1 Tab., 3 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301324 INVESTIGATING THE POTENTIAL FOR STREET OPERATION OF LIGHT-RAIL TRANSIT. This paper examines the potential for light-rail transit (LRT) operations in the street with mixed traffic. It is hypothesized that street operation of LRT is possible, and in some areas desirable, for both cost reduction and service improvement. It is believed that the potential cost savings in construction should lead planners to consider using LRT in streets. However, little work has been done in analyzing the problems associated with street operation. This paper attempts to establish a systematic framework for investigating the potential for a shared street environment and to stimulate a discussion among LRT Planners about the role of street operations in proposed systems. The methodology used in this study has two phases: the identification and investigation of the associated problems and the analysis of various design elements and strategies. Several possibilities for street operation are discussed and the generic problems of street running and traffic conflicts are analyzed. The approach is based on existing data from Toronto. /Author/

Taber, J Lutin, J (Princeton University) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 161-166, 9 Fig., 4 Ref.* This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 301325 INSTITUTIONAL BARRIERS TO IMPLEMENTING LIGHT-RAIL TRANSIT. The workshop briefly reviewed the different types of institutional barriers to the implementation of light-rail transit (LRT), and discussed issues raised by participants. The institutional barriers include those relating to the blurred definition of LRT, the issue of who makes the decision about LRT, and the complexities of the governmental process. Institutional barriers at the federal level are perceived to be of a bureaucratic nature. The overlap of programs of different agencies have also caused problems. Among the issues raised by participants was the question of how an urban area achieves consensus to ensure the implemen-

tation of capital improvements on a system-wide basis without a public referendum, the issue of support for non-highway projects by state departments of transportation, the subversion of the metropolitan planning process by state agencies and federal funding inequities, and the federal framework for the examination and evaluation of mass transportation facilities. Views were expressed on WMATA. A private industry spokesman expressed disappointment with UMTA'S lack of action in approving LRT systems, and a congressional aide explained congressional intent with regard to the Urban Mass Transportation Program. It was also pointed out that the weakness of the transit industry itself was a formidable barrier.

Mora, JG (Urban Mass Transportation Administration) Bottoms, GD (Department of the Treasury) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 168-169*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

14 302384 A PLANNING MODEL FOR PHASING IN A NEW FLEET OF LIGHT RAIL VEHICLES. This paper describes a computerized planning model developed to assist the operations planning groups of urban transportation systems. The model is to be utilized in planning the phasing in a fleet of new light rail vehicles (lrvs). The model consists of a system of interrelated, calibrated mathematical functions following iterative procedures to meet specified tolerances. Applications of the model are given within the context of the Massachusetts Bay Transportation Authority. The experimental investigations include: the impact of the lrvs on ridership demand, operating costs, revenues and on operating performance measures. Additionally, assignment rules for allocating arriving lrvs are evaluated. The experimental results show that the "best" assignment rule changes as a function of the number of lrvs available. In addition, the results show that following the introduction of the lrvs, "economies of scale" can be expected. The model is written in FORTRAN and consists of ten modules, the main routine and nine sub-routines.

Maggard, MJ Marcotte, AA Chang, YS (Boston University) Glickman, TS (Department of Transportation) *Transportation Research. Part A: General Vol. 13A No. 2, Apr. 1979, pp 83-90, 8 Fig., 1 Tab., 1 Ref.*; ACKNOWLEDGMENT: TRRL (IRRD 242471); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

14 302729 OPERATING CONTROL TECHNIQUES IN LOCAL RAIL TRAFFIC [Betriebsleittechnik im schienengebundenen Nahverkehr]. In short distance rail traffic, operating techniques play a major role in guaranteeing running safety and automating the network. The author describes the limits of existing possibilities and the tasks to be fulfilled and then gives details of a hierarchical system of process computers. He quotes the example of the system being installed in Hamburg. [German]

Sperl, H *Internationales Verkehrswesen Vol. 31 No. 3, May 1979, pp 172-175, 6 Phot.*; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

14 303204 SIMULATORS USED BY WMATA. The Washington Metropolitan Area Transit Authority rail transit system utilizes computer technology in many areas. Simulation is used in day to day operations of Metro. A train movement simulator is presently used to assist in calculating schedules and to minimize delay causing conflicts at locations where trains vie for the same track. In the future this simulator may be utilized to verify strategies and parameters used by the automatic train supervision system and the central control supervisors to control schedule disruptions. Brief descriptions are given of the Train Movement/Transit System Simulator, the Simulation of Operations Program (SOP) used to verify the Central Control Computer System software and the circuit simulator which is a program design to check the operation of interlocking circuits.

Lukes, M (Washington Metropolitan Area Transit Authority) ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1378-9VT, 1979, pp 190-191; IEEE Vehicle Technology Conference, 29th, Conference Record of Papers, Arlington Heights, Illinois, March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 303585 HOW THE CANADIANS TURNED DEREGULATION INTO PROFIT. Series of nine articles, a review of the Canadian scene, includes the following: How the Canadians turned deregulation into profit; The message on deregulation; Crow rates strangle grain exports; Ironing out the gradients to give more capacity; Drive to mechanise track renewal goes ahead; CP puts its faith in the high-cube container; Potentially one of the big exporters; Edmonton success blazes light rail trail; Hamilton may have first peplemover.

Railway Gazette International Vol. 135 No. 12, Dec. 1979, p 1091 ORDER FROM: ESL

14 304761 LIGHT RAIL TRANSIT: STATE-OF-THE-ART OVERVIEW. This document presents an overview of light rail transit, an urban transit alternative which has the potential to help fill the need for flexibility in public transportation. Existing and proposed U.S. and Canadian light rail transit systems are described with a historical perspective. The technical components and service characteristics of this mode are analyzed. The document also deals with a number of planning and implementation issues, including economics of operation, and various environmental and social concerns.

Transportation Systems Center Final Rpt. DOT-TSC-OST-79-4, May 1977, 82 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-103641, DOTL NTIS

14 307666 QUICK AND CHEAP...LRT AS IT SHOULD BE DONE. By July, 1981 San Diego expects to be operating a 26 km light rail line. Contracts for rolling stock and track materials have already been let, and bids are now being called for signalling and automatic revenue collection equipment.

Railway Gazette International Vol. 135 No. 10, Oct. 1979, 2 p., 3 Fig. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

14 308307 ELECTRONIC MONITORING OF VEHICLES IN SHORT-DISTANCE PUBLIC PASSENGER TRANSPORT [Elektronische Fahrzeugüberwachung im OPNV]. The high costs of staffing short-distance public passenger transport have led to rapid extension of driverless operating, particularly on the metropolitan railways. A system for capturing errors of evaluation, being tested in Hamburg, is likely to ensure complete safety in operation. The system is described, and a detailed description is given of the capture, storage and detection and evaluation of errors, with possibilities for further development. [German]

Weiss, HH *TU-Sicherheit u Zuverlaessigkeit in Wirtschaft* Vol. 20 No. 7, 1979, pp 308-310, 5 Phot., 5 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: VDI-Verlag GmbH, Postfach 1139, Graf-Recke-Strasse 84, 4 Dusseldorf 1, West Germany

14 309896 THE RUDIMENTS OF CONTROL. Automatic train control (ATC) is a complex system of functions at least some of which are at work to some degree on every U.S. rail transit system. In its fullest development ATC consists of three subsystems for automatic train protection (ATP), automatic train operation (ATO), and automatic train supervision (ATS) monitored and directed from a control center. The Atlanta system is used to illustrate the present level of this technology.

Breen, T *Modern Railroads/Rail Transit* Vol. 35 No. 1, Jan. 1980, pp 47-49, 3 Phot.; ORDER FROM: ESL

14 309928 NOTES ON LIGHT RAIL TRANSIT IN GREAT BRITAIN. This report combines a broad review of the state-of-the-art in modern light rail transit (LRT) systems with a survey of the potential for their introduction in the larger British cities. Following a short history of Britain's earlier tramways, an account is given of the latest techniques and technologies, with an example in the Tyne and Wear Metro. A look at costs shows that in favourable circumstances the savings in operating cost compared with urban buses can help to offset the much greater initial capital cost of an urban light railway. Recent experience in western Europe demonstrates this operational saving, and shows that LRT can also be more attractive to passengers than buses. Although several studies of possible LRT systems have been made recently in Britain, a survey of planners and transport operators in eleven large cities showed their preference for electric buses-battery or trolley-should oil become prohibitively expensive. There are comparatively few cities where LRT could be installed without physical difficulty or uneconomic expense. Even so, LRT could be economically attractive in several cities now because of its potential to lower operating costs. Recommendations are made for further study.(a)

Kompfner, P ; Transport and Road Research Laboratory, (0305-1315) Monograph TRRL Suppl Rpt SR482, 1979, 38 p., 4 Fig., 5 Tab., 2 Phot., 40 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244165); ORDER FROM: TRRL

14 309932 POLITICAL STORM BREWS OVER TYNESIDE METRO. The article describes progress on the 54 km Tyneside metro system which will use existing BR track or rails

laid alongside. Delays and a large increase in costs are causing concern for the local council, particularly as the government has a fixed price ceiling for the contract. Difficulties have arisen over the transfer of BR staff and the access to BR land for construction. However the twin 4.8 M diameter tunnels below the city centre are nearly complete. Problems encountered in the construction of the totally underground Monument station are described; it is estimated that completion will be delayed by about a year. Some delays were also experienced due to union action at Greensfield, where twin tunnels mainly in cut and cover, have been driven through a large maintenance shed and a marshalling yard. Accurate timing was essential as 10 weeks notice of track possession had to be given. Glacial deposits in the ground at this site required excavation with supported sides.

New Civil Engineer July 1979, pp 32-35, 1 Fig., 4 Phot.ACKNOWLEDGMENT: TRRL (IRRD 243733); ORDER FROM: ESL

14 309936 MODERN TRAMWAY [Le tramway moderne]. Compared to French tramways just after the war, the modern tramway is a new transport mode which combines comfort for the user and safe operation for the operator. This article outlines the characteristics of the modern tram (permanent guidance, use of metal on metal, electric traction), performance as regards speed when loaded and empty, and noise level. All modern trams are fitted with bogies or semi-bogies. Details are given of the frame, the interior and users' equipment. [French]

Herail, Y *Revue des Transports Publics Urbain et Regionaux* No. 749, Apr. 1978, pp 12-18, 11 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105561), Institute of Transport Research, Central Laboratory of Bridges & Highways, France; ORDER FROM: Union des Transports Publics Urbain et Regionaux, 5 rue d'Aumale, 75009 Paris, France

14 311444 AN AUTOMATIC OPERATING SYSTEM FOR THE RHINE-RUHR URBAN RAIL SYSTEM [Automatisches Betriebsfuehrungssystem der Stadtbahn Rhein-Ruhr]. The automatic operating system of the Rhine-Ruhr railway is part of an integrated technical operating system for extensive automation of the many functions of a rapid transit railway. Commencing with a strictly hierarchical classification of the overall function according to the disposition of the operations, the running of the operation, operational safety and the appropriate central functions, the system is described together with that of the hierarchically classified system of process computers for carrying out especially important sub-functions. These components of the system provide the automation for operating signal boxes and the provision of information on the operational situation for the supervision and control of the rail traffic. In addition they support the central station supervision and provide passengers there with information. Following the initial realisation of the system on the urban railway model stretch Essen-Mulheim the concept of the system extended since will also include central remote control of signals using data-processing technology. To fulfil this task there are, in view of the safety problems related to this, engineering problems of a special type which have to be overcome. [German]

Lindner, J *Internationales Verkehrswesen* Vol. 30 No. 5, Sept. 1978, pp 322-327, 5 Fig., 2 Phot., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 308554), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

14 311445 EXPRESS ROAD TRAMWAY ROUTE 64 IN VIENNA [Die Schnellstrassenbahnlinie 64 in Wien]. Following the construction of large residential flats in Vienna's residential Area 23 it became necessary to connect development axis "south" with an efficient means of public transport. The express road tramway route 64 now under construction will cope with the newly developed transport requirements in the foreseeable future as a road tramway on a line which is more or less free of crossings on its own track and in the far future as the U-bahn underground route U6. This paper contains details of the project tender, the alternative design, preparations for the works, the site establishment and finally the construction of this express road tramway route. (TRRL) [German]

Kramer, H *Mayreder-Zeitschrift* Vol. 23 No. 10, Oct. 1978, pp 30-35, 4 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 309035); ORDER FROM: Mayreder, Kraus & Company, Sophiengutstrasse 20, Linz, Austria

14 312046 WHAT ARE THE COSTS OF LOW NOISE-LEVEL CONSTRUCTION FOR METROS? [Was kosten laermarme Bauweise beim U-Bahn-Bau?]. Four diagrams are used to define the relation between construction costs and noise evaluation as resulting from a test line, with special reference to achieving values of 65, 70, 75 and 80 dB(A). The "cover-type construction" has particular advantages. A survey of 15 different types of metro construction is given. [German]

Paersch, A Seeling, R *Bauingenieur* Vol. 54 No. 11, 1979, pp 415-418, 1 Tab., 2 Phot., 15 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

14 312093 COMMUNICATIONS ON RESEARCH AIMED AT COMPARING TRANSPORT CONDITIONS IN CITIES, TOWNS AND OTHER BUILT UP AREAS. EXTENDED ABSTRACT OF THE STUDY REPORT. AN ENQUIRY INTO THE PROVISION OF BETTER SERVICES FOR THE HANDICAPPED ON LOCAL PUBLIC TRANSPORT [Mittellungen ueber Forschungen zur Verbesserung der Verkehrsverhaeltnisse der Gemeinden. Erweiterte Kurzfassung des Forschungsberichts. Untersuchung zur frage der Staerkeren Beruecksichtigung der Belange von Behinderten im Oeffentlichen Nahverkehr]. The journal contains a review of the research contracts let by the federal minister of transport on the subject of urban transport. It also contains an extended summary of the "investigation into the question of greater consideration of the needs of the disabled in public transport". The proportion of persons who are considered "participation-impaired" or "participation-disabled" is estimated to be 8-10% of the whole population. Consideration is to be given to the standards of comfort change and as a result in the future-with unchanged provision-a greater number of people

will feel (subjectively) impaired when using public transport. For these persons the gaining of facilities in public transport for the disabled, insofar as they improve the general usefulness, has increasing significance. Various possibilities of making vehicle or constructional changes in public passenger transport have been investigated, such as the forming of pavements and pedestrian overpasses, of steps, ramps, escalators, platforms and lifts, stopping places and station facilities for light railways. A further chapter is concerned with the installation of entrances and exits of public track-bound vehicles and with the internal areas of such vehicles. The investigation has also considered the problems arising from the introduction of certain measures, including the problems of the time and cost of subsequently introducing aids for the disabled in underground stations and the building of on level bus stops. As it is hardly to be expected that the towns and transport firms, who must consider the use of their capital almost exclusively for traffic and operational projects, will pursue the development of acceptable facilities for the disabled on their own initiative, it must be assumed that the provision of certain equipment will depend upon a political clarification of the investment responsibility. [German]

Forschung Stadtverkehr Monograph No. 23, 1978, 115 p., Refs. ACKNOWLEDGMENT: TRRL (IRRD 310133), Research Association for Road Communications, W Gr; ORDER FROM: Kirschbaum Verlag, Siegfriedstrasse 28, Postfach 9109, Bonn-Bad Godesberg, West Germany 5300; DOK 25113

14 312444 TOWARDS AUTOMATIC TRAIN CONTROL. A review is provided of recent developments in automatic train control around the world, and some aspects of railway automation are discussed in an Australian context. These discussions indicate that, while full automation may be justified on urban mass-transit systems, semi-automatic control of individual trains (by means of microprocessor-based driving aids) is an appropriate intermediate development for Australian non-urban railway networks. Such a development should lead to improved regulation of traffic and substantial savings of energy. A brief theoretical section is included which should provide a useful starting point for traction and signaling engineers who wish to investigate the possibilities of more precise control of traffic than the conventional fixed-block signalling system will allow.

Forsythe, W (Loughborough University of Technology, England) Milroy, IP Thomas, PD ; Institution of Engineers, Australia Conf Paper 1979, pp 163-168, 18 Ref.; National Conference Publication, Institution of Engineers, Australia n 79/4, Australian Conference on Control Engineering, 1st Preprint of Papers, Melbourne, Australia, June 5-7, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Institution of Engineers, Australia, 11 National Circuit, Barton, A.C.T. 2600, Australia

14 314886 RADIO CONTROL SYSTEMS FOR RAILWAYS AND PUBLIC TRANSPORT [Systemes de commande par radiocommunication pour chemins de fer et les transports publics]. Taking three examples (the Sihltal-Zurich-Uetliberg railway, local railways in Zaire and the Montbeliard operating control system), the

author illustrates the ways in which radio can be used in public transport. [French]

Tiesnes, M *Brown Boveri Review* Vol. 67 No. 1, Jan. 1980, pp 83-85, 1 Fig., 4 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

14 315016 SAN DIEGO LIGHT RAIL: ON TRACK '81. Metropolitan Transit Development Board is meeting its 30-month schedule for converting a 14-mile segment of former freight-only San Diego and Arizona Eastern Railway into a light-rail transit line reaching the Mexican border. Methods of acquiring SD&AE, funding the project without UMTA participation, construction details, operations planning and estimates of potential traffic are detailed. MTDB owns entire 115-mile railroad and is resuming freight service to the East over this mountainous region.

Railway Age Vol. 181 No. 11, June 1980, p 34, 2 Phot. ORDER FROM: ESL

14 315402 LIGHT RAIL A TRANSPORT SYSTEM FOR THE FUTURE. This paper begins with the previous history of the International Light Rail Commission, the results of its meetings, and its future work program. The various stages of light rail development are discussed as well as the differences between metropolitan railways and light rail. The majority of the paper contains discussion of the various light rail systems throughout the world. These systems are located in: Australia; Belgium--Brussels, Antwerp, and Charleroi; The Federal Republic of Germany--Stuttgart, Hanover, and Essen; Finland; France; Italy; The United States--Boston, Cleveland, Philadelphia, and San Francisco; Canada--Edmonton and Toronto; The Netherlands--Amsterdam, The Hague, and Rotterdam; The German Democratic Republic; Yugoslavia; Poland; The Soviet Union; Austria; Sweden; and Switzerland--Zurich, Basle, Berne, and Geneva.

Groche, G (Stuttgarter Strassenbahnen AG) ; International Union of Public Transport No. 8, June 1979, 33p, 49 Fig.; 43rd International Congress, Helsinki 1979, International Light Rail Commission.

14 316227 MARTA TRAIN CONTROL SYSTEM--A VIEW FROM THE WAYSIDE. This paper describes the Metropolitan Atlanta Rapid Transit Authority (MARTA) train control system. The major operational features are discussed to direct the reader's attention to the relative importance of the wayside subsystem. The MARTA system is described through five major operational features, with special emphasis on the wayside subsystem as a local point of system operations. The aspects of the automatic and manual modes of operation are explained in detail to emphasize the attention that has been given to the design of the system to ensure uninterrupted service.

Weinstein, JJ (General Railway Signal Company) Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1484-51A, 1979, pp 295-298; Conference Record IAS Annual Meeting, 14th, Papers presented Cleveland, Ohio, September 30-October 5, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

14 316598 A STUDY OF NOISE FROM THE TYNE AND WEAR METROCAR. This paper reports on a detailed study of the noise emitted by the new metrolcar which will be in operation in Tyne and Wear from 1980. The level and frequency characteristics of wayside, standstill, braking and accelerating noise are discussed. A formula is derived empirically which enables the peak noise level at a given distance from a metrolcar travelling at a particular speed in a "free-field" situation to be predicted. On the basis of this result and on an assessment of the present acoustic environments of an industrial and residential area of Newcastle, some suggestions are made as to the changes to be expected in the noise levels when the metro is fully operational. Comparison with other research work has been made whenever possible.(a)

Bell, MC Leung, CN ; Newcastle upon Tyne University, England, (0306-3402) Monograph Res Rpt. No. 27, Apr. 1978, 24 p, 7 Fig., 2 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 247305); ORDER FROM: Newcastle upon Tyne University, England, Department of Civil Engineering, Claremont Road, Newcastle NE1 7RU, Tyne and Wear, England

14 317426 MEANS FOR THE REDUCTION OF NOISE TRANSMITTED FROM SUBWAYS TO NEARBY BUILDINGS. A brief overview is presented of how noise and vibration generated by passing subway trains reach buildings near subway tunnels. Various means for reducing the ground-transmitted noise and vibration are described such as the use of resilient track support structures and the isolation of buildings and rooms, their effectiveness is discussed, and specific needs for further research are indicated.

Ungar, EE (Bolt, Beranek and Newman, Incorporated) Kurzweil, LG *Shock and Vibration Digest* Vol. 12 No. 1, Jan. 1980, pp 5-12, 31 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 317433 RELIABLE MICROPROCESSOR-AIDED DESIGN OF INTRICATE AUTOMATIC PROCESS SYSTEMS [Conception sure d'automatismes complexes a microprocesseurs]. The proposed design method is a method of progressive specifications. The aim is to obtain the final product (software, hardware) by a sequence of refinements of specifications. The example of the design of an automatic subway pilot is given. [French]

Pilaud, D Saucier, G *Revue Generale de l'Electricite* Vol. 88 No. 12, Dec. 1979, pp 921-929; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 318430 A REPORT ON LIGHT RAIL TRANSIT: SURFACE OPERATIONS. This report recognizes the fact that the high costs of segregated fixed-guideway transit have dampened LRT's popularity. As a result, the Transportation Research Board (TRB) and UMTA decided to conduct an examination of the obstacles to lower-cost surface configurations. Toward this end, a by-invitation-only seminar was convened in Washington, DC, on December 5-6, 1978. Its objective was to trace specific problems and to propose where effort toward their solution should be most effectively directed. These problems were expressed as a set of issues that served to focus thought and guide proceedings. This report contains three background papers as well as the summary of discussions on the impact of align-

ment options, traffic-engineering requirements, safety requirements, safety requirements for installation and operation requirements for passenger stop locations, intermodal interface, fare-collection options for surface operation, and future actions.

Transportation Research Board, Urban Mass Transportation Administration, (UMTA-DC-06-0216) Final Rpt. UMTA-DC-06-0216-80-1, Apr. 1980, 31p; Contract DOT-UT-80040; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-197700

14 319966 HANNOVER PINPOINTS LIGHT RAIL OBJECTIVES. With the construction of tunnels in the city centre and reserved tracks in the suburbs, Hannover is turning its tram network into a light rail system.

Scheelhase, K. *Railway Gazette International* Vol. 136 No. 4, Apr. 1980, pp 283-285, 1 Fig., 5 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

14 322038 LIGHT RAIL TRANSIT IN THE UNITED STATES. The paper reviews recent LRT developments in four American cities, two of which have undertaken to rehabilitate and upgrade their existing surface street railway systems, and the other two have embarked upon construction of entirely new light rail systems.

Taylor, SF (Sanders and Thomas, Incorporated) *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 67-74; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 322039 LIGHT RAIL TRANSIT IN CANADA. This paper describes current light rail transit planning and operation in Canada's major cities and smaller communities. There are ten urban areas in Canada with 250,000 or more people. Two of these have light rail systems in operation, three have lines under construction and nine others are planning LRT systems.

Sullivan, BE (Alberta Department of Economic Development) *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 75-82; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 322040 RAIL TRANSIT CONSTRUCTION AROUND THE WORLD. The author describes current rail transit projects in different cities of Europe, Asia and South America.

Goldsack, PJ *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 83-92; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 322568 TYNESIDE REPORT 8. PART 3: OPERATION. The greatest innovation in the operation of the metro is that by using the Phillips Vetag micro-processor based control system, the driver can control his train as well as drive it. On setting a code, the train is automatically routed through the system, changing the points, clearing signals, and changing station indicators. Two transponders are mounted on each passenger car giving signals to trackside sensors through loops sited on the track between the rails. There are 41 unstaffed stations, under the supervision of a central station controller who can monitor stations, through a closed-circuit TV, and address passengers on a PA system. Trains maintain constant radio contact with the control centre.

Each service will run at 10 minute intervals for most of the day, allowing 5 minute headways on most of the track, but this time is reduced to 2 1/2 minutes at peak periods in the centre. Automatic fare collection, similar to that used in Paris and Lyon, has been installed. Ticket machines have change-giving facilities but will not accept banknotes. A comprehensive public relations exercise has been carried out to publicise the system and to educate children into the potential dangers of the high-voltage overhead wires.

Haywood, PG Price, JH *Modern Tramway and Light Rail Transit* Vol. 43 No. 511, July 1980, pp 222-228, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 248774); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

14 322645 SIMULATION STUDIES OF AN ELECTRICAL INTERFERENCE PROBLEM AFFECTING MASS TRANSIT CIVIL ENGINEERING DESIGN. Part I of the Paper gives a brief description of an automatic train protection (ATP) system for a mass transit railway, and indicates some problems that may arise because of inductive interference caused by the presence of reinforcing steel in the structures supporting the track. Part II deals with two months of study capable of yielding quantitative estimates of the interference effects in a reliable and systematic manner. In the first method a full-scale simulated track system was built and, based on suitable instrumentation, the physical parameters as well as the relationships governing the inductive interference were determined. The second method relies on establishing a mathematical model that invokes basic electromagnetic field theory and transmission line theory to arrive at a generalised solution. The results obtained with both methods are presented and compared.

Chan, FHY Edgley, RK Lam, FK Tso, SK *Hong Kong Engineer* Vol. 8 No. 7, July 1980, pp 39-41, 4 Fig., 2 Ref.; See also Vol. 8 No. 8 August 1980 issue pages 35-41; ORDER FROM: Asia Trade Journals Limited, 7th Floor, Sincere Insurance Building, 4-6 Hennessy Road, Hong Kong, Hong Kong

14 322834 LIGHT-RAIL TRANSIT IN NORTH AMERICA: WHAT'S GOING ON? An ITE informational report by Technical Council Committee 5C-5 organized to develop design guidelines for handling light-rail transit (LRT)-vehicular traffic situations is presented.

ITE Journal Vol. 50 No. 3, Mar. 1980, pp 31-37, 8 Ref. ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 323211 CONSTRUCTION OF NEW URBAN RAIL SYSTEMS. Rapid transit and light rail systems exist in numerous North American cities. A survey shows 1341 line miles in operation and details of track structures, rail weight, turnouts and crossovers on these are given. The author describes the new systems, recently opened or under construction, and then discusses expansions of existing transit properties.

Shoff, DA (Daniel, Mann, Johnson and Mendenhall) *AREA Bulletin* Vol. 81 No. 678, June 1980, pp 447-457, 2 Fig.; Proceedings of the Seventy-ninth Technical Conference, AREA, held March 24-26, 1980, Palmer House, Chicago; ORDER FROM: AREA

14 323351 INTEGRATION IS KEY TO SUCCESSFUL PUBLIC TRANSPORT. The potential of the Tyne and Wear Metro rail system, the first phase of which is now in operation, lies in its integration with public transport such as bus services and parking facilities, as well as its ability to attract short distance travellers. A feature of the system is the increase in number of stations from 26 to 42 compared with the former suburban rail system. The service pattern has been based on a number of standard journeys with a 10 min headway. The metro system has been designed for future extension in three further phases. The ability of the system to negotiate 4% gradients and sharp curves will allow its penetration into areas where existing rail alignments are not sufficient. Stations are unmanned and are designed with emphasis on simplicity for ease of maintenance.

Transport Vol. 1 No. 3, July 1980, pp 65-67, 1 Fig., 3 Phot. ACKNOWLEDGMENT: TRRL (IRRD 249627); ORDER FROM: City Press Limited, Fairfax House, Colchester, Essex, England

14 324438 MICOL, MICROCOMPUTERS IN OPERATION CONTROL CENTERS. Automatic operations control system of urban rapid-transit systems is described by taking an example of an underground railway using microcomputers for decentralized data processing. The task complex is divided into an information processing section with safe signaling characteristics, and a processing section without safety functions. The safety side of the system is implemented by a network of fail-safe microcomputer while the non-safety-oriented work is accomplished by process-control computers suitable for handling large volumes of process-control data. Each microcomputer is allocated a certain share of the tasks. This modular arrangement, while increasing the hardware outlay, restricts any failure to just one part of the control center's functions.

Forstreuter, H *Siemens Power Engineering* Vol. 1 No. 2, Feb. 1979, pp 47-50, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

14 325283 THE NEW HONG KONG UNDERGROUND RAILWAY. This paper describes some of the planning for the Hong Kong Mass Transit Railway from the operations aspect. Successful operation of a mass transit railway, especially one as busy as the MTR, requires comprehensive planning of policies and details, anticipation of every untoward incident, and development of appropriate recovery drill, training, discipline, coordination and high morale.

Cotton, AR (Mass Transit Railway Corporation) *Union Internationale des Transports Publics, Revue* Vol. 29 No. 2, 1980, pp 114-124, 2 Tab., 6 Ref.; ORDER FROM: International Union of Public Transport, Avenue de l'Uruguay 19, B-1050 Brussels, Belgium

14 325443 BCR PIONEERS COMPUTERISED TRAIN CONTROL USING MICROWAVE RADIO. After 9 years of research British Columbia Railway and Glenayre Electronics have developed a computerized train location, identification and control system--LIC, for short--based on microwave radio. Following successful trials BCR is now installing equipment to cover the 240 km between North Vancouver and

Lillooet. In 1982 LIC should take over from the existing CTC. Cost is estimated at 20 percent of that of CTC, including equipping locomotives and cabooses, all communications, construction of a control center and trackside equipment. Transport Canada and provincial funding has made a major contribution to the research and development program.

Railway Gazette International Vol. 136 No. 12, Dec. 1980, p 1054, 1 Fig., 1 Phot. ORDER FROM: ESL

14 325444 BERLIN U-BAHN BEGINS AUTOMATIC TRAIN OPERATION. Early in 1981 Line 4 of the Berlin U-Bahn was to be switched to automatic train operation. German's Federal Ministry of Research and Technology has been funding since 1977 trials on a 1.6 km test track fitted with Seltrac equipment. Operation in revenue service will test the technical and economic viability and determine what steps are necessary to achieve unmanned operation.

Railway Gazette International Vol. 136 No. 12, Dec. 1980, p 1055, 6 Phot. ORDER FROM: ESL

14 325874 TYNESIDE TRAVEL GOES CONTINENTAL. The introduction of the Tyne & Wear Metro has shown the first UK attempt to introduce an upgraded public transport system using "supertram" technology and automatic fare collection. The network has required the construction of north-south and east-west tunnels under central Newcastle and a tunnel section under central Gateshead linked by the Tyne bridge. A viaduct serving the Byker area of the city was also constructed. Key stations in the

network are designed to provide multiple interchange facilities so that the same season ticket or travel pass can be used on both the metro and bus systems. A feature of the metro, due for completion in 1983, is that it can be readily extended at relatively low cost.

Aldovs, T *Municipal Journal* Aug. 1980, p 1014, 1 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 250348); ORDER FROM: Municipal Journal Limited, 178-202 Great Portland Street, London, England

14 325875 TYNE & WEAR METRO-FARE COLLECTION. Fare collection methods employed in the Tyne & Wear Metro are designed for maximum cost-efficient staffing levels. Each station is unmanned while trains only carry a single motorman. The metro system employs a simple ticketing procedure with only random inspection to prevent fraud. With this system a passenger carries a card ticket with a magnetically encoded stripe indicating zone, station number, fare and passenger category. The unmanned ticket barriers, based on Paris metro barriers, allow platform access once a ticket has been checked for validity and then returned. The integrated Tyne & Wear system allows a traveller to use the same ticket for a journey which includes metro and bus travel. Details are given of equipment used in the fare collection system and its method of operation.

Wyse, WJ *Modern Tramway and Light Rail Transit* Vol. 43 No. 515, Nov. 1980, pp 374-380, 2 Tab., 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 251010); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

14 325877 MIXED FORTUNES FOR METRO. Despite a small number of early mechanical problems the Tyne and Wear Metro light rail system is now said to be offering a popular and efficient service for its passengers. Such a form of light rail service is ideal for overcoming public transport problems of cities which are too small to warrant the consideration of a costly underground rail system. Although it was hoped that once the Tyne and Wear Metro was operating successfully, other similar schemes might follow, only Avon has so far commissioned a feasibility study.

New Scientist Vol. 87 No. 1220, Sept. 1980, p 912, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 250062); ORDER FROM: IPC Magazines Limited, King's Reach Tower, Stamford Street, London SE1 9LS, England

14 329542 AUTOMATING THE OPERATION OF THE METRO IN AMSTERDAM, HOLLAND [Die Betriebsautomatisierung der Metro Amsterdam]. A train protection and automatic control system is described. The entire sequence of operations is controlled and monitored by a central traffic directing station. During regular operation, the sequence of operations is automated. With this, trains are automatically directed by a linear train control, at which the computer controlled system guarantees maintenance of running time with a minimum consumption of energy. [German]

Sperli, H *Elektrische Bahnen* Vol. 78 No. 3, Mar. 1980, pp 71-74; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 044273 SUBWAY STATION AIR CONDITIONING FOR THE WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY. This paper describes the problems and solutions related to excessive heat expected in the Washington, D.C., subway system passenger stations. The heat sources are identified justifying the need for air conditioning. The method of calculating the cooling loads and controlling the air movement are explained. Costs and benefits of passenger station air conditioning are stated.

Soloman, IM, Chief Mechanical Engineer (De Leuw, Cather and Company); American Society of Mechanical Engineers Paper 73-RT-7, Jan. 1973, 8 pp, 8 Fig; Contributed by the Rail Transportation Division of ASME for presentation at the IEEE-ASME Joint Railroad Conference, St. Louis, Mo., April 11-12, 1973.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

15 044810 AERIAL STRUCTURE AND RAIL SUPPORT METHODS REPORT NO 11. A series of tests was run for BART to evaluate the ability of rail fasteners to maintain electrical isolation, reduce noise levels, and provide safety and economy; and to determine their suitability for use on advanced design concrete aerial structures. The evaluation of several types of concrete ties and the results of tests on a new concept in the installation of rail fasteners and associated hardware on concrete aerial structures are included. Investigation showed that a new concept of track support was required for aerial structures and subways; further, it was realized that the fastener chosen for use on the aerial structures can also be used on the underground portions of the rapid transit system, a fact which will limit the types of rail fasteners needed for the system. Subsequent studies, therefore, are geared to the choice of a fastener suitable for use on aerial structures. On aerial structures rail fasteners must be simple enough for one man to assemble with hand-carried tools. The fastener must remain stable under the application of a 15,000-pound wheel load and must be capable of holding a longitudinal force of approximately 2,000 pounds of 3,000,000 cycles of loading in a test machine. Other criteria for fasteners of rail and aerial structures are listed. The "second pour" technique, which still requires further development, is to be used in installing track fasteners on concrete surfaces in order to guarantee that the anchor bolts will not come in direct contact with reinforcing steel. Indications from test results indicate that concrete ties are safe and economical and perform well under the type of transit loadings expected in the BARTD system.

Parsons, Brinckerhoff-Tudor-Bechtel CAL-mtd-2; ACKNOWLEDGMENT: NTIS (PB-177496); ORDER FROM: NTIS, Repr PC; PB-177496, DOTL NTIS

15 044829 COMPUTER SIMULATION OF SUBWAY ENVIRONMENT. A designer-oriented computer program, designated the Single-Track Subway Environment Simulation Model, has been developed to simulate multiple train operation in a single-train subway and to provide continuous, peak, and average readings for the air velocity, temperature, and humidity throughout the stations, tunnels, and ventilation

shafts. The program also provides continuous calculations of the location, velocity, and acceleration of the train(s) moving through the system. This program is intended for use in evaluating the influence of tunnel geometry, ventilation shaft design, and environmental control equipment upon airflow, temperature, and humidity in a subway. The aerodynamic portion of the program has been validated using data from a scale-model test facility.

Hoover, TE Hitchcock, WW Kennedy, WD Guinan, JW (Parsons, Brinckerhoff, Quade and Douglas, Inc) *ASCE Journal of Transportation Engineering* Vol. 99 No. TE1, Proc Paper 9518, Feb. 1973, pp 53-72; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE, Repr PC

15 046061 METRO: LONDON'S PICCADILLY LINE EXTENSION--HOUNSLOW WEST TO HEATHROW AIRPORT CENTRE. The extension of London's Piccadilly metro line from Hounslow West to the centre of Heathrow Airport has now passed the halfway mark; work is in progress on all three stations--Hounslow West, Hatton Cross and Heathrow Central--as well as on the covered ways and tunnels. The work on the 3-1/2 mile extension is in three main parts--the cut-and-cover section from Hounslow West to a new station at Hatton Cross on the airport perimeter, the mainly deep tube section from Hatton Cross to Heathrow Central, and the terminal station at Heathrow Central.

Tunnels and Tunnelling Vol. 5 No. 3, May 1973, 3 ppORDER FROM: Morgan-Grampian Limited, 30 Calderwood Street, London SE18 6QH, England Repr PC

15 046087 GUIDELINES AND PRINCIPLES FOR DESIGN OF RAPID TRANSIT FACILITIES. In designing structures which are to be used by the public, it is essential that such structures be designed and built to conform to accepted practice, with regard to safety and with regard to adopting the latest technological developments. Similarly, in designing or providing for the supply of equipment, either fixed or moving, it is equally important that such equipment be designed or specified to conform with the safest and best of accepted practices. The purpose of these guidelines and principles is to describe in general terms what is considered to be good practices in rapid transit so that those responsible for designing and planning such facilities may have the benefit of this information. A summary of applicable standards presently in use by rapid transit agencies is also attached in the appendix. Institute for Rapid Transit 1973, 84 pp; Prepared by the Technical and Operations Committee, Subcommittee on Design Standards of the Institute for Rapid Transit.; ACKNOWLEDGMENT: Institute for Rapid Transit; ORDER FROM: Institute for Rapid Transit, 1612 K Street, NW, Washington, D.C., 20006 Repr PC

15 046818 CUT-AND-COVER AND BORED TUNNEL CONSTRUCTION ADOPTED BY LONDON TRANSPORTS TUBE RAILWAY EXTENSION LONDON AIRPORT. Secant-piling and rubber-supported track decking techniques applied for the two-mile residential area combined with box construction and concrete-lined tunnels within the airport perimeter to suite surface conditions on the 3-1/2-mile extension of Piccadilly Line.

Rail Engineering International Vol. 3 No. 4, Apr. 1973, 9 ppORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

15 047007 TRANSVERSE VENTILATION OF DOUBLE TUBE TUNNELS USING AN AUXILIARY TUNNEL. A transverse ventilation system proposed for double tube tunnels uses an auxiliary gallery. With this system complete separation is attained between fresh air ducts (in the auxiliary gallery) and used air ducts over the main tunnels ceiling. The proposed system makes it possible to reduce the cross-section of the fresh air supply ducts, by using a contemporaneity factor of the peak traffic flows in the two tubes. A further advantage is the reduction of construction problems and the solution of safety problems.

Rapisarda, F (Special Installations Dept of Technital S.P.A.) *Tunnels and Tunnelling* Vol. 5 No. 4, July 1973; ORDER FROM: Morgan-Grampian Limited, 30 Calderwood Street, London SE18 6QH, England Repr PC

15 047897 SUBWAY BUILDERS SNAKE TUNNELS UNDER OLD ARCH AND CONDUITS. Report on construction of tunnels under the streets of Brussels, Belgium to build the first 9 miles of the city's new rail transit system. The section that goes under the old arch will have two, two-lane highway tunnels on top of the subway tubes.

Engineering News-Record Vol. 190 No. 24, June 1973, p 26ACKNOWLEDGMENT: EI (EI 73 040128); ORDER FROM: ESL, Repr PC, Microfilm

15 047901 EARTHMOVING FOR PEOPLE MOVING--EXPANSION OF THE NEW YORK CITY TRANSIT SYSTEM. The expansion of the New York City Rapid Transit System, funded by a voter-approved \$25 billion transportation bond issue in 1967, is described. Fifty-two miles of new subway routes will be constructed, along with other on-going modernization of the system. Eleven new routes will be constructed under the program. The work and type of equipment presently used in constructing four of these routes is described in some detail.

Tremko, JA (New York City Transit Authority) Society of Automotive Engineers Preprint 730440, 5 pp; Prepared for Meeting 2-4 April 1973.; ACKNOWLEDGMENT: EI (EI 73 036786); ORDER FROM: ESL, Repr PC, Microfilm

15 047919 TUNNEL CONSTRUCTION AS THE THIRD GROUNDING SYSTEM FOR DC RAILROADS [DAS TUNNELBAUWERK ALS DRITTES ERDUNGSSYSTEM BEI GLEICHSTROMBAHNEN]. Specific problems associated with trains powered by direct current due to their high values. The tunnel network of the subway system in Berlin, Germany, is discussed, along with grounding techniques. [German]

Feldman, E *Elektrische Bahnen* Vol. 4 No. 2, Feb. 1973, pp 41-47; ACKNOWLEDGMENT: EI (EI 73 036202); ORDER FROM: ESL, Repr PC, Microfilm

15 047963 WMATA BUILDS 98-MILE SUBWAY, 86 STATIONS, OPEN IN 1974. This article describes the Washington Metro new under construction, and expected to cost \$3 billion. A referendum resulted in a large favorable vote for the system. The article discusses station design, advanced car design, and track designs contributing to quiet operation.

Myers, ET *Modern Railroads* Vol. 28 No. 9, Sept. 1973, pp 105-108; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

15 048022 BONDED CONTINUOUS TURN-OUTS APPLIED TO WASHINGTON METRO. Calculated thermal stresses induced from aerial structures established the need for special trackwork to enable high rail stresses to be transferred through the turnout. The design incorporates bonded joints to facilitate rail changing.

Hester, GH Robey, RH (De Leuw, Cather and Company) *Rail Engineering International* Vol. 3 No. 6, July 1973, pp 268-269, 1 Fig; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

15 048165 KEEPING COOL IN THE SUBWAY. With cities in the tropics such as Caracas, Sao Paulo and Calcutta now building transit systems, the problem of keeping air temperatures in tunnels to a tolerable level is becoming more acute. Norman H. Danziger outlines the basic principles evolved to produce a satisfactory thermal balance on underground railways, part of a three-year research programme sponsored by the Institute for Rapid Transit. It has been found that trains account for between 85 and 90 percent of all the heat generated in a subway system. About half of this heat is caused by braking, the remainder largely by acceleration, traction, and vehicle air conditioning.

Railway Gazette International Vol. 129 No. 7, July 1973, pp 255-258 ORDER FROM: IPC Transport Press, Repr PC

15 048171 BELGIAN TRAMWAYS PREPARE FOR FULL METRO WORKING. A total of five Belgian cities are now building—or firmly planning to build—new subway systems. With the exception of Liege they are, in the initial stages, confining metro operations to tram working. But tunnel construction in each city is designed for eventual conversion to full-scale metro working as the demand for mass transit grows. And in Brussels, where the first pre-metro line went into operation in 1969, construction has already begun on the city's first full-scale metro line.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 2 pp, 2 Fig ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

15 048176 INDIA ADOPTS RAIL TRANSIT TO BEAT CITY CONGESTION. Latest big country to join the mass transit race is India. Feasibility studies are already in progress in Delhi, Bombay and Madras. And in Calcutta, work has already begun on a 16.5-km Metro.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 4 pp, 3 Fig

ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

15 048177 DUTCH CITIES PRESS AHEAD WITH NEW SUBWAY PROJECTS. Delegates to next month's UITP Congress (The Hague, May 6-12) will have an opportunity of inspecting two major rapid transit construction projects. In Rotterdam, where the first Metro line was opened in 1968, the existing 7.5-km line is being extended from slinge to Zalmplaat (9.5 km), at a cost of F1.150 million. And in Amsterdam, work is well ahead on construction of the new Metro.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 4 pp, 4 Fig ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

15 048218 THE SCOPE FOR SUB-SURFACE TRANSPORT AND ITS INFLUENCE IN URBAN PLANNING. The author gives an account of what other countries in Europe are doing to use the "underground". He studies, in particular, aspects of urban planning for tunnel building in Essen, Germany. Two factors he says are especially important: time; it will, and did in the case of Essen, always take time to build an efficient transportation system. And to take into consideration that you are building for people. This article is in discussion form.

O'Reilly, MP *Tunnels and Tunnelling* Vol. 5 No. 5, July 1973, pp 431-445; ORDER FROM: Morgan-Grampian Limited, 30 Calderwood Street, London SE18 6QH, England Repr PC

15 048288 ENGINEERS' VIEW OF WASHINGTON METRO IS EYE-OPENER. When seen through the eyes of civil engineers, with the viewing being done mostly underground, construction work on the Washington Metro is found to include some eye-popping design forms and construction problems and procedures.

Dick, MH *Railway Age* Vol. 174 No. 17, Sept. 1973, 3 pp; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

15 050026 "CIRCUMVESUVIANA": INTERCHANGE STATION WITH THE STATE RAILROAD [CIRCUMVESUVIANA: LA FERMATA DI COLLEGAMENTO CON LE FERROVIE DELLO STATO]. The "Circumvesuviana" railroad in Naples, Italy, has created an interchange station between its own network and that of the State railways, in order to facilitate change of trains on the part of users and assist mobility over a metropolitan span of about 80 kms. In the article, a description is given of the various phases of construction of the work, which was carried out in normal and pre-stressed concrete structures astride a double railway transit, constituted by two old stone tunnels, without interrupting operation. The station has been equipped with the latest installations for the safety of railway operation and for the movement and information of users. [Italian]

Paci, UE Paoletta, G *Ingegneria Ferroviaria* No. 1, Jan. 1973, pp 24-32; ACKNOWLEDGMENT: EI (EI 73 045870); ORDER FROM: ESL, Repr PC, Microfilm

15 050137 BART—EARTHMOVING AND MASS TRANSIT. This paper gives a description of the Bay Area Rapid Transit (BART) system in San Francisco. The design and construction of the system depended upon the geography of the areas and upon the equipment and skills of the many contraction involved—all of which are described. Details are given of the excavation for tunnels and stations and the equipment used in these operations. The design of the vehicles on the BART system was aimed toward passenger safety and comfort, and some details of the cars are shown. BART may be a model for rapid-transit development in communities where mass-transit systems will help solve urban transportation problems.

Hammond, DG (Bay Area Rapid Transit District) ; Society of Automotive Engineers SAE Preprint #730438, Apr. 1973, 8 pp; Prepared for SAE meeting, April 2-4, 1973.; ACKNOWLEDGMENT: EI (EI 73 047083); ORDER FROM: ESL, Repr PC, Microfilm

15 050345 TORONTO LOOKS TO ITS THIRD NEW SUBWAY, THE SPADINA. Plans for the construction of a third subway in Toronto are being advanced, while construction on the last 2.7-mile extension to the Yonge St. line are in the final stages.

Meyers, ET *Modern Railroads* Vol. 28 No. 7, July 1973, 2 pp; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

15 050437 MUNICH U-BAHN PROGRESS. This article describes the construction of the Munich U-bahn rapid transit system. Integration of transportation in Munich is discussed, including the DB S-bahn commuter services. A map of the system is presented, and the target completion dates are given.

Modern Railways Vol. 30 No. 301, Oct. 1973, pp 411-414 ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England Repr PC

15 050458 TWO MAJOR NS STATIONS TAKE SHAPE. Integrated with town planning schemes and providing easy interchange with local transport as well as car parking, the reconstructed stations at Den Haag and Utrecht show how Netherlands Railways is making good use of its property and at the same time providing for changed and increased patterns of passenger travel.

Railway Gazette International Vol. 129 No. 10, Oct. 1973, 4 pp, 4 Phot ORDER FROM: IPC Transport Press, Repr PC

15 050476 PREFAB SHORING GRIDS AND BRIDGE PANELS SPEED CUT-AND-COVER JOB. Prefabricated steel shoring grids and wooden bridge segments are speeding construction and minimizing traffic disruption on two contracts for putting the San Francisco Municipal Railway (MUNI) streetcars under a busy city street.

Engineering News-Record Dec. 1973, p 26 ORDER FROM: ESL, Repr PC, Microfilm

15 050481 BART. This article is primarily concerned with the architecture of the BART stations and their relationship to the surrounding urban areas.

Liskamm, WH *Architectural Forum* Vol. 138 No. 3, Apr. 1973, pp 44-48, Figs; ORDER FROM: Whitney Publications Incorporated, 130 East 59th Street, New York, New York, 10022 Repr PC

15 050635 ORSAY-INVALIDES JUNCTION LINE [UNE INTERCONNEXION SIMPLE ORSAY-INVALIDES]. In this article, the author explains why it has been decided to build this junction line; it will provide a connection between the South-Western suburban lines and the Paris-Invalides to Western suburban lines. He mentions the various difficulties involved in constructing this connection because of the different electrification systems in service (1,500 V catenary on the Orsay side and 750 V third rail on the Invalides side), the relatively shallow work sites along the bank of the Seine in the political heart of Paris with its heavy road traffic and already extensively occupied subsoil. The project will be carried out in two stages. He gives details of the work to be done in Paris-Orsay and Paris-Invalides stations. [French]

Guilmard, A *Revue Generale des Chemins de Fer* Apr. 1973, Ingenieur, en Chef, E quipment Management; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

15 050636 A NEW LINE FOR A NEW TOWN: THE EVRY BRANCH [UNE LIGNE NOUVELLE POUR UNE VILLE NOUVELLE: L'ANTENNE D'EVRY]. The author explains in this article why a new line 10.7 km long is being built in the south-eastern suburbs of Paris to serve a development area with Evry new town as the urban centre, to house a population of 500,000 people in the near future. The author gives the salient features of the new line which will in fact duplicate, along a new route, an already existing line with which it will connect, and thus enable the predicted density of traffic to be handled because it is designed especially for passenger traffic. He describes the civil engineering work involved (in particular an 805-metre tunnel and a viaduct about 650 metres long), the stations and the new equipment (colour-light automatic block and 1,500 V d.c. traction current). It is planned to complete the work by the end of 1975. [French]

Jay, A, Manager, Paris South-Eastern Region *Revue Generale des Chemins de Fer* Apr. 1973, pp 233-237, 4 Fig; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

15 050666 BEHAVIOUR OF SUBAQUEOUS TUNNELS DURING EARTHQUAKES. Three-dimensional models of a subaqueous tunnel were built on a shaking table and vibrated for the purpose of investigating the dynamic behaviour of the tunnel. The material of the soft surface layer was gelatin gel and that tunnel was silicon rubber. In addition, earthquake observations at the site of the real subaqueous tunnel have been carried out using accelerometers and strain gauges set on the walls of the tunnel. At the site, micro-tremors were also measured. In these studies, it was noted that non-uniform displacements of the ground along the tunnel axis were caused variations of the dynamic behaviour of the ground, and that the tunnel deforms correspondingly to the varying deformations of the ground. From these experimental results, a mathematical

model of the subaqueous tunnel was formulated for anti-seismic design studies.

Okamoto, S Tamura, C *Earthquake Engineering and Structural Dynamics* Vol. 1 1973, pp 253-266; ORDER FROM: Wiley (John) and Sons Limited, Baffins Lane, Chichester, Sussex, England Repr PC

15 051272 SLURRY WALL TECHNIQUE EXPEDITES SUBWAY CONSTRUCTION. The slurry wall method provides control of seepage and percolation into open cuts and permits construction of deep concrete retaining walls before excavation of basement or subway areas is started. In the case of the Archer Street subway, the soil is predominantly sand, which is difficult to excavate between neat lines. The slurry wall was selected to contain the sand, which otherwise might slide, and to provide needed support of buildings abutting the street.

Galler, S (Transportation Administration) *Public Works* Vol. 104 No. 8, Aug. 1973; ACKNOWLEDGMENT: EI (EIX731103156); ORDER FROM: ESL, Repr PC, Microfilm

15 051273 SPECIAL FORMWORK CASTS TWO-LEVEL ARCH STATION UNDER STREET. Construction of the downtown sections of the area's 98-mile regional rail transit system in Washington DC is dealt with. Working 75 ft below the surface, special piggyback formwork was used to construct the 600-ft-long, two-level coffered arch station. Before any of the construction could begin, the contractors had to underpin any building that might be affected.

Engineering News-Record Vol. 191 No. 4, July 1973; ACKNOWLEDGMENT: EI (EIX731003591); ORDER FROM: ESL, Repr PC, Microfilm

15 051293 INNOVATIONS IN CONSTRUCTION METHODS FOR NEW JUNCTIONS OF MILAN METRO. After having indicated the present make-up of the underground network of Milan and its extensions being constructed at the present time, the author describes the methods used by the new manufacturers, in highly urbanized areas: 1) Earthwork under a cover supported by metallic beams in three parts making it possible to reduce the disturbance caused to automobile traffic. The cover was even built by means of prefabricated slabs in concrete constituting a built-in framework. 2) Previous consolidation of low coherency lands by means of injections of cement mixes, and then of sodium silicate and a catalyst. 3) Covering of dug walls by means of air projected concrete.

Salvini, A *Travaux* No. 463, Oct. 1973, pp 41-45; ACKNOWLEDGMENT: Travaux; ORDER FROM: Federation Nationale des Trav Publ & des Synd Aff, 6 Avenue Pierre Premier de Serbie, Paris 16e, France Repr PC

15 051402 SUBWAY AERODYNAMIC SCALE MODEL TESTING. Described is a 1/16-scale model test (SAT) facility designed, built, and operated for the purpose of studying the aerodynamics and thermodynamics of subway systems as they relate to the understanding and improvement of subway environmental control. The SAT facility is horizontal, the models run at real speeds, and the geometry is more realistic than previous experimental studies. A

detailed description of the SAT facility and the train models used is presented, as well as a discussion of the measurements made, and several examples of results, e.g.: drag coefficients, air flow motion values, as a function of tunnel venting. Drag coefficient results for a range of train blockage ratios and tunnel length-to-diameter (L/D) ratios are compared to a theory developed at CalTech by Harris and data from several drop tube experimental studies; the comparison is seen to be good. SAT facility data for several venting configurations are also presented.

Seeman, GR Culliah, CA Krachman, HE (Developmental Sciences, Incorporated); American Society of Mechanical Engineers Paper 73-ICT-57, Sept. 1973, 19 pp, 15 Fig; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; Contract UT-290-SC-3001; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

15 051427 COFFERDAM FOR BART EMBARCADERO SUBWAY STATION. Inward deformations of cofferdam walls during deep excavation in soft soils are inevitable but steps can be taken to minimize these movements. An excavation 1,160 ft (354-m) long by 55 ft (17 m) wide by 70 ft (21 m) deep in a busy downtown San Francisco street, flanked by major buildings, was performed for the BART Embarcadero station successfully in soil strata that contained varying depths of soft clay locally known as "recent Bay mud." To provide an impervious rigid cofferdam wall of adequate strength and reasonable thickness a soldier-pile and tremie concrete (SPTC) system of sheeting was selected. Successive excavation cuts below prescribed bracing levels were held to a practical minimum. Struts were preloaded to reduce compression deformations. Inclined meters recorded deflections of the walls while strain gages enabled determination of strut loads. The thicker the layer of soft clay the greater the inward movements of the walls notwithstanding the corresponding increases in wall sizes.

Armento, WJ *ASCE Journal of Soil Mechanics & Foundations Div Proceeding* Vol. 99 No. SM10, Paper 10075, Oct. 1973, pp 727-744; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

15 051428 TUNNEL SURVEY AND TUNNELING MACHINE CONTROL. An outline of the survey work necessary for the construction of a large tunnel project such as the San Francisco Bay Area Rapid Transit System is presented. In the second part of the paper, a method for shield or tunneling machine control by laser and double target is described. This method has proven successful during the driving of the tunnels of the BART system both by hand and machine methods.

Peterson, EW Frobenius, P *ASCE Journal of Surveying and Mapping Division Proceeding* Vol. 99 No. SU1, Paper #10008, Sept. 1973, pp 21-37; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

15 051583 SUMMARY OF PHASE II ACTIVITIES. The report has been prepared under the Transit Development Corporation (TDC) project, "Ventilation and Environmental Control

in Subway Rapid Transit Systems' and is one of many such reports leading to the final product—a 'Subway Environmental Design Handbook.' The report describes the various task assignments that were undertaken by all participating contractors during the second year of the project. It includes highlights of these activities, and identifies the major accomplishments. A list of the project technical reports prepared during the year is included. (Author)

Institute for Rapid Transit, (UMTA-DC-06-0010) Tech Rpt Jan. 1973, 31 pp; Prepared by Parsons, Brinckerhoff, Quade, and Douglas, Inc. See also report dated Jan 71, PB-201 877.; ACKNOWLEDGMENT: NTIS (PB-225201/3); ORDER FROM: NTIS, Repr PC, Microfiche; PB-225201/3, DOTL NTIS

15 053977 AN INTEGRATED ENGINEERING-PLANNING APPROACH TO THE PRESERVATION, IMPROVEMENT, AND REPLACEMENT OF ELEVATED TRANSPORTATION STRUCTURES. This paper outlines the considerations surrounding the community acceptance of elevated railroad and rapid transit structures, both old and planned for future construction. Covered are such factors as type of neighborhood affected, land use, traffic surveys, urban renewal plans, and environmental considerations. Particular emphasis is placed upon methods of improving existing elevated structures: evaluation of the physical condition and load-carrying ability of the structure, need for structural repairs, and improved analysis techniques. Computer modeling techniques have been applied to these studies. It is shown that through use of these techniques, the transit operator can more accurately plan renewal programs to reflect the community's needs.

Silver, ML Belytschko, TB Gelick, M (Illinois University, Chicago Circle); Society of Automotive Engineers Paper SAE #740029, SP-389, Feb. 1974, 8 pp, 7 Fig, 2 Tab, 11 Ref; The Office of University Research of the Department of Transportation, compiled this information under report No. DOT-TST-74-15.; ACKNOWLEDGMENT: SAE; ORDER FROM: SAE, Repr PC

15 054129 ESCALATORS IN RAPID TRANSIT STATIONS. As it becomes more apparent that comfort and convenience must be offered to the potential passenger to encourage him to change his travel mode, newer systems intend to install many more escalators per station. Several publications present escalator capacity recommendations ranging from 9,6000/hr to 10,7000/hr for 48-in. escalators operating at a speed of 120 fpm. While observed values were extrapolated to hourly volumes to permit comparison with existing capacity recommendations, it should be noted that peaking generally occurs within 1-min periods and a capacity value expressed in passengers per minute is more realistic. With this in mind, the recommended practical capacity would become 103 passengers per minute and the design value 90 passengers per minute, for 48-in. escalators operating at 120 fpm.

O'Neill, RS *ASCE Journal of Transportation Engineering* Proc Paper Vol. 100 No. TE1, #10333, Feb. 1974, 12 pp; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

15 054637 THE IMPORTANCE OF AERODYNAMICS IN THE DESIGN OF INTRA-URBAN TRAINS TRAVELLING IN TUNNELS. Aerodynamics can be a major factor in the design and operation of intra-urban subway-train transportation systems. In order to develop an adequate understanding of the aerodynamic characteristics of such systems, an experimental program was carried out. The major portion of the testing was conducted under equilibrium, incompressible conditions so that the fundamental aerodynamic characteristics could be isolated. The effects of geometric parameters (such as train speed, blockage ratio, wall roughness and train tunnel length) upon train drag and tunnel flow velocities were determined and compared with a simple theoretical model. The effect of aerodynamic forces upon typical subway-train operations is shown in order to give proper perspective to the importance of aerodynamics.

Kurtz, DW Dayman, B *High Speed Ground Transportation Journal* Vol. 7 No. 3, Sept. 1973, pp 381-399; ACKNOWLEDGMENT: British Railways (30110); ORDER FROM: Planning Transport Associates, Incorporated, Box 482A, Duke Station, Durham, North Carolina, 27706 Repr PC

15 054661 MONTREAL METRO, A DOWNTOWN SUCCESS, IS NOW SPREADING OUT. Montreal is undertaking an expansion programme, costing \$630 million, that will increase the subway system by 32.5 miles. To date the whole system has been paid for by the city and surrounding communities but Quebec may start to contribute to the operating deficit. A major advantage of rubber tired trains is that they can climb a steep grade (part of the new extension will be 6.5%) and hence construction costs are reduced. On the other hand, the track has to be completely enclosed which limits the system's expansion into the suburbs. Some outlying communities are reluctant to have the subway serve their area. They fear that shoppers will be attracted to Montreal.

Kizzia, T *Railway Age* Vol. 175 No. 5, Mar. 1974, 2 pp; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: XUM, Repr PC

15 054927 UNDERGROUND FORECAST: HUMAN WAYS OUT OF AN URBANIZATION DILEMMA. Tunnelling has obvious connections with the urbanization process in the world. Tunnels and other subsurface constructions play an important part in supply plants which provide power, water and communications. Increasing density in the more developed urban areas demand increasing subsurface space for these activities and for storage and certain industrial processes. Where the urbanization is far developed—that is in the central business districts of big cities—the subsurface space is the saving possibility to guarantee the functions in the metropolitan area. The intention of this article is to propose a hypothesis for the future development of tunnelling in the world as a whole.

Jansson, B *Tunnels and Tunnelling* Vol. 6 No. 1, Jan. 1974, 3 pp, 8 Fig; ACKNOWLEDGMENT: Tunnels and Tunnelling; ORDER FROM: ESL, Repr PC, Microfilm

15 054930 VENTILATION FOR UNDERGROUND RAILWAYS AND MOUNTAIN TUNNELS. This report compares the temperature and humidity in underground railway tunnels and those in mountain tunnels, on the basis of information available to the JNR, for the purpose of furnishing data on which to base the choice of ventilators and air-conditioners to be used in underground railways to be constructed in future.

Fukuchi, G Saito, S *Permanent Way* Vol. 15 Dec. 1973, 13 pp; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL, Repr PC, Microfilm

15 056758 PERFORMANCE ANALYSIS OF NATURAL-DRAFT AIR-COOLERS FOR SUBWAY TUNNEL COOLING. Recently, the air temperature in subway tunnels has risen to more than 30 degrees C due to the heat of many electric cars, many passengers, etc. Then, the natural-draft type air-coolers have made it possible for use to cool the air in the subway tunnel as low as 20 degrees C. The authors believe that the method will be the first development in the field of subway tunnel cooling. In this paper, authors present a method of analysis for a natural-draft type air-cooler and delineate the performance of a natural-draft type air-cooler under various conditions obtained by use of a digital computer.

Kamada, K (Hitachi Plant Engineering and Construction Company) Miki, H *Heat Transfer-Japanese Research* Vol. 2 No. 4, Dec. 1973, pp 101-117, 11 Ref.; ACKNOWLEDGMENT: EI (EIX740505074); ORDER FROM: ESL, Repr PC, Microfilm

15 056776 CONCRETE VS. STEEL AERIAL GUIDEWAY TRADEOFFS. The designer of an aerial guideway structure for new transit systems has a choice of two major construction materials concrete and steel. His selection will depend largely on four considerations: esthetic, structural, economic, and acoustical. Esthetic considerations cover such matters as configuration, compatibility of the structure with the environment, color, and surface texture. Structural considerations cover foundation requirements and size and shape of members to accommodate the design loads. Economic considerations include comparative costs of girders of various lengths, ease of installation in available right-of-way, comparison techniques possible through the use of one material or another, capability of local materials producers in terms of both technological expertise and plant capacity, and comparative cost of maintenance. Acoustical considerations include the ability of the material to minimize noise or to permit treatment which will absorb noise. Neither steel nor concrete offers all of the characteristics sought. By a process of both objective analysis and good taste, the designer selects one or the other, or produces a composite design to incorporate the better features of both.

Froid, SH (Tudor Engineering Company) Sacco, JJ; Society of Automotive Engineers Preprint Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504626); ORDER FROM: ESL, Repr PC, Microfilm

15 056819 VEHICULAR TUNNEL DESIGN THROUGH AREA WITH NUMEROUS MINING SHAFTS [VERKEHRSTUNNEL IN BERGSENKUNGSGBIETEN]. Design aspects and calculation methods are shown of a

project for an underground rapid transit system in the West German Ruhr mining area. The influence of mine shafts is studied for stresses in tunnels and adequate design measures. [German]

Spickernagel, H (Ruhr University) Duddeck, H Hollmann, F Kotulla, B Meissner, H Westhaus, KH Zerna, W *Konstruktiver Ingenieurbau Berichte* No. 15, 1973, 114 Ref; ACKNOWLEDGMENT: EI (EIX740100884); ORDER FROM: ESL, Repr PC, Microfilm

15 056848 HEAT IN SUBWAYS. The various heat sources in a subway rapid transit system are quantified and their spatial distribution along the tunnels and stations are determined. The results show that the trend to higher speeds will create a much larger heat load on the subways thus potentially driving the temperatures even higher than experienced in existing systems. Strategies for controlling the subway temperature by traditional technology are discussed as well as the opportunities for application of new technologies.

Murray, JA (Kaiser Engineers) Tyrill, AF ; American Society of Mechanical Engineers Paper N73-WA/RT-5, Nov. 1973; ACKNOWLEDGMENT: EI (EIX740104843); ORDER FROM: ESL, Repr PC, Microfilm

15 056857 AERODYNAMIC TESTING TECHNIQUE FOR SCALE MODEL SUBWAY VENT SHAFTS AND STATIONS. Describes a 1/16-scale model test (VST) facility designed, built and operated for the purpose of studying the aerodynamic characteristics of subway vent shafts and stations. The VST facility is a steady-state test facility, where geometrically realistic scale model subway components are tested and evaluated. The fluid mechanic behavior of the vent shafts and stations is characterized in terms of driving potential, impedances and geometry. A detailed description of the VST facility, a discussion of the measurements and an example of a vent shaft test are presented and compared to analytical predictions.

Seeman, GR (Developmental Sciences, Incorporated) Krachman, HE El Raheb, MS ; American Society of Mechanical Engineers Paper 73-WA/Aut-10, Nov. 1973, 7 Ref; ACKNOWLEDGMENT: EI (EIX740304681); ORDER FROM: ESL, Repr PC, Microfilm

15 056871 RECONSTRUCTING LONDON'S UNDERGROUND. Sections of London's Underground are a century old, and continuous reconstruction and improvement has been in progress for the last 50 years. LT's former Chief Civil Engineer gives a fascinating account of how this updating has been carried out while keeping traffic moving. While of great interest to the general reader, the specialist will find it a useful key to a complicated subject which, with its copious references, will lead him to more detailed accounts of unusual and difficult tasks faced in urban railway building. The subjects range from the enlargement of the City & South London tube tunnels in the 1920s to the very recent reconstruction of Moorgate station.

Follenfant, HG ; London Transport ; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: London Transport, Griffith House, 290 Old Marylebone Road, London NW1 5RJ, England Repr PC

15 056877 PRAGUE METRO OPENS THIS MONTH. Faced with the problem of weight restrictions imposed by a major bridge designed to carry tramcars, Czech industry developed ultra-lightweight rolling stock for the Prague metro, but strengthening the bridge ultimately made it possible to use conventional stock.

Railway Gazette International Vol. 130 No. 5, May 1974, pp 183-184, 5 Photos; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

15 056954 THEORETICAL AERODYNAMIC CHARACTERISTICS OF VEHICLES IN CONFINED SPACES. The report has been prepared under the Transit Development Corporation (TDC) project, 'Ventilation and Environmental Control in Subway Rapid Transit Systems,' and is one of many such reports leading to the final product—a 'Subway Environmental Design Handbook.' It describes the results of a theoretical effort pertaining to the non-steady flow in a tunnel induced by a moving vehicle. A study is made of the entry problem and the problem of a vented tube.

Transit Development Corporation, Incorporated, (UMTA-DC-06-0010) Tech Rpt Mar. 1974, 39 pp; Prepared by California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.; Grant DOT-UT-290; ACKNOWLEDGMENT: NTIS (PB-231385/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231385/6, DOTL NTIS

15 057435 MODERN TUNNELING METHODS SPEED MONTREAL METRO. The method described is to advance a tunnel section on two faces concurrently from a centrally located access shaft. Two gantry-type jumbo drills are used each equipped with five Tamrock hydraulic booms and drills.

Engineering and Contract Record Vol. 87 No. 3, Mar. 1974; ACKNOWLEDGMENT: EI (EIX740600034); ORDER FROM: ESL, Repr PC, Microfilm

15 057436 SILENT UNDERGROUND TO HEATHROW. Access to London's Heathrow airport will be improved by a new extension of the Underground railway. Natural-rubber bearing pads will ensure that houses near the new line are not disturbed by traffic vibration. The extension, 3.5 mi (5.6 km) long, will be in a tunnel constructed by the cut and cover technique. A novel feature of the line is that in the residential area of Hounslow the track is not laid directly on the floor of the tunnel. Instead it is contained in reinforced concrete troughs, each 7m (22 ft) long and weighing about 20 tons. After the concrete has set the precast units are lowered into place with specially designed handling equipment. The separate troughs are then joined with in situ concrete to form two continuous parallel decks. It is here that the natural rubber bearings become involved. They fulfil a dual role. They function as transverse strip bearings. Each trough is symmetrically supported by two rows, 18 ft (5.4 m) apart, of five bearings. These take care of the vertical load. In addition, bearings will be inserted between each trough and the tunnel wall, and between the two troughs; here they function as supporting side bearings.

Rose, IG (National Rubber Producers Research Association) *Noise Control and Vibration Reduction* Vol. 5 No. 2, Mar. 1974, 13 pp, 1 Ref.;

ACKNOWLEDGMENT: EI (EIX740605171); ORDER FROM: ESL, Repr PC, Microfilm

15 057521 RAPID TRANSIT TO EASE CALCUTTA'S CONGESTION. Work is now under way on a 16-km underground line along the most severely congested corridor in Calcutta. Scheduled to open in 1979, the line is being constructed largely by cut-and-cover through difficult subsoil conditions in one of the most densely populated urban areas in the world.

Mukherjee, SS, General Manager (Metropolitan Transport Project (Railways)) *Railway Gazette International* Vol. 130 No. 6, June 1974, pp 232-235, 2 Photos; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: XUM, Repr PC

15 057714 DON'T LOOK NOW, BUT The New York City Transit Authority is undergoing a \$2.5 billion, 40 route mile expansion. Most of the work is being done on two new subway lines and construction to further unify the Long Island Railroad with the subway system. Major improvements have been made in a new subway car design called R-44 that make it the most comfortable ride in North America.

Roberts, R *Modern Railroads* Vol. 29 No. 7, July 1974, pp 50-53; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

15 057724 THE HEAT INPUT OF UNDERGROUND RAILWAYS. Increases in acceleration and speeds and consequent higher power, combined with a denser traffic pattern bring about rises in heat input and the data presented enables the volume of air required to be estimated.

Koffman, JL *Rail Engineering International* Vol. 4 No. 5, June 1974, p 213; ORDER FROM: ESL, Repr. PC, Microfilm

15 057872 VIBRATION REDUCTION BY VIBRATION-PROOF MATS IN TOKYO SUBWAY. Noises and vibrations produced by trains running in a subway tunnel propagate through earth and sometime affect nearby buildings. While noises and vibrations resulting from the contact of wheels and rails are the principal source, the most effective way to reduce the problem is to alter the track structure. Vibration-proof mats of used rubber tires are used under the ballast of the Chiyoda Line. They functioned as desired but the track settled about 3 mm on account of reduced elasticity.

Fujiwara, T Nakamura, S Kazamaki, T (Teito Rapid Transit Authority, Japan) *Permanent Way* Vol. 15 No. 3, No. 56, p 28; Also available through Japan Railway Civil Engineering Association; ACKNOWLEDGMENT: Permanent Way; ORDER FROM: ESL, Repr. PC, Microfilm

15 071769 EFFECT OF ENVIRONMENT ON RAPID TRANSIT CONSTRUCTION. Rapid transit systems must be constructed in a hostile environment. The space required for construction is already crowded. Hindrance of traffic must be avoided or minimized. Existing utility systems and adjacent structures must be maintained and

remain useful during construction and must be restored to as good as, or better than, original condition upon completion. Care must be exercised to minimize imitation or harm to the public. All these factors cost extra expense and time, but the effect may be lessened by preparatory work, by vigorous public relations, by working closely with governing officials, and by timely acquisition of real estate.

Kline, GO *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE2, 9751, May 1973, pp 367-370; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

15 071790 CAISSONS SET FOR MAGNETIC TRAIN. Foundations for pillars to support the guideway of Ontario's experimental urban transit line are nearing completion. The primary foundation work involves installation of 481 caissons to support the 225 precast columns that carry the elevated guideway. The unlined caissons, also augered 2 feet into the bedrock have been straightforward for the most part. The main difference at these locations is the size of the reinforcing cage.

Jones, B *Engineering and Contract Record* Vol. 87 No. 5, May 1974; ACKNOWLEDGMENT: EI (EI 74 802883); ORDER FROM: ESL, Repr. PC, Microfilm

15 071792 GEOTECHNICAL CONSIDERATIONS IN PLANNING OF CLOSE-TO-SURFACE EXCAVATIONS IN URBAN AREAS, DESCRIBED IN AN EXAMPLE OF THE SUBWAY TUNNEL IN THE CITY OF LEIPZIG, EAST GERMANY [Geotechnische Erwägungen bei der Planung von Oberflächennahen Hohlraumabauten in Stadtraumen, Dargestellt unter Verwendung des Beispiels des Geplanten V-Bahn-Tunnels in Leipzig]. Special aspects of the underground excavations in urban areas consist of the confrontation with the fixed municipal installations. Under these assumptions, this paper describes various applications of the most important tunnel-configurations, when excavated from the surface and covered thereafter. Classification of configurations is made based on the techniques for supporting the vertical walls of the excavation. [German]

Siegmundt, M *Neue Bergbautechnik* Vol. 4 No. 4, Apr. 1974, pp 265-272, 21 Ref; ACKNOWLEDGMENT: EI (EIX740803133); ORDER FROM: ESL, Repr. PC, Microfilm

15 071814 SPECIAL SHORING SPEEDS SUBWAY. It is reported how by combining some special forming rigs used on previous San Francisco Bay Area subway jobs with prefabricated grillage shores, it was possible to speed construction of two subway stations beneath a busy San Francisco street.

Western Construction Vol. 49 No. 5, May 1974 ACKNOWLEDGMENT: EI (EIX740703199); ORDER FROM: ESL, Repr. PC, Microfilm

15 071988 PRECAST WALLS DROP INTO PLACE IN SIX EASY STEPS. This article describes how working in a tight area and along a busy route was made possible by slipping precast concrete sections into the ground to form smooth, strong subway walls quickly and neatly.

Pilarski, L (McGraw-Hill World News) *Construction Methods and Equipment* Vol. 56 No. 7, July 1974; ACKNOWLEDGMENT: EI (EIX740901355); ORDER FROM: ESL, Repr. PC, Microfilm

15 072208 SUBWAY PROBLEMS [I problemi delle Metropolitane]. This book is the second volume of a research devoted to the subways' problems. It is essentially the work of a structural engineer on the various architectural problems that the construction of a subway must meet. Chapter ten analyzes different methods of tunnel excavation, considerable space is given to the history of tunnels and to the problems that their construction may create for the surrounding buildings; with respect to this last point various architectural solutions-Europa Haus in Berlin, the Church of Auteuil in Paris, the E-O line in London, the Dnieper tunnel in Kiev-are examined in some detail. Chapter 11 is devoted to the features of an optimal route for a subway system. Chapter 12 treats the problem of stations from a functional point of view: location, maximum number of buildings, maximum speed of the escalators, the minimal set of rules to which the buildings of a station must conform and an overview of the most remarkable international experiences are covered in this chapter. Chapters 13,14,15 deal respectively with a study of the materials to be used, the main features of the network, and the electricity network that goes with subway systems. The last three chapters deal with the problems that may drive from insufficient automation, from the construction of special plants-made necessary, for example, by the particular conditions of the soil-and with the extremely serious problem of financing and managing the economics of a subway system. [Italian]

Polese, A ; Centro Esperimenti e Ricerche Trasporti Urb e Met No. 2, Dec. 1974, 246 pp, 117 Fig., 34 Tab.; ACKNOWLEDGMENT: TSC; ORDER FROM: Centro Esperimenti e Ricerche Trasporti Urb e Met, Italy Repr. PC

15 072226 MODERN METHODS OF TUNNEL CONSTRUCTION [Les procedes modernes de construction des tunnels]. Reprint of program and papers of the conference on Tunnel Construction 1) Nice faces its expansion. Needs in transportation infrastructure, especially tunnels. 2) Possibilities and limitations of underground construction in Nice. 3) Conception and characteristics of the Cimiez tunnel in Nice. 4) Construction work on the Cimiez tunnel. 5) Planning the Autoroute A8 in the Department of the Maritime Alps. 6) Construction plan for tunnels on Rte A8. 7) Possible problems at the execution of underground cavities by the new Austrian tunnelling method (not reprinted here). 8) Interesting points in preliminary research. 9) Completion of tunnels on the A8. 10) Experimental sections of the City Center Tunnel (Tunnel Centre Ville) of Marseille. 11) Doubling the tunnel of Saint Cloud/Paris: a new tunnel parallel and close to the old one. 12) The Tunnel under the Channel: Calais-Dover. 13) Recent achievements in rapid transport by the R.A.T.P. (Paris). 14) Tunnels of the French alpine highways. 15) Use of modern methods in the construction of subterranean galleries of the E.D.F. [French]

Ministry of Construction, France 1974, 224 pp, Figs.; Research Conference, Nice, October 1974.;

ACKNOWLEDGMENT: TSC; ORDER FROM: Ministry of Construction, France, Paris, France

15 072457 LEGAL, ECONOMIC, AND ENERGY CONSIDERATIONS IN THE USE OF UNDERGROUND SPACE. The U.S. National Committee on Tunneling Technology was established in 1972 to stimulate advancement in effective use of the subsurface. Improvements in technology and increased access to the underground result in benefits to society from the availability of additional mineral resources and in opportunities to use underground space for many purposes. Increased access gives rise to problems in legal and other social systems. This workshop examined and discussed the problems and their possible solution. Among the eight papers are: Development of Policy for Airspace; Legal Aspects of Use of the Underground; Planning the Underground Uses; and Economic Trends and Demand for the Development of Underground Space.

National Academy of Sciences Proceeding 1974, 121 pp, Figs., Tabs., Refs.; Proceedings of a workshop organized by Standing Subcommittee No. 3 of the US National Committee on Tunneling Technology, National Research Council and held in conjunction with the Engineering Foundation Conference, Need for National Policy for the Use of Underground Space, held 24-29 June 1974, in South Berwick, Maine. This book is RANN Report, NSF/RA/S-74-002.; Contract C310-268-000; ORDER FROM: National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr. PC

15 072939 CONSTRUCTING WASHINGTON, D.C.'S, METRO SUBWAY. This massive subway project with an eventual \$3.9 billion price tag involves extensive tunneling and construction of stations under Washington, D.C., in difficult soil and rock conditions. Many different contractors are at work and there are diverse approaches to construction problems. Underpinning many of Washington's official buildings is a crucial aspect of the project. Nearly 1,000 civil engineers are on the job: Bechtel is overseeing the immense undertaking.

Wilhoit, EE, Jr *ASCE Civil Engineering* Vol. 44 No. 11, Nov. 1974, pp 74-77, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: ASCE Civil Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

15 072952 BETTER CONTRACTING FOR UNDERGROUND CONSTRUCTION. Increasing pressure for preservation of surface environments in urban and rural areas is forcing the utilization of subsurface space for transportation and other purposes. Technological developments, such as in rock mechanics and in tunneling machines, will make possible the rapid and successful utilization of subsurface space. For several years it has been recognized that contracting practices in the U.S. are inadequate for even past methods and constitute a serious barrier to application of new technology and to economical development of underground space. This survey of U.S. and foreign underground construction results gives 17 recommendations for improving contracting practices.

National Academy of Sciences, (NSF/RA/S-74-005) 1974, 134 pp, Refs., 8 App.; Report of a study conducted by Standing Subcommittee No. 4, Contracting Practices, of the U.S. National

Committee on Tunneling Technology, NAS-NAE.; Contract NSF-C310-274-000; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236973, DOTL NTIS

15 080077 TUNNELLING BELOW THE STUTTGART HBF STATION BUILDINGS FOR THE S-BAHN [Unterfahrung des Empfangsgebäudes Stuttgart Hauptbahnhof durch die S-Bahn. Planung und Ausführung]. The authors describe foundation and underpinning work in connection with tunnel construction below the Stuttgart Hbf station buildings for the new rapid transit system (S-Bahn) without interfering with pedestrian movement. [German]

Bubel, H Ellwanger, G *Eisenbahntechnische Rundschau* Vol. 23 No. 7/8, July 1974, pp 274-281, 11 Fig.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra[Verlag, Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

15 080081 THE S-BAHN OVERPASS AT FRANKFURT (MAIN) WEST [Das S-Bahn-Überführungsbauwerk im Bahnhof Frankfurt (Main) West]. A long crossing structure next to and between the running lines is required for an independent routing of the S-Bahn in Frankfurt (Main) West station. The Author explains the choice of a prestressed-concrete bridge structure and deals in particular with the compensation of unequal sinkages. [German]

Prommersberger, G *Eisenbahntechnische Rundschau* Vol. 23 No. 9, Sept. 1974, pp 354-365, 13 Fig., 1 Tab.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Hernichel und Dr. Strauss, Darmstadt, West Germany Repr. PC

15 080304 A TALE OF THREE TUNNELS. This article describes "available techniques" adapted to resolving the unique problems associated with construction of three submerged under-water tunnels, each of which was confronted with a different problem. The projects are the steel-shell tube of the Hong Kong vehicular tunnel, the trench method used for the four-track tunnel of the Metropolitan Transportation Authority under the East River in New York City, and the second Hampton Roads Tunnel in Virginia which required a system of surcharged sand drains.

Kuesel, TR (Parsons, Brinckerhoff, Quade and Douglas, Inc) *ASCE Civil Engineering* Vol. 44 No. 12, Dec. 1974, pp 50-53, 4 Phot.; ORDER FROM: ESL, Repr. PC, Microfilm

15 080417 PAPERS PRESENTED AT THE WAYS AND STRUCTURES AND GENERAL SESSIONS OF THE ATA RAIL TRANSIT CONFERENCE HELD IN SAN FRANCISCO, CALIFORNIA ON APRIL 16 AND 18, 1974. Four of these papers concern problems facing the Bay Area Rapid Transit District and the way they are being resolved. Mr. McCutcheon discusses tunnel ventilation, Mr. Mahon deals with track maintenance as well as building and grounds and fire prevention. Mr. Storey deals with measuring vehicle noise and Mr. Todd discusses means of minimizing electrical leakage from running rails. Mr. Lawrence discusses recently completed tunnel construction in Toronto as well as the current construction of the Spadina subway and the

unique geology water and vibration problems encountered. The paper by Mr. Reed and Mr. Harris deals with the National Transportation Safety Board and its work with rail rapid transit systems. Mr. Aboudara describes the Transit Development Corporation and three of its on-going projects.

Todd, P Storey, HE Lawrence, ST McCutchen, WR Mahon, VP ; American Public Transit Association, National Transportation Safety Board, Transit Development Corporation, Incorporated, Bay Area Rapid Transit District ATA-RT-74-4, Sept. 1974, 140p; ACKNOWLEDGMENT: NTIS (PB-236563/3SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236563/3SL, DOTL NTIS

15 080425 AERODYNAMIC NEAR FIELD OF A SUBWAY TRAIN IN SMOOTH AND ROUGH TUNNELS. The report has been prepared under Transit Development Corporation project, 'Ventilation and Environmental Control in Subway Rapid Transit Systems,' and is one of many such reports leading to the final product—a subway environmental design handbook. A theoretical model for the near field aerodynamics of a subway train in smooth and ribbed tunnels has been developed. The theoretical results have been compared with experimental data measured in a number of different facilities over a wide range of experimental conditions.

Harris, GL ; Transit Development Corporation, Incorporated, Urban Mass Transportation Administration Tech. Rpt. Jan. 1973, 34 pp; Grant DOT-UT-290; ACKNOWLEDGMENT: NTIS (PB-237364/5SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237364/5SL, DOTL NTIS

15 080503 INTERNATIONAL SYMPOSIUM ON THE AERODYNAMICS AND VENTILATION OF VEHICLE TUNNELS. SESSION G. SESSION G OF THE SYMPOSIUM CONTAINS THE FOLLOWING PAPERS: RESEARCH AND ANALYSIS OF SUBWAY RAPID TRANSIT SYSTEM AERODYNAMICS AND THERMODYNAMICS, DANZIGER,NH; EXPERIMENTAL STUDIES RELATING TO THE AERODYNAMICS OF TRAINS TRAVELLING IN TUNNELS AT LOW SPEEDS, DAYMAN,B AND KURTZ,DW; THE GENERATION AND ALLEVIATION OF AIR PRESSURE TRANSIENTS CAUSED BY THE HIGH SPEED PASSAGE OF VEHICLES THROUGH TUNNELS, FOX,JA AND VARDY,AE; WAVE ACTION ASSOCIATED WITH A TRAIN ENTERING A TUNNEL, WOODS, WA. /TRRL/

Danziger, NH (Parsons, Brinckerhoff, Quade and Douglas, Inc) Dayman, B Kurtz, DW (California Institute of Technology) Fox, JA Vardy, AE (Leeds University, England) Wood, WA (Liverpool University, England) ; BHRA Fluid Engineering Company Conf Paper 1974, Figs., Tabs., Photos., Refs.; Symposium was held in April 1973.; ACKNOWLEDGMENT: TRRL (IRRD 210287)

15 080504 INTERNATIONAL SYMPOSIUM ON THE AERODYNAMICS AND VENTILATION OF VEHICLE TUNNELS. SESSION C. SESSION C OF THIS SYMPOSIUM CONTAINS THE FOLLOWING PAPERS: ENVIRONMENTAL CONTROL IN RAIL

TUNNELS, HARK, WB; AERODYNAMIC ANALYSIS OF VEHICLES IN TUNNELS, STROM, CR: THE AERODYNAMICS OF VEHICLES PASSING THROUGH TUNNELS, HAMMITT, AG; RE-EXAMINATION OF THE AERODYNAMICS OF VEHICLES IN ENCLOSED GUIDEWAYS, FDA, JV. /TRRL/

Hark, WB (Kennedy and Donkin) Strom, CR (Mitre Corporation) Hammitt, AG Foa, JV ; BHRA Fluid Engineering Company Conf Paper 1974, 52 Fig., 1 Tab., 43 Ref.; Symposium was held in April 1973.; ACKNOWLEDGMENT: TRRL (IRRD 210283)

15 080702 PIPE JACKING-A TECHNIQUE FOR SOFT GROUND TUNNELLING. THE PAPER DEALS WITH PIPE JACKING, A TECHNIQUE WHICH IS DESIGNED FOR THE CONSTRUCTION OF SEWER LINES, PEDESTRIAN SUBWAYS, IRRIGATION CONDUITS, ETC, BELOW GROUND WITHOUT DISRUPTING THE SURFACE AMENITIES. THE METHOD IS PARTICULARLY APPLICABLE TO SOFT GROUND WHERE TRADITIONAL MINING AND TUNNELLING PROCESSES MAY BE DIFFICULT. THE PAPER ALSO CITES BRIEFLY SOME PROJECTS WHERE THIS TECHNIQUE HAS BEEN EMPLOYED SUCCESSFULLY.

Basu, NK (Cementation Company Limited) *Indian Concrete Journal* Vol. 47 No. 9, Sept. 1973, 8 pp, 2 Fig., 6 Phot., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 210210)

15 080712 RESEARCH AND DEVELOPMENT IN WEST GERMAN TUNNELLING. The author gives an account of the general situation in Germany, where the underground railways are the most important area in which tunnelling is being carried out. He lists the main groups of research institutions that work on tunnelling, and their main areas of work. An outline is given of the research subjects for which information is available; these are divided into those which are finished and those that are still underway. Mention is made of individuals and organizations doing the work and publications that are available. Subjects include measuring instruments, tunnel linings, tunnelling machines, tunnelling by means of drilling the blasting, tunnel statics and rock mechanics, and the waterproofing of tunnels. Some of the general aspects of the work which is to be carried out in the near future are discussed; this includes studies of improving rock strength with plastics, the development of a special rock bolt for stress measurement, stress distributions near rock caverns, optical methods for measuring deformation, and safety matters. The author concludes with comments on International Cooperation in Research on Tunnelling and the formation of a German committee for underground construction work.

Girnau, G *Tunnels and Tunnelling* Vol. 5 No. 6, Nov. 1973, pp 549-556, 11 Fig., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 207892)

15 080713 SYDNEY RAIL TUNNEL MACHINERY. This short article is concerned with details of the boring machinery that has been used in the twin rail tunnels between Edgecliff and Bondi junction near Sydney in Australia. It is the largest of its kind in Australia. Eight motors were

used in conjunction with hydraulic pumps to exert a thrust of 180kn and a torque of 650 kilonewton metres on the cutting wheel, and gripping legs which stabilized the machine, and permitted transmission of the thrust and torque to the tunnel face. Details are given of the dust spoil extraction system and of the 1.67 km conveyor system that was used to remove the 152 tonnes of spoil per hour. The power supplies for the boring machine and tunnel services, the provisions that were made for eventual partial failure of the supply, and the method of connecting the power line to the machine are described. The article concludes with details of the organizations that took part in this 8 million dollar contract. It is accompanied by illustrations of the machine cutting head and of the motors and pumps.

Jessop, MP (Brook Motors) *Tunnels and Tunneling* Vol. 5 No. 6, Nov. 1973, p 564, 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 207894)

15 080932 TUNNEL BORING MACHINES--A MEANS TO RAILWAY LINE IMPROVEMENT. The paper which describes tunnel boring machines (used in Europe) for improving railway routes by shortening them and reducing grades, mentions the proposed tunnel beneath the English Channel for a double-track railway line, and suggests improvements in tunnel equipment for improved productivity of the machines. The machines may be one of two main types; the soft machine is usually of the face trace type and is capable of cutting vertical sides and arch roof; machines used for hard rock cutting are generally of the full face type and are capable of cutting a circular bore only. Figures are presented which describe the machines and illustrate their mode of action. Instances are describe of the use of the boring machine when both hard and soft rock are encountered together, when fault zones are encountered, and when the rock being worked upon, deteriorated on exposure to air (necessitating shotcrete application). Experience of the Swiss Federal Railways is described, as well as European designs which call for concrete ties to be nested into the slabs. Design features are listed that will not necessitate stoppage of the boring machine for any abnormal length of time. Standardizing of the size of machine components is urged. The use of boring machines is highly economical and rapid, and can be highly automated (using one operator only per shift).

MacNabb, TC (Canadian Pacific Railway) *AREA Bulletin* Vol. 75 No. 468, 75-648-9, June 1974, pp 779-796, 18 Fig.

15 082870 STAGE POST-TENSIONING--A VERSATILE AND ECONOMIC CONSTRUCTION TECHNIQUE. The author, whose company has been a prime developer of stage post-tensioning, describes the mechanics and structural advantages of this new and powerful prestressing technique and discusses its application to several major high rise structures. Some of the structures include large girders (of minimum depth) over subways and supporting high rise buildings, girders in nuclear facilities, girder ties in buildings with sloping columns, and in the foundation of the world's tallest free-standing tower. It is concluded that stage post-tensioning will play an important role in the future growth of the prestressed concrete industry.

Slater, WM (Conenco International Limited) *Prestressed Concrete Institute, Journal of* Vol. 20 No. 1, Jan. 1975, pp 14-27, 14 Fig.

15 083030 MAJOR PROGRESS ON LT FLEET LINE INCLUDING TWO STEP-PLATE JUNCTION TUNNELS. The 21-mile twin-tunnel construction linking Baker Street station on the Bakerloo Stanmore branch with the new Fleet Line tunnels bored to Strand station which incorporate two step-plate junctions, these encircling existing running bore shells which are now to be dismantled. An enterprisingly executed task enabling train running to continue with a minimum of delay.

Rail Engineering International Vol. 4 No. 9, Nov. 1974, pp 422-424 ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: ESL, Repr. PC, Microfilm

15 083051 MELBOURNE RAIL LOOP PIERCES VARIED GEOLOGY. Australian contractors are piggybacking two pairs of tunnels under Melbourne to provide a four-track commuter rail loop for the central business district. Because of varying geology, construction methods range from a tunnel boring machine (TBM) to drift mining, plus cut and cover. The 8-mile loop is an extension of the existing suburban rail system, connecting radial lines.

Engineering News-Record Jan. 1975, 2 pp, Phot. ACKNOWLEDGMENT: Engineering News-Record; ORDER FROM: ESL, Repr. PC, Microfilm

15 083757 LINKING UP THE LIVERPOOL LOOP. THE CONSTRUCTION OF AN UNDERGROUND RAIL NETWORK LINKING FOUR STATIONS IN LIVERPOOL IS DESCRIBED. THE EXTENSION OF EXISTING RAIL SERVICES IS AIMED AT REDUCING THE CONGESTION IN LIVERPOOL'S CENTER CITY. LARGE CAR PARKS ARE TO BE PROVIDED AT STATIONS TO ENCOURAGE PEOPLE TO TRAVEL INTO THE CITY BY TRAIN. THE LOOP AND LINK TUNNELS WERE DRIVEN THROUGH SANDSTONE, WHICH VARIES IN COMPRESSIVE STRENGTH FROM 5-28 MN/M2. MODIFICATIONS TO THE DOSCO TUNNELER USED ARE DESCRIBED. COLLIERY ARCH GIRDERS SUPPORT THE WEAKER SANDSTONE AND IN-SITU CONCRETE LINING WAS USED. SPRAYED CONCRETE LINING WAS SUITABLE FOR THE STRONGER SANDSTONE. IN THE STATIONS THE 7.5M TUNNEL HAS EXTENSIVE RIB SUPPORT. CONSTRUCTION DETAILS OF THE 5.1M EXTERNAL DIAMETER TUNNELS FOR THE 1.8 KM LINK ARE GIVEN. THE DOWNLINE TUNNEL PASSES THROUGH A DISUSED TUNNEL, WHICH WAS FILLED WITH CONCRETE AFTER THE SHAPE OF THE NEW UPLINE TUNNEL HAD BEEN FORMED IN POLYSTYRENE. THE CONTRACT IS SCHEDULED FOR COMPLETION IN DECEMBER 1976.

Gosney, J *Contract Journal* Vol. 261 No. 4959, Sept. 1974, pp 38-40, 1 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 211489)

15 083923 FAST SET SHOTCRETE IN CONCRETE CONSTRUCTION. Shotcrete as a supporting material for tunnel and for tunnel lining

has not been used a great deal in North America. This paper discusses the technique of coarse aggregate shotcreting and how it is being used today. In the past shotcreting was used on a limited basis, mainly as a rock sealant technique. With advances in technology and equipment, an increased use of coarse aggregate shotcrete in tunnels and underground mines is expected. The main thrust is coming from the ability to use accelerators in wet mix shotcrete.

Stenson, HN *American Concrete Institute, Journal of* Vol. 71 No. 6, June 1974, pp 289-295; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL, Repr. PC, Microfilm

15 084123 HISTORY OF LOADS AND DISPLACEMENTS FOR A DEEP EXCAVATION IN A MIXED SOIL PROFILE. A history of the behavior of an 82-ft-deep excavation for the Washington, D.C. subway is presented. Improvements in the methods for limiting and forecasting soil movements should result in reduced construction costs and damage claims. It was found that the largest volume of soil displacement takes place beneath the advancing excavation and accounts for approximately 60 percent of the total lateral displacement. Maximum apparent earth pressure for this excavation can be predicted by a trapezoidal earth pressure envelope of width 0.25 gamma H (where gamma is the soil unit weight of 120 pcf and H is the full depth of excavation).

O'Rourke, TD Cording, EJ (Illinois University, Urbana) *Transportation Research Record* No. 517, 1974, pp 1-15, 19 Fig., 14 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

15 084739 SIMULATION OF A PASSENGER FLOW THROUGH A RAPID TRANSIT STATION. This report presents the development of a mathematical model to describe the flow of passengers through a rapid transit interchange. The model represents a key element in the development of a completely rational approach to the design of transportation interface facilities, and depicts the movement of pedestrians as sequential flows of people across individual station components. Stochastic elements of the model design include the magnitude and distribution of passenger demand, and the modal split of arrivals. The basic processing algorithm for passenger flow is deterministic. The model incorporates the use of empirically derived functions of pedestrian flow through specific station components. The model is developed to serve as an aid to the station designer by simulating the movement of passengers on a digital computer. Examples are provided to demonstrate the program's flexibility and its application to access mode analysis, transit scheduling, and the testing of alternative station layouts.

Popper, RJ Anderson, RB Hoel, LA ; Carnegie-Mellon University CMUTRI-TO-73-15, May 1973, 25 Fig., 7 Tab., 16 Ref.; ACKNOWLEDGMENT: Carnegie-Mellon University; ORDER FROM: NTIS; Repr. PC Req. PRice, PB 225205/4RS, DOTL TA1225.P67

15 084774 EIGHT MINUTES TO NEW YORK. The Hudson River made New York inaccessible by railroad at the beginning of the 19th century. The only way to cross was by ferry. Construction of the Brooklyn Bridge began in 1867 using a new engineering technique, the

caisson. A California financier, D.C. Haskins, observed this technique of pressurized tanks that allowed digging in mud or sandy soil and began advocating its use for building tunnels. He formed the Hudson Tunnel Railroad Company and, after legal battles with railroad companies who owned the ferries, the tunneling began at Hoboken, N.J. It halted a year later after workmen had died of nitrogen narcosis, then known as "caisson disease" and there had been a blow up of the caisson. The company went bankrupt. As tunnels were successfully completed in the East River and in London attention was brought to finishing the Hudson tunnel. W.C. McAdoe and C.M. Jacobs formed the Hudson and Manhattan Railroad Company and in 1902 they began tunneling using a new technique known as a shield which consisted of an inclined ram pushed by hydraulic jacks. The shield enabled the workmen to tunnel about 3 feet a day. In 1908 the first subway train left from Nineteenth Street and Sixth Avenue in New York for Hoboken; the trip took eight minutes. A rash of other tunnels were soon begun until commuting under the Hudson became routine. In 1954 the historic first subway station was closed to the public.

Port Authority Trans-Hudson Corporation Reprint Aug. 1974, 15 pp, Photos.; Reprinted from American History Illustrated, August 1974, The National Historical Society, Gettysburg, Pennsylvania.

15 090185 CABLE-STAYED GUIDEWAY. ANALYSES AND DYNAMIC MODEL TESTS. This report presents the results of scale model tests and parametric structural analyses which were performed in support of a conceptual investigation of cable-stayed guideways for suspended vehicle systems (SVS). The SVS concept would use high speed ground transportation (HSGT) vehicles suspended from an overhead guideway and which could achieve large cabin bank angles for high speed turns. This cabin bank mechanism allows the SVS to maintain a high speed, even when the guideway is collocated with an existing freeway or railroad with relatively tight turn radii. The possibility of collocating the SVS guideway is further improved by the use of cable-stayed guideways with spans of 200 feet or greater. This report describes the static and dynamic tests of a 1:24 scale model of a 250-foot span cable stayed guideway which was designed for a conceptual SVS.

Whitelaw, RL Szeless, AG Counts, J Garst, DA Virginia Polytechnic Institute & State University, Federal Railroad Administration Final Rpt. FRA/ORD/D-74-18, Apr. 1974, 239 pp; Contract DOT-FR-3004; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238915/3SY, DOTL NTIS

15 090465 STATIC THREE DIMENSIONAL ANALYSIS OF ELEVATED STEEL TRANSPORTATION STRUCTURES. A three-dimensional finite element modeling technique that may be used to statistically analyze many classes of steel elevated transportation structures for design, analysis, and maintenance studies was developed and tested. Parameter studies on a typical class of steel elevated transit structure found in many cities showed that: (1) a 50 foot long built-up plate girder representation modeled as 50 beam elements and 100 plate elements gave calculated shear and moment values that com-

pared well with analytical values. The errors resulting from the use of fewer elements were found to be large. (2) Locations on the structure subjected to stress reversals or stress concentration are clearly indicated by the technique and show where damage due to fatigue and deterioration is likely to occur. (3) Forces in cross-bracing and sway frames, which are not readily obtained in a conventional analysis, may be easily obtained. (4) Calculated deflection taking into account the three-dimensional effects of bracing and sway frames may be determined and compared with allowable values.

Traubenik, M Silver, ML Belytschko, TB ; Illinois University, Chicago, Department of Transportation Intrm Rpt. Nov. 1974, 64 pp; Contract DOT-OS-30092; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239870/9SL, DOTL NTIS

15 090564 SUMMARY OF GEOLOGIC AND HYDROLOGIC INFORMATION PERTINENT TO TUNNELING IN SELECTED URBAN AREAS. A summary of the available geologic and hydrologic information pertinent to tunneling technology and underground construction for 34 U.S. urban areas is presented. Each summary includes a map showing the area of coverage, the geologic and ground water situation to a depth of 200 feet, special features related to tunneling, and a list of sources. Selected urban areas surveyed were: Atlanta, Baltimore, Boston, Providence, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Fort Lauderdale, Fort Worth, Houston, Indianapolis, Kansas City, Los Angeles, Louisville, Memphis, Miami, Milwaukee, Minneapolis, St. Paul, New Orleans, New York City, Philadelphia, Trenton, Phoenix, Pittsburgh, Portland, St. Louis, San Antonio, San Diego, San Francisco, Seattle, Washington, D.C.

Cushing, EM Barker, RM ; Geological Survey, Office of the Secretary of Transportation Nov. 1974, 375 pp; Contract DOT-AS-40047; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240715/3ST, DOTL NTIS

15 090847 SUBSURFACE INVESTIGATION, SECTION A013, ROCKVILLE ROUTE. Results are summarized of 65 test borings made at the locations of aerial structure piers and cut-and-cover construction in Section A013 of Rockville Route, generally following Rockville Pike north of the Capital Beltway in Montgomery County, Maryland, of the Washington Metropolitan Area Metro system. The report includes a continuous geological section along the centerline of the METRO structures through the test borings, logs of these borings, results of laboratory tests on soil samples and comments on potential design and construction problems.

Meuser, Rutledge Wentworth and Johnston, Washington Metropolitan Area Transit Authority WRWJ-75-127, Feb. 1975, 87p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240906/8ST, DOTL NTIS

15 090981 SUBSURFACE INVESTIGATION, SECTION K007, VIENNA ROUTE. Results are summarized of 125 testborings and 8 test pits made for the investigation of subsoil conditions in Section K007 of Vienna Route of the Washington

Metropolitan Area Metro System generally between DunnLoring and Vienna Stations along Interstate I-66 west of its intersection with the Capital Beltway. The report contains geological sections along the line of the METRO construction and for a number of ancillary structures and locations surrounding the stations, logs of the supplementary test borings, results of laboratory tests on undisturbed samples, and comments on anticipated design and construction problems.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-122, Feb. 1975, 152 pp; Prepared in cooperation with De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239698/4ST, DOTL NTIS

15 091371 CONSTRUCTION MONITORING OF SOFT GROUND RAPID TRANSIT TUNNELS. No abstract provided.

Parsons, Brinckerhoff, Quade and Douglas, Inc Nov. 1974, 293p-in 2v; Set includes PB-241 536 thru PB-241 537; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC; PB-241535-SET/ST

15 091372 CONSTRUCTION MONITORING OF SOFT GROUND RAPID TRANSIT TUNNELS. VOLUME I: A DEFINITION OF NEEDS AND POTENTIAL DEVELOPMENTS. The Urban Mass Transportation Administration (UMTA) Tunneling Program Concentrates its efforts on reducing tunneling costs, minimizing environmental impact and enhancing safety as it applies to the planning, organization, design, construction and maintenance cycles of rapid transit tunnels in the urban environment. This study investigates the area of construction monitoring of rapid transit tunnels in soft ground. Soft ground tunnel construction monitoring has the potential to reduce construction costs, safety hazards and environmental impacts. Monitoring can diagnose face stability and ground movement problems, and allow appropriate preventive or remedial action. Monitoring provides data for prediction of ground movements and allows the compilation of useful legal documentation. Such data are also required for improving design and prediction methods.

Schmidt, B Dunicliff, CJ ; Parsons, Brinckerhoff, Quade and Douglas, Inc, Transportation Systems Center, Soil and Rock Instrumentation, Incorporated Final Rpt., 3-V1 DOT-TSC-UMTA-75-9-V1, UMTA-MA-06-0025-74-1, Nov. 1974, 189p; Prepared in cooperation with Soil and Rock Instrumentation, Inc., Newton Upper Falls, Mass. Paper copy also available in set of 2 reports as PB-241 535-SET, PCS11.00; Contract DOT/TSC-661; ACKNOWLEDGMENT: NTIS, National Safety Council, Safety Research Info Serv (SRIS 760350 R), UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241536/2ST, DOTL NTIS

15 091613 SUBSURFACE INVESTIGATION, SECTION L001, WASHINGTON CHANNEL L'ENFANT-PENTAGON RIVER CROSSING. Results are summarized of a series of 'shake-tests' performed on 12 samples from six borings in the Washington Channel portion of Section L001 of the L'Enfant-Pentagon River Crossing between southwest Washington and

East Potomac Park, of the Washington Metropolitan Area Metro system. The investigation was made in order to satisfy requirements of the U.S. Environmental Protection Agency relating to constituents of the mix formed by disposal at sea of spoil dredged from the location of sunken tubes within Washington Channel. The report contains geological sections showing locations of these samples, results of chemical analysis of the 'shake tests' and a brief text summarizing the background of the investigation.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority MRWJ-75-132-#9, May 1975, 19 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241744/2ST

15 091752 A PROBABILISTIC APPROACH TO GEOLOGY IN HARD-ROCK TUNNELING. The report presents an approach for evaluating alternative strategies for construction of hard-rock tunnels on the basis of expected cost. Central to the proposed approach is the use of subjective degree-of-belief probability in the evaluation of geologic conditions. Subjective probability is used as a quantitative measure of a geologist's uncertainty about the existence of various geologic conditions along the tunnel alignment. The general conclusion of the report is that the proposed approach will lead to a more thorough analysis of the uncertainties involved in predicting geologic conditions, and of the costs of employing various construction strategies in various geologic settings. The approach will not reduce the uncertainties in tunneling, but will lead to the selection of that construction strategy which is most likely to perform successfully and economically in any given hard-rock tunnel.

Vick, SG ; Massachusetts Institute of Technology, National Science Foundation Tech. Rpt. R75-11, June 1974, 236 pp; Grant NSF-GI-34029; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242598/1ST, DOTL NTIS

15 091757 TUNNEL COST ESTIMATING UNDER CONDITIONS OF UNCERTAINTY. Of all areas of heavy construction, tunnel projects are subject to perhaps the greatest degree of uncertainty from the standpoint of predicting cost and progress. Sources of uncertainty include the unknown nature of geologic conditions along the tunnel alignment, and the difficulty of estimating the performance of men and equipment within the narrow confines of the tunnel. In this report a method is presented for explicitly reflecting these uncertainties in estimates of the time and cost of tunnel construction.

Wyatt, RD ; Massachusetts Institute of Technology, National Science Foundation Tech. Rpt. R75-13, Sept. 1974, 211 pp; Also pub. as Tunnel Construction-5.; Grant NSF-GI-34029; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242428/1ST, DOTL NTIS

15 091758 THE PROBABILISTIC ESTIMATION OF CONSTRUCTION PERFORMANCE IN HARD ROCK TUNNELS. This report concerns the development of a computer-based simulation model which can be used to evaluate costs and risks associated with hard rock tunneling. This report is the 4th in a series of

reports dealing with this subject. The report examines conventional cost estimating procedures and concludes that there are two major inadequacies which exist: (1) the inability to account for the uncertainty in suspected geologic conditions at the tunnel depth; and (2) the inability to quantify the effect of uncertain geology and the effect of the additional uncertainty in productivity of men and equipment on the performance of a construction strategy. The model employs techniques of probability and simulation to avoid these two shortcomings.

Minott, CH ; Massachusetts Institute of Technology, National Science Foundation Tech. Rpt. R74-47, July 1974, 198 pp; Also pub. as Tunnel Construction-4.; Grant NSF-GI-34029; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242427/3ST, DOTL NTIS

15 092288 DYNAMIC SOIL PROPERTIES REQUIRED TO PREDICT THE DYNAMIC BEHAVIOR OF ELEVATED TRANSPORTATION STRUCTURES. In this investigation, dynamic triaxial tests were performed (1) to provide additional data on the dynamic properties of soils at the range of strain amplitudes generated under the foundations of poorly performing transportation structures, (2) to justify that dynamic soil properties determined by triaxial tests are appropriate to represent field conditions, and (3) to investigate the effect of testing procedures on dynamic soil properties, soil volume changes, and induced pore water pressures which influence the performance of elevated transportation structure foundations.

Park, T Silver, ML ; Illinois University, Chicago, Department of Transportation Intrm Rpt. DOT/TST-75/44, May 1975, 161p; Contract DOT-OS-30092; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244069/1ST, DOTL NTIS

15 092338 SUBWAY ENVIRONMENT SIMULATION (SES) HEAT CONDUCTION MODEL VALIDATION. The purpose of this particular report describes the validation of heat conduction analytical model which comprises part of the subway environment simulation (SES) computer program. The conduction model is a closed form transfer cylindrical coordinate frame solution which treats the case of unsteady heat transfer in two, interfacing concentric materials. The validation was accomplished through field tests conducted within the Toronto Transit Commission subway over several months. The field measurements, including temperature at the tunnel air-wall interface and temperature in the earth beyond the tunnel structure, were compared directly with analytical model predictions.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Associated Engineers/A Joint Venture, (DC-06-0010) Tech. Rpt. UMTA-DC-06-0010-74-2, Jan. 1974, 43 pp; Prepared by Associated Engineers/A Joint Venture, New York.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244510/4ST, DOTL NTIS

15 092430 RAPID TRANSIT TUNNEL DIMENSIONS IN THE UNITED STATES: A BRIEF SUMMARY. Inside dimensions and shapes of existing and planned rapid transit

tunnels in the United States are identified. Included is a discussion of the factors involved in deriving the inside dimensions of a tunnel and methods of calculating circular tunnel diameters. Background information is provided for use in discussions concerning the need for standardization of tunnel dimensions.

Saulnier, G ; Transportation Systems Center Final Rpt. DOT-TSC-OST-75-24, July 1975, 36 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244585/6ST, DOTL NTIS

15 092596 RESEARCH PROGRAM PLAN FOR MEETING TOMORROW'S NEEDS IN TUNNELING AND EXCAVATION. This report presents the results of a study performed by Bechtel Corporation for the National Science Foundation, Research Applied to National Needs (RANN). The purpose of the study is to develop a recommended long range research program plan in tunneling and excavation for RANN. The objective of the RANN tunneling and underground excavation research program is to achieve technological improvements that would enhance the quality of life in urban areas through more economic and effective utilization of the underground space.

Bechtel Corporation, National Science Foundation Final Rpt. NSF/RA/T-74-087, Aug. 1974, 357 pp; See also PB-242 742.; Grant NSF-C841; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242777/1ST, DOTL NTIS

15 092597 RESEARCH PROGRAM PLAN FOR MEETING TOMORROW'S NEEDS IN TUNNELING AND EXCAVATION. EXECUTIVE SUMMARY. This report presents the summary of a study performed by Bechtel Corporation for the National Science Foundation, Research Applied to National Needs (RANN). The purpose of the study is to develop a recommended long range research program plan in tunneling and excavation. The results of the study, which are delineated in the main report and accompanying appendices, contain supporting evaluations.

Bechtel Corporation, National Science Foundation NSF/RA/T-74-086, Feb. 1974, 34 pp; See also PB-242 777.; Grant NSF-C841; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242742/5ST, DOTL NTIS

15 092716 SECTION G003: ADDISON ROUTE, PUMPING TEST. Results are summarized of a full-scale field pumping test made on East Capitol Street near the intersection with 65th Street S.E. in Section G003 of Addison Route, of the Washington Metropolitan Area Metro System. Three test borings, 3 wash borings and a 36-inch diameter deep well were placed for performance of the test. The record of drawdown, pumping quantities, computed permeability and some laboratory identification testing are included.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-135, #11, July 1975, 47p; Sponsored in part by Washington Metropolitan Area Transit Authority, D.C. and De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT:

NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243491/8ST

15 092717 PUMPING TEST, SECTION C010C, HUNTINGTON ROUTE [Rept. no. 12]. Results are summarized of a full-scale deep-well pumping test made for the investigation of ground water dewatering conditions at a location directly south of Huntington Station in Section C010c, Huntington Route in Alexandria, Va. of the Washington Metropolitan Area Metro system. The report contains geological sections which summarize information from the pumping test, showing the drawdown achieved, a record of observations of water levels and pumping rates at the test well, and results of laboratory test performed on samples recovered.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-136, #12, July 1975, 56p; Prepared in cooperation with Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243487/6ST

15 092808 SUBSURFACE INVESTIGATION, SECTION C009, HUNTINGTON ROUTE. Results are presented of 41 test borings made along the line of Section C009 of Huntington Route between Braddock Road on the south and Four Mile Run on the north in Alexandria, Virginia of the Washington Metropolitan Area Metro System. The purpose of the work was to provide information for design of surface trackage, cut-and-cover construction, retaining walls and the planned Braddock Road Station. The report contains logs of the test borings, results of laboratory tests on undisturbed samples, a continuous geological section along the line of METRO trackage, sections through the station parking areas and comments regarding anticipated design and construction problems.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Commission, De Leuw, Cather and Company, Incorporated, (MRWI-75-133) Report No. 133, May 1975, 96 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242963/7ST, DOTL NTIS

15 093082 SUBSURFACE INVESTIGATION, SECTIONS E003 TO E005, GREENBELT ROUTE. Results are presented of 75 test boring made to study Alternatives 'A', 'B' and 'C' from Columbia Heights Station location near the intersection of 14th Street and Columbia Road N.W., extending northeast 3.5 miles to the District boundary of the Washington Metropolitan Area Metro system. The purpose of the exploration was to provide information for general plans studies relating to these several alternatives, which chiefly involve mined earth tunnels. The report contains logs of the test borings, results of laboratory tests on undisturbed samples, a continuous geological section along the line of METRO trackage for the various alternatives and comments regarding anticipated design and construction problems.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-134, Aug. 1975, 145 pp; Revision of

report dated 26 Jun 75. Prepared in cooperation with De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, microfiche; PB-244787/8ST

15 093091 SUBSURFACE INVESTIGATION, SECTION B006E, SILVER SPRING STATION, GLENMONT ROUTE. Results are presented of six tests boring made at the locations of pier foundations for Colesville Road Bridge and the Silver Spring Station structure in Section B006e at the intersection of Colesville Road and Glenmont Route in northwest Washington, D.C., of the Washington Metropolitan Area Metro System. The purpose of the work was to evaluate subsurface conditions at the locations of a group of pier foundations to determine the need for pile support or the suitability of spread footings. The report contains logs of the test boring, results of laboratory strength test on 2-inch Shelbytube samples, geological sections along the lines of the bridge piers and comments regarding foundation conditions.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-137, #13, July 1975, 25p; Prepared in cooperation with Washington Metropolitan Area Transit Authority, Washington, D.C., and De Leuw, Cather and Co., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244490/9ST

15 093092 SUBSURFACE INVESTIGATION, SECTION E-002, GREENBELT ROUTE. Results are presented of 14 test pits made adjacent to the line of Section E002, on U Street and 14th Street N.W. in Northwest Washington, D.C., of the Washington Metropolitan Area Metro System. The purpose of the work was to provide information on the characteristics of existing building foundations for the design of underpinning or building protection in preparation for excavation of the subway in the streets. The report contains sketches illustrating the test pits, results of laboratory tests on hand-cut undisturbed samples, and a discussion of the general subsurface and foundation conditions.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-138, #14, Aug. 1975, 32 pp; Sponsored in part by Washington Metropolitan Area Transit Authority, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244472/7ST, DOTL NTIS

15 093292 ACCOMODATION OF UTILITY PLANT WITHIN THE RIGHTS OF WAY OF URBAN STREETS AND HIGHWAYS. STATE OF THE ART. The report presents a technological background and factual practices upon which local agencies could build an effective, workable utility location program. Findings are based on in-depth, on-site interviews of 40 communities in the U.S. and Canada, a mail survey of 500 local agencies, of which 222 submitted replies, and the assistance and cooperation of representatives of all major utility associations, the American Society of Civil Engineers, and the Institute for Municipal Engineering of the American Public Works Association. It was found to be infeasible to recommend national

standards for location of utilities due to the very large number of local and physical factors which influence location practices. Many examples of local standards are given. The report and the companion manual should be of valuable assistance to state and local highway agencies in cooperation with utility companies for making improvements to utility accommodation policies and practices.

Bert, KE Cohn, MM Hurst, WD Kuykendall, R Sullivan, RH; American Public Works Association, Federal Highway Administration, (SR 44) Final Rpt. FHWA-RD-75-8, July 1974, 169 pp, 26 Fig., 31 Tab., 6 App.; Paper copy also available in set of 2 reports as PB-245 198-SET, PC\$10.00.; RESPONSIBLE INDIVIDUAL: Lavell, RJ; Contract DOT-FH-11-7850; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245199/5ST, DOTL NTIS

15 093363 VIBRATION PREDICTION MODEL FOR FLOATING-SLAB RAIL TRANSIT TRACK. This report presents the theoretical development of a model to predict the vibration reduction by floating-slab tracks in subway tunnels. Data from a field study in New York City are also presented. The report is one of three reports dealing with noise and vibration control for urban rail transit track and elevated structures. The theoretical model described allows for the prediction of the force transmissibility--the ratio of the amplitudes of the force on the tunnel floor and the force on the rail. Data from the field study support the use of a simple single-degree-of-freedom oscillator for predicting vibration reduction. The theoretical model developed allows predictions to be made for a more general case.

Manning, JE Hyland, DC Tocci, G; Cambridge Collaborative, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0025-7513, DOT-TSC-UMTA-75-17, Aug. 1975, 142 pp; Contract DOT-TSC-643; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245638/2ST, DOTL NTIS

15 093736 SUBSURFACE INVESTIGATION, 10TH STREET MALL BRIDGE, SECTION D004, NEW CARROLLTON ROUTE. Results are summarized of seven supplementary test borings made to investigate subsoil conditions at the location of piers of the 10th Street Mall Bridge crossing the Penn Central Railroad tracks adjacent to D Street S.W. in southwest Washington, D. C. The purpose of the exploration was to ascertain the condition of soils immediately overlying the mined tunnels which could have been affected by settlements occurring during the mining operation. The report contains geological sections along the lines of the bridge piers, logs of the test borings, results of laboratory tests performed on samples obtained and a brief text describing results of the investigation.

Mueser, Rutledge, Wentworth and Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company, (Rept. No. 1) MRWJ-75-140, Sept. 1975, 18 pp; Sponsored by Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-246101/0ST, DOTL NTIS

15 093743 SUBSURFACE INVESTIGATION SECTION C010B, HUNTINGTON ROUTE.

Results are presented of 74 test borings made along the line of the METRO trackage in Section C010b of Huntington Route, generally in the City of Alexandria and crossing the Valley of Cameron Run south of the city to Huntington Station in Rose Hill of the Washington Metropolitan Area Metro System. The report contains a continuous geological section along the line of the trackage, logs of the borings, results of tests performed on samples obtained in the borings and a text summarizing anticipated design and construction problems.

Mueser, Rutledge, Wentworth and Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-130, Oct. 1975, 73 pp; Prepared in cooperation with Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-245777/8ST, DOTL NTIS

15 093745 SUBSURFACE INVESTIGATION SECTION A006B, ROCKVILLE ROUTE.

Results are presented of two slant borings made from the inbound running tunnel mined through the location of Zoological Park Station in Section A006b of Rockville Route of the Washington Metropolitan Area Metro System, north of Rock Creek in northwest Washington, D.C. The purpose of the work was to provide information on the probable extent and orientation of shear zones which were expected to pass through the position of the station entrance excavation on the west side of Zoological Park Station. The report contains geological sections illustrating conditions along the line of these borings, logs of the borings and a discussion of general subsurface conditions.

Mueser, Rutledge, Wentworth and Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-141, Rept. No. 2, Sept. 1975, 14 pp; Prepared in cooperation with Washington Metropolitan Area Transit Authority, D.C., and De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MFS\$2.25; Repr. PC \$3.25, Microfiche\$2.25

15 094155 SUBSURFACE INVESTIGATION, SECTION A011, ROCKVILLE ROUTE.

Results are summarized of seven supplementary test borings made in Section A011 of Rockville Route in four different locations, at the two stations in this section and near the planned Pooks Hill Road Power Substation of the Washington Metropolitan Area Metro System. The purpose of the work was to supplement earlier exploration at the station entrances and ancillary structures. The report contains geological sections incorporating these new borings, logs of the borings, results of laboratory tests on soil samples obtained and a discussion of anticipated design and construction problems.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company MRWJ-75-143, Dec. 1975, 28 pp; Report Number 4. Authority, D.C. Prepared in cooperation with DeLeuw, Cather and Co., Inc., Washington, D.C. See also report dated 30 Sep 75, PB-245 761.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248526/6ST

15 094187 DEVELOPMENT OF STANDARD SPECIFICATIONS FOR CONCRETE TIES FOR RAPID TRANSIT. PHASE I. TASKS 1 TO 5.

This report presents the results of the first part of a project to develop specifications for standard concrete ties for rapid transit use. The report is presented in five sections: Section 1 estimates the market potential of concrete ties for the transit industry. Section 2 presents a technical and economic evaluation of concrete ties based on international experience. Section 3 presents parameters necessary for the design of standard concrete ties for rapid transit use. Section 4 covers the preliminary specifications for the materials, fabrication and handling of the standard concrete ties.

Hanna, AN Weber, J ; Construction Technology Laboratories, Transit Development Corporation, Incorporated Final Rpt. TDC-CT-75-1, Oct. 1975, 117 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-247676/0ST, DOTL NTIS

15 094292 DEMONSTRATION OF ACOUSTICAL SURVEY SYSTEM. WASHINGTON METRO AREA TRANSIT AUTHORITY.

This report reviews the techniques and results of the demonstration of the Holosonics Acoustical Survey System in a tunnel of the Washington Metro Area Transit Authority subway system. Acoustical data from a small sampling--a drill hole--was related to the actual conditions of the large volume of rock to detect geological and man-made anomalies. This report also discussed the computer equipment, systems applications and data processing methods involved in the acoustical probe.

Price, TO ; Holosonics, Incorporated, National Science Foundation Final Rpt. NSF/RA/T-75/038, June 1975, 65 pp; Grant NSF-GI-41356; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247221/5ST, DOTL NTIS

15 094295 FIELD MEASUREMENTS OF GROUND DISPLACEMENTS ABOUT A TUNNEL IN SOIL.

Soil displacements were measured during the construction of two 21-ft OD shield-driven tunnels in principally granular soil for the Washington, D.C. Metro. The program of field observations and measurements was implemented to determine the relationship of construction procedure to ground movements about the tunnels. Inclinometers, extensometers, and surface settlement surveys measured the soil displacements at three instrument cross-sections in the Lafayette Park Test Section. The soil displacements were measured at a sufficient number of points at each cross-section such that the complete pattern of ground movements at different stages of construction could be determined.

Hansmire, WH Cording, EJ ; Illinois University, Urbana, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company Final Rpt. UILU-ENG-75-2021, Sept. 1975, 359 pp; Prepared in cooperation with DeLeuw, Cather and Co., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-246938/5ST, DOTL NTIS

15 094692 SUBSURFACE INVESTIGATION, BRANCH ROUTE, 'B' CORRIDOR, STATIONS 17825 TO 484 (F004 TO F008) AND ARS MEDIAN STATIONS 310 TO 424 (F008).

Results are presented of 87 borings made on two alignments of Branch Route, the "B" Corridor extending south from Anacostia through Congress Heights to a yard at Rosecroft Raceway and Section F008 of ARS Median from Station 310 along the Suitland Parkway median to a yard near Henson Creek, of the Washington Metropolitan Area Metro system. The investigation was made to determine subsurface conditions at the subway locations which consist chiefly of single-track earth tunnels in the "B" Corridor alignment and at-grade construction or aerial structures in ARS Median. The report includes continuous geological sections along the line of the subway in the area of the investigations, logs of the test borings, laboratory test data and conclusions regarding design and construction problems.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority MRWJ-75-142, Nov. 1975, 130pp; Prepared in cooperation with Washington Metropolitan Area Transit Authority, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249773/3ST

15 094698 SECTION A009: ROCKVILLE ROUTE, YUMA STREET ALTERNATIVES, SUBSURFACE INVESTIGATION.

The report summarizes results of eight borings made in connection with a study of a series of possible alternatives for the Yuma Street link in Section A009 of Rockville Route connecting the subway on Connecticut Avenue with the continuation of the subway on Wisconsin Avenue within Northwest Washington, D.C., of the Washington Metropolitan Area Metro system. The investigation was made to generally assess subsurface conditions at the locations of subway structures in connection with an environmental impact statement. The report contains a series of geological sections illustrating four alternative positions for this connecting link, logs of the eight borings and a general discussion of anticipated subsurface conditions.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority, De Leuw, Cather and Company Intrm Rpt. MRWJ-75-139, Nov. 1975, 52 pp; Sponsored in part by Washington Metropolitan Area Transit Authority, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249125/6ST

15 096371 SOIL STABILIZATION TEST AT THE SWEDEN BRIDGE IN VIENNA-A NEW APPLICATION OF RADIO NUCLIDES IN BUILDING [Badenverfestigungsversuch Bei Der Schwedenbuecke In Wien Eine Neue Anwendung Von Radionukliden In Der Bauwirtschaft].

As part of the preliminary work for the construction of the underground railway tunnel tubes under the Danube canal, experimental injections were made to stabilize the soil, but these were not successful. Following this an attempt was made to develop a control procedure for routine injections using radioactive marking substances. Based on measurements made of filter rate and direction of flow, an assessment was able to be made of the condition of the soil and thus of the effectiveness of soil stabilizing injections. The testing methodology (central boreholes in which

to introduce the water and the inspection equipment) are described in detail. The results of the four tests showed that the method used appears to effect a workable control of injections for stabilization and possible also for support. /TRRL/ [Germa.]

Rank, D Nussbaumer, W *Oesterreichische Ingenieur-Zeitschrift* Vol. 16 No. 10, Oct. 1973, pp 331-38, 8 Fig.; ACKNOWLEDGMENT: Road Safety Board, Austria, Federal Institute of Road Research, Inzel, W Ger, TRRL (IRRD 301715); ORDER FROM: ESL, Repr. PC, Microfilm

15 096372 STATE OF THE ART OF SLURRY TRENCH WALL TECHNOLOGY [Der Stand Der Schlitzwandtechnik]. The large area of application of slurry trench wall technology is described with reference to several large-scale construction sites (high-rise buildings, underground railways, nuclear reactors). Constant progress, particularly in drilling technology, in supporting liquids and in precast construction, has made possible a reduction in costs and rationalisation of the working method. Efforts are currently being made to allow the building of a whole construction pit to be undertaken by one contractor in order to attain maximum safety. The paper was presented at the meeting of the Austrian architectural and engineering association held in Vienna on 18th January 1972. /TRRL/ [German]

Hoffen, M *Oesterreichische Ingenieur-Zeitschrift* Vol. 16 No. 10, Oct. 1973, pp 321-301, 7 Fig., 10 Phot.; ACKNOWLEDGMENT: Road Safety Board, Austria, Federal Institute of Road Research, Inzel, W Ger, TRRL (IRRD 301716); ORDER FROM: ESL, Repr. PC, Microfilm

15 096670 TECHNIQUES AND EQUIPMENT FOR DETECTING UNDERGROUND SERVICES. This report is intended to be a guide to engineers who wish to employ specialist techniques to locate underground services. The tasks may range from checking a whole site for the existence of buried pipes or cables to tracing the routes of services already known to be present. The need for such techniques arises at various stages in road works from the preliminary survey for a new scheme to the maintenance of an old road. The characteristics of the service to be located and the conditions under which this must be done vary widely and few of the devices available fulfil multiple roles. To assist the engineer in choosing the most appropriate equipment, the report includes brief notes on the principles of operation of most types of device and lists a wide range of commercially available instruments together with an indication of the likely applications of each. /Author/TRRL/

Keir, WG ; Transport and Road Research Laboratory Supp. Rpt. #69 uc, 1974, 7 pp, 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 211350S); ORDER FROM: TRRL, Repr. PC

15 096876 NEW RAILWAY BRIDGES OVER LONDON'S EAST CROSS ROUTE. The east cross route, or London Inner Ring Road System, affects the eastern region of British Railways at Victoria Park and Old Ford. Two under-line bridges are required at Hackney Depot, and three in the Victoria Park area including a 7 span box girder viaduct. A major under-line bridge is required at Old Ford. Site problems required

differing forms of structure and different modes of erection. Problems with respect to the demolition of the old railway arch arose at the bridge over Wick Road. Special consideration was given to temperature effects on the Victoria Park viaduct which is on a curve. Old Ford bridge was a particularly difficult problem due to the high density electrified rail traffic and the presence of London transport tunnels and sub-station. This governed the choice of thrust bored abutments under the seven tracks. Superstructure design of all bridges was based on steel box girders, some strong enough to support a single track and others used as a beam group. Plated or concrete decks were used, and some of the parapet girders were clad. Waterproofing was by membrane or epoxy resin. Abutments were generally of reinforced concrete, sometimes on bored piles. /TRRL/

Jenkins, AH Holloway, BGR *Institution of Civil Engineers, Proceedings* Vol. 56 Nov. 1974, pp 537-557, 9 Fig., 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 212094); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England Orig. PC

15 097242 MANEUVERABLE TUNNEL MOLE NAVIGATES AROUND OBSTACLES. When surface congestion prevented open-cut construction, a mole with 39 cutter heads twisted and turned its way past the foundations of historic buildings to bore a 1.6-mi subway tunnel 82 ft below the streets of central Paris.

Sullivan, M *Construction Methods and Equipment* Vol. 56 No. 10, Oct. 1974, pp 56-57, 5 Phot.; ACKNOWLEDGMENT: Construction Methods and Equipment; ORDER FROM: ESL, Repr. PC, Microfilm

15 097243 MULTI-PRONGED SUBWAY WORK ADVANCES WITHOUT TRAFFIC TIEUP. Prefabbed steel shoring grids and specially built bridging panels speed construction of subway facilities beneath busy San Francisco streets without seriously disrupting traffic overhead.

Drossel, MR *Construction Methods and Equipment* Vol. 56 No. 10, Oct. 1974, pp 70-72, 9 Phot.; ACKNOWLEDGMENT: Construction Methods and Equipment; ORDER FROM: ESL, Repr. PC, Microfilm

15 097277 EXTENDING THE PARIS METRO. The Regie Autonome des Transports Parisiens (RATP) has been engaged in construction of a new "Regional Express Rail" transit system and in extension of the existing Paris Metro system. Many differing construction methods have had to be utilized because of the variety of soil and geological conditions. Construction under many of the city's landmarks produced other problems. Each new work has been analyzed and several solutions are studied to find the most suitable solution. After technical and economic analysis, contracts are let. This is the first of two installments.

Bougard, JF (Regie Autonome des Transports Parisiens) *Tunnels and Tunneling* Vol. 7 No. 3, May 1975, pp 43-48, 9 Fig.; This article was presented to the British Tunneling Society on 6 February 1975.; ORDER FROM: ESL, Repr. PC, Microfilm

15 098087 ACCOMMODATION OF UTILITY PLANT WITHIN THE RIGHTS-OF-WAY OF URBAN STREETS AND HIGHWAYS: MANUAL OF IMPROVED PRACTICE. This manual sets forth principles and practices under which utility facilities can be successfully accommodated within urban rights-of-way. These principles and practices can be characterized by five steps. 1. Enabling legislation to establish rights of local agencies to control use of the right-of-way; 2. Provision of adequate staff and budget to protect the public's investment in its streets and highways; 3. Establishment and implementation of adequate permit, inspection, and pavement restoration controls; 4. Implementation of cooperation and coordination mechanisms and record systems among all major utilities; and 5. Provision of accurate information to the field forces who excavate in the rights-of-way to allow them to work safely and protect existing utility plant. This manual and the companion report should be of valuable assistance to State and local highway agencies in cooperation with utility companies for making improvements to utility accommodation policies and practices.

Bert, KE Cohn, PE Hurst, WD Kuykendall, CR Sullivan, RH ; American Public Works Association, American Society of Civil Engineers Final Rpt. FHWH-RD-75-9, July 1974, 114 pp, 15 Fig., Apps.; This is a companion report to, "Accommodation of Utility Plant Within the Rights-of-way of Urban Streets and Highways: State-of-the-Art." FHWA-RD-75-8.; Contract DOT-FH-11-7850; ACKNOWLEDGMENT: Federal Highway Administration (E0110); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245199/AS, DOTL NTIS

15 098748 PLAIN CONCRETE TUNNEL ROOF DESIGN. The file name is K8ARCH. Computer Program. Design Plain Concrete Arch of Tunnel Roofs to support Uniform Vertical Load. By given span of arch and allowable stresses of compression and tension of concrete, a group of curves with various loads, radii and thicknesses will be printed out. The load varies from 2,000 psf to 16,000 psf with 2,000 psf increment. The radius varies from 1/2 span to 3/2 span with 1/2 ft. increment. The thickness varies from 0 to 10 ft. with 1/8 ft. increment.

Huang, K ; New York City Transit Authority Mar. 1974; ACKNOWLEDGMENT: AREA (AREA 08-30-001); ORDER FROM: New York City Transit Authority, 370 Jay Street, Brooklyn, New York, 11201

15 098749 PLAIN CONCRETE ARCH WALL DESIGN. The file name is KZARCH. Computer Program. Design plain concrete wall as an arch to support the side pressure. By given wall thickness, span, load and allowable stresses for tension and compression, the program will make ten(10) wall arch trails for each run. The thrust, shear, moment, shear stress and normal stress of inside and outside of wall will be printed out, if the arch is not overstressed. Word "overstressed" will be printed out in case the arch is overstressed. Computer will go back the position for input of second trail or new data.

Huang, K ; New York City Transit Authority Jan. 1974; ACKNOWLEDGMENT: AREA (AREA 08-30-002); ORDER FROM: New York City Transit Authority, 370 Jay Street, Brooklyn, New York, 11201

15 098750 STEEL RIB STRESS ANALYSIS. The file name is RIB. This program computes the maximum thrust and maximum moment in a steel tunnel support, or rib having a constant radius and selects the appropriate steel member. The method of analysis used is that given by Commercial Shearing and Stamping Co. in its book, "Rock Tunneling With Steel Supports", by Proctor and White. The input required is the radius of the rib, width of tunnel, assumed overbreak, assumed blocking point spacing, rock loading and rib spacing. The output consists of the following: Vertical Rock Load at each Blocking Point, Maximum Thrust, Moment, the steel W section to be used for rib, the length of the rib, and total weight of steel required for ribs for the particular length of design in question.

Kadnar, P ; New York City Transit Authority 1974; ACKNOWLEDGMENT: AREA (AREA 08-30-003); ORDER FROM: New York City Transit Authority, 370 Jay Street, Brooklyn, New York, 11201

15 125511 VIBRATION MEASUREMENTS OF STEEL TRANSIT STRUCTURES. Vibrations induced into rail rapid transit structures may be radiated from the structure as airborne noise that disturbs the rider and the wayside community, or as ground-borne vibrations that propagate into the foundations of wayside structures setting walls, floors, and common household items into annoying vibrations. This report describes the results of field measurements on existing steel elevated structures presented to aid civil engineers concerned with design, performance, repair, and evaluation of steel elevated transportation structures. These measurements showed that peak acceleration levels are generated in decreasing order of magnitude on the rail, on the top and bottom girder flanges, on the girder web, on cross-bracing, on the column, and at the footing base. In addition, peak acceleration levels of 70 g are little attenuated as they are transmitted from the rail through the structure, and peak acceleration levels significantly increase for increasing train speeds. /Author/

Silver, ML Venema, T *ASCE Journal of the Structural Division* Proceeding Vol. 101 No. ST9, ASCE #11557, Sept. 1975, pp 1855-69

15 126194 GROUND WATER AND URBAN PLANNING. REPORT FROM STEGA 1966-73 [Grundvatten och Byggnade. Stegas Arbete 1966-73]. Knowledge of groundwater conditions is essential in designing building structures, particularly when foundations are complex and at great depth. Drops in the water table can lead to serious damage to ground and buildings. This project comprised questionnaire surveys, groundwater measurements in reference areas, damage due to settlement near Stockholm, measurements of water table and settlements in new development areas, groundwater problems near tunnels and deep excavations, a computer model for groundwater, a land cost index, effect of groundwater on vegetation, and bacterial decomposition of foundation timber. In a Stockholm suburb, serious settlements occurred in an area built on postglacial clay; piles buckled and there was corrosion. In another Stockholm area, settlement damage is so extensive that repair costs amount to 50% of property value. Several tunnelling projects are in progress in this area. Water table conditions before and after construction were studied in two

model areas. Some tunnelling and deep excavation projects were investigated. A drop in water table can affect vegetation; timber piles which had always been below the water table suffer bacterial decomposition. The group compiled building geological maps comprising geological and geotechnical data and also foundation and land costs index maps based on these. /TRRL/ [Swedish]

Lindskoug, NE Nilsson, LY ; National Swedish Institute for Building Research R&D Rept. R20:1974, 1974, 164 pp, Figs., 18 Tab., Photos.; ACKNOWLEDGMENT: TRRL (IRRD-213447); ORDER FROM: National Swedish Institute for Building Research, Valhallavaegen 191, Stockholm, Sweden Repr. PC

15 126442 REFLECTIONS ON THE BUDAPEST SUBWAY CONFERENCE. This report of the 1975 conference included descriptions of general problems of tube metros, construction problems in tunneling and methods used for cut-and-cover tunnels. Since the Budapest Metro is being extended, there were descriptions of station construction methods there. Russian station construction methods were discussed.

Jacomb-Hood, EW *Tunnels and Tunnelling* Vol. 7 No. 5, Sept. 1975, pp 31-33, 4 Fig., 1 Phot.; ORDER FROM: ESL, Repr. PC, Microfilm

15 127134 FOUNDATION UNDERPINNING FOR STRUCTURES OVER SUBWAY EXCAVATION. To protect structures from settling due to the excavation for the Washington, D.C., subway, it was necessary to underpin their foundations. For the soil and construction conditions of this project, the influence zone for major historic and public buildings was defined as the area above a line rising from each side of the excavation at a slope of 1:1 from a point 2 ft (0.61 m) below the edge of the base of the subway excavation. Building foundation bearing areas above the influence zone were underpinned to deliver the foundation load below this sloping line. Work on two of the 36-year-old Superior Court Building of reinforced concrete and/or structural steel in Judiciary Square is described in this article. In general, the underpinning involved transferring those column loads and building wall loads, which are outside the subway excavation limits, but within the influence zone, to a pile foundation. Construction directly over the subway excavation was transferred onto prestressed concrete beams which spanned the excavation and rested on new pile foundations constructed on each side of the excavation. All foundations within the influence zone had to be temporarily supported on "pickup" beams while they were being undermined for pile installation, so as to avoid foundation movement.

Cohen, E Solomon, J *American Concrete Institute, Journal of* Vol. 72 No. 8, Aug. 1975, pp 387-394, 15 Fig.

15 127898 WATERPROOFING OF THE AUBER STATION BY MEANS OF EPOXY RESINS [Execution de l'etanchelie a la station auber au moyen de resines epoxydes]. One of the main problems during the construction of the Auber underground station was that of the adhesion of the waterproofing lining to the walls. A continuous resin film with high mechanical strength was used. A cement coating was also necessary to protect the resin coating and to be

used as a support for later finishing processes (tiles, paint, etc). Because of the high level of humidity in the tunnel, polyester and polyurethane could not be utilized. The waterproofing of the tunnel proceeded as follows: (1) treatment of joints by means of injection; (2) treatment of isolated points and cleaning of the surface; (3) application of two coats of resin on dried surfaces; (4) application of cement coating. /TRRL/ [French]

Construction No. 5, May 1973, pp 152-153, 2 Phot. ACKNOWLEDGMENT: Laboratoire Central des Ponts et Chaussees, TRRL (IRRD 102020); ORDER FROM: Editeur Dunod, 26 Boulevard de l'Hopital, Paris 5e, France Repr. PC

15 127911 AUCKLAND RAPID TRANSIT SCHEME. This article is based on the environmental impact report on the Auckland rapid transit scheme. This has the objective of providing a public passenger transport service which will make use of an electrified railway fully integrated and co-ordinated with road transport. It will involve a 30km rapid transit system and an underground loop line. The authors outline the proposals for the rail component including electrification, elimination of level crossings and a standardized service. Details of stations are given, which are designed for pleasantness and convenience, and include provisions for handicapped people. The route of the rail service is next discussed followed by brief details of the overhead power system. Three-car units each seating 150 passengers will operate at up to 120km/h two being operated in tandem during peak hours. After briefly describing the storage and servicing complex the authors discuss the construction of the underground section most of which will be excavated in unweathered sandstones and siltstones, which can be tunnelled by a header unit with a small traversing cutter or by a tunneling machine. 2.5 and 4 meter ventilation and emergency shafts will be incorporated. The 200,000 cubic metres of spoil are to be used in the Grafton Gully motorway construction. Environmental features of the system are discussed with particular reference to appearance and noise. Noise reduction is to be achieved by the use of long welded rails on rubber pads and heavy sleepers, by high quality alignment, the use of ballasted bridge deck designs and noise barriers. /TRRL/ *New Zealand Engineering* Vol. 30 No. 4, Apr. 1975, pp 99-102, 4 Fig., 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 214553); ORDER FROM: ESL, Repr. PC, Microfilm

15 127913 HEATHROW SUBWAYS WAIT FOR RAIL LINK. This article describes the progress of the construction of the passenger subways to the new underground station at Heathrow Airport. These subways are being built with minimum of disturbance to road traffic; the methods used are described: the use of "secant" bored piles to form the walls of the subway and that of a capping beam, on which are placed precast prestressed inverted T-Beams, forming the roof of the subway. Diaphragm wall techniques also were considered but they would have caused severe disruption above the ground. It was necessary to carry out 50 major service diversions and many sewer alterations. Method of installing the secant piles is described. When crossing a road the piling, roofing and reinstatement operations follow closely behind each other. The walls

of the subways are being covered by a 100 M thick layer of gunnite. To construct the subway under terminal one car park a mini-rig was used because of the restricted head room. Chemical stabilization was utilized to help the strata withstand the horizontal pressures developed by the exposed footings. The subway enters terminal one just above the foundation slab which is 4M thick. The main subways will be 8M wide and 2.42M high and will accommodate 1.4M wide moving walkways in both directions. The subways should be in use by the end of 1977. /TRRL/

Gosney, J *Contract Journal* Vol. 265 No. 4998, June 1975, pp 40-41, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 214481)

15 127932 BRITISH EXPERIENCE IN STANDARDIZATION AND METRIC CONVERSION. Experience in standardization and soft-ground tunneling for the underground railways of London are reviewed, and metric conversion in the construction industry and in the tunneling industry are discussed. Standardization of expertise is illustrated by the existence in Britain of contractors specializing in underground construction and those specializing in tunneling. A measure of standardization of running tunnel diameter was instituted in 1924. The shape of the load gauge and its limited dimensions, the absolute minimum clearance that must be assured around the outside of the vehicle to determine the structure gauge are important basics in standardizing the cross-sectional area of a railway tunnel. Walking space requirements are also incorporated. Different requirements in different cities determine the shape of the vehicle. The standard tunnel diameter dating back to 1900 is 11 ft. 8 1/4 inch and the standard station tunnel diameter (internal) is 21 ft. 2 1/2 inch. Departure from the standards (in 1907) and the reasons for it are set forth. Comments are made on the variations of conditions from city to city and the impracticability of applying the same standards in all cities. The standardization of machinery and equipment for tunneling, underground construction and mining are also discussed. Metric conversion has occurred in the tunneling industry because the construction industry has gone metric. The conversion has been monetarily costly. However, a peculiar situation exists: the engineers have metricated while users of the infrastructure, the operating personnel and others have not.

Follenfant, HG (British Tunnelling Society) ; National Research Council 1975, pp 28-40; Report of a symposium conducted by Standing Subcommittee No. 5, International Activities of the U.S. National Committee on Tunneling Technology, held on May 21-22, 1974 in Washington, D.C.; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243754

15 127939 A DESIGNER'S VIEWS: FUNCTIONAL REQUIREMENTS AND LIMITATIONS. The standardization of tunnel equipment is discussed, the potential for saving based on actual and theoretical costs for two tunnels is briefly analyzed, and comments are made on the possibility of adapting a machine to different diameters, and the potential cost saving with regard to linings. It is desirable to standardize the components performing the various functions of the tunnel boring machines, so that they are interchangeable between systems. The effect

of standard-size tunnels on projected tunnel design is discussed. Estimates indicate that there is no clear-cut economic advantage in standardization of tunnel diameter. The possibility of adapting a machine to different diameters depends on whether it is a shield machine or a hard-rock machine. The design of tunnel linings will vary with the depth of the tunnel below ground surface and the quality of the ground. Depending on the purpose of the tunnel, similar design criteria may govern different tunnels and lead to standardization of design: metropolitan tunnels for transit systems; municipal tunnels for water supply and sewage disposal; tunnels shared by several utilities within the same conduit. In types of tunnel with no standardization potential with regard to size, economics could be effected by use of standard specifications for the operations involved in the procedure. Work schedule which ensured machinery movement in sequence from one tunnel to another would lead to savings; designers could ensure that station and ventilation shafts are scheduled. The development of a standardized tunnel lining system for the Bay Area Rapid Transit System is briefly described.

Thon, JG (Bechtel Corporation) ; National Research Council 1975, pp 123-132; Report of a symposium conducted by Standing Subcommittee No. 5, International Activities of the U.S. National Committee on Tunneling Technology, held on May 21-22, 1974 in Washington, D.C.; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243754

15 128126 SAFE ROCK BLASTING [Foersiktig Spraengning]. The technique of blasting rock without causing harmful effects on surrounding buildings or other objects is described. The theory of wave propagations in rock is presented briefly. Tables are given showing: 1. The risk of damage in ordinary housing areas with reference to particle-motion velocity and type of rock. 2. Reducing factors for different types of detonators. 3. Recommended charge depending on distance to endangered object. Buildings with electrical installations such as relay devices, computers and automatic switchboards must be particularly considered. These devices are extremely sensitive to the acceleration of vibrations. Recommended maximum amplitudes and accelerations for continuous or intermittent vibrations are given for IBM computers. These restrictions necessitate a maximum charge of 250 times less than that permissible for the building itself. For economic reasons this cannot be done. As an alternative a method of moderating the vibrations reaching the computers has been developed. These are put on rubber dampers and thereafter will withstand the same vibrations as the building. The planning and execution of a pilot project is described and also the measuring equipment used. See also IRRD abstract no. 214777. /TRRL/ [Swedish]

Ljung, B ; Swedish Geotechnical Institute Conf Paper No. 56, 1974, 18 pp, 5 Fig., 3 Tab., 8 Phot.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD 214781); ORDER FROM: Swedish Geotechnical Institute, Banergatan 16, S-115-26 Stockholm, Sweden Repr. PC

15 128128 CENTRAL SECTION OF THE REGIONAL RAPID TRANSIT UNDERGROUND RAILWAY. INVESTIGATIONS AND STUDIES, CONSTRUCTION OF AN EXPERIMENTAL GALLERY BY MEANS OF A BORING MACHINE [Troncon central du Metro Express Regional. Travaux de reconnaissance et d'etudes, execution d'une galerie experimentale a l'aide d'une machine a forer]. This article describes the construction of the experimental section, which comprises a 900M two-lane tunnel excavated from Marl, the Chatelet open-cut station, and 2 one-lane 2km 500 tunnels 6M 30 in diameter excavated out of limestone, the Gare de Lyon Station, and two one-lane tunnels between the gare de Lyon and Nation Stations, which will be built by means of conventional methods. After stabilizing the ground, it was decided to use a unibo rotary drilling machine 3 min diameter. Details are given of the construction site, wear of tools, rate of progress, ingress of water, wet spoil removal, behaviour of the ground precision of the machine used and guiding laser device. Tests were carried out on provisional timbering, final linings, stress measurements in the supports, ground deformations; and extrapolation to real tunnels. /TRRL/ [French]

LUPIAC, L (RATP) ; Comite Francais de Mecanique des Roches Cahier 5, July 1973, 3 pp; ACKNOWLEDGMENT: Central and Regional Labs of Bridges & Highways, Fr, TRRL (IRRD 101201)

15 128557 JET-FAN VENTILATION. Tunnel ventilating systems are discussed and a jet fan system designed to maintain pollutants below the design level is described. An automatic fan control system has been devised to switch off half of the fans when pollutant concentrations are low and ensure that the fresh air flow is in the direction of the prevailing wind. The theory on which the jet-fan model is based is detailed. The fan thrust, tunnel resistance, vehicle drag and external wind force are all determined by means of equations. The jet fans for the Terrace Tunnel are fully reversible. If the direction of the piston effect is the same as the direction of the net external wind force, the fans may be run in the direction to take advantage of this external assistance. The direction in which the fans are switched on is controlled by a wind vane suspended from the tunnel ceiling. The purpose of the wind vane is to detect the direction of tunnel air flow due to the net effect of external winds and traffic piston-effect. The data upon which the system is based on an average specific emission rate of approximately 40 g CO/km. If the 1980 goal of 2.1 g CO/km is attained, the Terrace Tunnel may require ventilation only for emergencies.

Ostling, AR (Ministry of Works, New Zealand) *New Zealand Engineering* Aug. 1975, pp 231-235, 6 Fig., 2 Tab., 8 Ref.

15 128585 THE SINKING OF THE AMSTERDAM METRO. Subway construction was not practical in Amsterdam, the Netherlands, until this new placement technique. Most of the buildings in Amsterdam rest on old, untreated wooden piles that would deteriorate if the high water level were lowered for most conventional subway construction methods. Therefore, the tunnel segments for Amsterdam's new Metro are constructed on the surface and then allowed to settle

into their submerged final position with aid of hydraulic excavation by water jets and slurry pumps.

Halperin, D *ASCE Civil Engineering* Vol. 45 No. 9, Sept. 1975, pp 92-95, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr. PC, Microfilm

15 128712 AN NEW CIVIL ENGINEERING SPECIAL FEATURE ON THE 150TH ANNIVERSARY OF BRUNEL'S THAMES TUNNEL: MEN AND MOLES, TUNNELLING THROUGH THE AGES. This special tunnelling feature contains the following articles: The Thames Tunnel, Hayward, D; The growth of Shield Tunnelling, Harding, H? The State of the Art, Muir-Wood, A; The Channel Tunnel, Bartlett, J; The Bentonite Machine, Walsh, T; Research Projects, Hayward, D; Compressed Air Hazards, Jackman, P; Pipejacking, Marks, P; The Tunnellers' Contract, Hardy, A; Tunnel Linings, Donovan, J; Rapid Transit, Bubbers, B; Immersed Tubes, Pequignot, C. /TRRL/

New Civil Engineer No. 147, June 1975, pp 5-45, Figs., Photos. ACKNOWLEDGMENT: TRRL (IRRD-214939)

15 128891 VIBRATION MEASUREMENTS OF STEEL TRANSIT STRUCTURES. Vibrations induced into rail rapid transit structures may be radiated from the structure as airborne noise that disturbs the rider and the wayside community, or as ground-borne vibrations that propagate into the foundations of wayside structures setting walls, floors, and common household items into annoying vibration. This report describes the results of field measurements on existing steel elevated structures presented to aid civil engineers concerned with design, performance, repair, and evaluation of steel elevated transportation structures. These measurements showed that peak acceleration levels are generated in decreasing order of magnitude on the rail, on the top and bottom girder flanges, on the girder web, on cross-bracing, on the column, and at the footing base. In addition, peak acceleration levels of 70 g are little attenuated as they are transmitted from the rail through the structure, and peak acceleration levels significantly increase for increasing train speeds.

Silver, ML (Illinois University, Chicago) Venema, T *ASCE Journal of the Structural Division* Proceeding Vol. 101 No. ST9, ASCE #11557, Sept. 1975, pp 1855-69, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

15 129095 BUILDING TRACKS IN THE WASHINGTON METRO. Problems created by special fastening assembly are solved by the use of movable templates to position anchor bolts and in pouring grout pads for the assemblies. Tractor compressors are factor in facilitating construction.

Railway Track and Structures Vol. 71 No. 7, July 1975, pp 54-55 ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

15 129109 MANAGEMENT OF RISK. There are many risks involved with subsurface construction, but most of them can be identified. By thoughtful management, some can be overcome,

others reduced and still others shared in such a manner that their overall cost to the owner is minimized. When innovative methods, equipment, or materials are introduced, certain risks may increase to the point that advancement of the state-of-the-art is discouraged. In such cases, the owner, and society in general, may benefit from a reallocation of these risks. By recognizing the various classes of risk and deliberately setting out to manage them effectively, the mining and construction industries can optimize their service to society.

Mathews, AA (Mathews (AA) Incorporated); American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1167-76; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129110 TUNNEL CONSTRUCTION FOR THE SAO PAULO SUBWAY. Careful planning and execution of tunneling procedures kept surface settlement over the tunnels below a magnitude of .05 feet, allowing tunneling adjacent and under high rise buildings without large expenditures for building protection by under-pinning or chemical grouting. The strict requirements of the adopted tunneling procedures were responsible for many delays, reducing tunnel system utilization to 55%. When shields or tunneling machines are to be used for several headings or have to be transferred through subway station construction, provisions for easy assembly should be incorporated into the basic design concept of the equipment. Descriptions are included of soil and groundwater conditions, tunneling equipment and methods, lining, settlement and underpinning.

Amaral, L; American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1213-32; Presented at the Rapid Excavating and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129111 ROSSLYN STATION, VIRGINIA: GEOLOGY, EXCAVATION AND SUPPORT OF A LARGE, NEAR SURFACE, HARD ROCK CHAMBER. The large chamber was excavated in hard rock by conventional drill-and-shoot methods and supported with steel ribs and shotcrete. The station design, based on a moderate amount of subsurface information, was proven well suited to the actual rock conditions encountered. Although some problems were anticipated with jointed, large rock blocks, these problems were minimized by using drilled-in-spile bars in the crown and rock bolting in the sidewalls. It can only be concluded that the station design was compatible with the geologic conditions expected which were hard, blocky rock and tight joints. These factors permitted excavation and support of the opening without serious loss of ground, settlement of the surface street, or other adverse incident.

Bock, CG; American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1373-91; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI;

ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129112 TUNNELING AND UNDERGROUND EXCAVATION-GENERATOR OF LITIGATION. Contractors, in the present climate of cost escalation of labor, materials and equipment, general inflation and oppressive contract provisions are showing increasing reluctance to bid either a firm lump sum price or firm unit prices for major projects that will require more than a year or two to complete. But public agencies generally are forced by policy, regulations or legal authority to award contracts on competitive bids that call for a firm price commitment. One possible way of reducing litigation in such risky work as tunneling would be to include in firm price bid invitations bid items for specific changed conditions or other foreseeable contingencies. The prices quoted for these items would be paid only to the extent the changed conditions were encountered or the contingencies occurred.

Matthias, FT; American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1163-66; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129113 PLANNING UNDERGROUND CONSTRUCTION OPERATIONS. The modern underground constructor faces economic and competitive conditions which demand exacting planning, logistics and scheduling; the most efficient operation methods and equipment known; and realistic, comprehensive; analytical risk evaluation with adequate contingencies or other protection. Planning can usually be separated into two phases: preconstruction and during construction. Preconstruction work includes a thorough review and familiarization with engineering and contract documents, site investigations, evaluating such local conditions as weather and labor supply, selection of construction methods and equipment, and preparation of detailed cost estimates. During construction, planning encompasses preparation of detailed work schedules, cost controls, and contingency plans.

Eberhardt, FC (Dravo Corporation); American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 143-151; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129115 WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY'S EXPERIENCE WITH CONTRACTUAL RELATIONSHIPS IN TUNNELING CONTRACTS. Each subsurface project must be given intense study, more subsurface data must be collected, and made available to bidders and ample time for design and review should be available. The early determination that there is or is not a differing site condition should be made only after a complete study at the Contracting Officer level where all elements of expertise are

available. Audits are of major assistance to negotiators and adequate audit staff to keep up with the workload is essential. Contractual relationships are improved when construction management and technical inspection services are provided by other than the designer. The owner and the contractor must establish and maintain good public relations, otherwise poor contractual relations might develop.

Aldredge, WS (Washington Metropolitan Area Transit Authority) ; American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 2 1974, pp 1137-62, 12 Ref.; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129118 FORECASTING RAPID EXCAVATION DEMANDS IN THE URBAN SECTOR.

The paper describes efforts made since the 1972 Rapid Excavation Conference in Chicago to generate more thoughtful and more robust estimates of urban sector demands, and to apply what has been learned to the most difficult category of predictions: those for urban mass transit systems. A modest sample survey has been undertaken of demands by major category in three key American Urban areas: New York, Los Angeles, and Minneapolis-St. Paul. This is the only empirical effort going on to establish comprehensive benchmarks for present and future activity in these major metropolitan areas. From the data collected it should be possible to estimate propensities to spend in other cities for the important urban utilities.

Newcomb, R (West Virginia University) ; American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 325-330; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129126 PLANNING SUBWAYS BY TUNNEL OR CUT-AND-COVER. SOME COST-BENEFIT COMPARISONS. The largest single cost for any new transit system is construction, accounting for up to 70 percent of the total system cost. But intangible social costs, borne by the affected neighborhood community, may add as much as 25 percent to the total system cost. When these intangibles are taken into account in terms of loss of local economy, decrease of social activities, and general community disruption, high speed and deep tunneling methods become more competitive with cut and cover construction.

Proctor, RJ Hoffman, GA ; American Inst of Mining, Metallurg & Petrol Engrs Proc Paper Vol. 1 1974, pp 51-63, 26 Ref.; Presented at the Rapid Excavation and Tunneling Conference, San Francisco, Calif., June 24-27, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, Society of Mining Engineers, New York, New York, 10017 Repr. PC

15 129128 KARL TERZAGHI AND THE CHICAGO SUBWAY. Terzaghi's engagement on the Chicago Subway, 1939-1941, influenced his decision to take up permanent residence in the United States and had a strong impact on the development of applied soil mechanics. So-called squeeze tests, in which the settlements and subsurface movements were correlated with construction procedures, permitted improvements in construction methods and decreases in lost ground. Measurement of loads in bracing of open cuts led to better understanding of behavior of soft clay in undrained shear. Full-scale test sections provided basis for more economical design of permanent tunnel lining. All these activities evolved under Terzaghi's stimulation and in turn helped formulate his conceptions of the ways in which soil mechanics should be applied in practice.

Peck, RB (Illinois University, Urbana) *ASCE Engineering Issues-J of Prof Activities* Vol. 101 No. 4, Oct. 1975, pp 477-484, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

15 129131 FIVE DECISIONS IN TRANSIT STATION DESIGN. In each of the five areas the decisions may either aid or hinder the realization of design objectives, depending on the interplay of client-consultant consultation. The decision areas include the nature of station design; how best to handle people-moving requirements; providing for amenities and environmental quality; providing intermodal transfer facilities; and the level of community involvement in professional problem-solving. The paper suggests design methodologies in each of these areas to guide the achievement of design objectives.

McCutchen, WR (Bay Area Rapid Transit District) ; American Society of Civil Engineers Proc Paper 1975, pp 95-99; Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE, Repr. PC

15 129133 GENERAL PROBLEMS IN DESIGN AND CONSTRUCTION IN URBAN AREAS. The paper examines some of the existing policies and lack of policies on underground space as they pertain to rapid transit development projects in the United States. It discusses problems which have occurred during the development of both San Francisco's BART and the Washington, D.C. Metro project due to the conflict of interest in the use of such underground space. Several guidelines are offered for consideration and formulation of a national policy on the use of underground space.

Garrett, V ; American Society of Civil Engineers Proc Paper 1973, pp 140-148; Presented at the Engineering Foundation Conference on the Need for National Policy for the Use of Underground Space, Berwick Academy, South Berwick, Me., June 25-29, 1973.; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236755/AS, DOTL NTIS

15 129818 LIGHT RAIL TRANSIT CONSTRUCTION COSTS. Light rail transit has attractive service characteristics that can be secured in most cities for modest investments. The relatively low construction costs of light rail transit are due primarily to avoiding large civil works by relying instead on reserved

rights-of-way at grade. Many options are available for alignments at grade, and costs for way reservation can vary widely. This paper describes the construction costs for modern light rail transit; it takes into consideration way reservation and the more predictable costs for stations, street crossings, track, cars, electrification, signals, communications, and other requirements. The costs presented are estimates, based on the experience of the author in recent evaluations of light rail transit for several U.S. cities. Few new light rail facilities have been built in the United States in recent years; therefore, little opportunity exists for relating estimates of this type to actual construction. Figures discussed here range from high to low where convenient, and single estimates presented are conservative representations of the largest values likely to be experienced in most cities.

Beetle, GR (Klauder (Louis T) and Associates) *Transportation Research Board Special Reports* No. 161, 1975, pp 115-121; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

15 130643 DISCUSSION FOLLOWING PANEL 2, NEW HORIZONS IN UTILIZATION OF UNDERGROUND SPACE. In this discussion, studies performed on shales in Canada are described, and questions related to civil defense, instrumentation studies, five protection evacuation ventilation, and fire insurance are asked and answered. Problems associated with the construction of a large dam across the South Saskatchewan River in the geological area of the Bearpaw Shale are discussed. Heaving problems have been encountered in the Ottawa area where shale is exposed in building. Mineralogical, chemical and bacteriological studies have been performed on the shale. With regard to civil defense, it is observed that most of the subsurface buildings are not designed to protect against blast damage, and concussion, but can offer protection against fall out. About a million people could be accommodated in the subsurface buildings. An inventory has been made of all of the buildings with a protection factor of 20 and 50. A inert gas fire protection system with 3 to 6 percent concentration is described which would extinguish any fire instantaneously. Comments are made on the establishment of fire protection criteria, and experience with fires on the Canadian subways is described. The need is indicated for the provision for fire prevention in the form of brigade training for the employees.

Hilpan, PL, Moderator ; National Science Foundation Proceeding Mar. 1975, pp 115-122; Published in the Proceedings of the Symposium on the Development and Utilization of Underground Space, March 5-7, 1975, Kansas City, Mo., sponsored by the Department of Geosciences, University of Missouri, Kansas City.

15 130645 THE UNDERGROUND OF CITIES. Examples from Canada and other countries are described, and attention is directed to the most important of all the features of such works, the local geology and the urgent necessity for

immediate attention to this basic feature of all cities. The North Bay complex (a combat and control center for the air defense force in eastern Canada) is an underground location in competent gneiss which was explored through an extensive test-hole program before excavation started. Excavation started in 1959 and was complete in 16 months. The main complex consists of two caverns 400 feet long, 60 feet high, and 45 feet wide in which a 3-story steel frame building stands, with an effective floor area of 140,000 square feet. A water purification plant about to be constructed is described. The underground plant will include both low-and high-lift pumping station and a five million-gallon storage reservoir with a rated capacity of 50 million per day. The use of the underground in association with large center-city buildings and their use for civic services is mentioned. The British underground transportation services, and an underground hospital for asthmatics in Poland are also described. All successful underground space development depends on the certain and detailed knowledge of the local geology. A methodical collection of all subsurface information available for public use is essential for all cities. A city with such information is that of Prague in Czechoslovakia. Each quadrangle of the city is covered by 4 separate maps which show: the detailed geology; the depth of overburden over the bedrock; and the hydrogeology.

Leggett, RF ; National Science Foundation Proceeding Mar. 1975, pp 125-133, 7 Ref.; Published in the Proceedings of the Symposium on the Development and Utilization of Underground Space, March 5-7, 1975, Kansas City, Mo., sponsored by the Department of Geosciences, University of Missouri, Kansas City.

15 130649 SUBSURFACE USES IN SWEDEN AND FRANCE: A REPORT. A brief reconnaissance survey was made in Stockholm, Sweden, and the Loire and Cher Valleys of France, in an effort to observe the uses of the subsurface in these areas, and compare them with the underground development in greater Kansas City. In Sweden, a section of subway under construction and an underground sewage plant were visited. It is noted that Swedish skills in blasting are highly proficient, that subsurface development is not a reclamation of mined areas, and that commercial uses of the subsurface other than the military sites are of the basement type. In Sweden, the subsurface is viewed as a way to preserve the surface. The costs of subsurface development are weighed against climatic maintenance cost of similar surface construction, energy cost of an exposed surface location, costs of a disrupted surface environment and the cost of defense inadequacy. The Lorie and Cher valleys of France have much in common with Kansas City. The uses here were secondary to an original mining venture. The physiographic presence of rivers and their resultant bluffs have played an important part in both the Kansas City and Loire-Cher regions. The difference lies in the rural nature of the French valleys which have made economical housing the most desirable use for the abandoned mines. This is augmented by developments which exploit the areas as unique and economical vacation sites.

Stauffer, T, Sr (Missouri University, Kansas City) National Science Foundation Proceeding Mar. 1975, pp 159-178, 30 Fig., 7 Ref.; Published in the Proceedings of the Symposium on the Development and Utilization of Underground Space,

March 5-7, 1975, Kansas City, Mo., sponsored by the Department of Geosciences, University of Missouri, Kansas City.

15 131030 DESIGN OF TRANSIT STRUCTURES FOR URBAN AREAS. Design of transit structures for urban area requires consideration of many factors in addition to the purely technical strength and size designs. The task is to design the most effective and economical structures that will meet the overall transit and surrounding community needs. Development of such designs should achieve a coordinated balance among factors related to operation of the transit system and impact on the community, long range and during construction. This involves detailed consideration of many things, chiefly among which are: (1) The operating philosophy and plan of the transit system; (2) existing community development along the system planned; (3) constraints--physical, financial, visual public reaction; (4) geological conditions and probable construction methods; (5) nonstructural items, e.g., vehicles and train-control; (6) detailed design and contract packaging; and (7) scheduling construction--equipment and testing.

Hammond, DG Desai, DB (Daniel, Mann, Johnson and Mendenhall) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Proc. Paper 11918, Feb. 1976, pp 1-16, 11 Fig., 5 Ref.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr. PC, Microfilm

15 133227 DEMONSTRATION OF ACOUSTICAL UNDERGROUND SURVEY SYSTEM IN THE WASHINGTON METROPOLITAN AREA. The purpose of the subject study was to demonstrate current capabilities of Acoustical Surveying in conjunction with tunnelling operations to aid in geologic determination and prediction. The Holosonics Acoustical Survey system served as the basic equipment for the survey program. Peripheral equipment such as a fast transient recorder, perforated paper tape punch and CRT storage monitor was used to implement the system. Interfacing and field packaging were fabricated by Holosonics to allow use as an integral system. New computer software was applied to handle the changed input format and to refine the output. Five-hundred-and-ten feet of drill hole were logged in five separate holes requiring four field mobilizations. Four short holes totalling 210 feet were logged under the equipment and software calibration phase. The fifth hole was a 270 feet long cored hole.

Price, TO ; Holosonics, Incorporated, Federal Highway Administration Final Rpt. FHWA-RD-75-82, June 1975, 136 pp; Supersedes PB-247221.; Grant NSF-GI-41356; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251661/5ST, DOTL NTIS

15 133287 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. STATION PLANNING. The project was designed to develop a revised and updated series of handbooks covering various aspects of the design, construction, and equipment of a modern rail rapid transit system. This volume covers station planning.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-2,

Mar. 1975, 72 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251643/3ST, DOTL NTIS

15 133288 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. STRUCTURAL DESIGN. Contents: Structural design guidelines: Datum table; Clearances; Loads and stresses to be used in designing subways, tunnels and elevated structures; Details of design for structural steel; Design columns; Design of concrete and reinforced concrete structures; Water proofing of subways; Natural ventilation design criteria between stations.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-3, Mar. 1975, 125 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251644/1ST, DOTL NTIS

15 133289 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. CONSTRUCTION. Contents: Construction guidelines: Underpinning; Decking; Maintenance, support and protection of utilities; Excavation; Steel erection; Restoration; Hard rock tunneling; Mixed face tunneling; Soft ground tunneling; Pressure grouting and graveling.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-4, Mar. 1975, 186 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251645/8ST, DOTL NTIS

15 133291 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. HYDRAULICS, ELECTRIC DUCTS AND PLUMBING. Contents: Hydraulics; Electric ducts; Electric duct manholes; Plumbing.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech Rpt. UMTA-IT-09-0014-75-6, UMTA-IT-09-0014-75-6, 52 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251647/4ST, DOTL NTIS

15 133293 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. EQUIPMENT. Contents: Equipment guidelines: General criteria; Auxiliary electrical power and lighting; Heating; Ventilation and air cooling; Escalators; Pumps and ejectors; Fire lines; Direct current connections.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt. UMTA-IT-09-0014-75-8,

UMTA-IT-09-0014-75-8, Mar. 1975, 243 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251649/OST, DOTL NTIS

15 133296 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. MATERIALS INSPECTION-1. This volume contains an overall picture of the function, structure, and operation of the Materials Inspection Division. Included in this volume are the following: Functions of the materials inspection division; Inspections -general information; Introduction-testing laboratories; Physical testing laboratory; Chemical testing laboratory; Cement testing laboratory; Soils testing laboratory; Radiography-testing; Metallography-testing; Construction and road materials-sampling, inspection and testing; Steel and allied materials-sampling, inspection and testing; Procedures for inspection of special track work and truck frames for rapid transit cars.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt., 1 UMTA-IT-09-0014-75-1, Mar. 1975, 318 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251652/4ST, DOTL NTIS

15 133297 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. MATERIALS INSPECTION-2. Contents: Specific inspections: paint-sampling, inspection and testing; Lumber-sampling, inspection and testing; Inspection of fuel oils and lubricants; Uniforms and textile materials-sampling, inspection and testing; Soaps and synthetic detergents-sampling, inspection and testing; Rubber and synthetic rubber, sampling, inspection and testing; Plastics-sampling, inspection and testing; Leather inspection-sampling, inspection and testing; Floor coverings (non-textile)-sampling, inspection and testing.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Tech. Rpt., 2 UMTA-IT-09-0014-75-1, Mar. 1975, 409 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251653/2ST, DOTL NTIS

15 133306 THE AERODYNAMICS AND THERMODYNAMICS OF SUBWAY DESIGN CONCEPTS [Technical rept]. This report is one of many such reports leading to the final product—a 'Subway Environmental Design Handbook.' Subway environment simulation (SES) computer program applications to a variety of hypothetical double-track subway rapid transit systems with bi-directional train operations are presented and discussed. The study encompasses the effects of subway geometrical features, such as ventilation shaft configuration and location, mechanical systems, such as fans and cooling equipment, and train operations. Results are presented

in terms of both instantaneous and average subway air flows and temperatures.

Transit Development Corp., Inc., Washington, D.C. Urban Mass Transportation Administration, Washington, D.C. Parsons, Brinckerhoff, Quade and Douglas, Inc., New York., (UMTA-DC-06-0010) UMTA-DC-06-0010-74-4, Mar. 1974, 157p; Prepared by Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-251748/OST

15 133626 SUBWAY TRAMS KEEP GUADALAJARA ON TOP. This article describes a construction programme in Guadalajara Mexico, designed to avoid traffic congestion as the population doubles in the next 10 years. The first 5.3 km of subway, recently completed, will eventually form part of the city's projected underground railway system. Used initially as a tram way, it will change to tracked underground, railway following extensions to north and south. Each section therefore comes into immediate use and can be integrated into the whole system as it is completed. It is claimed that using trams gives flexibility in planning and construction of the network because the pressure to complete a given line is less severe. Trams will continue to follow the same route during the change to railways but at surface level where new dual three-lane carriageway roads are being built concurrently as each section of the subway cut and cover work is completed. Brief details are given of the ground conditions, the construction of the concrete subways and of the ventilation and lighting systems. /TRRL/

Walker, M *New Civil Engineer* No. 163, 1975, pp 26-27, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 216751); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England

15 133634 IN SITU CONCRETING IN TUNNELS. This article outlines the various problems, and the methods of answering them which arise during the concreting stage of tunnel construction, using the experience of the Liverpool loop line as a typical example. This line is a new underground railway system which incorporates 3.2km of 5M dia. tunnel. Access for the contractors was limited to five vertical shafts down to the tunnel which ranges in depth from 20 to 35M below ground level. The question of inaccessibility, no concrete lorry could gain access to the tunnel, raised major problems involving delivery of concrete to the tunnel, rapid transit from the access point to the working point and the handling of the concrete at the working point. The use of steel-lined boreholes incorporating pneumatic doors at the base of the downpipes to deliver concrete to the tunnel is described, together with the use of pneumatic-tyred and railway-tracked vehicles in addition to pumping to rapidly transmit the material to the workpoint, and the placing methods employed at the workpoint. In all these operations timing was considered to be of utmost importance, and a high degree of effective supervision necessary /TRRL/

Owen, GP *Concrete* Vol. 9 No. 10, Oct. 1975, pp 14-17, 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 216708); ORDER FROM: Cement and Concrete Association, 52 Grosvenor Gardens, London SW1W 0AQ, England

15 134063 TRANSPORT TUNNELS IN URBAN AREAS. After a short consideration of the vital role of transport in urban areas the various types of transport tunnel are described and the merits and problems of using tunnels to carry transport facilities are outlined. Data are given on the cost of constructing road and underground railway tunnels. Ground settlement due to tunnelling and the ventilation of road tunnels are considered. Examples of recent developments in European cities incorporating substantial underground works providing mass-transit, road and car parking facilities are described and an attempt is made to assess the future prospects of transport tunnels. /TRRL/

O'Reilly, MP (Transport and Road Research Laboratory) *Highway Engineer* Vol. 23 No. 1, Jan. 1976, pp 12-21, 11 Fig., 5 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217526); ORDER FROM: ESL

15 136402 ELASTIC CHARACTERISTICS OF TRACTION DRIVES OF TRANSPORT VEHICLES. A wide application has been found among the traction, drives of transport vehicles (rail and road vehicles) for designs in which the motor and the distributor reduction gear are fixed to a sprung vehicle frame, and the driving axles (the pairs of wheels) are connected to this gear by elastic transmission mechanisms. The presence of a reduction gear which is fixed on a vibrating base and works in connection with it as a planetary mechanism is responsible for a substantial interconnection between the torsional vibrations of the revolving masses of the drive and the angular vibrations of the vehicle frame. The selection of the elastic drive parameters is an important factor for such a design because in case of their deviation from the optimum values the drive becomes sensitive to disturbances which act on the vehicle from the direction of the track. The processes of interaction between the torsional vibrations of a drive which has a distributor reduction gear, and the angular vibrations of the vehicle were investigated in an example of a single-motor traction drive which has been adopted in the locomotive manufacture in the USSR.

Pavlenko, AP *Russian Engineering Journal* Vol. 54 No. 12, 1974, pp 8-12, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 136471 SUBSURFACE INVESTIGATION, SECTIONS E006 TO E008, GREENBELT ROUTE [Rept. no. 6]. Results are summarized of 33 test borings made along two alternative alignments studied for Sections E006 to E008 of Greenbelt Route of the Washington Metropolitan Area Metro System. The borings were positioned within planned sections of earth tunnels to delineate potential tunneling difficulties to assist the General Engineering Consultant in studies and recommendations of the optimum tunnel profile position. The report contains continuous geological sections incorporating the new borings, logs of the borings, results of laboratory tests on soil samples obtained and a discussion of anticipated construction difficulties for the alternative tunnel schemes.

Mueser, Rutledge, Wentworth and Johnston, New, York. Washington Metropolitan Area Transit, Authority, D.C. DeLeuw, Cather and Co., Inc., Washington, D.C. MRWJ-76-145, Mar. 1976, 114p; Prepared in cooperation with DeLeuw, Cather and Co., Inc., Washington, D.C. Sponsored in part by Washington Metropolitan

Area Transit Authority, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-251620/1ST

15 136825 MULTISPAN ELEVATED GUIDEWAY DESIGN FOR PASSENGER TRANSPORT VEHICLES. VOLUME I. TEXT. Analysis techniques, a design procedure and design data are described for passenger vehicle, simply supported, single span and multiple span elevated guideway structures. Analyses and computer programs are developed to determine guideway deflections, moments and stresses and vehicle accelerations resulting from a two-dimensional vehicle with finite pad length front and rear suspensions traversing a multispans elevated guideway. A preliminary design procedure is described to estimate guideway beam structural requirements so that a vehicle-guideway system will meet specified levels of passenger comfort. Design data for 150 mph and 300 mph intercity 40,000, 80,000 and 120,000 lb. air cushion vehicle single and multiple span (span lengths of 50 to 150 ft.) guideways is summarized. For both urban and intercity operating regimes, the data indicate that improvements in the vehicle suspension and the use of multiple span structures rather than single span structures may result in reduced guideway material requirements.

Wormley, DN Smith, CC Gilchrist, AJ ; Massachusetts Institute of Technology, Transportation Systems Center, Federal Railroad Administration Final Rpt., DOT-TSC-FRA-75-4.I., Apr. 1975, 137 pp; See also Volume 2, PB-253 009.; Contract DOT-TSC-349-1; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253008/7ST, DOTL NTIS

15 136826 MULTISPAN ELEVATED GUIDEWAY DESIGN FOR PASSENGER TRANSPORT VEHICLES. VOLUME II. APPENDIXES. Contents: Appendix A-derivation of vehicle-guideway interaction equations; Appendix B-evaluation of pier support dynamics; Appendix C-computer simulation program of two-dimensional vehicle over a multi-span guideway; Appendix D-computer program to determine guideway midspan deflections and moments and vehicle suspension deflections and accelerations based on a constant force model; Appendix E-guideway design program based upon a constant force vehicle model; Appendix F-tables of nondimensional suspension deflection fourier coefficients; Appendix G- parametric data for sprung and unsprung mass inertia suspension forces; Appendix H-nomenclature; Appendix I-report of inventions.

Wormley, DN Smith, CC Gilchrist, AJ ; Massachusetts Institute of Technology, Transportation Systems Center, Federal Railroad Administration Final Rpt., DOT-TSC-FRA-75-4.II., Apr. 1975, 213 pp; See also Volume 1, PB-253 008.; Contract DOT-TSC-349-2; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253009/5ST, DOTL NTIS

15 136979 DATA ANALYSIS AND INSTRUMENTATION REQUIREMENTS FOR EVALUATING RAIL JOINTS AND RAIL FASTENERS IN URBAN TRACKS. Rail fasteners for concrete ties and direct fixation and bolted rail joints have been identified as key components for improving track performance.

However, the lack of statistical load data limits the development of improved design criteria and evaluation tests. This report evaluates the data required for design, laboratory tests, and for the development and verification of analytical models of fastener and joint performance. Available track instrumentation is reviewed for fulfilling these requirements, and functional specifications have been developed for improved tie plate load cells and instrumented wheels. Also included are recommendations for data analysis and data processing procedures and test site selection criteria needed to plan and conduct comprehensive measurement programs.

Prause, RH Harrison, HD ; Battelle Columbus Laboratories, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-2, Feb. 1975, 156 pp; Contract DOT-TSC-563; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253192/9ST, DOTL NTIS

15 136981 DOUBLE TRACK POROSITY TESTING. The Subway Environmental Research Project (SERP) was undertaken in order to provide the subway design engineer with a basic understanding of the effects of various design parameters on subway aerodynamics and thermodynamics (and hence on the subway environment). Such understanding permits subway design with an eye toward efficient environmental control. In Phase II of the SERP, a test matrix designed to study the effects of center wall porosity (in a dual-track tunnel) on train drag and far-field air velocity was performed in the DSI SAT-DT facility. Additional testing in the SAT-DT facility was proposed (and conducted) in an attempt to discover the center wall porosity at which system performance nears that of a single tunnel (i.e., solid center wall). The purpose of this report is to describe the results of this additional testing, and to relate these results to those obtained during the original program.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Developmental Sciences, Incorporated, Associated Engineers/A Joint Venture, (UMTA-DC-06-0010) Tech. Rpt. UMTA-DC-06-0010-75-4, Nov. 1975, 35 pp; Contract DOT-UT-290; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253232/3ST, DOTL NTIS

15 137038 CRITERIA FOR EVALUATING ALTERNATIVE TRANSIT STATION DESIGNS. The urban transit interchange facility is described in terms of the important functional facility components and the quality of the station environment. These terminal dimensions are interpreted to establish a list of design objectives which reflect the points of view of the user, the special user (elderly and handicapped) and the operator. The stated objectives are then used to identify criteria for the evaluation of alternative urban transportation interface facility designs. A general evaluation is derived and compared with the basic systems evaluation procedures: effectiveness analysis, benefit-cost analysis, and ranking and rating models. A terminal facility evaluation model with a specific set of measurable criteria is described with respect to three primary areas of application; i.e., a set of mutually exclusive project designs, an iterative design process, and the analysis of a major design strategy (e.g., modular construction).

Hoel, LA Demetsky, MJ Virkler, MR ;

Virginia University, Department of Transportation Intrm Rpt. RLES-CE-4142-101-76, DOT/TST-76/68, Feb. 1976, 62 pp; Contract DOT-OS-50233; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253742/1ST, DOTL NTIS

15 137329 SUBWAY ENVIRONMENTAL DESIGN HANDBOOK. VOLUME I. PRINCIPLES AND APPLICATIONS. SECOND EDITION. This handbook is a guide and reference for the planning, design, construction and operation of environmental control systems for underground rapid transit. The handbook follows the engineering sequence from criteria through load analysis, and from system conceptual design to selection of equipment. It covers a broad range of parameters, including temperature, humidity, air quality and rapid pressure change, and, to a limited extent, noise and vibration as related to environmental control equipment. The content of the handbook is divided into two volumes. Volume I (this volume), Principles and Applications, encompasses all of the above subject matter so that much of the environmental system design can be accomplished using the techniques, computations and related graphic data contained therein.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration Tech Rpt. UMTA-DC-06-0010-76-1, Mar. 1976, 408 pp; Also available in set of 3 reports as PB-254 787-SET, PCS\$97.00/MF\$4.75.; Contract DOT-UT-290; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254788/3ST, DOTL NTIS

15 137330 SUBWAY ENVIRONMENTAL DESIGN HANDBOOK. VOLUME II. SUBWAY ENVIRONMENT SIMULATION COMPUTER PROGRAM (SES). PART 1. USER'S MANUAL. This document forms part of the Subway Environmental Design Handbook. It contains the background information and instructions to enable an engineer to perform an analysis of a subway system by using the Subway Environment Simulation (SES) computer program. The SES program is a designer-oriented tool which provides estimates of the airflow, temperature, and humidity characteristics, as well as the air-conditioning requirements, for both operating and proposed multiple-track subway systems of any given design and operating characteristics. The SES program can be used to evaluate the impact on the subway environment of alternative subway system design parameters such as tunnel and station cross-sectional area and length, tunnel interconnections, location and size of ventilation shafts and passenger entrances, ventilation fans, train headway and operating speed, and other parameters. The SES program is a numerical simulation model which incorporates the results of theoretical research, scale-model tests and field tests, and has been verified through comparisons with measurements taken in operating subway systems.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration Tech. Rpt. UMTA-DC-060010-75-1, Oct. 1975, 1514 pp; Also available in set of 3 reports as PB-254 787-SET, PCS\$97.00/MF\$4.75.; Contract DOT-UT-290; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254789/1ST, DOTL NTIS

15 137331 SUBWAY ENVIRONMENTAL DESIGN HANDBOOK. VOLUME II. SUBWAY ENVIRONMENT SIMULATION COMPUTER PROGRAM (SES). PART 2. PROGRAMMER'S MANUAL. The Subway Environment Simulation Computer Program (SES) is a product of a four-year research and development project in the area of subway environmental control sponsored by the U.S. Department of Transportation's Urban Mass Transportation Administration and the Transit Development Corporation, Inc. The project produced a two-volume Subway Environmental Design Handbook. Volume 2 consists of two separate documents: Part 1, the SES User's Manual, and Part 2, the SES Programmer's Manual. The Programmer's Manual is intended to assist computer department personnel in making the SES Program operational on a given computer and to aid a programmer needing to understand the details of the internal operation and sequencing of the program. The information contained herein is not intended for design engineers and will be of no assistance to those wanting to use the program as it stands; all information necessary for application of the program is provided in the User's Manual. Portions of this document are not fully legible.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration Tech. Rpt. UMTA-DC-060010752, Oct. 1975, 1256 pp; Also available in set of 3 reports as PB-254 787-SET, PC\$97.00/MF\$4.75.; Contract DOT-UT-290; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254790/9ST

15 137759 PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE ON VEHICLE DYNAMICS. PART 3: TRAFFIC SYSTEMS. Part 3 contains the following papers: Comparative Analysis of the Existing Transportation Systems and the Dynamic Shuttle System, Cosgriff, RL and Yeh, HA (this paper is presented in an abstract form); The Relationship Between Traffic Characteristics and Control System Effectiveness, Tarnoff, PJ (this paper is presented in an abstract form); Vehicle Routing Classifications, Characteristics and Solution Procedures, Turner, WC and Ghare, PM (this paper is presented in an abstract form); Energy Consumption of Suburban Service Commuter Trains, Walbridge, EW (this paper is presented in an abstract form); Scheduling Delays in Synchronous Transportation Networks, Kornhauser, AL and McEvaddy, PJ. /TRRL/

Swets & Zeitlinger Proceeding 1975, pp 118-140, Figs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-219441)

15 138073 MEASUREMENTS OF GROUND MOVEMENT AND LINING BEHAVIOR ON THE LONDON UNDERGROUND AT REGENTS PARK. An investigation of ground movement and tunnel lining behaviour was carried out during the construction of the Fleet Line of the London Underground at Regents Park. For two tunnels, 4.15 m in diameter, constructed with expanded concrete linings at depths of 34 m and 20 m, 5 mm and 7 mm of surface settlement respectively were caused with a trough of settlement some 50-65 m wide at right angles to the tunnel axis. Comparing the settlements at various depths with those obtained for a tunnel of the same line constructed with cast iron linings at

Green Park it was concluded that settlements for an expanded concrete lining were a little less than those for a cast iron one, which is to be expected in view of the more rapid rate of progress for the concrete lining and the fact that the ground is supported immediately after the passage of the shield. After a year, load cells at the axis and the crown of the lining showed that 0.51 and 0.31 of the overburden pressure had developed at these positions.

Barratt, DA Tyler, RG; Transport and Road Research Laboratory LR 684, 1976, 12 pp, 24 Fig.; ACKNOWLEDGMENT: British Railways; ORDER FROM: TRRL

15 138088 SUBWAY CONSTRUCTION IN MAJOR RURAL CITIES. Several Japanese cities having metropolitan area populations of approximately one million are constructing or planning to construct subway systems connecting residential suburbs and central business districts. The aim is to alleviate highly concentrated rush-hour demands for commuter transport. Sapporo, Fukuoka, Sendai and Hiroshima are discussed briefly and then Sendai City is examined in detail in the light of future trends in land use, population and urbanization. In such studies, it is concluded, future use of subways must be estimated on the basis of changes in urban characteristics, suburban development and all new factors created by operation of the line. Future, rather than present, demographic trends and land use patterns must be understood.

Nishikawa, Y *Wheel Extended* Vol. 5 No. 4, pp 20-28; ORDER FROM: Toyota Motor Sales Company, Limited, #3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

15 138810 BRAZIL'S UNDERGROUND MOVEMENT FOR AN UNDERGROUND REVOLUTION. Both of Brazil's major cities of Rio de Janeiro and Sao Paulo are building underground railway systems through poor ground covered with buildings. Because of the treacherous conditions in Rio the cut-and-fill technique is being used. The ground is a mixture of clays, sands and salty water 2 M below the surface. In the city centre, where the line passes through shops on either side, building settlement is prevented by diaphragm walls and dewatering wells in the trench interior. Threading through the old services has been very difficult. Because of low wages it has been possible to employ over 8000 men in the construction of the 12 km tunnel. Costly method of waterproofing are employed. The new construction at Sao Paulo supplements the existing 17 km stretch that has been in use since September 1975. Most of the 28 km new line will be on the surface, but 9 km will be constructed by the cut-and-cover method, and 3.5 km in bored tunnel using full faced machines with precautions to reduce ground disturbance under buildings. /TRRL/

Reina, P *New Civil Engineer* Apr. 1976, pp 14-16, 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 220215); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England

15 139713 LATERAL SUPPORT SYSTEMS AND UNDERPINNING. VOLUME 3: CONSTRUCTION METHODS. This provides specific design recommendations, design

considerations, and construction techniques for the construction of lateral support systems and underpinning. The design considerations are presented for each technique or method (soldier piles, steel sheeting, diaphragm walls, internal bracing, tiebacks, underpinning, grouting, and freezing). The factors affecting the design or implementation of these schemes are discussed. Construction techniques are presented, and literature references are provided for those seeking even greater detail. An overview of the construction methods compares the applicability of the techniques and the construction costs of each. Other reports developed from the study are FHWA-RD-128, Volume I, Design and Construction; FHWA-RD-129, Volume II, Design Fundamentals; and FHWA-RD-131, Concepts for Improved Lateral Support Systems.

Goldberg, DT Jaworski, WE Gordon, MD; Goldberg-Zoino and Associates, Incorporated, Federal Highway Administration, (1363-Vol-3) Final Rpt. FHWA-RD-75-130, Apr. 1976, 480 pp; Also available in set of 3 reports as PB-257209-SET, also see Volume I, RRIS 00 141250 and Volume II RRIS 00 139701.; RESPONSIBLE INDIVIDUAL: Sallberg, JR (HRS-11); Contract DOT-FH-11-8499; ACKNOWLEDGMENT; ORDER FROM: NTIS; PB-257212/1ST, DOTL NTIS

15 139723 MINIMUM COST DESIGN OF ELEVATED TRANSIT STRUCTURES. The results of a minimum cost design study for a typical elevated transportation structure for rail transit are presented. Special emphasis is given to clarify the impact of major variables such as span length, beam spacing, and soil conditions on the partial cost of each structural subsystem, on the total cost of the structure and on the minimum cost span. Suitable minimum cost design procedures are rapidly reviewed and the influence of the structural material is presented. The analysis of the results obtained in this investigation and their comparison to results obtained by other investigators for different structural systems and materials lead to a number of simple guidelines particularly useful when planning and designing elevated transportation structures. Most importantly, it was found that the minimum cost span is not very sensitive to the soil conditions, to the vehicle loadings, to the structural system and material, and to the minimum cost procedure used.

Naaman, AE Silver, ML (Illinois University, Chicago) *ASCE Journal of the Construction Division* Vol. 102 No. C01, ASCE #11986, Apr. 1976, pp 99-110, 8 Fig., 15 Ref.

15 141112 UTILIZATION OF HIGHWAY CONSTRUCTION SPECIFICATIONS AND TECHNIQUES FOR MASS TRANSPORTATION PROJECTS. The paper describes the use of highway construction specifications and techniques for mass transportation projects in Connecticut. The Department of Transportation has undertaken several mass transportation projects. Two of the projects involving highway specifications were the construction of high level platforms at 22 locations along the Penn Central Railroad between New Haven and Greenwich and the people mover demonstration project at Bradley International Airport. Highway specifications were incorporated into these projects to varying degrees based on the nature of the

project. This was done to maximize the use of time-tested specifications.

Spaulding, JJ ; American Assn of State Hwy and Transp Officials Conf Paper Nov. 1974, pp 32-43; Select Committee Meeting Paper presented to the American Association of State Highway and Transportation Officials, 60th Annual Meeting, Proceedings, Detroit, Michigan, November 18-20, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Assn of State Hwy and Transp Officials, 444 North Capitol Street, NN, Washington, D.C., 20001

15 141250 LATERAL SUPPORT SYSTEMS AND UNDERPINNING. VOLUME 1: DESIGN AND CONSTRUCTION. This volume is a convenient reference on the design and construction of lateral support systems and underpinning which are often required in conjunction with cut-and-cover or soft ground tunneling. The design recommendations and construction methods described herein are a summary of the more detailed information presented in the companion volumes of this study. Included in this volume are discussions of displacements, lateral earth pressure, ground water, passive resistance, stability analysis, bearing capacity, soldier piles, steel sheeting, diaphragm walls, bracing, tiebacks, underpinning, grouting, and freezing. An overview compares the relative costs of the construction methods used in lateral support systems and underpinning. Other reports developed from the study are FHWA-RD-75-129, Volume II, Design Fundamentals; FHWA-RD-75-130, Volume III, Construction Methods; and FHWA-RD-75-131, Concepts for Improved Lateral Support Systems.

Goldberg, DT Jaworski, WE Gordon, MD ; Goldberg-Zoino and Associates, Incorporated, (1363-Vol-1) Final Rpt. FHWA-RD-75-128, Apr. 1976, 327 pp, 145 Fig., 19 Tab., Refs.; Also available in set of 3 reports as PB-257209-SET; also See Volume II, RRIS 00 139701 and Volume III, RRIS 00 139713.; RESPONSIBLE INDIVIDUAL: Sallberg, JR (HRS-11); Contract DOT-FH-11-8499; ACKNOWLEDGMENT: ORDER FROM: NTIS; PB-257210/5ST, DOTL NTIS

15 141253 EXECUTIVE PRESENTATION: RECOMMENDATIONS ON BETTER CONTRACTING FOR UNDERGROUND CONSTRUCTION. This document which provides background information for presentations by the subcommittee before government agencies and others concerned with planning and developing projects for urban underground transportation, and which is based upon a 1974 report-Better Contracting for Underground Construction-defines the scope of the problem facing public contracting agencies and the construction industry, and what could be done to alleviate it. The unique problems encountered in underground construction are related to the risk involved and of how the responsibility for this risk should be divided. The cost of risk related to the unpredictabilities of underground construction and inflation are discussed, and the need for answers to certain questions regarding basic contracting practices is emphasized. The usefulness is noted of experiences of European countries which undertake considerable underground work and of the Federal government which has designed and constructed large and complicated underground facilities. The method by which European

countries contract such work is reviewed. Recommendations are presented relating to sharing construction risks and financial risks, expediting claims, stimulating innovation in construction, assuring award to qualified contractors, and effecting cost savings.

National Academy of Sciences-Natl Research Council 1976, 21 pp, Photos., Refs.; ORDER FROM: National Academy of Sciences-Natl Research Council, 2101 Constitution Avenue, NW, Washington, D.C., 20418

15 142246 DYNAMIC PROPERTIES OF ALLUVIAL CLAY FOR ASEISMIC DESIGN OF TOKYO CENTRAL UNDERGROUND STATION. The aseismic design for the Tokyo underground station structure, which is newly constructed in the weak ground, has been carried out in order to reduce the damage due to earthquakes. Dynamic moduli and damping ratios of soil which are required in the aseismic design have been measured by the vibrational triaxial compression test apparatus.

Nasu, M *Railway Technical Research Inst Quarterly Reports* Vol. 17 No. 1, 1976, pp 1-5, 13 Fig., 3 Tab.; ACKNOWLEDGMENT: Railway Technical Research Institute; ORDER FROM: Japanese National Railways, Kunitachi, Box 9, Tokyo, Japan

15 142936 WASHINGTON METRO: OUR NATIONAL MODEL. The first segment of Washington, D.C.'s rapid transit railway is now open. It has helped open federal eyes to the underlying cause of cost overruns--contract terms. The 96-mi (155-km) overall system features a host of engineering innovations, and these are the main focal points. Featured are aerial structures, tunneling, stations, system operation, and materials.

O'Neil, RS Fairhead, EA *ASCE Civil Engineering* Sept. 1976, pp 70-76; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL

15 142956 URBAN TUNNELS--AN OPTION FOR THE TRANSIT CRISIS. There has been no fundamental modification of the basic system of subway construction in the United States since the first subways were built in the 19th century. Excavation equipment and methods have been vastly improved, but subway system design and the basic construction sequence and procedure remain the same. New high-speed boring machine technology in suitable subsurface geologic conditions can introduce radical economies and reduce environmental impacts, if transit planners are aware of construction processes that include the economies of boring machine excavation. New approaches to subway construction are examined.

Walton, MS Proctor, RJ (Minnesota Geological Survey) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE4, Nov. 1976, pp 715-726, 3 Tab., Refs., 1 App.

15 143228 ASSESSMENT OF DISRUPTIVE EFFECTS ASSOCIATED WITH URBAN TRANSPORTATION TUNNEL CONSTRUCTION. FINAL REPORT. Social, economic, and environmental impacts resulting from tunnels' being constructed for mass transportation purposes in urban areas are identified. A matrix is constructed identifying the locus of costs to affected groups by four kinds of causal agents: traffic interference, property takings, environ-

mental disturbances, and utility disruptions. A separate matrix must be constructed for social, economic, and environmental costs. The cells of the matrix must be further expanded in order to pinpoint actual costs: variables must be identified for each affected group and each causal agent and measures for the variables determined. The measurement and aggregation of impacts are discussed. Four possible ways of lessening impacts are mentioned.

Wolff, PC Scholnick, PH ; ABT Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration AAI-76-27, DOT-TSC-UMTA-76-12, June 1976, 200 pp; See also RRIS 00A 058470.; Contract DOT-TSC-1018; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-256848/3ST, DOTL NTIS

15 143229 CUT-AND-COVER TUNNELING. VOLUME 1. CONSTRUCTION METHODS, DESIGN, AND ACTIVITY VARIATIONS. This report presents the results of a study to develop an analytical method for evaluating and optimizing cut-and-cover tunneling operations. The method is based on the results of a series of multiple estimates prepared by contractor type of basic resource estimating, rather than published unit prices. Major variables are type of structure, type of ground support, type of bracing, depth of excavation, and depth of water table. Volume 1 contains detailed descriptions of the study situations considered, the methodology to be employed, design criteria used, alternate methods of performing each construction activity, and a discussion on methods of cost analysis.

Wickham, GE Tiedemann, HR ; Jacobs Associates, Federal Highway Administration Final Rpt. FHWA-RD-76-28, JA-135, May 1976, 213 pp; Contract DOT-FH-11-8513; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257014/1ST, DOTL NTIS

15 143760 SUBSURFACE INVESTIGATION, SECTION F003, BRANCH ROUTE. Results are summarized of thirteen supplementary borings made at the location of sewer crossings on M street in southeast Washington, District of Columbia and at selected locations within the Washington Naval Shipyard. The borings were performed to investigate conditions at the planned crossing of the subway tunnels beneath the M Street sewers and to ascertain the character of deep bearing strata for high-load underpinning piles to be installed within the Navy Yard. The report contains geological sections incorporating the new borings, logs of these borings, results of laboratory tests on soil samples obtained and a discussion of anticipated design and construction problems. This investigation is for the Washington Area Metro System.

Mueser, Rutledge, Wentworth, & Johnston, Washington Metropolitan Area Transit Authority MRWJ-76-148, Rept. No. 8, July 1976, 56 pp; Sponsored in part by Washington Metropolitan Area Transit Authority, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255888/OST, DOTL NTIS

15 144011 SUBSURFACE EXPLORATION METHODS FOR SOFT GROUND RAPID TRANSIT TUNNELS. 2 VOLUMES. No Abstract.

Parsons, Brinckerhoff, Quade and Douglas, Inc, Soil and Rock Instrumentation, Incorporated, Transportation Systems Center Apr. 1976, 247 pp; Set includes PB-258343 thru PB-258344.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259342-SET/ST, DOTL NTIS

15 144012 SUBSURFACE EXPLORATION METHODS FOR SOFT GROUND RAPID TRANSIT TUNNELS. VOLUME I: SECTIONS 1-6 AND REFERENCES. The objectives of the Urban Mass Transportation Administration (UMTA) Tunneling Program are to lower subway construction costs and reduce construction hazards and damage to the environment. Some measure of each of these objectives for bored tunnels and deep excavations can be achieved through a more detailed knowledge of the subsurface and of how changes in soil types or characteristics will affect construction. This study assesses subsurface exploration methods with respect to their ability to provide adequate data for the construction of rapid transit, soft-ground bored and cut-and-cover tunnels.

Schmidt, B Matarazzi, B Dunicliff, CJ Alsop, S Parsons, Brinckerhoff, Quade and Douglas, Inc, Soil and Rock Instrumentation, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-3.1, UMTA-MA-06-0025-76-1, Apr. 1976, 203 pp; Prepared in cooperation with Soil and Rock Instrumentation, Inc., Newton Upper Falls, Mass. Also available in set of 2 reports as PB-258342-SET.; Contract DOT-TSC-654; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258343/3ST, DOTL NTIS

15 144013 SUBSURFACE EXPLORATION METHODS FOR SOFT GROUND RAPID TRANSIT TUNNELS. VOLUME II: APPENDICES A-F. This study assesses subsurface exploration methods with respect to their ability to provide adequate data for the construction of rapid transit, soft-ground bored and cut-and-cover tunnels. Geophysical and other exploration tools not now widely used in urban underground construction are investigated, their potential is discussed, and performance specifications and ideas for future development are presented. The effect of geotechnical variations on construction costs is modeled, and the effect of the prior knowledge of variation, including preliminary designs, specifications, cost estimates, and development plans, are formulated. Volume Two contains Appendixes A-F.

Schmidt, B Matarazzi, B Dunicliff, CJ Alsop, S Parsons, Brinckerhoff, Quade and Douglas, Inc, Soil and Rock Instrumentation, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-3.2, UMTA-MA-06-0025-76-2, Apr. 1976, 144 pp; Prepared in cooperation with Soil and Rock Instrumentation, Inc., Newton Upper Falls, Mass. Also available in set of 2 reports as PB-258342-SET.; Contract DOT-TSC-654; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258344/1ST, DOTL NTIS

15 147314 DESIGN CRITERIA FOR ELEVATED TRANSPORTATION STRUCTURES AND MODAL EXCHANGE FACILITIES. Investigations and evaluations of existing elevated

transportation systems were made to establish new guidelines and design standards for elevated transportation structures and modal exchange facilities. These criteria may be used to improve the physical condition of existing elevated systems and reduce their negative environmental impact on wayside areas. Prototypical renovations of existing transit structures and station areas are presented showing ways in which the new design standards may be applied to improve existing transit systems. Also, a prototypical elevated structure and a prototypical modal exchange facility are presented to demonstrate an application of the design criteria to hypothetical situations.

Gelick, MS Orseske, RJ Silver, ML ; Illinois University, Chicago, Department of Transportation Res. Rpt. DOT/TST-76/46, Jan. 1976, 123 pp; Contract DOT-OS-30092; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-260875/OST, DOTL NTIS

15 147677 NEW LIFE FOR GLASGOW TRAVEL TUNNELS. The author reviews the state of passenger transport in Glasgow and describes improvements being made to bus, underground and rail services. The underground system is to be completely rebuilt and new 2 or 3 car trains at a 2 minute frequency brought into service. British Rail's central low level line which passes beneath the city is to be reopened and will link the north and south electric systems. Other alterations described include the elimination of through traffic from part of the city centre and a city centre circular bus service to link Glasgow's inter-city stations. Brief details are given of the work involved and the problems that have been encountered. /TRRL/

Merchant, M *Surveyor - Public Authority Technology* Vol. 147 No. 4385, pp 9-11, 3 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 221487); ORDER FROM: IPC Building and Contract Journals, Limited, 32 Southwark Bridge, London SE1, England

15 147940 FINLAND'S FROZEN TUBE. Gives details of the problems associated with the Kluuvi cleft region of the proposed Helsinki metro. The underground section passes through this glacial cleft which is filled with alluvial water-bearing deposits. Compressed air and grouting methods are considered to be unlikely to be satisfactory because of the high water table, instability of the fill and doubts as to the origin of the water. Ground freezing methods have therefore been proposed for this 40 M section of the tunnel, which is to be lined with a cast iron circular lining. The remainder of the tunnel is in strong rock requiring no lining. The article discusses the advantages and disadvantages of the two freezing methods that have been proposed. The vertical method involves freezing from the surface and avoids disturbance of the water table. However, it would interfere with surface activities and would need insulation to avoid the heave that would result from freezing the entire block of ground. The horizontal method would probably need drilling from two chambers and from both ends and would also require the provision of compressed air in the workings. Because neither method was obviously best, tenders were called for prices on either scheme. /TRRL/

Consulting Engineer Vol. 40 No. 4, 1976, 2 pp, 3 Fig. ACKNOWLEDGMENT: TRRL (IRRD 221488);

ORDER FROM: ESL

15 148262 TOWARD A METHODOLOGY FOR EVALUATING ALTERNATIVE TRANSIT STATION DESIGNS. The paper describes a comprehensive approach for transit station design that includes criteria development for system users and operators. This approach involves an iterative process wherein a basic design is created and evaluated relative to established criteria and then incrementally modified until all objectives are satisfied. A comprehensive set of criteria for assessing the performance of alternative transit station design configurations is provided and an interest-impact matrix model is recommended for transit station evaluations. The potential of the evaluation framework is in application to numerous terminal design settings.

Hoel, LA (Virginia University) Demetsky, MJ ; American Society of Mechanical Engineers Conf Paper Paper D&O-26, 1976, 4 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247.; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

15 148269 REDUCING ENERGY CONSUMPTION THROUGH TRAJECTORY OPTIMIZATION FOR A METRO NETWORK. The problem considered is the determination of tunnel trajectories in the "equivalent" vertical plane when trains traveling in both directions must follow the same trajectory. The problem is first formulated as a control problem with control and state constraints. Then, under certain simplifying assumptions, an heuristic method employing a direct search algorithm is presented and used in the trajectory optimization. The trajectories are optimized to reduce the sum of the energy consumed by the trains traveling in both directions on the trajectory. The results show an average reduction of 7.73 percent in energy consumption as compared with existing trajectories.

Hoang, HH (Ecole Polytechnique, Canada) Polis, MP Haurie, A *IEEE Transactions on Automatic Control* No. 5, Vol. AC-20, Oct. 1975, pp 590-595, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 148590 A COMPUTER MODEL FOR SIZING RAPID TRANSIT TUNNEL DIAMETERS. A computer program was developed to assist the determination of minimum tunnel diameters for electrified rapid transit systems. Inputs include vehicle shape, walkway location, clearances, and track geometrics. The program written in FORTRAN IV calculates the locations of six critical points with respect to the top of the low rail. Twenty triplets of points are considered, each triplet defining a possible circle. Circles not containing all six points are discarded and the minimum-diameter circle is selected. An additional plotting option is available to provide a visual presentation of tunnel, vehicle envelope, and walkway envelope.

Wyman, FP Hefland, HJ ; Bechtel Corporation, (DOT-TSC-OST-75-49) Final Rpt. DOT-TSC-OST-75-49, UMTA-MA-06-0025-7518, Jan. 1976, 104 pp; Co-sponsors of this report were the Office of the Assistant Secretary for Systems Development and Technology, and the Urban Mass Transit Administration, DOT, under contract to Transportation Systems Cen-

ter, Cambridge, Massachusetts.; IA DOT-TSC-601; ACKNOWLEDGMENT: DOT; ORDER FROM: NTIS

15 148676 HALF A CENTURY PROGRESS IN SOFT GROUND TUNNELING. The paper summarizes major developments in the practice of soft ground tunneling in the United States, highlighting the important tunnels constructed in the last half century. The evolution of the shield, of the cast-iron fabricated steel or concrete lining, of the rate of progress concreting, grouting and cost over the last 50 yr are presented. The procedures and improvements are given of the major soft ground tunnels: Holland, Detroit-Windsor, Sumner-Boston, Lincoln, Queens Midtown, Chicago Subways, Brooklyn-Battery, Callahan-Boston, N.Y. Sewer Tunnels, San Francisco-BART, Washington-WMATA. The conclusion points out expected future improvements in procedure, equipment, progress rates, and cost.

Fox, GA Nicolau, LE (Grow Tunneling Corporation) *ASCE Journal of the Construction Division* Vol. 102 No. C04, Dec. 1976, pp 637-667, 5 Fig., 1 Tab., 51 Ref., 1 App.

15 148870 CONSTRUCTION: WHERE THE \$ GO. The experience of the Metro in Washington, D.C. is used to illustrate how the cost of subway construction has risen in recent years, and what subway builders can expect in the next few years. The cost of completing Metro was estimated prior to the 1969 groundbreaking at \$2.5 billion, or an average of \$25 million a mile, completed and equipped. At this writing, Metro confronts a new estimate of \$5.1 billion. The upward spiral of wages and prices at a time when a downward trend was forecast coupled with schedule delays is considered to have thrown the financial plan into disarray. Delay causes are listed and discussed. Comments are made on the Montreal system of contracting (differs from the fixed price system in the U.S.), and the Swedish approach where the contractor designs as well as constructs the tunnel, and there is total interchangeability of jobs among workers.

Eisen, J *Mass Transit* Vol. 3 No. 11, Dec. 1976, pp 6-11, 3 Fig.

15 149009 LONDON TRANSPORT'S FLEET LINE PROJECT. The author describes the works involved in the first stage of London Transport's \$80 million Fleet Line project of which the civil engineering construction is now substantially complete. In addition to the difficulties of fitting in with and connecting to London's existing underground railway lines, the author describes how above-ground structures, such as the Queen Eleanor Memorial at Charing Cross, were supported while the work was under way.(a) /TRRL/

Mead, DR *Tunnels and Tunnelling* Vol. 8 No. 7, Nov. 1976, pp 35-39, 5 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 223681); ORDER FROM: ESL

15 149140 SUPPORTED EXCAVATION IN WEAK CLAY. The performance of a supported (or braced) excavation is influenced by a large number of variables. These variables, together with the complex interaction and behaviour of the soil and supporting materials, are the subject of the text. The parameters involved in the perfor-

mance of a braced excavation was acquired by studying the detailed case records obtained during the construction of the Oslo subway. Using this information as a guide a computer program was developed which could adequately model a braced excavation and which incorporated as many of the parameters as possible. The details of the case study and a description of the computer program, together with a user's manual, three example problems and a program listing, are included. /RTAC/

Palmer, JH ; Toronto University, Canada Oct. 1974, 350 pp; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

15 150474 COMBINED UTILITY/TRANSPORTATION TUNNEL SYSTEMS-ECONOMIC, TECHNICAL AND INSTITUTIONAL FEASIBILITY. Although utility tunnels are common in Europe and Asia, United States use is largely confined to institutions where all utilities are under single ownership. Cut-and-cover transportation projects appear to display nearly ideal conditions for the use of utility tunnels. This project evaluated the economic, technical and institutional feasibility of incorporating utility tunnels into cut-and-cover transportation tunnel projects. Direct construction costs for the utility tunnel and conventional utility treatment options were projected and found to be comparable. In addition, significant reductions in urban disruption result when the construction of the utility tunnel and transportation tunnel is properly integrated. The combined tunnel system is the recommended option. The treatment of each utility, the structure of the tunnel operating entity and recommendations for implementation are included.

Huck, PJ Iyengar, MN Makeig, KS Chipps, J ; IIT Research Institute, American Public Works Association, Transportation Systems Center Final Rpt. DOT-TSC-OST-75-50, July 1976, 242 pp; Prepared in cooperation with American Public Works Association, Chicago, Ill.; Contract DOT-TSC-794; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262067/2ST, DOTL NTIS

15 150537 SUBSURFACE INVESTIGATION, SECTION A014 ROCKVILLE ROUTE [Rept. no. 9]. Results are summarized of 58 test borings made at selected locations along the line of Section A014 of Rockville Route, generally following Rockville Pike north of Strathmore Avenue to Station 76440 of the Washington Metropolitan Area METRO system where the METRO adjoins the B and O Railroad right-of-way. Five of these test borings were made with a large-size hollow-stem auger to assess the difficulty of excavation in the subsurface materials. The report includes a continuous geological section along the centerline of the METRO structures, special cross-sections at the location of the subway station and parking lots, logs of the test borings, results of laboratory tests on soil samples and comments on potential design and construction problems.

Mueser, Rutledge, Wentworth and Johnston, New, York. DeLeuw, Cather and Co., Inc., Washington,, D.C. Washington Metropolitan Area Transit Authority, D.C. MRWJ-76-149, Oct. 1976, 107p; Sponsored in part by Washington Metropolitan Area Transit Authority, D.C. Prepared in cooperation with DeLeuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-260692/9ST

15 151219 FIELD MEASUREMENTS OF THE VIBRATION PROPERTIES OF ELEVATED RAPID TRANSIT STRUCTURES. Vibrations induced into rail rapid transit structures may be radiated from the structure as airborne noise that disturbs the rider and the wayside community or as ground-borne vibrations which propagate into the foundations of wayside structures setting walls, floors, and common household items into annoying vibration. This report describes the results of field measurements on existing steel elevated structures presented to aid transit operators and engineers concerned with design, performance, repair, and evaluation of steel elevated rapid transit structures. These measurements showed that the peak acceleration levels are generated in decreasing order of magnitude on the rail, on the top and bottom girder flanges, on the girder web, on cross-bracing, on the column, and at the footing base. In addition, peak acceleration levels of 70 g are little attenuated as they are transmitted from the rail through the structure, and peak acceleration levels significantly increase for increasing train speeds.

Venema, T Silver, ML ; Illinois University, Chicago, Department of Transportation Intrm Rpt. DOT/TST-75/43, Dec. 1974, 83 pp; Contract DOT-OS-30092; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263220/6ST, DOTL NTIS

15 151656 USE OF SOIL STABILIZATION IN THE CONSTRUCTION OF THE FRANKFURT/MAIN RAPID TRANSIT LINE (ANWENDUNG DER BODENVERFESTIGUNG BEIM BAU DER S-BAHN IN FRANKFURT /MAIN). The main purpose of the stabilization measures discussed in this report was to stabilize the unfixed layers and to increase the strength of loose rock above the tunnels to secure existing aboveground structures against damage resulting from the formation of the half-space due to tunnel work. (Author)

Schultz, EW Dintzner, J ; Cold Regions Research and Engineering Lab Hanover, N H CRREL-TL-560, Dec. 1976, 19p; *Trans. of Die Bautechnik (West Germany)* v52 p37-42 1975.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A034182/6ST

15 151745 PROCEEDINGS: SEMINAR ON UNDERGROUND CONSTRUCTION PROBLEMS, TECHNIQUES AND SOLUTIONS HELD AT CHICAGO, ILLINOIS ON OCTOBER 20-22, 1975. The seminar on "Construction Problems, Techniques and Solutions" held at the First Chicago Center in Chicago on October 20-22, 1975, was organized to focus on anticipated construction problems of the Chicago Central Area Transit Project to include underground construction techniques, new technology, ground engineering techniques (underpinning, dewatering, grouting), and involved an exchange of experiences among owners, design teams, contractors, and other pertinent agencies. Because of the continuing requests for seminar materials 19 papers prepared for the seminar follow in their entirety. The authors are identified by their titles and associations as of October 1975. Additionally, a complete summary of the panel

discussion held during the last afternoon of the seminar and moderated by Mr. Nelson, CUTD Executive Director, is furnished because of the pertinent views that were expressed therein.

Barnes, WL Xanthakos, PP ; Chicago Urban Transportation District, Urban Mass Transportation Administration, Transportation Systems Center UMTA-MA-06-0025-76-8, Dec. 1976, 438 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264027/4ST, DOTL NTIS

15 151779 CONSTRUCTION MONITORING OF SOFT GROUND TUNNELS: A RATIONAL HANDBOOK OF PRACTICES FOR RAPID TRANSIT SYSTEM PLANNERS AND MANAGERS. This report aims to fit the objectives of the Urban Mass Transportation Administration (UMTA) Tunneling Program to lower subway construction costs and to reduce construction hazards and damage to the environment. This report generated from an UMTA sponsored study that disclosed the art of instrumentation and monitoring as being advanced but not as potentially sufficient on tunneling projects. One of the main reasons for this stemmed from a lack of general procedures and guidelines, as well as, a lack of expertise among decision-makers regarding tunnel monitoring. UMTA commissioned this Handbook to remove such difficulties. The principal purpose of this Handbook is to encourage and improve the use of monitoring for urban mass transit tunnels, and other deep excavations. This Handbook documents the findings of a recent UMTA construction monitoring instrumentation research project. The Handbook is directed to systems planners and managers and points out how to incorporate a successful monitoring program(s) into their systems that help to control and reduce costs.

Schmidt, B ; Parsons, Brinckerhoff, Quade and Douglas, Inc, Urban Mass Transportation Administration, Transportation Systems Center, (MA-06-0025) Handbook UMTA-MA-06-0025-77-1, DOT-TSC-661, Jan. 1977, 70 pp; Contract DOT-TSC-661; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264361/7ST, DOTL NTIS

15 152538 UMTA TRIES TO DIG OUT FROM BURDEN OF RISING TUNNEL COSTS. Faced with the rapidly increasing tunneling cost on one hand and a mandate to improve urban transportation on the other, UMTA is aggressively funding its tunneling research and development program. The program has four major parts: Interaction with society. Materials handling. Ground control and stabilization. Site exploration. UMTA and local DOT officials have been working together on ways to encourage designers and contractors to adopt new techniques on certain sections of a mass transit contract. An UMTA funded study, involving 400 feet of a soft ground tunnel in the WMATA system is designed to check the settlement and ground movement of ungrouted, moderately grouted, and heavily grouted sections. UMTA is also observing two grouting projects: One project on WMATA involves a grouting for underpinning a freeway underpass. The other project involves underpinning with compaction grouting for brick buildings in the Bolton Hill section of Baltimore's system. In the rock tunneling area, UMTA has suggested that shotcrete and rock bolts be used wherever possible. Other areas of

concern for UMTA are materials handling, including muck use; new design approaches for both flexible and stiff tunnel liners; the potential for standardizing components of tunnels; and, assessing the cost trade off between sealing trains entering a tunnel against rapid pressure changes or using modified portal designs.

Engineering News-Record Vol. 198 No. 9, Mar. 1977, pp 14-15, 5 Phot.

15 152602 PRODUCTION OF A LARGE PATERN SYSTEM (QUALITY M1) FOR TUNNEL RING SEGMENTS [Herstellung einer Grossmodelleinrichtung der Gueteklasse M1 fuer Tunnelringsegmente]. The details of the design and production of patterns for casting subway tunnel ring segments in cast iron are described and illustrated. The patterns are expected to be used for 20,000 castings without major repairs. [German]

Eppstein, H *Giesserei* Vol. 63 No. 21, Oct. 1976; ACKNOWLEDGMENT: EI (EIX770300111); ORDER FROM: ESL

15 152668 ELEVATED STRUCTURE FOR ATLANTA TRANSIT SYSTEM. A standardized elevated structure for above-ground segments of the Metropolitan Atlanta Rapid Transit system was designed primarily for installation with adequate clearance on railroad rights-of-way and also as a low-profile aerial guideway which would be aesthetically suitable in residential neighborhoods. The concept involves a prestressed concrete deck slab acting compositely with single box girders supported on rectangular concrete columns. Various sound-deadening arrangements have been part of the structural design.

Railway Track and Structures Vol. 73 No. 2, Feb. 1977, pp 17-19, 2 Phot. ORDER FROM: ESL

15 152808 WASHINGTON METRO'S TOP-LESS TUNNELS. Soil investigations for a section of the Metro where existing major highway and bridge structures would leave relatively little cover over the tunnels revealed that the tunnels would have to be driven through mixed face, with a clay invert and a waterlogged sand crown. Thus, there was a good chance that the roof would fall in. The design settled on a scheme of grout injection to stabilize the granular soils and preclude the development of runs in the crown of the tunnel headings. Combined with careful tunneling, it was felt that this would be sufficient to maintain both safety and decorum. The paper discusses the construction planning, design provisions, grouting program, equipment and methods, problems and costs.

Kuesel, TR (Parsons, Brinckerhoff, Quade and Douglas, Inc) ; American Inst of Mining, Metallurg & Petrol Engrs Conf Paper 1976, pp 296-310; Presented at the 3rd Rapid Excavation & Tunneling Conference, Las Vegas, Nevada, 14-17 June 1976.; ACKNOWLEDGMENT: EI (EIX770200129); ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, 345 East 47th Street, New York, New York, 10017

15 152809 SELECTION OF THE VERTICAL ALIGNMENT OF RAPID TRANSIT TUNNELS. The paper presents an abbreviated view of factors that influence selection of vertical align-

ment of rapid transit tunnels in an urban setting. The two principal factors relating to pre-existing site conditions are the geological setting and the impact of tunneling on adjacent structures. However, a wide variety of other influences makes itself felt, which includes geometric criteria based on train operations, overall route interaction, environmental and public policy considerations, and finally the total economic appraisal.

Daugherty, CW (De Leuw, Cather and Company) Ware, KR Gould, JP ; American Inst of Mining, Metallurg & Petrol Engrs Conf Paper 1976, pp 311-331; Presented at the 3rd Rapid Excavation & Tunneling Conference, Las Vegas, Nevada, 14-17 June 1976.; ACKNOWLEDGMENT: EI (EIX770200130); ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, 345 East 47th Street, New York, New York, 10017

15 152810 AS-BUILT GEOTECHNICAL REPORT: ITS USE FOR DESIGN OF SUPPORT FOR THREE ROCK STATIONS, WASHINGTON, D. C. METRO. The three rock station areas have been explored by crown pilot tunnels and an as-built report, with geologic maps and sections, has been prepared for use by the design engineer as the basis of design for support of the structures. The geotechnical report describes the geologic structure in detail and relates it to excavation and support of the three crown pit tunnels and the running tunnels which will be enlarged to create the stations. The information was complete enough to permit the design engineer to visualize the geologic structure, compute loads for the various types of rock conditions, and design the steel set supports.

Bock, CG (Bechtel Corporation) ; American Inst of Mining, Metallurg & Petrol Engrs Conf Paper 1976, pp 430-447; Presented at the 3rd Rapid Excavation & Tunneling Conference, Las Vegas, Nevada, 14-17 June 1976.; ACKNOWLEDGMENT: EI (EIX770200132); ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, 345 East 47th Street, New York, New York, 10017

15 152812 TRANSPORTATION TUNNELING DEMAND, PRESENT AND FUTURE. Currently, the two major types of transportation tunnels being constructed are highway and rail transit. The technological and institutional improvements which are needed in order to reduce capital construction costs can be achieved by an effective Federal research and development program which is responsive to the industry needs. A responsive R&D program should be based on clearly defined cost benefit ratios; hence demand forecasting is an integral part of the R&D activity. Demand studies can also provide guidance to policy makers in all sectors of the tunneling industry, such as the needed capacity of the industry to meet projected construction. How much the increase in tunneling might be through the 1980's is the subject of the paper.

Butler, GL (Urban Mass Transportation Administration) Wilkes, W ; American Inst of Mining, Metallurg & Petrol Engrs Conf Paper 1976, pp 774-793, 11 Ref.; Presented at the 3rd Rapid Excavation & Tunneling Conference, Las Vegas, Nevada, 14-17 June 1976.; ACKNOWLEDGMENT: EI (EIX770200138); ORDER FROM: American Inst of Mining, Metallurg & Petrol Engrs, 345 East 47th Street, New York, New York, 10017

15 153969 SYSTEMS STUDY OF PRECAST CONCRETE TUNNEL LINERS. The study addresses precast concrete lining systems. Existing precast concrete systems designed or constructed in Europe, Japan, and the United States are evaluated. With these as a point of departure, designs for lining systems applicable to the specific conditions encountered in the United States are developed. A comparative cost analysis is made between the linings designed in the study, one existing precast concrete design and two in fabricated steel. Appreciably lower costs are found for all of the concrete liner designs when compared to those in fabricated steel. Water sealing systems are discussed and recommendations for the development and testing of sealing details are made. Guidelines for dissemination of information about, and for the implementation of the systems, are presented.

Birkmyer, J ; Bechtel Corporation, Transportation Systems Center, Office of the Secretary of Transportation, Urban Mass Transportation Administration Final Rpt. DOT-TSC-OST-77-7, Mar. 1977, 147 pp; Sponsored in part by Department of Transportation, Washington, D.C. Office of the Secretary, and Urban Mass Transportation Administration, Washington, D.C.; Contract DOT-TSC-772; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264761/8ST, DOTL NTIS

15 154118 SUBSURFACE INVESTIGATION, GLENMONT ROUTE, STATIONS 97950 (B009) TO 123225 (B011) AND STORAGE YARD (B012) [Final rept]. Results are presented of 108 borings of the B-series made for General Plans Study of Glenmont Route, along Georgia Avenue in Montgomery County, from its junction with B&O Railroad Metropolitan Branch to the community of Glenmont of the Washington Metropolitan Area Metro system. The investigation was made to determine subsurface conditions over a length of 25,000 feet for subway tunnels in rock and at the location of three subway stations, Forest Glen, Wheaton and Glenmont. Forest Glen Station is presently planned to be a deep rock excavation whereas the two northern stations will be cut-and-cover excavations from the surface. The report includes continuous geological sections along the line of the subway in the three sections, logs of all of the test borings made at various times for WMATA in Sections B009 to B011, laboratory test data and recommendations regarding design and construction problems.

Mueser, Rutledge, Wentworth and Johnston, New, York. Washington Metropolitan Area Transit, Authority, D.C. MRWJ-76-146, June 1976, 284p; Sponsored in part by Washington Metropolitan Area Transit Authority, D.C. See also PB-232 515. Microfiche copies only.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263789/OST

15 154798 AN INVENTORY OF FUTURE TRANSIT SUBSURFACE CONSTRUCTION. An inventory of future transit (fixed guideway) subsurface construction in the United States and Puerto Rico was undertaken, covering the 1976-1990 time frame. A total of 19 transit constructing authorities in 17 cities were surveyed by questionnaire and on-site visitations. Information was gathered on status, routes, type of construction, costs, geology, environmental factors, and any other unique factors. A total of over

120 miles of planned construction was revealed, expected to cost over \$7.5 billion, in the survey time period. However, the total is heavily influenced by planned Washington construction. Among other cities about 30 miles is totally funded; the rest is planned but unfunded. Costs of cut and cover are beginning to approach mined tunnel (except in New York), and environmental considerations often swing the balance.

Vaccaro, AP ; Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Office of the Secretary of Transportation Final Rpt. DOT-TST-76-86, June 1976, 109 pp; Prepared in cooperation with Urban Mass Transportation Administration, Washington, D.C.; Contract DOT-OS-60065; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265721/1ST, DOTL NTIS

15 156035 SHIELD-DRIVEN TUNNELS WITH OR WITHOUT COMPRESSED AIR. The following discussion of major shield-driven tunnels describes the state of the art, the problems, and the imposed restraints. No one particular method is considered superior because the method that is used depends on specific project conditions which vary widely. Construction of shield-driven tunnels under compressed air in Chicago, New York, Oakland-San Francisco, and Washington, D.C. are described. Future research in shield-driven tunnels are recommended in the following areas: safety regulations in tunnel construction; methods to fill tail voids more quickly and more effectively; methods of improving tail seals to prevent grout, pea gravel, or water from running back into the shield; developing a precast concrete primary lining that would be water tight and require no secondary lining; successful foreign methods of filling the tail void should be studied; more efficient backhoes are needed to improve the rate of progress in shield-mined tunnels; lastly, small cities which do not anticipate large crowds utilizing a rail rapid transit system should consider narrower cars, thus saving on the cost of shield driven tunnels.

Mayo, RS (Mayo and Associates) *Transportation Research Board Special Reports* No. 171, 1977, pp 14-15, 1 Phot.; This article appeared in TRB Special Report No. 171, Tunnel Construction: State of the Art and Research Needs.; ORDER FROM: TRB Publications Off

15 156322 CONTRACTOR PUMPS IN CONCRETE FOR UNDERPINNING SQUEEZE PLAY. The paper reports how without disturbing the interior of a bank, including its basement vault, a contractor placed underpinning for construction of a new light rail transit system in Edmonton, Alberta, by excavating in cramped quarters with hand tools and then pumping in concrete for prestressed girders.

Engineering News-Record Vol. 198 No. 2, Jan. 1977, p 17 ACKNOWLEDGMENT: EI (EIX770400144); ORDER FROM: ESL

15 156341 PRACTICAL EXPERIENCE FROM THE EXCAVATION OF SLURRY TRENCHES IN OSLO CLAY. Subway and railroad tunnel through the center of Oslo where the tunnel walls are constructed by means of the slurry trench method is described. Every 4.5 m crosswise along the tunnels, slurry trenches are excavated and cast with concrete 5 m below the

bottom of the tunnels. This contributes both to preventing bottom heave failure and to bracing the tunnel walls. Of the total 31,000 square meters of slurry trench excavated, 18,000 square meters are carried out with only water as slurry, while for the remaining trenches, partly the traditional bentonite slurry and partly a slurry made of clay from the site are used. The stability of the slurry trenches and results of some of the extensive measurements, observations and experience gathered during the execution of the projects are discussed.

Karlsrud, K *Norwegian Geotechnical Institute Publication* No. 110, 1976, pp 39-47, 6 Ref.; ACKNOWLEDGMENT: EI (EIX770400384); ORDER FROM: ESL

15 157210 STRUCTURES FOR MASS TRANSIT. This manual which is intended for the structural engineer, considers those facets of mass transit which affect aerial guideway design and discusses the interaction between the vehicle and the supporting structure. Aspects of vibration and passenger comfort are discussed in detail. Aspects of vibration and passenger comfort are discussed in detail. The manual illustrates the difference in design technique required for some vehicles. Continuous spans are shown to have an advantage over simple spans for most guideways. The design of guideways for vehicle speeds in the range of 60 mph and less is generally found to be governed by stress rather than by stiffness. The opposite is true for speeds in the range of 150 mph and greater. The relationship between guideway surface roughness and passenger comfort is discussed. Tables are presented in which systems with similar requirements are grouped to facilitate the study of aerial structures by class rather than by individual system. Gross weight and velocity were chosen as the elements needed to define a class. Dynamic studies and design examples are described which are based upon 3 hypothetical vehicles having weights of 10k, 25k and 60k.

Clausen, KA ; American Iron and Steel Institute *Monograph* No Date, 92 pp, 59 Fig., 18 Tab., Photos., 29 Ref.

15 157246 SYSTEMS SAFETY AND TUNNEL SUPPORT. About 10 years ago a Swiss engineer, John Bernold, designed a tunnel support system that needs three requirements: (1) It seals off rock from the effects of air slacking and water entrainment; (2) It immediately provides a strong temporary support for the miners; (3) All of the steel placed can be used as part of the permanent tunnel support structure. With the Bernold system, shot-crete is supported, and together with the steel plates, has a very high shear strength. This support system, in addition to providing safety for tunnel employees, substantially reduces the work effort, because the need for vast quantities of temporary timber lagging no longer exists; it reduces the amount of steel needed for the permanent support; it eliminates the need for large quantities of concrete to cover a tangle of temporary steel arches and a mat of re-steel. This system can be compared to a thin arch dam, and it reacts to extreme ground forces by flexing to shift the load. A great number of tunnels in Europe have used the Bernold systems safety approach for tunnel support. The St. Gotthard Highway Tunnel through the Swiss Alps is notable for the use of this system. The subways in Tokyo also have used this system to good

advantage. The Bernold system has been used in almost 1,000 miles of tunnels, and not one has fallen. It is stated that the Bernold system can easily meet the safety requirements of OSHA, the U.S. Corps of Engineers, and the State of California Tunnel Orders.

MacCollum, DV *National Safety News* Vol. 114 No. 6, Dec. 1976; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 157580 NEW TUNNEL "SAN BERNARDINO" ON THE GENOVA-VENTIMIGLIA LINE [La nuova galleria San Bernardino della linea Genova-Ventimiglia]. Tunneling through highly degraded shales, in the presence of buildings existing in vertical with respect to the portal, with an average coverage of about fifteen meters, required the perfecting of a particular method of construction. This method, based on the construction of a pre-portal, made up of metallic inserts injected with mortar, is briefly described, both with regard to the characteristics and the planning of the project, and with regard to the modalities for its execution. Furthermore, mention is made of the reasons which induced the rejection of defense structures of a different type, such as the underpinning or the consolidation of the terrains involved by means of chemical injections. The works described have been completely carried out, in full compliance with the programs of time and expenditure, and achieving the prime objective of safeguarding the integrity of the buildings located above the tunnel. [Italian]

Piepoli, G *Ingegneria Ferroviaria* No. 10, Oct. 1976, pp 3-12, 17 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 157687 FLOATING TRACK SLAB ISOLATION FOR RAILWAYS. Where an underground railway is in existence, it is up to the developer to take what precautions may be necessary to provide an acceptable interior environment. Many a building has been isolated on resilient bearings from the ground-borne vibrations produced by an adjacent railway with the result that the occupants are unaware of the trains running underneath the building. The technique for the resilient mounting of large structures has been well developed, and there is a B.S.I. Draft for Development in which some guidelines have been established. Where a new underground railway is to be constructed close to or under existing properties it may be more expedient to isolate the railway. Several design of a "floating track slab" have been constructed, usually with very beneficial effect. Some of these floating track slabs are described in this contribution.

Grootenhuis, P *Journal of Sound and Vibration* Vol. 51 No. 3, Apr. 1977, pp 443-448; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

15 157936 CONSIDERATIONS ON THE PROBLEM OF NON-STATIONARY AIR CURRENTS OCCURRING WHEN TRAINS PASS THROUGH TUNNELS [Ueberlegungen zum Problem der instationaeren Stroemung bei einer Zugfahrt durch einen Tunnel]. When non-stationary aerodynamic phenomena occur, acceleration and deceleration forces are produced which influence the environment. The author explains the main reasons for these non-stationary phenomena and supports these with results from tests carried out in a number of tunnels. [German]

Glueck, H *Archiv fuer Eisenbahntechnik* Vol. 31 Dec. 1976, pp 77-81, 7 Fig., 10 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

15 158942 THE GROUND MOVEMENTS RELATED TO BRACED EXCAVATION AND THEIR INFLUENCE ON ADJACENT BUILDINGS. This report summarizes the settlement and lateral displacement measurements associated with urban excavation projects in the dense sands and interbedded stiff clay of Washington, D.C. and the soft clay of Chicago. The ground movements caused by excavation in each area are discussed in light of the soil profile and construction techniques. The relationship between soil displacement and the damage caused to adjacent buildings is examined. Criteria for the onset of architectural damage are recommended for brick-bearing wall and frame structures subject to excavation movements. Brick-bearing wall structures are described, with special emphasis on the construction details related to building stability. Various modes of instability caused by differential ground movements are examined for brick-bearing wall structures. Case histories of building damage caused by adjacent excavation are presented.

O'Rourke, TD Cording, EJ Boscardin, M ; Illinois University, Urbana, Office of the Secretary of Transportation, Federal Railroad Administration Final Rpt. DOT/TST-76T-23, UILU-ENG-76-2023, Aug. 1976, 135 pp; Contract DOT-FR-30022; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267311/9ST, DOTL NTIS

15 159345 STUDY OF SUBWAY STATION DESIGN AND CONSTRUCTION. Due to the high cost of urban underground transit construction in recent years, construction practices used in other countries were reviewed to determine if construction methods which are commonly accepted there might be adapted to U.S. practice. Design and administrative practices were also reviewed to determine which have the most significant effect on station costs to assure that future system developers are aware of the items that offer the greatest opportunities to control costs. Using 13 on-site interviews in Europe and North America, unusual construction methods, design considerations, and general considerations which offer opportunities for cost savings were identified. Two basic points for reducing costs were emphasized repeatedly by those interviewed: the basic recommendation for obtaining economy in station design and construction is to take advantage of every opportunity which the locale and site offer; and while final design and construction practices are the most visible sources of expenditure, it is almost universally the early policy, planning, and design decisions which have the greatest effect on the final cost of a transit project. With the experience and opinions of the many transit authorities and construction agencies and a review of current literature as a base, a set of seven recommended subway station designs were developed. To examine costs, three series of estimates were performed comparing the station types among themselves, comparing the costs of varying major station dimensions, and comparing costs of alternative construction meth-

ods, such as slurry walls and other excavation support systems which performed multiple functions.

O'Neil, RS Worrell, JS Hopkinson, P Henderson, RH ; De Leuw, Cather and Company, Skidmore, Owings, and Merrill, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0025-77-6, Mar. 1977, 208 pp; Prepared in cooperation with Skidmore, Owings, and Merrill, Boston, Mass.; Contract DOT-TSC-1027; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268894/3ST, DOTL NTIS

15 159486 SOIL STABILIZATION IN NEAR SURFACE TUNNEL CONSTRUCTION [Baugrundvevuetung beim Oberflaechennahen Tunnelbau]. Problems associated with the application of injection methods, requirements for injection agents, construction of injection piles, and application of the freezing process are discussed. [German]

Heyne, KH *Bauzeitung* Vol. 30 No. 12, Dec. 1976, pp 667-669, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 159600 CENTRAL-AREA BUS TERMINALS; PLANNING AND DESIGN GUIDELINES (ABRIDGMENT). Bus terminal planning and design must reflect the particular needs of each specific situation. The terminal must be located in conjunction with rail rapid transit lines, busways, and contraflow bus lanes and are useful mainly where the urban area population exceeds 750,000 and the downtown employment exceeds 50,000. Freeway access by free-flowing grade-separated ramps and bus roadways is essential for a major terminal. Comments are made on the relationship of terminals to bus volume concentrations, cost, revenue, demand and economic feasibility. The scale of development and basic functions. Internal terminal design should separate vehicle and passenger movements, carefully reflecting their specialized circulation and geometric requirements. Intercity and commuter services should have separate platforms to reflect their differing service patterns and berth occupancy requirements. Berth space requirements should reflect both scheduled and actual peak-period bus arrivals and departures. General design features are listed.

Hoey, WF Levinson, HS (Smith (Wilbur) and Associates) *Transportation Research Record* No. 614, 1976, pp 27-31, 3 Fig., 4 Tab., 1 Ref.; This article appeared in TRB Research Record No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

15 159721 TUNNELLING 76-SESSIONS 7-11. The following papers were presented at these sessions of the Conference: Session 7--Ground and lining studies for the Channel Tunnel Project, Curtis, DJ; Design and installation of ground instrumentation for the Channel Tunnel, Potts, ELJ; Measurements of ground-lining interaction pressure in an underwater tunnel in coal measures rock, Attewell, PB; Session 8--Hydraulic Percussive rock drills--a proved concept in tunnelling, Ottosson, L; Programme of laboratory, pilot and full-scale experiments in tunnel boring, O'Reilly, MP, Roxborough, FF and Hignett, HJ; Factors influencing the cutting performance of a selective tunnelling machine, Fowell, RJ; Session 9--Mining drifts and tunnels:

role of rockbolting and parameters in its selection, Dejean, M; Performance of tunnel support systems in the four fathom mudstone, Ward, WH; Location and support of tunnels in deep-level gold mines, Wagner, H; New approaches to steel supports for tunnels and mines, Billington, CJ; Session 10--The Kaimai Tunnel, New Zealand--a case history, Bennion, JD; Subway Tunnels in areas of mining subsidence in the Ruhr District, Germany, Duddeck, H; Construction of an inclined twin-tube escalator shaft on the Budapest metro, Rozsa, L; Some problems associated with the use of a tunnel machine in deep-level gold mines, Graham, PC; Session 11--Full-face tunnelling machines in British coal mines, Rees, PB; Machine-bored small-size tunnels in rock, with some case studies, Barendsen, P. /TRRL/ papers by O'Reilly, M et al and Ward, WH, see IRRD abstracts nos 225432 and 220648. The covering abstract of the proceedings is IRRD abstract no 225428.

Institution of Mining and Metallurgy, (0 900488 34 4) Proceeding 1976, pp 231-438, Figs., Tabs., Phots., Refs.; Proceedings of an International Symposium organized by the Institution of Mining and Metallurgy, March 1-5, 1976, London, England.; ACKNOWLEDGMENT: TRRL (IRRD-225430)

15 163829 A TITAN AT GATESHEAD. The article describes the operation of the first of a new range of large road-header excavating machines, the titan, being used in the UK on a site for the tyne and wear rapid transit system at gateshead. The excavation contract consists of the construction of a new station in an open cut operation, and also the construction of running tunnels on either side of the station. The running tunnels are being constructed through coal measures and so equipment must be subject to flameproofing regulations. Examples of pick use rate and excavation rates are given for the german-made machine. Construction methods chosen for the tunnelling project are described as well as the problems that have been met and the ways in which they have been overcome. It is stated that further machines of this type are to be manufactured in the UK. /TRRL/

Tunnels and Tunnelling Vol. 9 No. 2, Mar. 1977, pp 35-36, 1 Fig., 1 Tab., 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD-226932)

15 163998 THE AERODYNAMICS AND VENTILATION OF VEHICLE TUNNELS-A STATE OF THE ART REVIEW AND BIBLIOGRAPHY. The publication presents a state of the art review and bibliography on the aerodynamics and ventilation of road and rail tunnels, and also of underground rapid transit systems. The review discusses the subject in the following sections: road tunnels--the nature of the problem; effects of air pollution; the quantity of air required for efficient road tunnel ventilation; systems of road tunnel ventilation; instrumentation and control; planning of ventilation stations; economic considerations. Rail tunnels and rapid transit systems underground--classification of tunnel systems; the thermal environment; the pressure and environment for both main line tunnels and RTSU; air quality in both main-line tunnels and RTSU; tunnel exit noise and vibration; possible future tube vehicle systems. The bibliography contains details of 588 publications in four sec-

tions: (a) general and related references; (b) road tunnels; (c) motor vehicle exhaust emission, and (d) rail tunnels and other tube-vehicle systems. Two indexes to the bibliography are provided, the first by subject, tunnel name and country and the second by author. /TRRL/

Pursall, BR King, AL; British Hydromechanics Research Association, G, (0 900983 620) Monograph Vol. 2 1976, 238 pp, 50 Fig., 7 Tab. BHRA Fluid Engineering Series.; ACKNOWLEDGMENT: TRRL (IRRD-226472)

15 164332 SYMPOSIUM ON PRESTRESSED CONCRETE IN SHORT TO MEDIUM SPAN BRIDGES, SYDNEY, 1976. Papers include: "Australian scene, including railway bridges" by J. Laurie and N.D. Tickner. "Design analysis of skew bridge structures" by D.J. Lee and E.C. Chaplin. "Rapid passenger transport: by G.F. Janssonius." "Partial prestressing" by G.F. Janssonius. "Partial prestressing" by Prof. T. Bronnum-nielsen. "Behaviour of prestressed concrete box girders made of precast segments and subjected to combined bending, torsion and shear" by Dr. P. Dayaratnam & J.Y.T. Populi. "Stage prestressing and prestressing as a construction aid" by G.P. Cook. "Thrust method for constructing railway bridges" by Dr. Ing Markus Hoptner. "Prestressed concrete through-girder bridges and high strength concrete bridges for railways" by Dr. Y. Ishiguro and Dr. Y. Miyasaka. "Standardisation of bridges in Czechoslovakia" by Dr. T. Javor. "Prestressed concrete bridge concepts in developing countries" by F. Kulka and P.Y. Chow. /TRRL/

Concrete Institute of Australia Monograph No Date, 158 pp, Figs., Tabs., Phots., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 227231)

15 165031 COST ASPECTS OF ELEVATED GUIDEWAY DESIGN. The paper presents some of the cost-saving features incorporated in current optimum guideway designs, identifies the general areas where cost-reductions may be initiated and summarizes guideway costs for the majority of present day vehicle systems. Innovative design concepts aimed at Personal Rapid Transit systems are discussed.

Prestgaard, E (ABAM Engineering Incorporated); Colorado University, Boulder Conf Paper Vol 2, Pap 35, 1975, 19 pp; Presented at the International Conference on Personal Rapid Transit, Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Boulder, Center for Urban Transportation Studies, Boulder, Colorado, 80302

15 165167 CALCULATION, MODEL TESTING AND IN-SITU MEASUREMENTS OF TUNNELS IN SOFT SOIL [Berechnungen, Modellversuche und in-situ Messungen bei einem Bergmaennischen Vortrieb in Tonigem Untergrund]. An assessment is made of the advantages offered by the new Austrian tunneling method which was first applied in construction of the Frankfurt subway tunnels. A comparison is made of results obtained by calculations for soil pressures and settlement rates and results obtained on models and in tunnels. [German]

Mueller-Salzburg, L Sauer, G Chambosse, G *Bauingenieur* Vol. 52 No. 1, Jan. 1977, pp 1-8, 11 Ref.; ACKNOWLEDGMENT: EI;

ORDER FROM: ESL

15 165317 SEGMENTAL CONCRETE LINER FOR SOFT GROUND TUNNELS. Concrete is presented as a low-cost material for use as a sole tunnel liner material in future mass transit tunnel projects. Existing mass transit tunnels throughout the world which have used concrete liners are presented. A systems summary is given which outlines numerous factors that must be considered for implementation of concrete as a sole tunnel liner material. Various concretes and liner sealant systems are presented as well as past and current research efforts directed toward greater use of concrete in future transit tunnel projects. Many aspects for consideration in a sealant system test verification program are also presented. /Author/

Tartaglione, LC (Lowell University) *ASCE Journal of the Construction Division* Proceeding Vol. 103 No. CO2, ASCE 13011, June 1977, pp 227-243, 7 Fig., 21 Ref., 1 App.

15 165763 INSURANCE FOR URBAN TRANSPORTATION CONSTRUCTION. This report investigates insurance programs for urban transportation construction, including subways, and establishes guidelines by which an authority owner can choose the insurance program which best serves the needs dictated by the conditions and factors of the specific job. An optimal insurance program combines lowest costs, highest standards, and most effective administration. There are many possible tradeoffs, thus, the decision is complex. An analysis of insurance programs is presented; e.g., coordinated and conventional, withholding policies, deductibles, liability, Completed Operations Coverage and other possible coverage combinations. Various forms of insurance are discussed, as are programs for general construction safety. Innovative variations of Coordinated Insurance Programs are explored. The results are decision-making guidelines for owners for managing risk in urban transportation construction.

Barrett, JE; Cresheim Company, Incorporated, (DOT-TSC-UMTA-77-23) Final Rpt. UMTA-MA-06-0025-7713, June 1977, 116 pp; Contract DOT-TSC-1159; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB 272-108/2ST, DOTL NTIS

15 166275 SUBSURFACE INVESTIGATION, SECTION A015, ROCKVILLE ROUTE [Rept. no. 2]. Results are summarized herein of 77 test borings made in Section A015 of Rockville Route of the Washington Metropolitan Area Metro System. The exploration was performed to investigate conditions along the running line of the rapid transit system, which includes grade and aerial structures and the Twinbrook and Rockville Stations. The report includes a continuous geological section along the centerline of Metro tracks, special cross sections at station locations and other structures and parking lots, logs of the test borings, results of laboratory tests on soil samples and comments on potential design and construction problems.

Mueser, Rutledge, Wentworth and Johnston, New York. De Leuw, Cather and Co., Inc., Washington, D.C. Washington Metropolitan Area Transit, Authority, D.C. MRWJ-77-151, Mar. 1977, 132p; See also PB-260 692. Sponsored in part by Washington Metropolitan Area Transit

Authority, D.C. Prepared in cooperation with De Leuw, Cather and Co., Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267476/OST

15 166453 METHODOLOGY FOR THE DESIGN OF URBAN TRANSPORTATION INTERFACE FACILITIES. Procedures and techniques are described which determine measures of the performance of transit station designs. Categories of measures are defined according to the manner by which they are treated in the design process; as a result of policy, or as measures of performance and economic efficiency. Policy items considered include concessions, advertising, personal care facilities, telephones, acoustics, construction materials, design flexibility, parking facilities, and provisions for the handicapped. Performance measures are associated with passenger processing, passenger orientation, the physical environment safety, and security. The policy and performance considerations along with cost factors are used to specify a systematic transit interchange facility design methodology that is recommended to practitioners. Comprehensive descriptions of appropriate analytical techniques for the evaluation of transit station designs are provided in the appendices to the report.

Demetsky, MJ Hoel, LA Virkler, MR ; Virginia University, Department of Transportation Final Rpt. DOT/TST-77/46, UVA/529036/CE76/102, Dec. 1976, 119 pp; Contract DOT-OS-50233; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269956/9ST

15 167108 MARTA TUNNEL CONSTRUCTION IN DECATUR, GEORGIA-A CASE STUDY OF IMPACTS. PHASE II. The focus of this report is on the assessment-forecasting relationship, namely, how to assess impacts and then to illustrate how those actual impacts could have been forecast. This report presents a case study conducted in Decatur, Georgia, in order to assess the disruptive effects associated with the construction of rapid transit tunnels for the Metropolitan Atlanta Rapid Transit Authority (MARTA) East Line. This case study has three objectives: (1) to pilot test the assessment methodology developed, (2) to refine the methodology as a forecasting tool; and (3) to develop mitigation procedures. A socio-economic profile of Decatur is presented. Impacts of the construction are considered, both in general and specific terms.

Wolff, BC Scholnick, PH ; ABT Associates, Incorporated, Urban Mass Transportation Administration, Transportation Systems Center UMTA-MA-06-0025-7714, AAI-77-18, June 1976, 138 pp; See also report dated Jun 76, PB-256 848; Contract DOT-TSC-108; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271366/7ST, DOTL NTIS

15 167286 MUCK UTILIZATION PLANNING. URBAN TRANSPORTATION TUNNELING: A HANDBOOK OF RATIONAL PRACTICES FOR PLANNERS AND DESIGNERS. This handbook alerts transportation system planners and designers to planning methods which can lead to more efficient use of earth and rock materials produced during excavation for transportation tunnels and large excavations. The earth and rock materials produced from

tunnel operations are commonly described by the miner's term, 'tunnel muck'. Tunnel muck has been traditionally treated as a waste product of the construction process. This handbook documents the results of a study of alternative uses for tunnel muck including use of muck as backfill materials within the transit project. The suggested procedures are consistent with construction methods and project management procedures.

Liu, TK Gifford, DG Dugan, JP ; Haley and Aldrich, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Handbook DOT-TSC-UMTA-77-22, May 1977, 64 pp; Contract DOT-TSC-836; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-272139/7ST

15 167342 A PROCEDURAL GUIDE FOR THE DESIGN OF TRANSIT STATIONS AND TERMINALS. PHASE I. The guide provides a synthesis of state-of-the-art concepts regarding the planning, design, and evaluation of passenger transportation stations. The enclosed material directs transportation planning teams to search for efficient station designs. The guide describes the important stages and considerations in a comprehensive terminal analysis methodology. When it is used with the two supplementary research reports, the specific details of the various tasks are given. The guide acknowledges that the transit station design process requires contributions from many disciplines and skills. It assists to coordinate station development programs in accommodating inputs from the disciplines. It further highlights the elements of different stations to assure valid comparisons relative to performance and cost criteria.

Demetsky, MJ Hoel, LA Virkler, MR ; Virginia University, Department of Transportation Final Rpt. DOT/TST-77/53, UVA/529036/CE77/103, June 1977, 78 pp; Report on Design of Transportation Interface Facilities. See also report dated Feb 76, PB-253 742.; Contract DOT-OS-50233; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272619/8ST

15 167384 RECOMMENDED PROCEDURES FOR SETTLEMENT OF UNDERGROUND CONSTRUCTION DISPUTES. The Subcommittee on Contracting Practices appointed a Task Group on Arbitration to review methods other than court litigation currently used for settlement of disputes in the U.S., particularly in the construction industry, and to recommend specific procedures for the resolution of disputes and an organizational arrangement under which such procedures could be administered effectively. This report presents the procedures developed by the Task Group on Arbitration.

US National Committees/Tunnelling Technology, National Science Foundation, Urban Mass Transportation Administration, Federal Highway Administration, Department of Transportation Final Rpt. NVC/AE/TT-77/1, Nov. 1977, 31 pp; Sponsored in part by Urban Mass Transportation Administration, Washington, D.C., Federal Highway Administration, Washington, D.C., Department of Transportation, Washington, D.C. See also report dated Nov 74, PB-236 973.; Contract NSF-C310-277-000; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272964/8ST

15 167531 MILAN METRO: EXPERIENCE IN TUNNEL CONSTRUCTION ON THE PORTA GARIBALDI-PIAZZA CADORNA SECTION. A description is given of work on the sections, the most difficult yet encountered. The problems associated with this section, both surface and underground, are noted, and methods of construction are presented, details being given of the tunnels, both single and double-tracked, soil treatment and excavation procedures.

Botti, E (Metropolitan Milanese) ; Institution of Mining and Metallurgy Proceeding 1976, pp 153-164; Tunnelling, Proceedings of an Intl Symp, London, England, March 1-5, 1976. Also available from the Institution of Mining and Metallurgy.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 167547 TRAINS AND TRAVIATA WON'T MIX--NOW. The track design described includes spring steel fasteners called Pandrol clips which are used overseas for their vibration control characteristics. Tests indicated the new underground tracks would generate about 5 decibels greater ground vibration than the existing city loop track. To reduce this, modified tracks were recommended for the 73m stretch beneath the theater.

Eden, D *Institution of Engineers (Australia) Journal* Nov. 1976, pp 19-20; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 167549 SUBWAY TUNNELS IN AREAS OF MINING SUBSIDENCE IN THE RUHR DISTRICT, GERMANY. Because the city of Gelsenkirchen is undergoing subsidence movements due to coal mining, special problems arise in the design and erection of the tunnel for the underground system of the municipal railway. The principal results of the design rules derived from extensive preliminary studies are discussed. The subsidence movements are causing compression and straining of the ground in which the tunnel is embedded. These actions of the soil have to be translated into idealized design displacements for engineering purposes. If the tunnel structure follows these deformations without restraints, no stresses (or, at least, only minor stresses) will occur. The conditions to which the tunnel structure should comply are cited. The design principles proposed are those of a tunnel lining that is almost completely flexible in the direction of the tunnel axis and stiff transversely to the axis. The theory of plasticity is applied to calculate the strains and stresses due to subsidence movements. Thus, the material chosen for the tunnel lining should provide sufficient capacity to yield without coming close to rupture. General rules for the design principle are given for tunnels constructed either by cut-and-cover or by covered driving.

Duddeck, H (Technical University of Braunschweig, West Germany) Hollmann, F Kotulla, B Meissner, H Westhaus, KH Zerna, W Ahrens, H ; Institution of Mining and Metallurgy 1976, pp 381-390; Tunnelling, Proceedings of an Intl Symp, London, England, March 1-5, 1976. Also available from the Institution of Mining and Metallurgy.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 167550 TRANSIT STATION PLANNING AND DESIGN: STATE OF THE ART. Proceedings include 7 technical papers that deal with

transit station planning and design, aspects of rapid transit station, design of pedestrian facilities for the Washington metro, and methodological issues for transit station.

Hoel, LA (Virginia University) Roszner, ES ; Carnegie-Mellon University, National Science Foundation TRI Res Report n8, NSF/RA-760499, 1976, 186 pp; Transp Facil Workshop, Conference Pap and Summ of Conference Proceedings, New York, New York, May 22-24, 1974. Also available from Carnegie-Mellon University, TRI.; Grant NSF-GI-39223; ACKNOWLEDGMENT: EI, NTIS; ORDER FROM: ESL, NTIS; PB-275279/85T

15 167603 DESIGN OF ELEVATED GUIDEWAY STRUCTURES FOR LIGHT RAIL TRANSIT. ABRIDGMENT. This paper outlines a rationale for designing an elevated guideway for urban rail transit, and applies this to a design of a double-track guideway for a proposed light rail transit (LRT) line. Three factors that affect the rationale for designing elevated guideway structures for LRT include performance requirements that specify guideway function; constraints that limit the choices available to the designer; and, design considerations that tell the designer how to choose among options, all of which satisfy the performance requirements and constraints. A design study is included which develops a suitable guideway configuration and examines in some detail a typical four-span structure. The following design aspects are discussed: Vehicle specifications; guideway cross sections; structural design; construction options; and, costs. The authors conclude that the rationale presented for the design of elevated guideway structures for LRT is neither a specification nor a code, but should form the basis for either. It identifies performance requirements that must be met for the structure, constraints that limit the designer's range of choice in meeting the performance requirements, and design considerations that provide the basis for making design choices.

Billing, JR Grouni, HN (Ontario Ministry of Transportation & Communic, Can) Vuchic, VR, Discussor (Pennsylvania University, Philadelphia) *Transportation Research Record* No. 627, 1977, pp 17-21, 3 Fig., 1 Ref.; From TRB Record 627, Rail Transit.; ORDER FROM: TRB Publications Off

15 168093 MELBOURNE'S TROUBLED TUNNELLER GRINDS TO A HALT. The problems encountered in tunnelling Melbourne's underground railway are described. Drill and blast methods were prohibited to minimize ground disturbance under the tall buildings and steel ring beams had to be inserted at 1 m intervals just behind the face. Also shotcreting of the tunnel sides within 1 m of the face was required within one hour of exposure. The tunnelling machine covered nearly 40 m/week until it hit hard rock when numerous problems arose culminating in the failure of the main bearing. This failure meant that the machine had to be completely rebuilt with a new 12 spoked head and the triple-disc cutters replaced by more efficient single discs. Front support is provided by a sliding shoe, and steering jacks on the shoe help to prevent the head dropping. Bearing design was changed, and the cutter head speed reduced from 5.2 rev/min to 3 rev/min. Gearboxes and variable

speed motors have been replaced with high-torque low-speed motors. Mucking out is now by rail instead of conveyor. The new hard-rock machine can work at up to 73 m/week.

Ferguson, H *New Civil Engineer* Analytic No. 256, Aug. 1977, p 16, 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-229040); ORDER FROM: Institution of Civil Engineers, 91-93 Farringdon Road, London EC1M 3LE, England

15 168648 TUNNEL CONSTRUCTION (CITATIONS FROM THE NTIS DATA BASE). Unique tunneling methods, cost studies, tunnel support innovations, tunneling machines, and soil and rock properties encountered are investigated in these Government-sponsored research reports. Vehicular, water, sewage, and mine tunnels are reviewed. Finite element analysis is used extensively for investigation of soil and rock mechanics. (This updated bibliography contains 327 abstracts, 82 of which are new entries to the previous edition.)

Habercom, GE, Jr ; National Technical Information Service Sept. 1977, 332 pp; Supersedes NTIS/PS-76/0647, NTIS/PS-75/550, NTIS/PS-74/096 and COM-73-11390. See also NTIS/PS-76/0648, NTIS/PS-76/0649, NTIS/PS-76/0650 and NTIS/PS-77/0788.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0787/OST

15 169298 SYSTEMS ANALYSIS OF RAPID TRANSIT UNDERGROUND CONSTRUCTION. VOLUME I. SECTIONS 1-5. This study describes rapid transit system implementation, design, and construction procedures. The relationships and responsibilities of governmental, private, and public groups involved in planning and implementing an urban rapid transit system are discussed. In this report, techniques and processes of cut-and-cover and tunnel construction are discussed in detail. Environmental impacts of this construction as well as safety and insurance aspects are presented. Physical and institutional controls (sensitivities) on construction are identified. Physical controls include such factors as utility density, traffic conditions, maintaining existing structure integrity, ground conditions, and weather. Institutional controls include the project schedule, right-of-way acquisition, material and equipment supply, and labor agreement and productivity.

Birkmyer, AJ Richardson, DL ; Bechtel Corporation, Little (Arthur D), Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-12.I, Dec. 1974, 177 pp; Prepared in cooperation with Little (Arthur D.), Inc., Cambridge, Mass. Also available as rept. no. DOT-TST-75-72.I. See also Volume 2, PB-275568.; Contract DOT-TSC-601; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275567/65T

15 169299 SYSTEMS ANALYSIS OF RAPID TRANSIT UNDERGROUND CONSTRUCTION. VOLUME II. SECTIONS 6-9 AND APPENDIXES. Three San Francisco Bay Area Rapid Transit (BART) projects and two Washington Metropolitan Area Transit Authority (WMATA) projects are analyzed with respect to time schedules, costs, and sensitivity to physical and institutional controls. These data are utilized in developing generalized models of four specific types of underground construction: cut-and-

cover station, cut-and-cover line, free-air-driven tunnel, and compressed-air-driven tunnel. The models presented herein are a planning tool for evaluation of the alternative types of underground construction in a transit system with respect to local costs and physical and institutional controls. Possible future tunneling cost-reduction techniques and recommendations for further research are made. (Portions of this document are not fully legible)

Birkmyer, AJ Richardson, DL ; Bechtel Corporation, Little (Arthur D), Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-12II, Dec. 1974, 305 pp; Prepared in cooperation with Little (Arthur D.), Inc., Cambridge, Mass. Also available as rept. no. DOT-TSC-75-72.II. See also Volume 1, PB-275567.; Contract DOT-TSC-601; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275568/45T

15 169955 MOVEMENT OF NON-STATIONARY AIR IN UNDERGROUND TUNNELS. AN APPROXIMATION METHOD FOR EVALUATING AIR CURRENTS [Die instationaere Luftstroemung in U-Bahn-Tunneln. Eine Naeherungslösung zur Berechnung des Anfachvorganges]. Equations can be obtained for evaluating air currents produced by trains in tunnels by means of an approximation method of evaluating the increase in speed of an underground trainset as the driver accelerates after stopping in a tunnel. The results of calculations have been compared against results obtained from measurements and both coincide with each other. [German]

Rohne, E *Schweizerische Bauzeitung* Vol. 95 No. 40, 1977, pp 705-711, 14 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Verlags der Akademischen Technischen Vereine, Postfach 630, 8021 Zurich, Switzerland

15 170458 FORMS ROLL OVER STREET-CAR TRACKS TO CAST STATION IN HILL. The construction of a new station in the side of a hill in San Francisco by using massive arched traveling forms that roll over existing tracks to cast the station's vaulted walls and ceiling is described. The station, 51 ft wide and 26 ft high, is elliptical in cross section and lies on a vertical curve with a 2% grade. The 212-ft-long underground section will be topped by a 150 x 125-ft building, also underground.

Engineering News-Record Vol. 199 No. 15, Oct. 1977, pp 22-23; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 173061 TUNNELS FOR THE NEW HONG KONG METRO. Hong Kong will have its first underground railway system in operation by 1980. In the mid 1980's, five interconnected lines will serve 5.5 million people living or working within 30 square miles. By the end of the 1980's it promises to be the most heavily used system in the world. The article describes the background, design and construction of the tunnelling works. /TRRL/

Haswell, CK (Haswell (C) and Partners) *Tunnels and Tunnelling* Analytic Vol. 9 No. 6, Nov. 1977, pp 31-35, 2 Fig., 2 Tab., 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 230375); ORDER FROM: ESL

15 173391 MECHANICAL PRECUTTING: A NEW PROCESS FOR TUNNEL DIGGING [Le prédecoupage mécanique: un procédé nouveau pour le creusement des tunnels]. This process, which avoids soil decompression when excavation is being carried out, and takes maximum advantage of the natural arch effect, was used by the RATP (Paris Transport Authority) in recent drilling operations. It is extremely safe, quick and suitable for use in difficult terrain, and cost-wise is highly competitive. [French]

Bougard, JF *Tunnels et Ouvrages Souterrains* No. 22, July 1977, pp 174-180, 2 Tab., 38 Phot.; See also No. 23, pp 202-210 (September-October 1977) and No. 24, pp 264-272 (November-December 1977); ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

15 173402 BEHAVIOR DURING CONSTRUCTION OF THE DUPONT CIRCLE SUBWAY STATION LINING. The paper reports on the results of an instrumentation program conducted during construction of the station in Washington, D.C. The primary objective of this study was to evaluate the short-term performance of the lining for a large, shallow underground opening in rock. Lining behavior was evaluated with respect to induced moment, thrust, and deflection. The instrumentation program was conceived to verify assumptions made in lining design and to provide insight into procedures for designing and constructing thick, permanent shotcrete linings. Among the subjects discussed are rock mass geology at the project site, construction sequence and the instrumentation program, measured behavior of the station and a comparison of the measured behavior with the results of a stress analysis of the lining.

Brierley, GS (Haley & Aldrich, Incorporated) Cording, EJ; American Society of Civil Engineers, American Concrete Institute Proceeding ACI Publ n SP-54, 1977, pp 675-712; Shotcrete for Ground Support, Proc of the Eng Found Conf, Easton, Md, October 4-8, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE, American Concrete Institute, P.O. Box 19150, Redford Station, Detroit, Michigan, 48219

15 173403 SOFT GROUND TUNNEL FOR THE MUNICH METRO. The paper discusses the extension of Section 9 of the Munich Metro located at Sendlinger Tor Platz in downtown Munich, using the New Austrian Tunneling Method. Among the topics discussed are location, geological conditions and geotechnical problems, soil mechanics, tunnel design considerations, structural analysis, and construction work realized in the field.

Laabmayr, F; American Society of Civil Engineers, American Concrete Institute Proceeding ACI Publ n SP-54, 1977, pp 352-372; Shotcrete for Ground Support, Proc of the Eng Found Conf, Easton, Md, October 4-8, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE, American Concrete Institute, P.O. Box 19150, Redford Station, Detroit, Michigan, 48219

15 173570 SHOTCRETE FOR GROUND SUPPORT. The Proceedings contain 39 papers presented at the Conference. Papers are arranged under the following session readings: materials, field control, equipment and processes, payment provisions, design, code histories and perfor-

mance. Case history examples include applications of shotcrete support in highway tunneling, subway stations, hydroelectric power tunnels, shaft sinking, and in the U. S., Europe and Latin America. Selected papers are indexed separately.

American Concrete Institute, American Society of Civil Engineers Proceeding ACI Pub SP-45, 1977, 766 pp; Proceedings of the Engineering Foundation Conference, Easton, Maryland, October 4-8, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 174021 PLANNING AND ITS IMPORTANCE IN REDUCING THE COST OF URBAN TUNNELS. Planners can significantly increase the utilization of underground space for transportation, water, sewage, and utility services through better understanding of the effect of geology and construction depth on the cost of underground construction. Planners should realize that construction in soft, near-surface soil in many urban areas is first expensive and second requires underpinning of existing structures, utility relocation, and restoration of city street activities that can cost more than the original tunnel. On the other hand, planners should realize that competent rock exists at reasonable depths under most urban areas in which tunnel boring machines or even conventional drill and blast methods can be used to advance relatively economical tunnels at very fast rates. Such deep tunnels in rock do not require the relocation of utilities, the underpinning of structures or street restoration. Moreover, vertical access to deep tunnels in good construction materials is not prohibitive in cost and can be made to be acceptable to the public. For example, access to a 50 M deep tunnel is equivalent to vertical access via an express elevator to the 14th story of a high rise building. Cost estimates of underground tunnelling in a typical urban area such as Chicago have shown that the basic cost of construction of a cut-and-cover tunnel is in the order of \$13400/M, while the cost of an equivalent tunnel in rock below the surface is in the order of \$3800/M. The cost for the vertical access to the deep tunnel is more than offset by the highly variable cost of underpinning, utility relocation and restoration which can more than double the cost of shallow tunnels. Clearly, the economics of deep tunnels to provide urban services points to an innovative alternative for providing underground space under U.S. urban areas.

Silver, ML Peters, JF (Illinois University, Urbana) *Underground Space Analytic* Vol. 2 No. 2, Dec. 1977, pp 65-79, 12 Fig., 4 Tab., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230943); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

15 174022 RESEARCH AND DEVELOPMENT NEEDS FOR SYSTEMS AND MANAGEMENT IN UNDERGROUND TRANSPORTATION CONSTRUCTION. Relative to other sectors of the U.S. economy, construction is experiencing a higher rate of inflation, technological stagnation, and a decreasing physical share of the gross national product. This at least in part results from the lack of incentives for and activity in research and development. This paper focuses primarily upon the consequent problems faced in urban transportation construction. At this stage it appears that

some of the major obstacles that impact costs, slow productivity and inhibit the implementation of innovations result from: (1) decisions made and policies set during the planning and design phases; and (2) the contractual and organizational structure chosen for project administration. There are also major opportunities for improvements through wider and more effective use by construction contractors of existing methodologies and management techniques that have already proven to be successful. Changes in all of these areas are necessary if the limited amount of research now being done is to have any major impact through implementation.(a)

Paulson, BC (Stanford University) *Underground Space Analytic* Vol. 2 No. 2, Dec. 1977, pp 81-89, 3 Fig., 2 Tab., 41 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230944), EI; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523 ESL

15 174023 MATERIALS HANDLING RESEARCH FOR TUNNELLING. Recent research at the Colorado School of Mines has focused on the materials handling problem of muck haulage in rapid transit tunnels. For the muck rates projected within the next decade, high-volume transportation modes will be required. Hydraulic and pneumatic pipelines appear attractive as high capacity haulage systems serving a confined space. Slurry pipelines are examined here in detail with special reference to muck preparation, extensible conveyor systems, slurry pipelining, and slurry dewatering. Pipeline efficiency and reliability depend on a controlled particle size and distribution. Therefore, some crushing of the muck will be necessary. A simple means for temporarily extending the transport system between muck preparation and slurry pipeline is necessary for high capacity-continuous operation. Assuming that the slurry water is recycled to the tunnel face, dewatering schemes must be considered. Technical feasibility is demonstrated in these areas.

Faddick, RR Martin, JW (Colorado School of Mines) *Underground Space Analytic* Vol. 2 No. 2, Dec. 1977, pp 121-127, 5 Fig., 5 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230947); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

15 174026 THE STOCKHOLM UNDERGROUND. The paper summarizes the drill-and-blast techniques of excavation used in constructing the underground railway public transport system of Stockholm. The Stockholm Tunnelbana now totals 110 km of rail including 53 km in rock tunnels. The paper treats drill-and-blast methods, stability requirements, methods of controlled blasting to obtain stability and avoid damage to structures, and methods and requirements for ground water control in urban areas. Recent underground stations on the Jaerva line have been given a new design in which the traditional cast concrete ceiling has been discarded. The rock ceiling is exposed by a thin (7.5-10 cm) layer of reinforced shotcrete only. In some station walls the bare beautiful rock surface itself is exposed and is utilized as a decorative work of art. The number of the covering abstract of the conference is IRRD 231024.

Pettersson, B; Statens Raad foer Byggnadsforskning *Analytic* Vol. D No. 3, Document

D3:1977, 1977, pp 189-203, 8 Fig., 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 231022), National Swedish Road & Traffic Research Institute; ORDER FROM: Statens Raad foer Byggnadsforskning, Box 27063, Stockholm, Sweden; P 0429'

15 174070 CONTROL OF GROUND MOVEMENTS AND SUPPORT OF TUNNELS- RESEARCH AND PRACTICE. Research and practice in ground support is discussed under three headings: stability of the tunnel heading, lining design, and ground movements and building damage. Many of the developments in these areas have resulted from observations of field performance, in some cases closely coordinated with analytical and laboratory studies. Lining studies conducted by means of destructive testing of models, analytical studies, and field measurements and observations have been used to economize on lining design by taking maximum advantage of the support and passive reaction provided to the lining by the surrounding ground. Support procedures are being developed to interface with tunnel boring machines so that permanent linings can be rapidly installed and provide early support in a variety of tunnel ground conditions. The stability of the tunnel heading is often of more concern than the dimensioning and placement of a permanent lining, particularly where ground conditions are bad or the tunnel is large. Rock displacements are commonly monitored for large deep chambers as well as for the large shallow chambers currently under construction for subways along the east coast of the United States. In several projects, measurements have provided early warning of potentially unstable conditions so that corrective measures could be provided. Ground movements are of primary concern for soft ground tunnels in urban areas. Measurements obtained after each shove of the tunnel shield have provided a means of evaluating the processes causing lost ground so that adjustments can be made in tunnel procedures. Lateral and vertical ground movements have been measured and related to building distortions and damage. /TRRL/

Cording, EJ (Illinois University, Urbana) *Underground Space* Vol. 2 No. 2, Dec. 1977, pp 113-119, 3 Fig., 34 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230945)

15 174731 PROCEEDINGS OF WORKSHOP ON MATERIALS HANDLING FOR TUNNEL CONSTRUCTION HELD AT KEYSTONE, COLORADO ON AUGUST 3-5, 1977. With the anticipated increases in tunnel construction in the next decade greater demands will be made on transportation systems to remove tunnel muck at rates consistent with tunnel excavation rates. Conventional materials-handling systems such as rail, rubber-tire vehicles, and conveyors will have to expand their capabilities. Simultaneously, hybrid and lesser known systems such as pneumatic and slurry pipelines must be considered as potential systems for muck haulage, particularly since they show substantial promise of being capable of transporting the muck volumes projected for the next decade. A workshop entitled, 'Materials Handling for Tunnel Construction', was held August 3, 4, 5, 1977 at Keystone, Colorado. Experts were invited from the construction, metal and non-metal mining

industries. The participants evaluated the state of the art of materials-handling systems for underground construction, exchanged information on current systems applications and research, itemized research needs, and produced a written summary of their conclusions. This report comprises the proceedings of the workshop.

Faddick, RR Martin, JW ; Colorado School of Mines, Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-97-50, Aug. 1977, 291 pp; Sponsored in part by Transportation Systems Center, Cambridge, Mass. and Urban Mass Transportation Administration, Washington, D.C. Office of Rail Technology.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276602/OST

15 175271 DEVELOPMENT OF RESEARCH IN THE CONSTRUCTION OF TRANSPORTATION FACILITIES: A STUDY OF NEEDS, OBJECTIVES, RESOURCES, AND MECHANISMS FOR IMPLEMENTATION. The report describes an in-depth research study to (1) evaluate and quantify the current and projected state of productivity in the construction of transportation facilities; (2) determine areas having the highest potential economic returns and the greatest needs where research could lead to improvements in technology and management that in turn could lead to improved productivity; quantify decisionmaking criteria where possible; (3) assess the present and potential interests and capabilities of institutions-universities in particular-that would do such research in transportation construction; and (4) explore improved mechanisms for implementing transportation construction innovations. Some of the major obstacles that impact costs, slow productivity and inhibit the implementation of innovations result from (1) decisions made and policies set during the planning and design phases; and (2) the contractual and organizational structure chosen for project administration. There are also major opportunities for improvements through wider and more effective use by construction contractors of management techniques that have already proven to be successful.

Paulson, BC Fondahl, JW Parker, HW ; Stanford University, Department of Transportation Final Rpt. DOT/RSPD/DPB/50-7713, TR-223, Sept. 1977, 161 pp; See also PB-277420 in RRIS 00 175272; Bulletin 7802.; Contract DOT-OS-60150; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-277419/8ST, DOTL NTIS

15 175272 DEVELOPMENT OF RESEARCH IN THE CONSTRUCTION OF TRANSPORTATION FACILITIES: A STUDY OF NEEDS, OBJECTIVES, RESOURCES, AND MECHANISMS FOR IMPLEMENTATION. SUMMARY REPORT. Specific objectives for the study included the following: (1) Evaluate and quantify the current state of productivity in the construction of transportation facilities; (2) determine areas having the largest potential economic returns and the greatest needs where research could lead to improvements in technology and management for improved productivity; (3) assess present and potential interests and capabilities of institutions and individuals that could do such research in transportation construction; (4) explore incentives and improved mechanisms for implementing findings that would result from

expanded research efforts; (5) develop means for evaluating the impact that policy, contractual and technical decision-making in the planning and design stages has on capital costs in the construction phase.

Paulson, BC Fondahl, JW Parker, HW ; Stanford University, Department of Transportation Final Rpt. DOT/RSPD/DPB/50-7714, TR-224, Sept. 1977, 32 pp; See also PB-277419 in RRIS 00 175271; Bulletin 7802.; Contract DOT-OS-60150; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-277420/6ST, DOTL NTIS

15 175543 MUCK UTILIZATION IN URBAN TRANSPORTATION TUNNELING PROCESS. The purpose of this study is to develop a workable approach to muck utilization for transit tunnels, including cut and cover construction, in the urban area. This report presents the results of a detailed investigation into the potential for muck utilization in the urban transportation tunneling process, and it documents the necessary technical and planning procedures that may be used to evaluate its utilization. This report provides transportation system planners and engineers with the necessary information to use more efficiently the earth and rock materials produced during excavation for transportation tunnels and large excavations. Six guideline steps for muck utilization planning are presented as well as the selection of a Muck Utilization Coordinating Committee (MUCC) for implementing these guideline steps. The muck utilization planning concepts were investigated for three U.S. cities (case studies): Atlanta, Georgia; Chicago, Illinois; and Baltimore, Maryland. Additionally, a trial case study of the muck utilization guidelines was made for the Baltimore Rapid Transit System.

Liu, TK Gifford, DG Stulgis, RP Freed, DL ; Haley and Aldrich, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-77-34, Dec. 1977, 378 pp; Contract DOT-TSC-836; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278066/6ST

15 175906 SUBSURFACE INVESTIGATION, SECTION A017, ROCKVILLE ROUTE [Rept. no. 4]. Results are summarized of 100 test borings made in Section A017 of Rockville Route of the Washington Metropolitan Area Metro System. The exploration was performed to investigate conditions along the running line of the rapid transit system which includes at-grade and aerial structures and Shady Grove station plus several crossing structures. The report includes a continuous geological section along the center line of Metro outbound track, special cross-sections at station locations and the various crossing structures and parking lots, logs of the test borings, results of laboratory tests on soil samples and comments on potential design and construction problems.

Mueser, Rutledge, Wentworth and Johnston, New, York. De Leuw, Cather and Co., Washington,, D.C. Washington Metropolitan Area Transit, Authority, D.C. MRWJ-77-153, Aug. 1977, 108p; Prepared in cooperation with De Leuw, Cather and Co., Washington, D.C. Sponsored in part by Washington Metropolitan Area Transit Authority, D.C. See also rept. no. 7 dated 24 May 76, PB-253 316.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275117/OST

15 176013 RAPID TRANSIT SUBWAYS-GUIDELINES FOR ENGINEERING NEW INSTALLATIONS FOR REDUCED MAINTENANCE. Economic design of new subways requires optimization of installation and maintenance costs of all the major constituent items. A prerequisite for this is an awareness of the rigorous environmental and other conditions imposed on the subway. Changing ground pressures crack structures, and this results in water seepages that deteriorate both the structure and the installed items. Durable watertight structures are obtained by using appropriate structural systems, material specifications, construction details, and waterproofing systems. Cathodic protection provides an economic protection against corrosion of metallic items in aggressive soil conditions. Ventilation and pump structures should be planned for ease of access and maintenance. Vents flush with street or sidewalk increase the dirt load and maintenance; above-surface alternatives should be evaluated. Escalators are high total cost items and operate under especially arduous conditions. Maintenance costs are reduced by using heavy duty components, adequate monitoring systems, and by designing the housing and machine room to permit ready maintenance and inspection. Automatic lubrication or sealed bearings also reduce maintenance. Elevators, ventilation equipment, and pumps and their housings should be engineered and specified to maximize durability of component and minimize maintenance on a similar basis to escalators. Passenger elevators should be planned to also move maintenance equipment and materials. Satisfactory architectural finishes should be selected for durability and ease of cleaning as well as for appearance. Stations should be planned for adequate monitoring of all spaces and for good illumination to reduce vandalism and to enhance public safety. Effective maintenance depends on ready accesses and provisions for movement of equipment and materials in the various sections of the subway. Station entrances, the portals, and ventilation and pump shafts should be designed accordingly. Guidelines and justification of good design practice for these and related subjects are presented.

Birkmyer, J ; Bechtel, Incorporated, Urban Mass Transportation Administration, Transportation Systems Center UMTA-MA-06-0025-78-2, Jan. 1978, 119 pp; Contract DOT-TSC-1078; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279453/5ST

15 176569 PROCEEDINGS--WORKSHOP ON MATERIALS HANDLING FOR TUNNEL CONSTRUCTION. With the anticipated increases in tunnel construction in the next decade, greater demands will be made on transportation systems to remove tunnel muck at rates consistent with tunnel excavation rates. This workshop discussed and noted that conventional materials-handling systems such as rail, rubber-tire vehicles, and conveyors will have to expand their capabilities. It was also stated that hybrid and lesser known systems such as pneumatic and slurry pipelines must be considered as potential systems for muck haulage, since they show substantial promise for transporting the volumes projected for the next decade. /UMTA/ Faddick, RR Martin, JW ; Colorado School of Mines, (DOT-TSC-UMTA-77-50) UMTA-MA06-0025-77-19, Aug. 1977, 291 pp; Sponsored by DOT, Urban Transportation Administration under contract to DOT, Transportation

Systems Center.; ORDER FROM: NTIS; PB-276602

15 176909 LT HEATHROW LINK COMPLETE. LONDON TRANSPORT'S UNDERGROUND RAILWAY LINK TO HEATHROW AIRPORT COMPLETE. A brief description is given of the new section of underground linking Heathrow Airport to the existing Piccadilly line. Aspects covered include layout, construction details, interior design, timing of train services and communications, which include a closed circuit TV link to the line controller at Earls Court. Tourist facilities include a comprehensive information centre staffed by British Rail, London Transport and the London tourist board, a sterling exchange office and a computer-controlled journey-planner for routine route information.

Modern Railways Vol. 35 No. 353, Feb. 1978, pp 70-71, 1 Tab., 5 Phot. ACKNOWLEDGMENT: TRRL (IRRD-231802); ORDER FROM: ESL

15 177200 NEW AIR SHAFT DESIGN FOR RAILROAD TUNNELS. An outline of the various methods for reducing pressure fluctuations is given. These range from simple non-aerodynamic methods to complex proposals involving the optimum positioning of airshafts. The latter case leads to a new airshaft design which overcomes some of the problems caused by long airshafts of conventional design. The description has been concentrated on the case of long shafts, that is shafts which exceed about 5% of the tunnel length.

Vardy, AE (Leeds University, England) Fox, JA *ASHRAE Journal* Vol. 20 No. 2, Feb. 1978, pp 41-46, 12 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 178482 DESIGN AND CONSTRUCTION OF SOME UNDERGROUND STATIONS FOR THE HONG KONG MASS TRANSIT RAILWAY SYSTEM. The paper describes the sites, the soil conditions and the structural concepts chosen to overcome the difficulties foreseen. The method used to construct the main walls, which is the principal structural feature, is described and illustrated. The method adopted is based on local construction techniques but designed by means of modern structural analysis. The preparation of the tenders is described and some of the construction problems are covered.

Banjamin, AL (Maunsell (G) and Partners) Endicott, J Blake, RJ *Structural Engineer* Vol. 56A No. 1, Jan. 1978, pp 11-20, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 178747 A TRANSIT STATION DESIGN PROCESS (ABRIDGMENT). The state-of-the-art of transit station planning is characterized by a lack of consistency among principles, standards, and techniques. Design standards and design guidelines as developed by transit operating agencies do not address trade-offs among the different station features or design components. In order to provide for consistency among the procedures used by different agencies to design transit stations and to ensure comprehensive treatment in the station design process, a methodology which uses analytical techniques for designing and evaluating alternative transit stations has

been developed. The performance of the station must be judged relative to a set of predefined objectives which derive from anticipated interests. Typical station design objectives reflect the points of view of the general user, the special user (the elderly and handicapped), and the operator concerning passenger processing, the station environment, and cost. The design objectives are then translated into a set of performance criteria which serve to define explicit performance measures that are the basis for comparisons among alternative station designs. This paper shows a method for analyzing transit interface facilities. The discussion focuses on the procedures which can be used to establish policy for station features, to provide performance measures for subsystems, and to give cost estimates. /Author/

Demetsky, MJ Hoel, LA Virkler, MR (Virginia University) *Transportation Research Record* No. 662, 1978, pp 26-28, 1 Fig., 2 Tab., 8 Ref.; This article appeared in the *Transportation Research Record* No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

15 178779 DEVELOPMENT OF ECONOMIC FACTORS IN TUNNEL CONSTRUCTION. The escalating cost of underground construction of urban transportation systems has made transit planning, especially construction cost estimating, difficult. This is a study of the cost of construction of underground, rapid transit tunnels in soft ground and is sponsored by UMTA's Office of Rail Technology. Twenty-two tunnels from the San Francisco Bay Area Rapid Transit District (BART), the Chicago Metropolitan Sanitary District, and the Washington, D.C. Metropolitan Area Transit Authority (UMATA) have been analyzed to determine what factors influence the Rate of Advance (ROA) through the ground. A statistical study of factors that influence tunnel construction costs was made to determine the magnitude of the major factors involved in construction cost. Tunnel construction data on cost and resources expended was collected and used to develop relations between construction ROA and physical variables. The data is also used in an analysis of the cost impact of institutional factors such as: availability and analysis of geologic conditions; flexibility and quality of engineering specifications; conditions for obtaining right-of-way and construction and entry permits; potential contractor liability; and labor agreements. Utilization of the study results are expected to better the accuracy of cost estimating procedures for further tunnel construction. The appendices contain numerous charts and tables illustrating such items as: Case History Data/format; Ring & Face Log Data/sheets; Average Weekly Progress Data/key punch forms; Systems Calculations for estimating tunnel construction cost; Rate of Advance Calculations; Calculations of Downtime Hours; Mexico City Tunnel Data; and References.

Damskey, LR Gin, GT ; Bechtel Corporation, (DOT-TSC-UMTA-77-37) Final Rpt. UMTA-MA06-0025-77-16, Dec. 1977, 183 pp; This report was sponsored by DOT, Urban Mass Transportation Administration under contract to DOT, Transportation Systems Center.; Contract DOT-1104; ORDER FROM: NTIS; PB-280878

15 179524 TUNNELLING TECHNOLOGY. AN APPRAISAL OF THE STATE OF THE ART FOR APPLICATION TO TRANSIT SYSTEMS. This appraisal forms part of a continuing study of the applicability of tunnelling technology to urban transit systems in tunnels of intermediate diameter. It deals specifically with present and potential tunnelling methods suited to the subsurface conditions of three Ontario locations: Toronto, Hamilton and Ottawa. Experience gained in these areas in the construction of deep sewers and of transit tunnels is related to present world-wide technology. The conclusions from this study are that the cost and feasibility of a transit tunnel are more dependent on the variations in subsurface conditions along the tunnel route, on contractual arrangements and on the length of tunnel necessary to amortize the cost of specialized equipment, rather than on the exact diameter of the tunnel within the range under consideration. The study indicates that the technology and expertise necessary for construction of transit tunnels is readily available in Ontario. It is further concluded that tunnelling merits serious consideration for transit routes where land acquisition costs are high or where the disruption of services is a major problem. In favorable subsurface conditions, the benefits arising from reduced environmental intrusion into a community may more than offset the somewhat greater costs of tunnel transit systems over surface or elevated systems.

Ontario Ministry of Transportation & Communication, Can, Golder Associates, MacLaren (James F) Limited May 1976, 166 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 232254); ORDER FROM: Ontario Ministry of Transportation & Communication, Can, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8, Canada; P7803084

15 179976 PRECAST TUNNEL UNITS AND THEIR POSSIBLE USES. Advantages of precast concrete elements for construction are well-known and well-established. Many notable structures of diverse kinds have been built in India using prefabrication. It is suggested that road culverts and pedestrian crossing subways can be built using precast concrete tunnel units. /Author/TRRL/

Srinivasan, D (Neyveli Lignite Corporation) *Indian Concrete Journal* Vol. 51 No. 8, Aug. 1977, pp 247-249, 2 Fig., 2 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 232071)

15 180196 PEDESTRIAN SUBWAYS AT HEATHROW. An outline of the ground engineering involved in the construction of subways at Heathrow in the United Kingdom while keeping disruption to a minimum is presented.

Crundwell, VC (Mouchel (LG) and Partners) *Consulting Engineer* Vol. 42 No. 1, Jan. 1978, p 18; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 180331 TTC REPLACES VIADUCT BEAMS BY DRILLING HOLES THROUGH ROADWAY ABOVE. The paper reports how the Toronto Transit Commission successfully replaced four 9 t precast concrete beams on the subway under the Bloor Viaduct by drilling holes through the roadway above and lowering and raising the beams by two mobile cranes.

Hancock, N *Engineering and Contract Record* Vol. 91 No. 4, Apr. 1978, pp 44-45; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 180332 WRIGGLE SURVEY FOR HONG KONG METRO. The alternatives that have become available as a result of recent developments in survey methods and instrumentation were investigated. The method used for the metro that uses EDM tacheometry for taking the measurements which are then processed on a mini-computer is described. The initial route length of an underground railroad is 15 km, and the journey time for that distance is expected to be 40 minutes. It includes 26 km of tunnels and 6 km of overhead structures. The nominal diameter of the tunnels is 4.9 m. The advantages of the new method are outlined.

Eales, NJ (Longdin and Browning (Surveys) Limited) *Consulting Engineer* Vol. 42 No. 2, Feb. 1978, pp 29-31, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 180380 MANAGEMENT OF A LARGE PROJECT--BART. The economic, political, and sociological implications of a project the size and complexity of BART are enormous. Its design, construction, and operation interacts with, and affects, most segments of the Bay Area's population. As no new large rapid transit systems had been built since the early 1900's, BART, during its planning and design period, was not able to draw on existing data banks of progressive and analytical transportation design criteria, formulas, and concepts. The BART Board of Directors decided that planning, design, and construction management would be performed by consultants under direction of the District. This decision was based on the undesirability of BART's attempting to assemble a large and diverse staff for a relatively short-term requirement, coupled with the unavailability of transit people with the necessary experience. The BART staff included a small but strong technical group to give direction to the consultants and to clear the way in nontechnical areas to enable the consultants to carry out their directives.

Hammond, DG (Daniel, Mann, Johnson and Mendenhall) *ASCE Engineering Issues-J of Prof Activities* Vol. 104 No. 3, July 1978, pp 181-191; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 180391 LINING AND WATERPROOFING TECHNIQUES IN GERMANY. Since 1967 in the Federal Republic of Germany the improvement of public mass transit has been financially promoted in overcrowded regions and city centers. Without including road tunnels and sewers,--solely in the area of railway transit an enormous volume of tunnel construction work has been carried out. Various technical research and development programs have been combined with this volume of construction work. Whereas in the sixties the tunnels were almost exclusively constructed in open cut because of the, in most cases, rather difficult soil conditions, the underground excavation method has been increasingly used in the seventies. This, of course, is a consequence of technical developments, which have had a considerable effect on the cost. The article discusses three problem areas and developments that have taken place in them; they include tunnel lining and especially, reinforced concrete

lining; joint sealing with special consideration of the waterproofing of concrete segmental lining; tunnelling costs and the most important factors that influence them.

Girnau, G *Tunnels and Tunnelling* Vol. 10 No. 3, Apr. 1978, pp 36-45; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 182560 DRAINAGE OF GROUND WITH CAVITIES LEFT FROM MINE WORKINGS NEAR THE SURFACE IN THE COURSE OF CONSTRUCTION OF THE DORTMUND S-BAHN [Baugrunderneuerung bei oberflächennahem Bergbau im Zuge des Stadtbahnbaues in Dortmund]. Drainage work on ground with cavities, carried out during construction of Line 1 of the urban railway has been successful so far, in spite of the presence of partially filled in underground mine workings on deposits lying close to the surface. Details are given on buildings, construction methods, planning, invitation to tender and the execution and evaluation of drainage work. [German]

Dittrich, RR *Nahverkehrspraxis* Vol. 26 No. 4, 1978, pp 126-138, 6 Tab., 5 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Arnold Verlag, Siegburg Strasse #5, 4600 Dortmund, West Germany

15 182887 NOISE CONTROL FOR FAN AND VENT SHAFTS IN SUBWAYS. Subway fan and vent shafts can be prominent sources of noise impact to both the adjacent community and to patrons in the subway stations. Author discusses available methods for reduction of fan and train noise propagated out of vent shafts and fan noise propagated into stations. In addition, the results of fan noise measurements in station platforms and outside the fan shafts at existing rapid transit facilities are presented.

Lee, PYN *Noise Control Engineering* Vol. 10 No. 3, May 1978, pp 102-107, Refs.; ACKNOWLEDGMENT: DOT; ORDER FROM: ESL

15 182889 TORONTO TRANSIT COMMISSION USES CONCRETE CROSSTIES. As a result of extensive testing on a 1000-foot section of track, the Toronto Transit Commission has installed concrete crossties on an open cut section of its new Spadina subway extension and the use of concrete ties is also planned for the tangent track areas of its Bloor Danforth extension.

Concrete Vol. 23 No. 5, May 1978, p 292
ACKNOWLEDGMENT: DOT; ORDER FROM: ESL

15 183235 SURFACE ACCESS TO HEATHROW AIRPORT--THE UNDERGROUND SOLUTION. The article discusses the extension of the London transport underground to Heathrow airport and how it operates within the existing underground services. One of the main benefits of the underground extension has been to reduce road congestion in the approach roads to the airport by carrying an expected 30% of air travellers. The Piccadilly Line, of which the extension forms a part, operates fifteen trains per hour at peak periods. The 3.5 ml extension from Hounslow West was constructed by cut and cover methods to the airport and then by deep level tube tunnels under the runways to the centre of the airport. It is at this location that Heathrow Central station has been built in a reinforced concrete construction 400 ft long and 75 ft wide.

The ticket hall is connected with each of the three air terminals by wide subways equipped with moving walkways in both directions. It is thought that early misgivings concerning the possibility of conflict between air passengers and other users of the Piccadilly Line are unlikely to be justified even with further traffic growth.

Ellen, ER (London Transport, England) *Chartered Institute of Transport Journal* Vol. 38 No. 4, May 1975, pp 107-110, 1 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 233680); ORDER FROM: Chartered Institute of Transport, 80 Portland Place, London W1N 4DP, England

15 183288 THE RER (EXPRESS REGIONAL NETWORK) [Le RER]. The whole issue of this journal is devoted to the RER which was extended by 17 km of additional lines in December 1977. The first part outlines the history of the RER, part 2 deals with the construction of the tunnel, the architecture of the stations, and various types of equipment: tracks, mechanical staircases, electrical equipment, traffic signals, telecommunications, energy supply, ventilation. New techniques were used, some of them being described: uplifts in large structures, aerodynamic phenomena caused by trains moving, centralized control. Part three describes the operation of the system. [French]

Paris Transport Authority RATP Doc Inf, Sept. 1977, 117 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD-105444); ORDER FROM: Paris Transport Authority, 53 Ter Quai des Grands Augustins, B.P. 70-06, 75271 Paris, France

15 183893 USE OF FLOATING-SLAB TRACK BED FOR NOISE AND VIBRATION ABATEMENT. Underground rail rapid transit systems can produce ground-borne vibration and noise from trains that creates intrusion in buildings located close to the underground facilities. This intrusion is usually a low-frequency (31.5- to 125-Hz range) noise or rumble transmitted via the intervening ground to the building structure. The use of floating-slab track bed, concrete slabs supported on resilient elements, to isolate the vibration of the rail support from the subway structure has been effective in reducing the transmission of vibration and noise to the surrounding ground and nearby buildings. This paper presents details on two types of lightweight floating-slab track bed; i.e., the continuous and the discontinuous designs. Some sections of continuous floating-slab track bed are in service at the Washington Metropolitan Area Transit Authority Metro System, and measurements of the reduction of the noise and vibration levels are presented.

Wilson, GP (Wilson, Ihrig and Associates) *Transportation Research Record* No. 653, 1977, pp 45-58, 8 Fig.; This article appeared in *Transportation Research Record* No. 653, Track Systems and Other Related Railroad Topics.; ORDER FROM: TRB Publications Off

15 183898 IMPROVED SEATINGS FOR BALLASTED TRACKS [Verbesserung des Schotteroberbaus in Tunneln und auf Bruecken mit elastischen Polyurethan-Matten]. When the track ballasting is laid on a hard surface this not only produces higher stressing, but also increases the level of sound transmission. The problem is

particularly acute in tunnels and on bridges carrying high-speed traffic. The fitting of flexible mats--especially SYLOMER matting--has an ameliorative effect as follows: deadening of solid-borne noise on underground railways (passing below built-up areas), reduced noise reflection from steel bridges, reduced dynamic stressing of the ballast, especially at high speeds, retention of the correct track level for considerably longer periods in tunnels and on bridges, reduced maintenance costs. The article describes the properties of the matting and various laboratory and practical test results. [German]

Keim, D Kohler, KA Schober, W *Eisenbahntechnische Rundschau* Vol. 27 No. 9, Sept. 1978, pp 543-548, 10 Fig., 1 Tab.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

15 183899 SURVEY WORK IN THE BUILDING OF THE STUTTGART S-BAHN REVERSING TUNNEL [Vermessungsarbeiten beim Bau des Wendetunnels der S-Bahn Stuttgart]. The work of the survey engineer is of particular importance in tunnel construction, when high demands are placed on practical experience and expertise in overcoming problems and preventing errors. Modern surveying equipment, particularly the electronic distance meter and the tunnel laser apparatus for driving data, ease the work of the survey engineer, but the difficult working conditions (dust, noise, bad lighting) still place great demand on him. That such a satisfactory job, completed within the contract period, was made of the reversing tunnel for the Stuttgart S-Bahn can be attributed to the good co-operation with the contractor's survey staff and the other experts (geologists, construction engineers, etc.). The article describes the project, the geodetic conditions, the survey work for tunnel driving and the building of the tunnel shell, and the special survey work involved in the building of the tunnel.

Kunz, K Rilling, H *Eisenbahntechnische Rundschau* Vol. 27 No. 9, Sept. 1978, pp 575-580, 8 Fig.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

15 184595 DIAPHRAGM WALLING IN GLASGOW'S ARGYLE STREET. This article describes the processes and problems involved in the construction of two sets of diaphragm walls (one more than 30m deep and within 2m of the shop fronts on either side of Glasgow's busiest shopping street) and the other more than 24m deep from within an existing tunnel with only 4.5m of headroom for the purpose of widening a subway tunnel to make room for an underground station with an island platform. The need for minimal disruption to normal activity along a major shopping area, as well as the maintenance of emergency access for fire-fighting and the like, and the limited space affected both design and construction procedures. The diaphragm walling was carefully programmed so as to permit as early a start on the actual construction of the station at the east end of the station area while the diaphragm walling continued to proceed westward (eg., because movement of construction equipment to and from the sites was limited to the evening hours, equipment needs had to be taken into account several shifts in advance so as to

prevent delays caused by the lack of a vital piece of equipment). The outer diaphragm walls were formed in panels 3-4.1m long which were installed after excavation through sand, clay with silt and gravel lenses overlying a dolerite bedrock and which extended vertically from street level down 23-30m to up to 300 mm into the rock. Bentonite slurry was provided to each panel site via a pipeline linked to a mixing and storage area away from the street. Excavation on the narrow street was accomplished by a unit suspended from twin cables and mounted on a crane. Special excavators, had to be used also when the inner diaphragm walls were constructed from within the old tunnel prior to its demolition because of the low head room. (4.5m). Headroom also restricted the length of panel reinforcement cages that could be handled. Sections were installed in 3.5m lengths using a small crane and lowered into the trenches, subsequent elements being spliced on by means of bulldog clamps to give the required final depth. Concrete was either brought in by trucks from Central Station 0.8 km away or, when space was limited, pumped from the surface.

Ground Engineering Vol. 11 No. 5, July 1978, pp 19-24, 2 Fig., 11 Phot. ACKNOWLEDGMENT: Ground Engineering; ORDER FROM: ESL

15 188077 VERTICAL "S" CURVE GUIDES CWR STRING TO SUBWAY TUNNEL. Fabrication of welded rail strings above the tunnel site in which they would be installed for Washington Metro necessitated a delivery arrangement which saw the rail placed in a vertical reverse curve of sufficient radius to avoid exceeding the elastic limit that could have produced permanent kinking. A Soviet-developed portable welder was used in a fixed position with other stations generally found in a butt-welding plant. The string then passed over rollers in a trench and through an entry into the subway where roller supports at varying heights completed the 45-ft drop to the tunnel invert. On the floor, rollers were used to move the strings to their installation sites.

Railway Track and Structures Vol. 74 No. 12, Dec. 1978, pp 31-33, 5 Phot. ORDER FROM: ESL

15 188103 HEATING, VENTILATION AND AIR-CONDITIONING INSTALLATIONS FOR THE RHINE/MAIN S-BAHN NETWORK: PHASE 1 CONSTRUCTION [Heizungs-, Lueftungs- und Klimaanlage fuer die S-Bahn Rhein-Main; 1. Baustufe]. The sizeable dimensions and various uses of underground tunnels on the Rhine/Main S-Bahn network including the North wing of Frankfurt main station that has been re-built are such that large heating, ventilation and air-conditioning installations have had to be put in. In addition to details of these aspects, the article describes the installations for heat recovery, control, regulation, electric power supply and fire protection. [German]

Helfrich, W *Eisenbahningenieur* Vol. 29 No. 8, Aug. 1978, pp 354-363, 3 Tab., 10 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Dr Arthur Tetzlaff-Verlag, Niddastrasse 64, Frankfurt am Main, West Germany

15 188223 TUNNELING FOR URBAN TRANSPORTATION: A REVIEW OF EUROPEAN CONSTRUCTION PRACTICE. Several underground construction methods are examined

with reference to recent European applications. An evaluation of the inherent strengths and weaknesses associated with each method is made. The methods under review include grouting in soil, grouting in rock, ground freezing, cast-in-situ walls, prefabricated walls, secant piles, slurry shield tunneling, and the New Austrian Tunneling Method as applied to soft ground conditions. The economics of underground construction are examined. The tunneling costs associated with six European metro systems are summarized. Where appropriate, the construction costs are itemized and the cost structures are viewed in the light of the ground conditions and construction methods used. The operation and organization of several European metro authorities are discussed. Tunneling practice in the United Kingdom is studied and used as a focal point for examining such issues as the apportionment of risk under contract and the resolution of contract disagreements. Comparisons are made between urban tunneling costs for rapid transit in the U.S. and Europe. Recommendations for improving tunneling practice are offered. /Author/

O'Rourke, TD ; Illinois University, Urbana, (UIIU-ENG-78-2024) UMTA-IL-06-0041-78-1, Aug. 1978, 210 p., 58 Fig., 25 Tab., 96 Ref., 1 App.; Sponsored by the Urban Mass Transportation Administration (DOT); SPONSORING AGENCY: Contract DOT-UT-80018; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS

15 188321 VIBRATION AND PASSENGER COMFORT: CAN DATA FROM SUBJECTS BE USED TO PREDICT PASSENGER COMFORT? This paper presents a review of both field and laboratory studies of human reaction to vibration, to try to answer the question whether laboratory based studies may be used to predict comfort levels for passenger vehicles. The conclusion is reached that such studies may be used, provided their restrictions are understood. Finally, tentative suggestions are made for acceptable levels of vibration in passenger transport vehicles. /Author/TRRL/

Osborne, DJ (University College, Swansea) *Applied Ergonomics* Vol. 9 No. 3, Sept. 1978, pp 155-161, 4 Fig., 4 Tab., 30 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237079); ORDER FROM: ESL

15 188323 TUNNELLING IN JAPAN. The article discusses the problems associated with tunnel construction in Japan. The natural rock formation of the country affected by ancient tectonic action coupled with volcanic activity has resulted in mixed geological conditions of very hard rock and decomposed weak ground. As most of the country's cities are located on river deltas, tunnelling construction encounters low strength fluvial deposits and high water levels. Ground treatment such as grouting, dewatering and freezing are required to aid excavation and to protect the work face. Details are given of tunnelling construction in progress in Japan including railway, highway, underground railway and water supply tunnels. /TRRL/

Tunnels and Tunnelling Vol. 10 No. 5, June 1978, pp 19-22, 7 Fig., 2 Tab., 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 236906); ORDER FROM: ESL

15 188333 THE ATMOSPHERE IN THE METRO [L'atmosphère du métro]. The first chapter deals with the specific characteristics of the atmosphere in the metro: composition and physical parameters of the air, comfort as regards temperature, and includes a brief outline of the railway authorities objectives in this field. A table describes the air conditioning equipment, the urban metro and the regional metro. The means employed to improve the atmospheric conditions in the metro are presented in the third chapter: improvement in ventilation, reduction in heat dissipated in the tunnel, air conditioning of stations, metro lines, surge shafts, cleaning. Four appendices deal with: temperature control in the urban network, the technical construction of a ventilation plant, temperature curves for the railway lines, layout plans for the installation of ventilators and ventilation bays. [French]

Sutton, D Flahaut, J *RATP Bulletin de Documentation et D'information* Sept. 1976, pp 3-69, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 105213), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM: Regie Autonome des Transports Parisiens, 53 Ter. Quai des Grands Augustins, Paris, France

15 188336 THE METRO: 'PALACES FOR THE PEOPLE'. Low cost public transport in Moscow restricts commuting by car to a low level. The metro is the most popular form of transport and although half the size of London's underground is used for an average of 5.7 M journeys per day compared with London's 2 M. The article describes the history, design and construction of the underground system which will be extended and improved before the 1980 olympic games. It is planned that there will be some 330 km of track and 300 stations by the year 2000. The first shafts were excavated by hand in 1932 through wet and variable ground-quite unsuitable for an underground rail system. Shields were not used initially; ground freezing was a common method of dealing with the poorest ground conditions. An outstanding feature of the system is the ornate architecture of the early stations; marble cladding and semi-precious stones such as onyx are still used for decoration and mosaics in the modern constructions.

New Civil Engineer No. 311, Sept. 1978, pp 42-43, 5 Phot. ACKNOWLEDGMENT: TRRL (IRRD 237270); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England

15 188337 ENVIRONMENTAL TRADE-OFFS OF TUNNELS VS CUT-AND-COVER SUBWAYS. Heavy construction projects in cities entail two kinds of cost-internal cost, which can be defined in terms of payments from one set of parties to another, and external cost, which is the cost borne by the community at large as the result of disutilities entailed in construction and operation. Environmental trade-offs involve external costs, which are commonly difficult to measure. Cut-and-cover subway construction probably entails higher external and internal cost than deep tunnel construction in many urban geological environments, but uncertainty concerning the costs and environmental trade-offs of tunneling leads to limited and timid use of tunneling by American designers. Thus uncertainty becomes a major trade-off which works

against tunneling. The reverse is true in Sweden after nearly 30 years of subway construction. Econometric methods for measuring external costs exist in principle, but are limited in application. Economic theory based on market pressure does not address the real problem of urban environmental trade-offs. Nevertheless, the problem of uncertainty can be addressed by comparative studies of estimated and as-built costs of cut-and-cover vs tunnel projects and a review of environmental issues associated with such construction. Such a study would benefit the underground construction industry and the design of transportation systems. It would also help solve an aspect of the urban problem.

Walton, M (Minnesota Geological Survey) *Underground Space* Vol. 3 No. 2, Sept. 1978, pp 62-67, 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237150); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

15 188340 BLADE SHIELD TUNNELLING IN ESSEN. The article describes the excavation and lining of the fourth construction section of Essen's underground railway. The tunnel is located in an area of green sand and coarse silt in which the water table is located 5 M above the tunnel floor. As compressed air tunnelling methods could not be used because of thin cover and the soil structure, it was necessary to lower the water table by sinking wells. Tunnel excavation was performed with blade shield tunnelling equipment designed for use in unstable ground conditions. The article gives details of excavation methods used with this equipment in a built-up area and evaluates the resulting ground settlements.

Gruner, H *Tunnels and Tunnelling* Vol. 10 No. 5, June 1978, pp 24-28, 5 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 236907); ORDER FROM: ESL

15 188369 CONSIDERATIONS ON THE REVISION OF THE TUNNEL CONSTRUCTION RULES [Gedanken zur Neubearbeitung der Tunnelbauvorschriften]. The author outlines the development of tunnel construction rules in the German-speaking countries. The concept of the "tunnel" can be variously interpreted. The fundamental change in tunnel building methods in the last twenty years is described (so-called "New Austrian Tunneling Practice"). The article concludes with a consideration of the proposed revision of "Tunnel Construction Rules (DV 802)", "Rules for Structures of Underground Railways, Enclosed Type (DV 802)" and the DB's design manual for structures, which must be seen in relation to each other. [German]

Martinek, K *Eisenbahntechnische Rundschau* Vol. 27 No. 11, Nov. 1978, 6 p., 1 Tab., 6 Ref.; ACKNOWLEDGMENT: Eisenbahntechnische Rundschau; ORDER FROM: Hestra-Verlag, Holzfohllee 33, 61 Darmstadt, West Germany

15 188993 DRIVING WITH A FULL-FACE DIAPHRAGM. A full-face diaphragm on a shield offers means of driving tunnels through soft, wet alluvial soils such as are often found in estuaries. This paper describes an investigation of small diameter tunnels driven at three such sites using the full-face diaphragm on a shield. It was found that this arrangement can successfully

drive tunnels through both very wet and very soft ground. Reasonable agreement was found between the observed and calculated ground resistance to driving. The importance of accurately determining the nature and depth of the strata during the site investigation is emphasized.

McCaul, C (Transport and Road Research Laboratory) West, G Manlow, TV *Tunnels and Tunnelling* Vol. 10 No. 6, July 1978, pp 23-25, 12 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 188995 SETTLEMENTS IN A SAO PAULO SHIELD TUNNEL. The East-West line of the Sao Paulo, Brazil subway system includes about 3.5 km of shield tunnels in the downtown area, about 3 km being completed. The designers (Promon Engenharia S/A) were responsible for the settlement monitoring system, and the data collected was analysed and correlated with characteristics of the soil and the tunnelling methods used. The soil settlement troughs are compared with those predicted by the methods of R.B. Peck and E.J. Cording. The influence of different tail grouting techniques, additional settlements due to the release of air pressure in the tunnel and cases of building damage are described.

Sozio, LE (Promon Engenharia, Brazil) *Tunnels and Tunnelling* Vol. 10 No. 7, Sept. 1978, pp 53-55, 5 Fig., 1 Tab.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 189006 SUBWAY DESIGNS AND CONSTRUCTION METHODS THAT CUT COSTS. The author describes how the high cost of subway construction in the United States can be reduced by adopting station and track structure configurations, structural systems, and construction techniques best suited to the site geology and other constraints. The mixed soils and high water tables generally encountered in U.S. cities, together with a highly mechanized construction industry, constrains subway design and construction. For such conditions, estimates are provided that indicate the influence on cost of length and diameter of tunnels in different materials. Costs of stations constructed by cut-and-cover and by tunnel-enlargement are also compared. Alternative station construction techniques are described.

Birkmyer, AJ (Bechtel Corporation) *ASCE Civil Engineering* Vol. 48 No. 10, Oct. 1978, pp 62-65; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 189007 CROSS-VENTILATION OF UNDERGROUND RAILWAY TUNNELS. The aerodynamic merits and demerits of cross-ventilating adjacent tunnels in underground rapid transit systems are discussed. Three types of cross-ventilation are considered, namely (a) numerous small holes in the dividing wall between the tracks in a cut-and-cover tunnel, (b) a curtailed dividing wall, and (c) passages linking separately bored tunnels. It is shown that considerable reductions in the air velocities expected on station platforms will result if the end regions of the tunnels are well cross-ventilated. Additionally, useful reductions in the aerodynamic drag force on trains can be expected if cross-ventilation is provided along the whole length of the tunnel. However, this is recommended only for low-speed systems because interaction between passing trains will cause large pressure fluctuations at high speeds.

Vardy, AE ; American Society of Mechanical Engineers n 78-WA/FE-14, 1978, 10 p., 17 Ref.

For ASME Meeting held December 10-15, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 189008 TOKYO'S FREEZE-DRY SUBWAY TUNNEL. The paper reports how freezing of soil beneath a riverbed covered with insulating plates solidifies the earth for safe tunnel excavating in a restricted site.

Walabayashi, J *McGraw Hills Construction Contract* Vol. 60 No. 9, Sept. 1978, pp 46-47; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 189009 GROUTING LIMITS SETTLEMENT AS TRANSIT BORES ADVANCE. Construction of an 8-mile mass transit starter line in Baltimore, Maryland is discussed. The Maryland Mass Transit Administration's rail transit line runs the gamut of construction techniques. It begins with compressed air, shield-driven tunnels and cut-and-cover stations in granular material, giving way to drill-and-blast construction through granite-like gneiss.

Engineering News-Record Vol. 201 No. 11, Sept. 1978, pp 22-23 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 189775 RAPID TUNNEL CONSTRUCTION IN LENINGRAD [Skorostnoe sooruzenie tunnelej v Leningrade]. With the aid of experience obtained in the field of tunnel construction and operation projects, tunnels on the Leningrad metro have been built at the rate of 876 m per month. The article contains a detailed description of the new kind of lining used in these tunnels. [Russian]

Gucko, VA *Transportnoye Stroitel'stvo* No. 10, Oct. 1978, pp 11-14, 4 Fig.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

15 189776 TUNNEL CONSTRUCTION USING THE EARTH FREEZING TECHNIQUE. EVALUATION OF STRESSES AND DEFORMATION [Tunnelvortrieb im Schutze eines gefrorenen Bodenkoerpers. Spannungs- und Verformungs-Ermittlungen]. No Abstract. [German]

Eckhardt, H Meissner, H *Forschung und Praxis* No. 21, 1978, pp 62-70, 18 Phot., 10 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Forschung und Praxis, Dusseldorf, West Germany

15 190212 SETTLEMENTS AROUND TUNNELS IN SOIL: THREE CASE HISTORIES. This report presents the results of three case histories of field observations of settlements around tunnels in soil. Two of the cases are twin, 20-ft (6-m) diameter, single-track tunnels for the Washington, D.C. Metro System: Section F2a, F Route, is a steel segment lined tunnel in interbedded sands and gravels and clays, typical of downtown Washington; (2) Section G1, with an expanded rib and lagging lining, is in transition from these deposits to a hard, fissured clay. The third case is a 9-ft (3-m) diameter sewer tunnel with an expanded rib and lagging lining driven in dewatered, dense sands at Rockford, Illinois.

Detailed measurements of subsurface settlements at points 3 to 6 ft (1 to 2m) above the tunnel crowns are used to determine sources and magnitudes of lost ground. Where the tunnel face was controlled to prevent large losses, ground losses due to overcutting and plowing of the shield were about one-half of the total estimated ground loss; incomplete filling of the tail void was the next biggest source of loss. Ground surface settlement data, including widths, slopes, and volumes of the surface settlement troughs are reported for several cross-sections on each tunnel and for points along the tunnel centerlines. The volume of surface settlement was less than the volume of ground loss because the disturbance of tunneling caused a net volume expansion in the dense granular materials. The relationship between ground loss and surface settlement volume, as shown by sand bin model test data is also reported. A procedure for estimating ground loss and surface settlement in advance of tunneling is suggested. /UMTA/ MacPherson, HH ; Illinois University, Urbana, (IL-06-0043) Final Rpt. UMTA-IL-06-0043-78-1, Mar. 1978, 144 p.; Sponsored by the Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-290856

15 192188 ELECTROMAGNETIC CROSS-BOREHOLE SURVEY OF A SITE PROPOSED FOR AN URBAN TRANSIT STATION. LLL has developed and tested an electromagnetic method for probing between boreholes and has applied the method to characterize the site for a future urban rapid-transit station--the Forest Glen/Georgia Avenue station Washington, DC. Using this technique, the subsurface region's transmission properties were determined by sending a continuous-wave (cw) electromagnetic signal between a transmitter and a receiver in different boreholes. From the network of sampled signals, which vary according to the electrical properties of the media through which they pass, the region's properties can be determined. For the Forest Glen/Georgia Avenue site, there has been an excellent correlation of the predicted subsurface geologic structure and fracture density with the borehole core information. This suggests that cross-borehole probing has significant merit for inferring the detailed structure between boreholes. This is a desired capability that no other technique meets with as high a resolution as the described procedure.

Lytle, RJ Dines, KA Laine, EF Lager, DL ; California University, Livermore, Department of Energy June 1978, 23 p.; Contract W-7405-ENG-48; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCRL-52484

15 194141 RHINE-RUHR METRO-CASE STUDY NO 1. BOCHUM CITY RAILWAY. CONTRACT 3. The article describes a case study concerning the construction of contract B3 forming part of the underground rapid transit system being commissioned by the city of Bochum as part of the Rhine-Ruhr metro system. Contract B3 is located at the end of the first tunnel section of line B and incorporates a station, a ramp to street level and provision for a future extension of the tunnel section. The construction method used was the new Austrian tunnelling method instead of open cut as originally planned for some sections. Headings were excavated by road-heading machines and a telescopic shovel feeding

wheeled loading shovels. Front end loaders transported the spoil to shafts for lifting and removing from site. Steel arches were placed every metre with sprayed concrete for initial support. When the excavation was complete a final in-situ concrete lining was constructed in 8-10 M lengths. Details are given of tunnel dimensions and construction techniques employed.

Hunt, M *Tunnels and Tunnelling* Vol. 10 No. 10, Dec. 1978, pp 44-46, 3 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-238399); ORDER FROM: ESL

15 194142 RHINE-RUHR METRO-CASE STUDY NO 2. HERNE CITY RAILWAY. CONTRACT 5. The Herne city railway, which is to form a link in the Rhine-Ruhr metro system, consists of a single line beneath the city centre connecting Recklinghausen and Bochum. The line is divided into eight sections, one of which, the 660 M long section no 5, is described in this study. The cut and cover excavation method was used with bored pile retaining walls. The geological conditions consisted of 1-2 M of alluvial fill below street level with weathered marl beneath. The water table at 5 M below ground level was lowered below formation level by sinking wells and installing pumping equipment. The floor slab and walls were concreted in one operation to prevent water inclusion using a 60 tonne mobile formwork rig. The article describes construction stages and equipment used.

Hunt, M *Tunnels and Tunnelling* Vol. 10 No. 10, Dec. 1978, pp 42-43, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-238400); ORDER FROM: ESL

15 194155 BETTER MANAGEMENT OF MAJOR UNDERGROUND CONSTRUCTION PROJECTS. The object of this study was to recommend actions that result in public underground projects that are completed on schedule, and at reasonable cost, and operate to design. To this end, a hypothetical model of a major urban underground transportation construction project called the Key City Model was developed by a subcommittee of the National Committee on Tunnelling Technology. From this model, the subcommittee derived a list of primary elements-social, political, physical, and technical-that could conceivably be faced in building an urban rapid transit system which might have a bearing on management. A questionnaire containing these elements was sent to 105 people experienced in underground construction who were asked to rank them. Using the survey results, the subcommittee ranked the elements and then sent out another survey asking for recommendations. As a result this survey and the comments made at a workshop attended by people involved in underground construction, the recommendations presented here were formulated.

National Academy of Engineering, Office of the Secretary of Transportation, Urban Mass Transportation Administration, National Science Foundation Final Rpt. NRC/AE-TT-78-1, 1978, 151 p., 11 Fig., 4 Tab., Refs., 6 App.; Study conducted by the Subcommittee on Management of Major Underground Construction Projects. Sponsored by the Urban Mass Transportation Administration, National Science Foundation, and Office of the Secretary of the Department of Transportation. See also PB-236973 and

PB-272964.; Contract DOT-OS-70030; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-290855/6ST

15 194906 FLEXIBLE TUNNEL TO RIDE WITH QUAKES. The paper reports that a Japanese joint venture contractor is building a flexible sunken tube rail tunnel under Tokyo Bay designed to accommodate as much as 4 ft of soil settlement and survive a major earthquake. Joints between the elements have a rubber gasket on the outside and a small gap on the inside for flexibility. Post tensioning cables strung through the joints tie the segments together, and H-shaped steel members form a shear key embedded in the end of one element at each joint to prevent excessive vertical displacement. /EI/

Engineering News-Record Vol. 201 No. 12, Feb. 1978, p 64ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 195078 REDUCING COSTS IN URBAN TRANSPORTATION CONSTRUCTION. This paper describes an in-depth research study to evaluate the current and projected state of productivity in the construction of transportation facilities and explores improved mechanisms for implementing transportation construction innovations. At this stage it is evident that some of the major obstacles that impact costs, reduce productivity, and inhibit the implementation of innovations result from:(1)Decisions made and policies set during the planning and design phases; (2)the contractual and organizational structure chosen for project administration; and (3)delays and cost increases resulting from third-party intervention. There are also opportunities for further improvements through wider and more effective use by construction contractors of management techniques that have already proven to be successful.

Fondahl, JW (Stanford University) Paulson, BC, Jr Parker, HW *ASCE Journal of the Construction Division* Vol. 105 No. 1, Mar. 1979, pp 51-63, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 195086 TUNNEL CATENARY OF THE URBAN RAPID TRANSIT SYSTEM RHINE-MAIN (RIVERS) IN WEST GERMANY [Die Tunnel-fahrleitung der S-Bahn Rhein-Main]. The catenary installations of the Rhine-Main rapid transit system have essentially been designed according to the parameters of the counterpart in Munich (West Germany). Because of different systems of tunnel construction and special structural conditions, extensive special structural measures were necessary. Therefore the supports and anchors of the catenary, switching equipment and feeding installations had to be installed by appropriate arrangements in the clear spaces between the structural elements and the normal structure gage. In general, only limited use could be made of the clear space. This required appropriate intensive and extensive job planning. The application of special working techniques during the installation of the catenary was the precondition for a rational, trouble-free realization of all catenary work. [German]

Noeding, M (AEG-Telefunken, West Germany) Zienert, S *Elektrische Bahnen* Vol. 49 No. 9, Sept. 1978, pp 239-244, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 196143 SOIL-STRUCTURAL INTERACTION AND CONCRETE TIE DESIGN. In this closure, the author summarizes several points made by the discussor which he feels are well taken. It is agreed that the analysis (which was general) should not be extended to light rail. In that context, heavier rails (132-1/4yd or 66-kg/m or over) would not be economically justified. Also, the need for more data on the dynamic loads imposed on concrete, or indeed wood, ties for North American heavy wheel loading is emphasized, since dynamic loading is very dependent on track quality. (Currently in the U.S., trains with lighter wheel loads are permitted to go slightly faster poor-and medium-quality, but have no speed advantage over heavier trains on high-quality track). The discussor's point out that line loading was assumed at the rail seat, and any optimum tie length would thus be increased by only assumption made for the bearing distribution of the rail, rail pad, and tie thickness is well taken. The use of equal positive and negative moments at the two critical sections, as well as the optimization using these two critical moments as equal, were questioned by the discussor. While not agreeing with his reasons for questioning such requirements the writer basically agrees with the discussor for a practical tie design. In response to the suggestion that speed restrictions on curves generally lead to lower requirements on curves, the author notes that such restrictions are generally imposed after construction due to operating problems and never, to his knowledge, specifically specified prior to construction.

Raymond, GP (Queen's University, Canada) *ASCE Journal of the Geotechnical Engineering Division* Vol. 105 No. GT5, ASCE 14549, May 1979, pp 698-700, Refs.; Closure of discussion on ASCE Paper 13557 (February 1978); ORDER FROM: ESL

15 196622 ANALYSIS OF NATIONWIDE DEMAND FOR URBAN TRANSPORTATION TUNNELS. For the purpose of determining estimates of the amount of transportation-related tunneling activity likely to occur to 1990, a methodology was devised whereby the conditions necessary to justify the application of tunnel segments for mass transit facilities were identified and matched against the number of situations in which these conditions are likely to be fulfilled. A corollary outcome of the analysis is an appraisal of factors that affect the preference of one type of mass transit system over others and an understanding of the sensitivity of preferred system choice to these factors. A technical evaluation of supply and demand for alternative types of mass transit systems was conducted to determine the future viability of such systems for cities that do not have them. Results of city-by-city application of the methodology developed revealed that, with current construction costs and property values, three cities currently without mass transit systems--Detroit, Cincinnati, and Denver--would meet necessary conditions for tunneled systems by 1990. At the other extreme, tunnel distance was computed for conditions in which tunnel construction costs in real terms were postulated to fall to 40 percent of today's cost and right-of-way values to rise by 5 percent/year. Other sensitivity results for the preference of tunnels to new right-of-way and for the forecast of nationwide tunnel construction under other assumptions are also reported. /Author/

Myers, MG Wood, RK (Logistics Management Institute) Blattenberger, LB (Congressional Budget Office) Lago, AM (Ecosometrics, Incorporated) *Transportation Research Record* No. 684, 1978, pp 1-8, 5 Fig., 1 Tab., 17 Ref.; This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.; ORDER FROM: TRB Publications Off

15 196626 SOFT-GROUND TUNNELING BY GROUND FREEZING: A CASE HISTORY. A brief introduction to artificial ground freezing for temporary excavation retention during construction is presented. The major aspects that affect the suitability of ground freezing in a particular project are discussed. To illustrate the applicability of artificial ground freezing, a case history in Washington, D.C., is presented. The project consisted of a circular 3.8-m (12.5-ft) diameter sewer tunnel approximately 33.5 m (110 ft) in length that passed 2.7 m (8.9 ft) beneath four sets of railroad tracks. The design process, including the frozen-soil laboratory testing program and the computer modeling, is presented. An instrumentation program was used during construction to monitor the performance of the project. The instrumentation consisted of thermocouples to monitor ground temperatures and elevation monuments to monitor ground movement during construction. /Author/

Jones, JS Brown, RE (Law Engineering Testing Company) *Transportation Research Record* No. 684, 1978, pp 28-36, 10 Fig., 25 Ref.; This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.; ORDER FROM: TRB Publications Off

15 196627 PRACTICAL DESIGN OF CONCRETE DIAPHRAGM WALLS. Diaphragm walls constructed by the slurry trench method achieve their greatest economy when it is possible to use them as part of the permanent underground structure. To use these support-of-excavation structures as permanent components of a structure, engineers must be assured of their compatibility with structures built in an open excavation. There should be consistent reliability in applied loads, levels of stress, watertightness, durability, and performance. It is suggested that the use of diaphragm walls of precast concrete panels can provide reliable strength and durability and that use of a cement bentonite grout on the backside of the diaphragm wall to displace excess slurry can meet waterproofing requirements. It is recommended that plastic analysis be combined with ultimate strength methods in the design of these walls to resolve the problem presented by the complicated residual stress patterns generated in the diaphragm wall by the construction processes of excavation; installation, prestressing, and removal of braces; and backfilling. In addition, use of a built-in hinge in the diaphragm wall at the lowest brace facilitates control of residual moments. This approach can satisfy the need for reliability in stress levels in the structure. A structure so designed and constructed will be compatible with one built in an open excavation. /Author/

Iffland, JSB (Iffland Kavanagh Waterbury) *Transportation Research Record* No. 684, 1978, pp 37-43, 10 Fig., 14 Ref.; This paper appeared in TRB Research Record No. 684, Tunneling and Underground Structures.; ORDER FROM: TRB Publications Off

15 196715 SUBWAY STRUCTURES RELATIVELY GOOD, OTHER ELEMENTS OF SUBWAY SYSTEM NEED REHAB. New York has postponed construction of its Second Avenue Subway but is going ahead piecemeal with the line between midtown Manhattan and Jamaica, Queens. Seventy percent of the Transit Authority capital budget is going into rehabilitation and modernization of existing lines. Elevated structures, despite ages up to 93 years, appear in good shape. Oldest subway, the 75-year-old Lexington Avenue IRT, is getting priority in rehabilitation of power and signal systems, and in refurbishing of the stations.

ASCE Civil Engineering Nov. 1978, p 67 ORDER FROM: ESL

15 197284 STATION EXCAVATIONS IN HARD ROCK FOR THE WASHINGTON METRO. Details are given of the construction of rock caverns for mass transit railway stations in Washington DC. Ten of the stations have been excavated in gneiss, schist and quartz where these vaulted rock excavations measure some 650 ft long, 45-50 ft high and 60 ft wide. The caverns are designed without interior supporting columns. For drilling and roof bolting operations four pneumatic Ingersoll-Rand, three-boom, ramp-master jumbos were used. The drills have penetration rates of 1 m/min on 50 mm diameter blastholes. A stabilator robot shotcrete unit following behind the jumbos spray a 50-100 mm layer of shotcrete to stabilise the rock face.

Tunnels and Tunnelling Vol. 11 No. 3, Apr. 1979, pp 57-58, 4 Phot. ACKNOWLEDGMENT: TRRL (IRRD-241070); ORDER FROM: ESL

15 197287 TYNE AND WEAR: BRIDGE N106 OVER THE RIVER TYNE. The bridge is designed to carry the Tyne and Wear Metro across the River Tyne between the centres of Newcastle and Gateshead. It is a continuous steel through-truss of three spans, the central river span being 164 M long. The 4000 T of structural steelwork are supported on reinforced concrete foundations and piers. The authors, representing the client, engineer and contractors, describe the planning of the bridge in the context of the metro, and the factors which affected its design. After discussing some of the special features of the design, the paper describes the construction of the foundations, piers and superstructure, illustrating in particular the erection methods which make this form of bridge construction practical and economical.

Layfield, P (Tyne & Wear Transport Executive) Taylor, G McIlroy, P (Fairhurst & Partners) King, C (Cleveland Bridge & Engineering Company) Casebourne, M (Cementation Construction Company) *Institution of Civil Engineers, Proceedings, Pt I* Vol. 66 No. PT1, May 1979, pp 169-189, 9 Fig., 2 Tab., 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-240958); ORDER FROM: ESL

15 197344 ECONOMIC FACTORS IN TUNNEL CONSTRUCTION. This report describes a new cost estimating system for tunneling. The system is designed so that it may be used to aid planners, engineers, and designers in evaluating the cost impact of decisions they may make during the sequential stages of planning and design of urban transportation tunnels. In developing a cost estimating technique and method, an

extensive review was made of currently available estimating systems. Techniques were adapted from the systems studied where applicable, and new methodologies were developed as needed for optimization. A detailed estimating technique is used in which units of effort are converted to obtain a base cost for a "standard" tunnel constructed in 1976 in Washington, DC. Correction factors may then be applied to obtain the costs in other time frames and geographic locations. The use of units of effort provides a technical base which does not change rapidly with time, but may be updated as changes in technology and productivity occur.

Foster, EL McDonald, R Wightman, W Toporoff, I; Underground Technology Development Corporation, Singstad, Kehart, November, and Hurka, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0025-7910, Feb. 1979, 306 p.; Prepared in cooperation with Singstad, Kehart, November, and Hurka, New York.; Contract DOT-TSC-1106; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-294726/5ST, DOTL NTIS

15 197442 DEVELOPMENT OF DESIGN PROCEDURES FOR STABILIZED SOIL SUPPORT SYSTEMS FOR SOFT GROUND TUNNELING. VOLUME IV. CASE HISTORY STUDIES, WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY SYSTEM. The practice of injecting chemical grouts into permeable soils in order to stabilize them for tunnel construction is a common procedure in Great Britain, Europe, and Japan. It is only within the last five years that this technology has been used in the U.S., namely, in the work for the Washington Metropolitan Area Transit Authority (WMATA) subway construction. This report documents five WMATA case histories where chemical grouting was used; information is provided as to the soil conditions, method of treatment, reason for treatment, and tunnel performance. The document is the fourth in a series directed towards the subject of use of chemical injection technology to stabilize sand soils for ground movement control during tunneling. The research program has been carried out over the last three years at Stanford University. Other available project reports are: Volume I: A Report on the Practice of Chemical Stabilization Around Soft Ground Tunnels in England, France, and Germany (PB-272 771), and Volume II: Preliminary Results (PB-273 064). The chemical grouting was used as an economic alternative to conventional underpinning. Ground movement data show that the settlements in the grouted areas were generally small (less than 50mm) and that no cases of serious ground runs occurred. The best ground control was achieved where the soils in the upper half of the tunnel cross-section and above the crown were uniformly groutable, and good, general construction and support practices were used. Grouting of the soils around the tunnel was less effective at movement control in cases where soil layers in the crown area were ungroutable.

Clough, GGW Baker, WH Mensah-Dwumah, F Stanford University, Urban Mass Transportation Administration, (UMTA-MA-06-0025) Final Rpt. UMTA-MA-06-0025-78-9, Oct. 1978, 170 p.; See also Volume 2, PB-273064.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-295022/8ST

15 197460 A QUANTITATIVE METHOD FOR ANALYZING THE ALLOCATION OF RISKS IN TRANSPORTATION CONSTRUCTION. The report presents a conceptual model of risk that was developed to analyze the impact on owner's cost of alternate allocations of risk among owner and contractor in mass transit construction. A model and analysis procedure are developed, based on decision analysis but extending the standard methodology to include: (1) explicit consideration of risk as an incentive to perform, and (2) the interaction between two decision-makers (owner and contractor) trading risk for price.

Levitt, RE Ashley, DB Logcher, RD Dziekan, MW ; Massachusetts Institute of Technology, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-79-14, Apr. 1979, 156 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295099/6ST, DOTL NTIS

15 197698 CASE STUDIES OF BUILDING BEHAVIOR IN RESPONSE TO ADJACENT EXCAVATION. A substantial portion of the cost of soft ground tunnels and braced excavations in urban environments is devoted to the protection and repair of adjacent structures and utilities. Often, the choice between cut-and-cover tunnel construction is based on the potential ground movements associated with each method and the anticipated response of the nearby buildings to these ground movements. In some instances, the locations of tunnel routes and large braced excavations are selected to avoid large and/or sensitive structures. This report summarizes one year of field observations and data collection of the ground movement and resultant building distortion and change in response to underground construction. It documents case histories of the distortion and damage to structures adjacent to tunnels and excavations. Measurements of ground movements and building response were made at two test sites in Washington, D.C. The sites were a nine-story apartment building adjacent to a 60-foot-deep open cut and a pair of two-story brick-bearing wall structures near two 21-foot-diameter tunnels. The structures at the test sites were instrumented to measure settlement and tilt of the bearing walls and foundations. Both lateral and diagonal displacements were measured with tape extensometers extending between column lines and bearing walls at various floor levels in the structures. From these data, the slope of the settlement trough could be separated into the components causing angular distortion and tilt of the structure. Lateral extension, shearing, or bending could also be distinguished from the data. Additional data were gathered at other sites in Washington, D.C. and in Chicago, Illinois through construction records and field inspections. The ground surface settlement data, building response data, and the progress of the excavation are compared and related.

Boscardin, MD Cording, EJ O'Rourke, TD ; Illinois University, Urbana, Urban Mass Transportation Administration, (UMTA-IL-06-0043) Final Rpt. UILU-ENG-78-2023, UMTA-IL-06-0043-78-2, Oct. 1978, 141 p.; Contract DOT-UT-80039; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-295757/9ST

15 198024 RECOMMENDATIONS FOR BETTER MANAGEMENT OF MAJOR UNDERGROUND CONSTRUCTION PROJECTS. EXECUTIVE PRESENTATION. This report identifies procedures and practices in major underground construction projects and recommends improved procedures that will ensure more efficient and economic execution of these projects. It is the continuation of a previous study by the subcommittee on Contracting Practices of the U.S. National Committee on Tunneling Technology which noted that many of the problems encountered in the contracting and construction phases of underground projects result from actions taken in development, pre-design, and design phases. A hypothetical model of a major urban underground transportation construction project is described in detail. One of the most important causes of management is delayed decisive action. Thirty-nine most critical elements of a project are listed. Steps leading to completion and operation of the project are outlined. Recommended objectives and specific recommendations to support each objective are presented in the concluding section. The report is intended for use by government organizations, professional associations, and industry concerned with underground construction.

National Committee on Tunneling Technology, Office of the Secretary of Transportation, Urban Mass Transportation Administration, National Science Foundation NSF/RA-780467, 1978, 31 p.; Grant NSF-DAR76-21335; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293543/5ST

15 198284 THE ATLANTA RESEARCH CHAMBER; APPLIED RESEARCH FOR TUNNELS; BLASTING TECHNIQUES, CONVENTIONAL SHOTCRETE, STEEL-FIBER-REINFORCED SHOTCRETE. MONOGRAPHS ON THE STATE-OF-THE-ART OF TUNNELING. This report describes the construction of the Atlanta Research Chamber and the research conducted in it. In addition, 24 monographs on the state-of-the-art of modern tunnel practice are included. The Atlanta Research Chamber was conceived as a team effort of 18 individuals from twelve engineering firms in the United States, Canada, and Austria to combine their special expertise to study various aspects of tunnel support system in hard rock. It was primarily a practical effort by practical engineers, attempting to develop useful tools for tunnel designers and builders. Later, the team was expanded, and a number of team members were asked to write monographs on modern tunnel practice. All have practical application, and by being gathered together in one volume, may serve to promote the common goal, which is to construct underground space economically and safely. To balance these predominately technical monographs, new team members were recruited to write monographs representing owners, contractors, labor, legal aspects, insurance, overseas practice, and additional technical ideas.

Rose, DC ; Metropolitan Atlanta Rapid Transit Authority, Urban Mass Transportation Administration, (UMTA-GA-06-0007) Intrm Rpt. UMTA-GA-06-0007-79-1, June 1979, 361 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297574/6ST

15 199068 MATERIALS HANDLING FOR URBAN TUNNELING IN ROCK. An examination of prior forecasts of tunnel construction provides an estimate of 2.4 million feet of rock tunnel to be constructed during the 1976-2000 period. Tunnel projects for the near term (1980) and far term (1990) periods are defined for study. The flow and characteristics of materials handled are defined for the tunnel projects. The state-of-the-art and status of R&D programs for materials handling are reviewed. Based on extensive interviews with representatives of tunnel contractors, equipment manufacturers, government agencies, and consultants, the application of various methods of material handling to tunneling is discussed, including conventional rail haulage, crane and hoist lifting, and horizontal transport and lifting by hydraulic and pneumatic pipeline and by conveyor. Total job cost estimates using these modes of material transport are obtained (with material handling costs isolated) by modification of an estimating technique used for preparing contractor bid estimates. A comparison of the results indicates that major cost savings through substitution of alternative material handling modes should not be anticipated. R&D program elements are recommended to assure that material transport will not become the limiting factor as the rate of tunnel excavation increases in future years.

Duncan, JM Giamboni, LA Schneider, HV Sperry, PE ; Holmes and Narver, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0100-79-9, May 1979, 349 p.; Contract DOT-TSC-1281; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299117/2ST

15 260348 THE IMPORTANCE OF AERODYNAMICS IN THE DESIGN OF INTRA-URBAN TRAINS TRAVELING IN TUNNELS. Aerodynamics can be a major factor in the design and operation of intraurban subway-train transportation systems. In order to develop an adequate understanding of the aerodynamic characteristics of such systems, an experimental program was carried out. The major portion of the testing was conducted under equilibrium, incompressible conditions so that the fundamental aerodynamic characteristics could be isolated. The effects of geometric parameters (such as train speed, blockage ratio, wall roughness, and train speed, blockage ratio, wall roughness, and train and tunnel length) upon train drag and tunnel flow velocities were determined and compared with a simple theoretical model. The effect of aerodynamic forces upon typical subway-train operations is shown in order to give proper perspective to the importance of aerodynamics.

Dayman, B Kurtz, DW *High Speed Ground Transportation Journal* Vol. 7 No. 3, 1973, pp 381-99, 15 Fig., 19 Ref., 1 App.

15 263680 DEVELOPMENT OF SHOTCRETE FOR METRO CONSTRUCTION IN WASHINGTON. The use of shotcrete in the Washington, D.C. Metro System is reviewed. Shotcrete in this instance is defined as coarse aggregate as opposed to the ACI definition which is broader and includes fine aggregate and non-structural uses. Six-inch shotcrete linings in fair to good rock with moderate overbreak used

in conjunction with rock bolts was considered to be an economical solution. Such linings could also be used as temporary supports eliminating steel ribs, and serve as the first step in building up a permanent lining with further layers of shotcrete. This paper which outlines basic steps utilized in developing shotcrete, also outlines the experience gained in implementing the specifications. The early set of shotcrete was selected at 500 psi at 8 hours and the 28 day strength was specified to be 5000 psi. The high early and final strength values must be selected for optimum effect and a trade-off has to be made between high early strength and high final strength for durability. The two gradations are presented which were specified for the combined coarse and fine aggregates. In the accelerating admixture needed to reduce rebound, two to 3 percent by weight of cement is used. A maximum of 3 minutes for initial set and 12 minutes for final set for the cement-accelerator paste, and a paste strength of 800 psi in 8 hours are specified. Control aggregate gradation was achieved by selecting fine-coarse aggregate gradation bands which could be met with available local aggregates. In the testing of shotcrete mix in laboratory for conformity with specifications, two sizes of aggregate with maximum sizes of 0.75 and 0.5 inch were selected. Field trials by nozzlemen, quality control during production and construction testing are also discussed. Of the accelerators tested, Sigunite and Triacasol T-1 conformed to requirements. Tests were made to determine the compatibility of cements with the selected acceleration and the ability of the combinations to produce the desired early strength.

Bawa, KS (Lorezi, Dodds and Gunnill); American Society of Civil Engineers, American Concrete Institute Conf. Proc SP-45, 1974, pp 33-49, 6 Fig.; In "Use of Shotcrete for Underground Structural Support: Proceedings of the Engineering Foundation Conference, South Berwick, Maine, 16-20 July 1973".

15 263684 CURRENT FIELD RESEARCH PROGRAM ON SHOTCRETE. The field work is described and a preliminary evaluation is presented here of a comprehensive research program (conducted in an underground station of the Washington, D.C. subway) designed to evaluate the practical aspects of the behavior of conventional and experimental shotcretes (regulated-set shotcrete and steel fiber shotcrete). The project was planned to demonstrate the practicality of the experimental shotcrete for routine construction by using the normal crews and equipment available to the contractor. It was also intended to develop information on the experimental shotcrete for potential users. The need for a control of a conventional shotcrete led to inclusion of research on conventional shotcrete. Coarse aggregate mixes of regulated set shotcrete and steel fiber shotcrete were shot successfully in the dry-mix process by a civil engineering contractor using on-site crews and equipment. The results of rebound tests showed that the rate of rebound for about the first 0.5 inch was more than five times the rate of rebound for the remainder of the layer. There was a greater percentage of coarse particles in the rebound than in the wall. A high percentage of steel fibers rebounded. A homemade long nozzle consisting of a single water ring about 14 feet behind the tip of the hose appeared to provide more uniform mixing than other nozzles. At the

end of a few hours the compressive strength of reg-set shotcrete was 3 to 10 times the compressive strength of conventional shotcrete. After 29 days the compressive strengths of conventional and reg-set shotcrete were generally greater than 5,000 psi but the compressive strength of the steel fiber shotcretes was somewhat less. However, the ratio of flexural strength to compressive strength was much higher for steel fiber shotcrete. The steel fiber shotcrete exhibited considerable post-crack resistance.

Parker, HW (Illinois University, Urbana); American Society of Civil Engineers, American Concrete Institute Conf. Proc SP-45, 1974, pp 330-350, 6 Ref.; In "Use of Shotcrete for Underground Structural Support: Proceedings of the Engineering Foundation Conference, South Berwick, Maine, 16-20 July 1973".

15 263686 INSTRUMENTATION TO MONITOR BEHAVIOR OF SHOTCRETE SUPPORT SYSTEMS. In this discussion which comments on the construction conditions (which are directly related to the instrumentation results), and the general behavior of shotcrete-rock bolt and shotcrete-steel rib support systems, emphasis is placed on the rock instrumentation program which was conducted in the Washington, D.C. subway tunnels. The types of instruments used and their performance is described, as well as the instrumentation program and the preliminary results of the studies. The effects of rock geometry, rock block movements, shotcrete-rock bond, as well as the shrinkage properties of the shotcrete on development of tensile and compressive strains in a rock bolt-shotcrete lining are illustrated. Conclusions regarding design considerations of shotcrete support systems are presented. The instrumentation consisted of the use of extensometers to monitor general rock behavior in the tunnels and stations, and extensometers and strain gages placed in test sections to measure rock movements and strains in the shotcrete lining. The basic approach used was to correlate local geologic conditions and construction procedures with these measurements. The extensometers consisted of mechanical rod-type, double-position and six-position units. The bonded resistance gages used here, were read using a Wheatstone bridge, and the vibrating wire embedment gages were read using a frequency counter. Rock movements in steel supported sections of the tunnel were as much as five times those in the shotcrete-lined reaches. Tension stresses were developed in locations where chloride seams and bedding plane orientation was such that tension would develop. Rock bolt-shotcrete combination support system was used in these areas.

Jones, RA Mahar, JW (Illinois University, Urbana); American Society of Civil Engineers, American Concrete Institute Conf. Proc SP-45, 1974, pp 297-319, 7 Fig., 2 Ref.; In "Use of Shotcrete for Underground Structural Support: Proceedings of the Engineering Foundation Conference, South Berwick, Maine, 16-20 July 1973".

15 263687 USE OF SHOTCRETE FOR TUNNELING IN DIFFICULT GROUNDS. The use of shotcrete in Europe is discussed. Experience in the use of shotcrete in a hydroelectric plan tunnel in Italy is described. Special reinforced shotcrete was used to line the tunnel immediately

after excavation. The reinforcement consisted of steel mesh ribs placed at distances varying from 0.5 to 1.20 m and completed by secondary rods and by a large steel mesh behind the steel mesh ribs. Details are outlined of this construction which, subsequent studies indicate, was completely successful. A second project is detailed which consisted of road tunnels which underpassed built-up zones and garden zones. The ground consisted of various types of argillaceous slates inserted with chalky sandstone strata, some part of which were greatly decomposed and others totally decomposed. The problems presented in this particular situation could be solved only by the shotcrete system. A section in which the shotcrete ring was the only support of the tunnel up to the completion of the excavation works (2 years later), was continuously tested by survey of bench marks installed from 5 up to 7 on a part of the steel mesh ribs. The maximum subsidences (on single bench marks) were of 0.30 mm after 272 days and of 0.416 mm after 242 days at another point. These data confirm the validity of the shotcrete method. Comparisons are made of the results of the shotcrete method with those constructed according to traditional methods. The successful use of the shotcrete method for the construction of the Milan Subway System (1967-1970) is described. Attention is drawn to certain points which are of importance for the shotcreting method. Shotcrete must be applied only where the ground characteristics require it. The widths employed must be adequate to support the ground. The steel mesh ribs and metal support must be distributed and placed in such a way that they will be integrated in a resistant, calculable complex with the shotcrete. The components of the concrete must incorporate an ideal and accurate granulation for the kind and percent of accelerators employed.

Curzio, PQ Barazzoni, G Nobili, F Anselmi, A (Quadrio Curzio S.p.A., Italy); American Society of Civil Engineers, American Concrete Institute Conf. Proc SP-45, 1974, pp 79-95; In "Use of Shotcrete for Underground Structural Support: Proceedings of the Engineering Foundation Conference, South Berwick, Maine, 16-20 July 1973".

15 263694 GEOLOGIC CONSIDERATIONS IN SHOTCRETE DESIGN. The use is described of shotcrete in large shallow underground openings in rock, and several examples are presented which indicate the effect of geology on shotcrete behavior. The results of observations of rock movement and cracking in the shotcrete have indicated a characteristic behavior of the shotcrete support in blocky rock. This behavior (illustrated with examples) has implications for the design of shotcrete in a support system. Large underground openings excavated for the Washington, D.C., Metro stations and the geology of the area are described. In the construction of such openings shotcrete (in combination with other support methods) is a useful construction tool for limiting rock movements and fallouts and for maintaining the stability of the face, headings, intersections, pillars and walls. Specifications should provide for sufficient thickness to be initially placed in the headings during the cycle. They should be flexible enough to permit additional thicknesses to be placed in areas where cracking or rock movement is observed. The thickness requirement of the shotcrete may be established by observations of the size and shape

of the overbreak and the protruding rock blocks, by noting the planarity, slickness, and water on the joint surfaces bounding the blocks, and by observation of cracks in the shotcrete and movement of rock blocks. In blocky rock, shotcrete is used in combination with other supports. The fast-setting properties of the shotcrete make it possible to install the permanent lining near the face of the tunnel. A continuous thick shotcrete arch can be analyzed in a manner similar to a concrete arch. The parameters controlling the behavior of a thin shotcrete lining in blocky rock are listed. Observations are presented which relate to aspects such as the thickness of shotcrete, bond and frictional strength of rock-shotcrete interface, the tensile properties of shotcrete, and the orientation and shape of rock blocks and the nature of bonding surfaces.

Cording, EJ (Illinois University, Urbana); American Society of Civil Engineers, American Concrete Institute Conf. Proc. SP-45, 1974, pp 175-199, 10 Fig., 1 Ref.; In "Use of Shotcrete for Underground Structural Support: Proceedings of the Engineering Foundation Conference, South Berwick, Maine, 16-20 July 1973".

15 265304 DESIGN OF OUTLYING RAPID TRANSIT STATION AREAS. Design of modern rapid transit stations in outlying areas is a complex process that has had only limited documentation. The paper attempts to help the designer in organizational and technical aspects of his or her work. Steps in the design procedure are outlined, and data needed for design are listed. The designer's work starts with an analysis of the requirements of the 3 interested parties: passengers, transit system operator, and community. Design principles and standards emphasize priority sequence for different access modes: pedestrians, feeder bus, kiss-and-ride, and park-and-ride. Maximum separation of modes is desirable: Bus stops should be close to the station entrance, preferably in a separate transit area; kiss-and-ride should be next in distance from the station; park-and-ride should be in the farthest areas. Design should be such that the maximum concentration of automobile traffic is on the periphery of the station, for close-in areas have pedestrian concentrations. Safe and convenient pedestrian movement must be provided for throughout the station area. Examples of design elements for each mode are presented. Finally, the paper contains several examples of total designs of different types of stations.

Vuchic, VR Kikuchi, S (Pennsylvania University, Philadelphia) *Transportation Research Record* No. 505, 1974, pp 1-12, 9 Fig., 11 Ref.; ORDER FROM: TRB, Orig. PC

15 300618 CONTRACTOR'S "PIPE ENVELOPE" CUTS SUBWAY COSTS. The paper reports how by using an arch of steel pipes it was possible to build a subway tunnel in downtown Atlanta, Georgia, through an embankment without disruption by the railroad only 4 m above it.

Hancock, N *Engineering and Contract Record* Vol. 92 No. 3, Mar. 1979, p 14; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 300761 THE ATLANTA RESEARCH CHAMBER APPLIED RESEARCH MONOGRAPHS. The Atlanta Research Chamber is located directly below Peachtree Street in down-

town Atlanta, Georgia. It is included in the CN-120 contract for the Peachtree Center Station, which is a part of the Metropolitan Atlanta Rapid Transit Authority's (MARTA's) multi-billion dollar "Phase A" 53-mile transit project. The Urban Mass Transportation Administration (UMTA) funded the Atlanta Research Chamber as part of UMTA's continuing effort to discover ways to reduce tunnel and rapid transit costs. This report describes the construction of the Atlanta Research Chamber and the research conducted in it. In addition, 24 monographs on the state-of-the-art of modern tunnel practice are included. The Atlanta Research Chamber was conceived as a team effort of 18 individuals from twelve engineering firms in the United States, Canada, and Austria to combine their special expertise to study various aspects of tunnel support system in hard rock. It was primarily a practical effort by practical engineers, attempting to develop useful tools for tunnel designers and builders. Later, the team was expanded, and a number of team members were asked to write monographs on modern tunnel practice. All have practical application, and by being gathered together in one volume, may serve to promote the common goal, which is to construct underground space economically and safely. To balance these predominately technical monographs, new team members were recruited to write monographs representing owners, contractors, labor, legal aspects, insurance, overseas practice, and additional technical ideas.

Rose, DC; Metropolitan Atlanta Rapid Transit Authority Intrm Rpt. UMTA-GA-06-0007-79-1, June 1979, 361 p.; Sponsored by Department of Transportation, Urban Mass Transportation Administration.; Contract GA-06-0007; ORDER FROM: NTIS; PB-297574/AS

15 301143 TUNNEL CONSTRUCTION UNDER HISTORICAL BUILDINGS IN NUERNBERG [Tunnelbau unter Historischen Gebaueuden in Nuernberg]. In the central city area of Nurnberg an underground station was constructed using traditional techniques. This involved working underneath the "Nassau House" which was built in the 12th and 13th centuries, the soffit of the tunnel being only 2,50 M below the bottom of the foundations. Furthermore the station tunnel had to be driven only 0,80 M beside the foundation of the 75 M high south tower of the Lorenz Church (13th century). The underground station is situated in friable keuper sandstone. An additional complication was that the rock core remaining between the two tunnel tubes was only 2,80 M wide and had to accommodate three transverse passages and two access halls. The chosen method of construction, the progress of the work and the results of measurements during the work are described in detail. The settlements observed in the case of the Nassau House were only 9 mm and for the south tower of the Lorenz Church only 2 mm. The measurements showed among other things, that for such closely spaced tunnel tubes a common relieving arch is formed in the surrounding strata even for such small cover and low strength rock which serves to reduce the loads on the tunnel lining. On the basis of the comprehensive preliminary investigations it was possible to include all the necessary work in the tender documents and to complete the work within the allotted time

without exceeding the estimated costs. The relatively small settlements which occurred had no adverse effects on the valuable historic buildings. /TRRL/ [German]

Bauernfeind, P Mueller, F (Hauptamt fuer Tiefenbauwesen, West Germany) Mueller-Salzburg, L *Rock Mechanics* Vol. SUPP 1978, pp 161-192, Fig., Tab., 2 Phot., 2 Ref.; This paper was presented at the Hans-Cloos Conference on Geomechanics, held 14th & 15th October, 1976, in Salzburg.; ACKNOWLEDGMENT: TRRL (IRRD-307778); ORDER FROM: Springer Verlag, 175 Fifth Avenue, New York, New York, 10010

15 301150 UNDERGROUND RAILWAY CONSTRUCTION IN VIENNA [U-Bahn-bau in Wien]. On the occasion of the opening of the Vienna underground railway system, a comprehensive account is presented of all the associated problems and their solutions. These include the questions of planning, project planning, legal aspects, construction methods, financing, design, geodesy, geotechnology, the construction process, air conditioning, installation work, lifts and escalators, the operation, alignment and superstructure work, the electrical equipment, safety and parking of vehicles. [German]

Aufbau Vol. 33 No. 1-3, 1978, 120 p., Figs., Tabs., Photos., Refs. ACKNOWLEDGMENT: TRRL (IRRD-307793); ORDER FROM: Verlag fuer Jugend und Volk, Tiefer Graben 7, A-1014 Vienna, Austria

15 301209 ON THE RANGE OF VALIDITY OF SIMPLIFIED ONE DIMENSIONAL THEORIES FOR CALCULATING UNSTEADY FLOWS IN RAILWAY TUNNELS. Methods of calculating unsteady flows in tunnels have been developed in Japan in connection with the Shinkansen high speed train. In this country the High Speed Train, the Advanced Passenger Train and the Channel Tunnel project have provided the incentive for work on methods of calculation. Another approach has been developed in France, aimed primarily at underground metro systems.

Woods, WA Pope, CW; British Hydromechanics Research Association Conf Paper Paper D.2, 1979, 36 p.; Paper presented to the 3rd International Symposium on the Aerodynamics and Ventilation of Vehicle Tunnels, Sheffield, March, 1979.; ACKNOWLEDGMENT: British Railways; ORDER FROM: British Hydromechanics Research Association, Cranfield MK43 0AJ, Bedfordshire, England

15 301434 TUNNELLING UNDER DIFFICULT CONDITIONS. PROCEEDINGS OF INTERNATIONAL TUNNEL SYMPOSIUM, TOKYO, 1978. No Abstract.

Pergamon Press, Incorporated SNCF Cat 53 N47, 1979, 406 p., Tabs., Photos., Refs.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Pergamon Press, Incorporated, Headington Hill Hall, Oxford OX3 0BW, England

15 301838 NATM PROVES ITS ADAPTABILITY. The article summarizes the New Austrian Tunneling Method (NATM) which has been successfully used in many deep alpine rock tunnels also in German underground railway

construction. Rock bolts and grouting compound the surrounding mass forming an integral structure independent of a lining. Tunneling takes place in increments of complete rings of sprayed concrete forming a tabular shell of predictable strength. Steel arches and wire mesh reinforcement can be used to strengthen the concrete layer. Short and long anchors can be added to the support system to control instability. Instability at the face is predictable if pressure changes and actual movements are monitored. Tunnel geometry is monitored by convergence measurements. Illustrations are given of how the method can be used to excavate very large tunnel sections in caverns by dividing operations into manageable working stages.

New Civil Engineer Tunneling Supplement, (0307-7683) Mar. 1979, pp 22-23, 1 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241331); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England

15 301974 THE ROCKETING COST OF WASHINGTON'S METRO. Details are given of the progress made on the construction of the Washington Metro, described as the USA's biggest public works project. Inflation has overtaken funding rates and real progress has been retarded. The Metro at present with 50 km of line and 34 stations has 110 km of line and 53 stations still to be completed. The financial history of the project is described. An associated article (pp 42-3) shows diagrammatically the projected network and the various construction contracts currently underway are described together with the associated geological problems. Another of the problems has been caused by building height controls which have led to structures being typically 10 floors high and seated on shallow pad foundations which have required considerable underpinning. A final article (p 44) briefly describes the complex tree of responsibility on the Metro project. /TRRL/

New Civil Engineer No. 317, Nov. 1978, p 38-39, 1 Fig., 6 Phot. ACKNOWLEDGMENT: TRRL (IRRD 241286)

15 302205 PROCEEDINGS OF A CONFERENCE ON SITE EXPLORATION IN ROCK FOR UNDERGROUND DESIGN AND CONSTRUCTION. During the period March 29-31, 1978, FHWA sponsored a "Conference on Site Exploration In Rock For Underground Design and Construction." This conference was developed around a field research study for evaluation of geologic structure using new site exploration techniques which utilized various new site exploration techniques currently under development or consideration by the FHWA Office of Research. The site chosen for this study was the proposed underground, Forest Glen Metro Station, to be included in D.C. Metro System. Future excavation of this site would allow field verification of the predictions by the various investigators. In addition to descriptions of the site investigation systems employed in this study, these proceedings include a key note address, state-of-the-art presentation and a description of the site geology. /FHWA/

Hampton, D, Editor Greenfield, E ; Hampton, (D) & Associates, Chartered, Federal Highway Administration Final Rpt. FHWA-TS-79-221, July 1979, 102 p.; SPONSORING AGENCY.; RESPONSIBLE INDIVIDUAL: Hooks, JM (HDV-22) Linger, DA (HRS-11); Contract DOT-FH-

11-9150; ORDER FROM: NTIS

15 302381 APPLICATION OF THE SLURRY TRENCH WALL TECHNIQUE DURING THE CONSTRUCTION OF THE UNDERGROUND RAILWAY IN MOSCOW [Primenenie sposoba "stena v grunte" na stroitel'stve moskovskogo metropolitena]. This article describes the construction of two reinforced concrete walls 110 M long, 11 M high and 0.6 M wide by means of skips designed by NIOSP. The experimental site was in an urban environment; the soils were saturated sand silt, sand, gravel, rounded pebbles, large blocks and dense clay. The work continued in the summer, autumn and winter. The slurry trench walls built are used as retaining walls and waterproofing walls beyond which the tunnels are being built. The latter will then be covered up. The walls will also protect buildings against noise and vibrations caused by trains. [Russian]

Garazza, BM Fedorov, BS Smorodinov, MI *Soil Mechanics and Foundation Engineering* No. 2, 1977, pp 7-10, 1 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 108446), Central Laboratory of Bridges & Highways, France; ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

15 302385 THE JUBILEE LINE. 3. CONSTRUCTION FROM BOND STREET STATION TO ADMIRALTY ARCH. Constructed as a section of London's Jubilee Line underground railway, a description is given of the station construction at Bond Street and Green Park. The article also describes the running tunnel drives between Bond Street Station and Admiralty Arch with the associated auxiliary works. Construction aspects of the tunnel works are described in detail.

Bubbers, BL (Mott, Hay & Anderson) *Institution of Civil Engineers, Proceedings* Vol. 66 No. PT1, Aug. 1979, pp 395-406, 5 Fig., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242230); ORDER FROM: ESL

15 302386 THE JUBILEE LINE. 2. CONSTRUCTION FROM BAKER STREET TO BOND STREET EXCLUSIVE AND FROM ADMIRALTY ARCH TO ALDWYCH. Forming part of London's Jubilee Line underground railway, a description is given of the design and construction of the running tunnels, step-plate junctions and crossover tunnel between Baker Street and Bond Street, Admiralty Arch and Aldwych, and Baker Street and Charing Cross stations. Tunnel construction and design are detailed as well as the problems associated with keeping stations operational while work was carried out.

Lyons, AC (Halcrow (Sir William) and Partners) *Institution of Civil Engineers, Proceedings* Vol. 66 No. PT1, Aug. 1979, pp 375-394, 13 Fig., 3 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242229); ORDER FROM: ESL

15 302387 THE JUBILEE LINE. 1. THE PROJECT. The article describes the purpose and layout of London's Jubilee Line underground railway and includes details of the design and construction of surface works. These include a new train servicing depot for the Bakerloo Line made necessary by the use of existing facilities by

Jubilee Line rolling stock. Features of the finishes and equipment for the stations and tunnels are described. The article also includes a summary of costs.

Cuthbert, EW (London Transport Executive) *Institution of Civil Engineers, Proceedings* Vol. 66 No. PT1, Aug. 1979, pp 359-374, 7 Fig., 3 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242228); ORDER FROM: ESL

15 302912 INSTRUMENTATION OF UNDERGROUND OPENINGS. The following papers were presented at this session of the proceedings: The use of deformation measurements in dimensioning the lining of subway tunnels (Muller-Salzburg, L); Subway tunnel at Nurnberg-predicted and measured deformations (Gartung, E and Bauernfeind, P); Observations for shallow chambers in rock (Cording, EJ and Mahar, JW); Experience in field measurements for underground power stations in Italy (Martinetti, S); Monitoring system for large underground openings-experiences from the Grimsel-Oberaar scheme (Descouedres, F and Egger, P); Site investigation for main underground complex-dinoruric pumped storage scheme (Douglas, TH and Richards, LR); Design and observation of the underground power station Langenegg (Wisser, E); Seelisberg tunnel: Huttegg ventilation chamber (Letsch, U); Instrumentation considerations for large underground trial openings in civil engineering (Sharp, JC); Electro optical convergence measurements in large underground chambers, (Sampaolo, A); field measurements in tunnels (Londe, P); Adjustment of programs of measurements based on the results of current evaluation (John, M); Field instrumentation for the design of tunnels in swelling rock (Bischoff, N and Hagmann, AJ); Creep behavior of soft ground tunnel (Takemoto, T and Ryoike, K); Du Toitskloof tunnel- geotechnical investigations and rockmechanical measurements (Bebi, PC); Mechanical measurements of rocks for research into geological causes of failures at railroad tunnels between Neustadt and Donaueschingen (Gunzelmann, H); Displacement measurements as a means for safe and economical tunnel design (Carvalho, OS and Kovari, K); convergence measurements in a deep tunnel (Comes, G and Debreuille, P). /TRRL/

Balkema (AA), (90-6191-017-X) 1979, pp 451-731, Figs., Tabs., Photos., Refs.; Proceedings of the International Symposium on Field Measurements in Rock Mechanics, Zurich, Volume 2, April 4-6, 1979; ACKNOWLEDGMENT: TRRL (IRRD 241798)

15 303173 CONSTRUCTION OF A SUBWAY STATION WITH LOW COVER [Bergmaennische Auffahrung eines U-Banhofes unter Geringer Ueberdeckung]. This article describes how a 600-m-long part of the Bochum, West Germany, subway station was built by tunneling in 1975 and 1976. In addition to the subway station, one-track and two-track tubes had to be constructed with the height of the cover ranging between 8 m and 3 m. Tunneling was executed based on the principles of the "New Austrian Tunneling Method". [German]

Laue, G Will, M *Rock Mechanics, Felsmechanik, Mecanique des Roches* Vol. 11 No. 2, Sept. 1978, pp 107-121, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 303186 SUNKEN TUBE TUNNEL SEGMENTS ARE CAST BY ROLLING FORMS. Construction of a rail tunnel under Hong Kong's Victoria Harbor consisting of large concrete sunken tube segments cast by rolling forms is described. The 4,600-ft, double-track tunnel is part of the colony's first 9.7-mile transit line, linking Hong Kong Island with the Kowloon Peninsula. Methods of segmental casting, formwork arrays and controlled sinking are discussed.

Engineering News-Record Vol. 202 No. 17, Apr. 1979, pp 22-23. ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 303276 IRF TEAM COMPLETES STUDY OF EUROPEAN SLURRY TRENCH WALLS. As part of a FHWA funded study of current slurry trench (or diaphragm) wall design and construction methods, an IRF team inspected several projects in Europe. (The slurry trench method entails constructing a wall in a narrow fluid-filled trench which, as excavation proceeds, is kept filled with a dense bentonite (clay) slurry which in turn supports the sides of the trench until being replaced by cast-in-place concrete or precast concrete panels. It is widely used in Europe for urban highway and rail transit cut and cover work.) The team observed such projects as a retaining wall at a depressed intersection of the A6 and A580 motorway near Manchester and diaphragm walls on the Glasgow, and Munich and Paris subway systems, as well as such unusual applications as two found in Italy: a new foundation for a earthquake damaged church north of Trieste and a barrier to prevent pollution from an oil refinery reaching a fish hatchery near Milan.

World Highways Vol. 30 No. 8, Aug. 1979, p 3, 2 Phot. ORDER FROM: International Road Federation, 1023 Washington Building, Washington, D.C., 20005

15 303587 EGGS LAID IN KOLN SOFTEN TRACK NOISE. An elliptical cushioning unit incorporating an oval elastomer ring which functions in shear has been installed in a test section of the Cologne subway to combat transmission of noise to surrounding buildings and structures. The unit is mounted on the concrete tunnel floor and has the rail fasteners on its top. The so-called "egg track" was developed as an alternative to tracks which rest on heavy-duty concrete slabs that rest on springs on the tunnel floor. Vibration and sound dampening are claimed to be comparable at a much smaller cost.

Braitsch, H (Köln Transport Authority) *Railway Gazette International* Vol. 135 No. 12, Dec. 1979, p 1115, 2 Fig.; ORDER FROM: ESL

15 303591 SYSTEMS AND PRACTICES FOR RAPID TRANSIT TUNNELLING. This paper examines various systems and practices for rapid transit tunnelling, with special emphasis on European practice. Several underground construction methods are studied, which include grouting in soil, grouting in rock, ground freezing, cast in situ walls, prefabricated walls, secant piles, and the new Austrian tunnelling method as applied to soft ground conditions. The organizations of several European metro authorities are discussed. Tunnelling practice in the United Kingdom is studied and used as a focal point for examining such issues as the apportionment of risk under contract and the resolution of contract disagree-

ments. The economics of underground construction are examined, and tunnelling costs associated with six European metro systems are summarized. Where appropriate, the construction costs are itemized and the cost structures are viewed in the light of the ground conditions and construction methods used. Comparisons are made between urban tunnelling practice for rapid transit in the us and Europe. Recommendations for improving tunnelling practice are offered.

O'Rourke, TD (Cornell University) *Underground Space* Vol. 4 No. 1, July 1979, pp 33-44, 6 Fig., 1 Tab., 1 Phot., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243237); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

15 303646 ARCHES GIVE OPEN LOOK TO WASHINGTON METRO STATIONS. One of the early decisions in the planning for the Metro system was a design for the 53 underground passenger stations which is artistically pleasing as well as functional. The stations are semicircular in cross section, having very low sidewalls joined by a wide expanse of arch. Both sidewalls and arch feature a pattern of recessed coffers which become increasingly deep toward the center of the arch. The design eliminates the need for central pillars and roof supports, and provides the station with an open look which is unusual for underground construction. Blaw-Knox Equipment, which has supplied forms for 16 of the 19 stations built to date, approached the problem of forming by scaling up their tunnel-forming methods to match the size of the stations. Forming methods developed to overcome these problems have not only been economically successful, they have helped the construction crews stay on schedule.

Tunnels and Tunnelling Vol. 11 No. 6, July 1979, pp 76-78. ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 303647 ROME METRO: DRIVING A NEW LINE UNDER AN ANCIENT CITY. The article discusses civil works construction and tunnelling for the most recent section of the city's newest underground line. It traces the development of the Roman Metro to the present day, geological conditions through which the work progressed, tunneling methods and equipment, tunnel lining, station construction, ventilation system, and other aspects of the work.

Harding, PG *Tunnels and Tunnelling* Vol. 11 No. 6, July 1979, pp 13-18; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 303956 DADE COUNTY'S EXPERIENCE WITH URBAN STATION SIMULATION (USS) PROCEDURES (ABRIDGMENT). Urban Station Simulation (USS) is a transit station simulation computer program developed by the Urban Mass Transportation Administration (UMTA) to analyze the capacities of stations. The geometric configuration of a proposed station and the proposed capacities of its various service facilities are input to the USS program, which simulates the movements of individual passengers through the station and records statistics on how they are distributed along alternate routes and on the delays they encounter in waiting lines (or queues) that develop at various points. This paper is an analysis of a USS program used by the Kaiser Transit Group (KTG) to assist analysis of

transit stations in the Metropolitan Dade County Transportation Improvement Program. The USS program has been applied to designs for the proposed Douglas Road, South Miami, Dade and North stations in the southern (Dixie Highway) corridor of the stage one Dade County Rapid Transit System. Although the USS program has not been widely released by UMTA--which has even taken the first steps to produce a new version--due to many known deficiencies, this paper demonstrates that pedestrian simulations can provide many useful analyses of station design. KTG's simulation results have been well received by the architects who must use them, and more analyses have been requested.

Rardin, RL Sharp, GP Corradino, JC Schimpeler, CC (Schimpeler-Corradino Associates) *Transportation Research Record* No. 719, 1979, pp 60-63, 4 Fig., 1 Tab., 4 Ref; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

15 305293 DEVELOPMENT OF IMPROVED DESIGN PROCEDURES FOR UNDERGROUND STRUCTURAL SUPPORT SYSTEMS IN ROCK. An investigation to develop more rational analyses and design procedures than those currently used for structural support systems for underground openings in rock is reported. The primary focus is on analytical procedures that can be used to predict the loads on support systems from the rock conditions, the construction procedure, and the behavior of the support. The non-linear behavior of the loosening rock is also considered. A diagram of project organization is followed by a brief description of each task performed during the first year effort. Completed work on Task 1, collection and review of basic data, and Task 2A, a comparative analysis using spring loaded beam models, 2-D finite element elastic models, and 2-D finite element slip-joint models, is reported. The WMATA Dupont Circle Subway station was selected for the comparative analysis under Task 2, and the WMATA Bethesda subway station was selected for prediction calculations. Recommendations and proposed schedules for future tasks are outlined.

Young, GA Sennett, RE; Agabian Associates, National Science Foundation Prog Rpt. 7814-4615, NSF/RA-780631, Apr. 1978, 79 p.; Grant NSF-APR76-80044; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300393/6ST

15 305440 COMPARATIVE COST OF NEAR SURFACE AND DEEP TUNNELS. Comparative cost estimates are presented for deep and shallow tunnels constructed under geologic conditions that are found in major U.S. urban areas. The cost data presented can be used in the pre-design planning of tunnel systems for sewer, water, utilities, and transportation. Particular emphasis was placed on the potential for reducing the overall cost of tunnel projects in urban areas by placing tunnels at greater depths where geologic conditions are more favorable and disruption of the surface environment is avoided. The cost analyses were performed using COSTUN, a comprehensive computer program for estimating the cost of soil and rock tunnels. The geologic conditions assumed for the analysis were modeled after the known conditions in Atlanta, Boston, Chicago, Denver, and Los Angeles. Results of the

cost comparison are: (1) the cost of deep underground heading tunnels is much more sensitive to different geologic conditions than is the cost of cut and cover tunnels; (2) for tunnel sizes less than 6 to 10m, deep rock tunneling is less expensive than cut and cover construction; (3) the cost difference between rock tunneling from underground heading and cut and cover construction decreases with tunnel size with the cost of both types of construction being nearly the same for tunnels in the 10 to 12m size range; and (4) the cost of underpinning, utility relocation, and surface restoration associated with cut and cover construction is extremely variable and can sometimes exceed the cost of the basic tunnel construction.

Peters, JF Peck, LG Silver, ML; Illinois University, Chicago, National Science Foundation Final Rpt. NSF/RA-790156, June 1979, 303 p.; Grant NSF-APR76-00315; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-102403

15 305531 POTENTIAL FOR STANDARDIZATION IN RAIL TRANSIT TUNNEL CONSTRUCTION. The research reported within this report was performed in two phases. Phase I provided a detailed catalogue of the interacting components of the factors shown to have a significant effect on tunnel planning, design, construction, and operation. This research concentrated on engineering considerations, identification of interrelations among components and their parameters, and criteria applied during the planning, design, construction, and operation of tunnel systems. However, greater emphasis was placed on design and construction aspects. Phase II consisted of an evaluation of the identified critical tunnel components and parameters to establish specific components and/or parameters which are suitable for standardization and future work needs in the area of tunnel standardization. This research study was limited to a review of rapid transit tunneling systems located in Atlanta, Baltimore, Chicago, New York, San Francisco, and Washington, DC., and was limited to driven tunnels. Based on knowledge gained from this study, and from the literature search of the authors, the savings to be expected from tunnel standardization is approximately 2% of construction costs.

Hampton, D McCusker, TG; Hampton (Delon) and Associates, Urban Mass Transportation Administration Final Rpt. UMTA-DC-06-0182-79-1, Aug. 1979, 86 p.; Contract DOT-UT-70055; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-108699

15 305935 IMPROVED DESIGN OF TUNNEL SUPPORTS: EXECUTIVE SUMMARY. This report focuses on improvement of design methodologies related to the ground-structure interaction in tunneling. The design methods range from simple analytical and empirical methods to sophisticated finite element techniques as well as an evaluation of tunneling practices in Austria and Germany. The purpose of this report is to provide the tunneling profession with improved practical tools in the technical or design area. These design tools provide more accurate representations of the ground-structure interaction in tunneling. The Executive Summary is the first of six publications to be published on the Improved Design of Tunnel Support. Volumes 1

through 5 will be published in March, 1980. This Executive Summary summarizes improvements in the methodology available to tunnel designers with the objective of reducing the cost of tunnel construction in the United States. This report summarizes each of the five volumes--Volume 1: Simplified Analysis for Ground-Structure Interaction; Volume 2: Aspects of Yielding in Ground-Structure Interaction; Volume 3: Finite Element Analysis of the Peachtree Center Station in Atlanta; Volume 4: Tunneling Practices in Austria and Germany; and Volume 5: Empirical Methods for Rock Tunneling--Review and Recommendations.

Einstein, HH Azzouz, AS Schwartz, CW Steiner, W; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-49, UMTA-MA06-0100-79-15, Dec. 1979, 55 p.; Prepared by Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.; Contract DOT-TSC-1489; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-134547, DOTL NTIS

15 307544 AERODYNAMICS AND VENTILATION OF VEHICLE TUNNELS. PAPERS PRESENTED AT THE THIRD INTERNATIONAL SYMPOSIUM, SPONSORED AND ORGANISED BY BHRA FLUID ENGINEERING, HELD AT SHEFFIELD 19-21 MARCH 1979. VOLUME 1. At this symposium the following papers were among those presented: Trends in ventilation systems (Haerter, A); Some aerodynamic aspects of the Kai Tak Airport road tunnel complex (Moss, GM); Semi-transverse ventilation analysis for the Elizabeth River Tunnel (Danziger, NH and Kennedy, WD); The effects of pressure transients on the design of railway tunnels (Henson, DA and Lowndes, JFL); Piston effects in the underground stations of Marseille Metro (Valensi, J); The friction losses on walls caused by the jet flows of booster fans (Rohne, E); Characteristics of longitudinal ventilation system using normal size jet fans (Baba, T, Hattori, Y, and Seki, T); Pressure transient predictions in railway tunnel complexes (Fox, JA and Higton, NN); On the range of validity of simplified one-dimensional theories for calculating unsteady flows in railway tunnels (Woods, WA and Pope, CW); unsteady flow due to trains passing a tunnel (Harwarth, F and Sockel, H); Conversion of unventilated longitudinally or semi-transverse ventilated vehicular rock bore tunnels to fully-transverse mechanical ventilation system (Bonforte, GA); Air recirculation between tunnel portals (Baumann, HO); A new longitudinal ventilation system using electrostatic precipitator for long vehicular traffic tunnels (Baba, T, Ohashi, H. Nakamichi, F and Akashi, N). /TRRL/

BHRA Fluid Engineering, (0 906085 29 2) Monograph 1979, 520 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243108)

15 307545 AERODYNAMICS AND VENTILATION OF VEHICLE TUNNELS. PAPERS PRESENTED AT THE THIRD INTERNATIONAL SYMPOSIUM, SPONSORED AND ORGANISED BY BHRA FLUID ENGINEERING, HELD AT SHEFFIELD 19-21 MARCH 1979. VOLUME 1. At this symposium the following papers were among those presented: ventilation system for motorway tunnels

(Lowndes, JL and Fudger, G); Austrian method for calculating the fresh air demand in road tunnels (Freibauer, B, Fischinger, R and Pucher, K); Analysis of train drag in various configurations of long tunnels (Qwthorpe, RQ, Pope, CW and Green, RH); Aerodynamic measurements with high-speed trains (250 km/h) in the Heitersberg Tunnel. Comparison of theory and experiment (Gaillard, MA); Transient pressure measurements at the top of the engine 103 during the passage through the Heitersberg Tunnel (Treigstein, H); The use of a hydraulic analogy for modelling the unsteady flows in railway tunnels (White, WR and Pope, CW); Alleviation of tunnel entry pressure transients: (1) experimental program (Dayman, B and Vardy, AE); Alleviation of tunnel entry pressure transients: (2) theoretical modelling and experimental correlation (Vardy, AE and Dayman, B); Induced ventilation in road tunnels-A comparison between full-scale and model studies (Pursall, BR and West, A); A wind tunnel study of the influence of wind on the ventilation of road tunnels (Vermeulen, PEJ); Research into the testing of booster fans and other equipment for the longitudinal ventilation of road tunnels (Roché, L); Fire in rapid transit vehicle tunnels (Cochran, IJ); The practical problem affecting the design, control and handling of emergency incidents in vehicular tunnels (Doherty, MJ); Traffic break-downs, wind and the longitudinal ventilation of road tunnels (Jongedijk, H). In addition there are two discussion papers: Health standards and monitoring in tunnel atmospheres in the United Kingdom (Pursall, BR); operational feedback (Allenby, H). /TRRL/

BHRA Fluid Engineering, (0 906085 29 2) Monograph 1979, 520 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243109)

15 307653 LARGE-SCALE FREEZING WORK FOR SUBWAY CONSTRUCTION IN JAPAN. Four parallel tunnels and two utility tunnels are being constructed simultaneously by the freezing method under a river in the central part of Tokyo. Over the proposed tunnels there exists an old concrete arch bridge across the river. In addition, in the river there are piers of an expressway viaduct close to the tunnels to be constructed. Under such conditions, this freezing work is being carried on with care, taking safety measures. The freezing work is described in detail, as are the safety measures.

Miyoshi, M Tsukamoto, T Kiriya, S *Engineering Geology* Vol. 13 No. 1-4, 1979, pp 397-415; International Symposium on Ground Freezing, 1st, Bochum, West Germany, March 8-10, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 307654 SOIL-FREEZING METHOD FOR LARGE TUNNEL CONSTRUCTIONS. Examples of the use of the soil-freezing method applied in large tunneling projects show that this construction method can compete with traditional methods in both technical and economic aspects. Tunneling works executed in Stuttgart, Aarburg, Helsinki, Frankfurt, Duesseldorf and Zurich are described.

Wind, H *Engineering Geology* Vol. 13 No. 1-4, Apr. 1979, pp 417-423; International Symposium on Ground Freezing, 1st, Bochum, West Germany, March 8-10, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 307655 SUBWAY CONSTRUCTION IN STUTTGART UNDER PROTECTION OF A FROZEN SOIL ROOF. Experiences gained on the building of the City Railway turning loop are described, the new Austrian tunneling method is used in connection with the freezing technique. The Metro-tunnel lies in leached-out gypsum marl and unleached zones, respectively. In a section of this tunnel within the leached-out gypsum marl, the excavation was protected by a frozen soil roof in order to keep away any water seepage which could be dangerous for the excavation itself, and for the buildings superimposed as well. The drilling for the freeze pipes, the installation and operation of the freezing system and the tunnel driving, including the erection of the final support, are described.

Jonuscheit, G-P *Engineering Geology* Vol. 13 No. 1-4, Apr. 1979, pp 425-428; International Symposium on Ground Freezing, 1st, Bochum, West Germany, March 8-10, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 307911 POWERVANE WINDS UP A CHEAP TUNNELLING SOLUTION. The article describes the powervane tunnelling machine, which is five times cheaper than American electrohydraulic alternatives. The powervane design incorporates two moving parts—a semi oscillating cutting head motor and a hollow spool propulsion ram. Unobstructed access through the core of the machine is a major advantage. The compressed air system is served by a 17 cu m/min capacity compressor at the surface supplying a 100 t shove capacity through the hollow spool pneumatic ram at the face. Other systems served by this power source are four 10 t steering rams, the muck scabbler screw, conveyor and the lighting. The powervane has a self ventilating system, free of electrical equipment and is thus completely flameproof. The powervane has undergone three trials and the first production machine has now been built. (TRRL)

Fletcher, T *New Civil Engineer* July 1979, p 28, 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 242612)

15 308282 THE STEEL RAIL BRIDGE OVER THE MAIN AT FRANKFURT-NIEDERRAD [Staelerne Eisenbahn-Stabbogenbruecke ueber den Main in Frankfurt-Niederrad]. A description of the 545-m double-track rail bridge built for the town-airport rail link. [German]

Konrath, H Jancke, K *Bauingenieur* Vol. 54 No. 9, 1979, pp 327-334, 9 Phot., 1 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Springer Verlag, 175 Fifth Avenue, New York, New York, 10010

15 308870 ATTITUDE AND COMMUNICATION IN THE MANAGEMENT OF UNDERGROUND CONSTRUCTION PROJECTS. A number of management strategies can be implemented in underground construction projects to benefit all parties by reducing delays and cost overruns. Though discussed here in terms of mass-transit projects, these management strategies are applicable to all underground construction projects. Citizen participation should be encouraged during the planning stage of the project. Because communication among all parties (government, designers, contractors, suppliers, etc) is essential during planning, design,

and construction, a typical hierarchical management team might not be appropriate: one alternative is matrix management, in which specific tasks are performed by identified subgroups. Many problems in underground construction projects can be overcome by encouraging a win-win attitude, in which participants concentrate on actions that benefit all parties involved, instead of the prevailing win-lose attitude, in which each party attempts to gain at the other's expense. Advisory panels of recognized experts can be useful in evaluating changed conditions or other problems that may occur during the project. Professional liability litigation is costly and time-consuming, and can often be avoided through risk management, communication, and equitable contract documents. If, however, a dispute does arise, mediation/arbitration, a new concept of conflict resolution, offers several advantages over litigation or conventional arbitration, and can effectively reduce costs and risks to the parties involved. (a) (TRRL)

Gnaedinger, JP (Soil Testing Services, Incorporated) *Underground Space* Vol. 4 No. 2, Sept. 1979, pp 85-89, 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244116); ORDER FROM: ESL

15 309912 PRECAST CONCRETE SEGMENT LINING OF THE BUDAPEST METRO. The article describes the design and construction of the tunnel lining system in the Budapest metro. The lining consists of unconnected reinforced concrete hinged segments in which each ring consists of a bottom segment, six side segments of uniform size and one key segment consisting of three pieces. The lining, made up of ten segments of three basic sizes, has an outside diameter of 5.5 M and a wall thickness of 200 mm. Each 1.0 M wide concrete ring has a volume of 3.46 cu m and a weight of 8.68 t. A feature of the lining structure are the hinges where the segments support each other. The hinge design allows movement of the segments to minimize the bending moment. The lining system overcomes waterproofing problems by a combination of concrete mix technology and a bituminous coating with caulking between segments. Details are given of construction techniques used for the tunnel lining system.

Rozsa, L *Tunnels and Tunnelling* Vol. 11 No. 10, Dec. 1979, pp 53-55, 5 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 244638); ORDER FROM: ESL

15 309921 BALTIMORE RAPID TRANSIT SYSTEM TESTS SEGMENTAL CONCRETE RINGS. A description is given of the construction of the 8 mile Baltimore rapid transit system which includes 4.5 miles in tunnels. The system includes nine stations, six of which are underground, and is designed for future extension. Excavation involves soft ground machine tunnelling in alluvial soils and also hard rock drill and blast methods. All six underground stations are being built by cut-and-cover methods—two of the stations are at depths of 100-120 ft. Compressed air is used to stabilize the surrounding ground for excavation with an hydraulic shield. Following normal practice in the USA, steel linings are used except for a 1500 ft experimental section which is being lined with concrete segmental rings. Running tunnels are 18 ft diameter so that the railway will accept current US and Canadian rail cars.

Tunnels and Tunnelling Vol. 11 No. 7, Sept. 1979, pp 69-70, 2 Fig. ACKNOWLEDGMENT: TRRL (IRRD 243556); ORDER FROM: ESL

15 309927 SOFT GROUND TUNNELLING PROBLEMS SOLVED IN GERMAN METROS. The construction of the first section of the S-bahn underground railway networks in Frankfurt and Stuttgart has provided the stimulus for the development of soft-ground tunnelling techniques. After its completion, the 6.1 km Frankfurt network will connect the eastern and southern suburban lines. Geological conditions consist of gravelly sands on a formation of clay marl. Four parallel single-track 7 M diameter tubes were shield-driven with a permanent lining of cast iron segments. Subsidence was avoided by the injection of mortar between the segments and soil. The covering gravel was consolidated by an injection of a bentonite suspension. The article details the use of cut-and-cover methods and the New Austrian Tunnelling Method at the crossing of the S-bahn station at Frankfurt station. A further 385 M tunnel was constructed by the NATM under main streets and buildings.

Martinek, K *Tunnels and Tunnelling* Vol. 11 No. 9, Nov. 1979, pp 41-47, 10 Fig., 9 Phot., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244123); ORDER FROM: ESL

15 310091 INTERNATIONAL SYMPOSIUM ON GROUND FREEZING. SESSION 3- ENGINEERING. The following papers were presented in Session 3, Engineering, of the Symposium on Ground Freezing: Thermal and Rheological Computations for Artificially Frozen Ground Construction (Sanger, FJ and Sayles, FH); Stability of Mine Workings in Frozen Soils (Vyalov, SS and Gorodetsky, SE); Creep Stress Analysis of Frozen Soils Under Multiaxial States of Stress (Klein, J and Jessberger, HL); Strength Analysis of the Frozen Ground Enclosure of a Low-Temperature Storage for Liquefied Gases (Ilyina, NP and Shafarenko, EM); Design of Tunnel Support Systems Using Ground Freezing (Jones, JS and Brown, RE); Large Scale Freezing Work for Subway Construction in Japan (Miyoshi, M and Kiriya, S); Ground Freezing for Support of Open Excavations (Braun, B and Shuster, JA); Ground Freezing Monitoring Techniques (Voort, HJ and Heinrich, D); Ground Consolidation With Liquid Nitrogen (Veraneman, G and Rebhan, D); Chances and Limitations of Ground Freezing with Liquid Nitrogen (Stoss, K and Valk, J); Natural frost in improvement of construction properties of Ground in Hydroengineering and Industrial and Civil Construction (Melnikov, PI and Makarov, VI); Jointing of Two Tunnel Shields Using Artificial Underground Freezing (Takashi, T and Kiriya, S); Conversion of Abandoned Collieries in Southern Belgium in a Low-Pressure Gas-Storage. With Description of Special Plugging of the Various Shafts (Buttiens, E); and, Application of the Ground Freezing Method to Penetrate a Sequence of Waterbearing and Dry Formations-3 Case Studies (Rupprecht, E). (TRRL)

Ruhr University, West Germany Proceeding 1979, pp 205-363, Figs., Tabs., Photos., Refs.; Paper from the International Symposium on Ground Freezing, held March 8-10, 1978, Bochum, Germany.; ACKNOWLEDGMENT: TRRL (8001TR011E)

15 310092 INTERNATIONAL SYMPOSIUM ON GROUND FREEZING. VOLUME 2. Volume 2 of The Symposium on Ground Freezing

contains general reports on Sessions 1, 2 and 3 and also includes the following additional reports: Effects of Temperature and Pressure on Frost Heaving (Penner, E and Walton, T); Strain Rate Effect on the Compressive Strength of Frozen Sand (Baker, THW); Creep Behaviour of Frozen Soils in Uniaxial Compression Tests (Eckardt, H); Thermal and Rheological Computations for Artificially Frozen Ground Construction (Sanger, FJ and Sayles, FH); The Soil Freezing Method for Large Tunnel Constructions (Wind, H); Construction of a Sewer in Artificially Frozen Ground (Bosch, HJ); Subway Construction in Stuttgart Under Protection of a Frozen Soil Roof (Jonuscheit, GP); Ground Freezing for Support of Open Excavations (Braun, B, Shuster, JA and Burnham, EW). (TRRL)

Ruhr University, West Germany Monograph 1979, 155 p., Figs., Tabs., Photos., Refs.; From the International Symposium on Ground Freezing, held March 8-10, Bochum, Germany. See also HRIS 63 310088.; ACKNOWLEDGMENT: TRRL (IRRD 244389)

15 310562 PROCEEDINGS OF THE 3RD INTERNATIONAL SYMPOSIUM ON THE AERODYNAMICS AND VENTILATION OF VEHICLE TUNNELS; 2 VOLS.; VOL. 1 PAPERS PRESENTED; VOL. 2 EDITED DISCUSSION. This volume contains the following papers: Trends in ventilation systems; Some aerodynamic aspects of the Kai Tak Airport road tunnel complex; Semi-transverse ventilation analysis for the Elizabeth River Tunnel; Piston effects in the underground stations of Marseille Metro; Analysis of train drag in various configurations of long tunnels; A wind tunnel study of the influence of wind on the ventilation of road tunnels.

Stephens, HS Wood, PA ; Maxwell Scientific International 1979, 700 p.; ORDER FROM: Maxwell Scientific International, Fairview Park, Elmsford, New York, 10523

15 310674 PERMANENT SLURRY TRENCH WALLS CUT SUBWAY COST AND DISRUPTION. The walls under construction described run 1,700 ft and go 30 to 40 ft deep, mostly drilled into rock and tied back, as they flank the site of a new station. Rebar cage with tieback blockouts goes into trench before concrete.

Engineering News-Record Vol. 203 No. 13, Sept. 1979, p 19 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 311057 CONSTRUCTION OF RAILWAY TRUNK LINE TUNNELS UNDER MAJOR CITIES USING THE SHIELD METHOD. The paper reports on construction of a 9.4 km tunnel in Tokyo, which is part of the Japanese National Railways' expansion program. A tunneling shield was used for about 7 km of the length, and the remainder was built by cut-and-cover techniques. This paper discusses the technical investigations and actual results of shield tunnel excavation in gravel deposits under high water pressure and non-cohesive sand deposits. To obtain data for economical and safe tunnel construction, various field measurements were made during the construction work. Some of these data are introduced and are discussed in connection with the design methods.

Niwa, T (Japanese National Railways) ; Pergamon Press, Incorporated Conf Paper 1979, pp

215-221; Tunnelling under Difficult Conditions: Proceedings of the International Tunnel Symposium, Tokyo, Japan, May 29-June 2, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

15 311214 A DIAGNOSTIC APPROACH TO MANAGEMENT INFORMATION SYSTEMS. The reporting requirements of Section 15 of the Urban Mass Transportation Act of 1964, as amended 1974, have pushed transit systems into a new area of data management, which has led to the development of management information systems. There is, however, danger that in some cases these information systems and the standards of service they generate will become ends in themselves. They offer a comfortable structure for decision making that may not always be justified. The purpose of these systems is not simply to generate data; primarily, they are designed to help managers manage. But to do so they must be simple to use and carefully integrated to explore all factors affecting the organization. The staff responsibility at the level of operations planning is not to simply provide facts and measure them against predetermined yardsticks but, more importantly, to analyze trends and identify and isolate specific problems so that well-reasoned decisions can be made. An integrated system is the key to success: The interrelationships within a transit organization, especially in such areas as labor and vehicle utilization, can provide the basis for accurate and sound diagnosis, which can in turn result in more effective management. (Author)

Prangley, RE (ATE Management and Service Company) *Transportation Research Board Special Report* No. 187, 1980, pp 36-39, 3 Fig., 1 Tab., 1 Ref.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

15 311334 THE HONG KONG MASS TRANSIT IMMERSSED TUBE-SOME ASPECTS OF CONSTRUCTION. MTRC Contract 103-Immersed Tube, comprised the construction of a twin tube tunnel 1400m long between Tsimshatsui and Wanchai including the North and South Ventilation Buildings and associated works. The immersed tube is located beneath Victoria Harbour starting within reclaimed land adjacent to Fenwick Street, Wanchai, on the Island, to a point approximately 24m seaward of the then existing seawall south of Nathan Road in Tsimshatsui, Kowloon, and forms the major part of the longest stretch of line between stations on the MIS. The tunnel comprises fourteen 100m long concrete units and the contract included demolition and reconstruction of the Wanchai seawall and provision of temporary access to the North Ventilation Building (NVB). Included in the construction of the concrete ventilation buildings were emergency stairs, the provision and installation of floodgates and all building and architectural works. Kumagai, Gumi Co. Ltd of Japan were awarded the contract in March 1976 with a tender and construction method being based on the engineer's design. The period of

contract was 196 weeks, from March 1976 to contract completion at 30 December 1979. This paper describes in detail the major activities of this project such as: construction of the dry dock and the 14 tunnel units, the dredging of the trench across the harbor, screening the trench bottom with an aggregate bed, backfilling the trench, constructing of two ventilation building caissons, installation of the floodgates and reconstruction of the seawalls at Wanchai and Tsimshatsui.

Kennedy, MJ *Hong Kong Engineers* Vol. 8 No. 1, Jan. 1980, pp 9-22, 20 Fig., 1 App.

15 311438 COMPLETING ROME'S METRO. The article describes the problems encountered in the construction of the final stages of the 10.2 km line of the Rome metro. The line includes a section constructed by Metrroma running from central Rome to Ottaviano. The 4.4 km of twin bore line, with a finished internal diameter of 5.5 M, includes six stations and two roadway underpasses to take the Tiber embankment roads beneath the line where it surfaces. In this section 3.1 km of twin tunnels were bored at depths from 16-60 M. The bores converge, surface, cross the river and then go underground again for 1.3 km. The shield-driven bores cross volcanic and travertine soils then travel through silty clay deposits. Two water tables permeate the volcanic deposits and also the gravel and sand. The lining system used for the bored tunnels involved the use of 280 mm thick precast concrete segments joined by longitudinal and circumferential pre-stressed diwydag bars. This method, a world first, was adapted as it was considered that bolted segments would not prove as durable in the ground conditions encountered. (TRRL)

Civil Engineering Dec. 1979, pp 12-17, 5 Fig., 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 244879); ORDER FROM: ESL

15 311842 CONSTRUCTION METHOD FOR TUNNELS BY MEANS OF IMMEDIATE SUPPORT WITH SHOTCRETE AND BOLTING-PROVISIONAL TEXT PROVISOIRE [Presentation de la methode de construction des tunnels avec soutènement immediat par beton projete et boulonnage-Texte provisoire]. The author recalls the development of the "new Austrian method", the most important basic principle of which is not to disturb the soil around the cavity and to derive maximum benefit of the initial mechanical characteristics of the terrain. Details are given of the role of shotcrete, that of bolting, the necessity of adapting the support to the real behaviour of the terrain and conditions, ease and speed of installation. Excavations and support characteristics are given together with the recommended techniques, limits of the latter. Examples are presented of tunnels and underground structures built with final application of shotcrete. (TRRL) [French]

Louis, C *Tunnels et Ouvrages Souterrains* No. 31, Jan. 1979, pp 13-21, 5 Fig., 1 Tab., 7 Phot., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 108851), Central Laboratory of Bridges & Highways, France; ORDER FROM: ESL

15 312049 CONSTRUCTION OF A TUNNEL CLOSE TO THE GROUND SURFACE USING FREEZING TECHNIQUES OVER RELATIVELY LONG DISTANCES [Herstellung einer oberflächennahen Tunneln unter Anwendung des Gefrierfahrens ueber grossere Distanzen]. The freezing technique as used for tunnels close to the ground surface is more difficult than conventional construction techniques, but provides considerable advantages compared with the latter, especially where complex line sections are involved. [German]

Holstegge, W *Tiefbau* Vol. 21 No. 11, 1979, pp 936-956, 30 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Bertelsmann Fachverlag, Friedrichsdorfer Strasse 75, Guetersloh, Westfalen, West Germany

15 312084 UNDERGROUND RAILWAYS AND TUNNELLING, AN OVERVIEW OF BRITISH ACTIVITIES. Although tunnelling has been slow to enter the scientific age, and variable and difficult ground conditions have hampered attempts to devise efficient mechanical excavation and support systems, several significant improvements have been made in recent years. These advances have occurred in the areas of geotechnical investigation, excavation, groundwater management, and tunnel lining. Largely as a result of these improvements, thorough site investigations and the consequent development of a tunnelling system are now carried out prior to driving a tunnel. Modern tunnelling, as opposed to cut and cover construction, offers advantages of minimal surface disruption and comparable or reduced costs. Although it requires a high capital cost, the underground location of rapid-transit systems provides an efficient and convenient mode of transportation that is more energy-efficient than other forms of wheeled transportation. Urban redevelopment also can be centered around an underground transportation system by the construction of public and commercial facilities along the route.(a)

Bartlett, JV (Mott, Hay & Anderson, England) *Underground Space* Vol. 4 No. 3, Nov. 1979, pp 137-142, 4 Fig., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246274); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

15 312115 CONTINUOUS CONCRETE SUPPORTS STRENGTHEN HONG KONG'S UNDERGROUND TRACKS. Settlement and lateral distortion of supports have always plagued conventional rail support systems. A method devised to solve these problems has been employed in the construction of 15.5 km of double track in Hong Kong's underground railway. With the system the "Pandrol" shoulders are cast precisely into the rail supporting plinth. The Pandrol shoulders are held in position by "Pandrol support bars" while the concrete sets. It is these support bars which form the key to the system. Two pairs of Pandrol shoulders are held in position on the Pandrol support bar by simple pins. The Pandrol support bars are clipped to modified conventional plinth forms. These forms are relatively inexpensive to fabricate and are made in short lengths. The method has three major advantages: the forms can accommodate normal railway curves; the forms can readily be transported down small shafts and accesses; and the system is flexible and can be assembled in

short lengths on several headings or in long lengths as desired.

Cunliffe, JWF (Gammon Service Limited) *Tunnels and Tunnelling* Vol. 11 No. 9, Nov. 1979, pp 50-52; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 312133 SUBWAY FIGHTS POOR SOIL IN SEVEN DIFFERENT WAYS. The paper reports that German contractors are using seven different methods to build a 2-mile stretch of subway through poor soil in a congested area of West Berlin. Most of the project is being carried out without dewatering and resembles a marine construction job more than dry-land tunneling. Approaching a river crossing, the job shifts to giant concrete caissons built on grade and sunk through the soil. The job is divided by diaphragm walls of double steel sheetpiles placed every 350 ft. They help resist soil pressure and allow dewatering and finished tunnel construction to take place in stages.

Engineering News-Record Vol. 203 No. 25, Dec. 1979, p 64 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 312426 VIBRATIONS OF CURVED SPANS FOR MASS TRANSIT. Nondimensional dynamic responses of simple and multiple-supported, horizontally curved beams with moving loads are measured in laboratory-scale experiments. Effects of system parameters involving span stiffness, arc length, frequency, end support constraints, and various transit load speeds and spacings are investigated. For critical combinations of certain parameters, adverse coupling of bending and torsional span responses are observed. For instance, as critical load speeds are approached, measured twist angles and bending strains at midspan approach unboundedness for multiple spans, but are bounded for equivalent simple spans placed end-to-end. Calculations based on Bernoulli-Euler curved beam theory (with negligible warping rigidity) complement these simple span measurements. Experiments also include multiple spans with up to 90 degree turns, subject to both transit point loads in tandem and sprung vehicles. Results are applicable to dynamic span designs for mass transit systems.

Joseph, TP Wilson, JF *ASCE Journal of the Engineering Mechanics Division* Vol. 106 No. 2, Apr. 1980, pp 255-272, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 312788 SUBSURFACE INVESTIGATION, GLENMONT ROUTE, SECTIONS B009, B010 AND B011, STATIONS 97950 TO 123059. APPENDIX VOLUME [Supplementary rept. no. 2]. The supplementary report on the subsurface investigation of three sections of Glenmont Route of the Washington Metropolitan Area Metro System, is presented in two parts, a main folio volume which contains the text, geological sections, boring logs, laboratory tests results and discussions regarding design and construction problems and this Appendix volume. The Appendix volume contains detailed backup information and original test data relating to the field pumping tests, rock unconfined compression tests, water pressure tests performed in rock in-situ, core orientation studies, rock hardness testing and the title page and certain

excerpted pages from a series of references which are available through public sources or through WMATA. These latter provide background information to the investigation and the text of the Glenmont Route report.

Mueser, Rutledge, Johnston and DeSimone, New, York.*Washington Metropolitan Area Transit, Authority, DC. MRJD-79-163, Dec. 1979, 126p; Sponsored in part by Washington Metropolitan Area Transit Authority, DC. Prepared in cooperation with De Leuw, Cather and Co., Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-117476

15 312791 SUBSURFACE INVESTIGATION, GLENMONT ROUTE, SECTIONS B009, B010, AND B011, STATIONS 97950 TO 123059 [Supplementary rept]. Results are presented of a total of 242 borings of several series made for final design of Sections B009, B010 and B011 along Georgia Avenue in Montgomery County of the Washington Metropolitan Area Metro system from its junction with the B&O Railroad Metropolitan branch to the community of Glenmont. The investigation was made to determine subsurface conditions over a length of 25,000 feet for subway tunnels in rock and at the locations of three subway stations, Forest Glen, Wheaton and Glenmont. Two of these stations are planned to be deep mined excavations in rock; whereas the northernmost station will be a cut-and-cover excavation from the surface. The report includes continuous geologic sections of the test borings made in the area for WMATA since Report No. 146 of June 1976, laboratory test data and discussions regarding design and construction problems.

Mueser, Rutledge, Johnston and DeSimone, New, York. Washington Metropolitan Area Transit, Authority, DC. MRJD-79-163-1, Dec. 1979, 496; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-123110

15 313097 CONSTRUCTION OF URBAN RAIL TRANSIT SYSTEMS: THE CHALLENGE OF MORE COST EFFECTIVE CONSTRUCTION. The goal of the conference was to seek input from the construction community on improving the use of public funds and insight into identifying new ways to control and reduce cost of construction of urban rail transit systems in the United States. The conference was organized into four sections and addressed the following topics: Transportation Overview, Transit Assistance Program, Technology Development and Deployment, and Policy; Owners' Point of View, Designers' Point of View, and Contractors' Point of View; Insurance and Bonding, Value Engineering, Construction Management; and Management R&D Review, Technology R&D Review, and Test Sections.

Dewey, RW ; Pacific Consultants, Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-79, Sept. 1979, 106p; Conference Proceedings Held at Williamsburg, Virginia on December 7-8, 1978.; Contract DOT-TSC-1526; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-130479

15 313106 RAIL TRANSIT CRITERIA FOR SYSTEM REVIEW AND PRELIMINARY DESIGN. This report is a manual intended to assist in evaluating rail transit proposals and to provide information for preliminary design of

trackways and to serve as a guide to the acquisition and use of data required for the final design of a specific system. The standards and characteristics of a number of operating and proposed systems were analyzed and organized to produce this manual. The first three chapters describe and contrast light and heavy rail systems, outline the system planning process, and discuss the implications of choices within systems. These chapters also describe vehicle and facility characteristics and requirements that affect trackway location and design. Finally, they discuss system operational factors and the magnitude and range of major cost elements. The last chapter contains principles, conventions and criteria for trackwork and for the preliminary design of trackways.

Hintzman, KW Kershaw, RE Mori, KY Pearson, CL Rogers, E ; California Department of Transportation, Urban Mass Transportation Administration Final Rpt. 13200-631063, UMTA-CA/PD-78/1, Dec. 1979, 374 p.; Grant DOT-UMTA-CA-09-8001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-135312

15 313213 FIELD EVALUATION OF FRACTURE CONTROL IN TUNNEL BLASTING. The objective of this research was to implement fracture control procedures in a tunnel project and to assess the practicality, advantages, disadvantages, performance and cost effectiveness of fracture control methods against smooth blasting procedures. This report describes the procedures and results of field tests of fracture control—a procedure for achieving fracture plane control in tunnel blasting. It describes and discusses the project and site geology, the theory and applications of fracture control blasting, and the experimental procedures used. The report provides conclusions and recommendations for future research. The procedures and results of an experimental smooth blasting round utilizing milli-second delay detonating caps are described in Appendix A.

Thompson, DE McKown, AF Fourney, WL Sperry, PE ; Haley and Aldrich, Incorporated, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-44, UMTA-MA-06-0100-7914, Dec. 1979, 172p; Contract DOT-TSC-1579; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-149297, DOTL NTIS

15 313914 SITE INVESTIGATION AND CONSTRUCTION OF THE LIVERPOOL LOOP AND LINK TUNNELS. The site investigation and the construction records for the Liverpool Loop and Link underground railway tunnels have been compared to see what lessons of good practice in site investigation emerge. The tunnels were constructed almost entirely within Triassic sandstones generally ranging in strength from weak to moderately strong, enabling road-headers to be used effectively for most of the excavation. The Report discusses the site investigation and the ground conditions as encountered during construction in some detail. (Copyright (c) Crown Copyright 1978.)

West, G Toombs, AF ; Transport and Road Research Lab., Crowthorne, (England). 68 TRRL-SUPPLEMENTARY-8, c1978., 35p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-154206

15 314005 PROCEEDINGS OF A WORKSHOP ON TUNNEL LINING DESIGN HELD AT CAMBRIDGE, MASSACHUSETTS ON MARCH 12-13, 1979. The workshop provided a forum for the identification and discussion of problems in the design and construction of tunnels centering around six topics, namely: Lining Design, Qualification, Geotechnical Investigations, Observational Approach, Specifications, and Constructibility and Cost Considerations. A position paper on each topic is arranged together with appropriate discussions from the working group members. In addition to background information regarding the planning of this workshop, this report also contains the keynote address, position papers, names and addresses of subcommittee members, as well as information about the six topics discussed at the workshop.

Pacific Consultants, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) DOT-TSC-UMTA-80-7, Dec. 1979, 234 p.; Contract DOT-TSC-1526; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-171366, DOTL NTIS

15 314786 CUT-AND-COVER TUNNELING. EXECUTIVE SUMMARY. The purpose of the research study was to develop a method for evaluating alternate cut-and-cover tunneling construction systems. This brief report summarizes the evaluation method, which is given in detail in Volume 2 of the final report. (FHWA)

Wickham, GE Tiedemann, HR ; Jacobs Associates Final Rpt. FHWA-RD-79-61, Dec. 1979, 13p; Sponsored by DOT, FHWA.; SPONSORING AGENCY.; RESPONSIBLE INDIVIDUAL: Sallberg, JR (HRS-11); Contract DOT-FH-11-8513; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB80-183791

15 314787 CUT-AND-COVER TUNNELING. VOLUME 2-COST ANALYSES AND SYSTEMS EVALUATION. This volume summarizes the findings of the entire study. It presents a method for comparing the costs of alternate construction schemes for cut-and-cover tunneling in urban areas. It considers both the cost of construction and the cost of urban disruption, enabling the planner to choose that construction most effective for his particular requirement. (FHWA)

Wickham, GE Tiedemann, HR ; Jacobs Associates, (JA 165) Final Rpt. FHWA-RD-76-29, Dec. 1979, 304p; SPONSORING AGENCY.; RESPONSIBLE INDIVIDUAL: Sallberg, JR (HRS-11); Contract DOT-FH-11-8513; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB80-183809

15 314788 CUT-AND-COVER TUNNELING. VOLUME 3-SUMMARY COST ANALYSES. This volume contains summary cost analyses for 15 of the 176 study situations. The analyses give the unit costs of all labor, equipment, and material resources required to complete each project and are typical of the 176 cost estimates prepared for this study. (FHWA)

Wickham, GE Tiedemann, HR ; Jacobs Associates, (JA-166) Final Rpt. FHWA-RD-76-30, Dec. 1979, 242p; Sponsored by DOT, FHWA, Office of Research and Development.; SPONSORING AGENCY.; RESPONSIBLE INDIVIDUAL: Sallberg, JR (HRS-11); Contract DOT-FH-11-8513;

ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB80-183817

15 314789 CUT-AND-COVER TUNNELING SUPPLEMENTAL VOLUME-CONSTRUCTION COST DATA FOUR BASIC ESTIMATES. The overall report presents a method for making comparative evaluations of cut-and-cover tunneling operations required for highway and transit construction within urban areas. It considers both the cost of construction and cost of disruption, enabling the planner to choose construction most effective for his particular requirement. This Supplemental Volume contains computer printouts showing complete cost detail for four cut-and-cover projects. It is primarily reference material for those interested in the basic details used by the study team to develop the series of 176 multiple estimates summarized in Volume 2. (FHWA)

Wickham, GE Tiedemann, HR ; Jacobs Associates, (JA 167) Final Rpt. FHWA-RD-76-139, Dec. 1979, 732p; Sponsored by DOT, FHWA, and the Office of Research and Development.; SPONSORING AGENCY.; RESPONSIBLE INDIVIDUAL: Sallberg, JA (HRS-11); Contract DOT-FH-11-8513; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB80-185317

15 314799 ADVANCES IN TUNNELLING AND SUBSURFACE TECHNOLOGY. The contents of this volume include: 1978 Activity reports of member nations; Planning of subsurface use; Catalogue of works in progress; Seismic effects; Shield-driven tunnel enlargement by pipe-roof method for subway station construction; Some geotechnical and planning considerations in underground siting of nuclear power plant; Criteria for choosing drilling equipment for rapid tunnelling in hard rock; etc. (Pergamon Press)

Pergamon Press, Incorporated Proceeding 1979, 110p, 11 Fig., 33 Ref.; Proceedings of the 5th Annual International Tunnelling Association meeting, Atlanta, Georgia, June 1979; ACKNOWLEDGMENT: Maxwell Scientific International

15 315299 GEOLOGY AND TUNNELING ECONOMICS IN MONTREAL. The economic construction of transportation projects depends in part on the availability of all relevant geological and geotechnical data. In Montreal, Canada, all of the 120 km (75 miles) of subways, major sewers, and aqueducts constructed during the last 18 years have been affected by local geological factors. Contracted costs for subway tunnels in shale were about 20 percent higher than for those in limestone. Locally, the presence of weathered zones in limestones and shales, where they have been faulted or intruded, increased actual costs to six times the normal unit price in good limestone. The contracted cost was 12.5 times the normal for a transition from an open cut into a tunnel in soil or rock. Variations of costs for contractors were estimated from rates of advance, amounts of concrete required to backfill overbreaks, and numbers of steel arch ribs used for roof supports. Tunnel-boring machines were more sensitive to geological surprises than were normal construction methods. Comparisons were made between data from preconstruction investigations and

both construction records and site mapping. It was confirmed that, although preconstruction data usually give general warning of problems, precise notice is often lacking. Even the use of techniques such as the measurement of rock-core lengths gives only a partial indication of actual tunneling conditions, which emphasizes the need for continuous detailed mapping during construction. (Authors)

Grice, H (McGill University, Canada) Durand, M (Quebec University, Canada) *Transportation Research Record* No. 733, 1979, pp 51-56, 4 Fig., 2 Tab., 16 Ref.; This paper appeared in *Transportation Research Record No. 733: Mechanics of Track Support, Piles, and Geotechnical Data.*; ORDER FROM: TRB Publications Off

15 316581 MULTIPLE GROUTING TECHNIQUES BEAT STOCKHOLM'S GROUND-WATER. The article examines the problem of water ingress in tunnel workings, with the subsequent lowering of groundwater table and subsidence, following drill-and-blast operations. This subsurface disruption can result in subsidence and damage to buildings and structures. An example is given of a multiple-hole grouting technique used to overcome the problem in the construction of an 1800 M section of a 6 km twin-tube line for the Stockholm Metro. Depth of cover over the 22 sq M tunnels varies from 6-50 M with the overall project 20 M below sea-level. To avoid lowering of the groundwater table a pre-grouting operation was carried out using the Hany multiple hole grouting system. This automatic system delivers grout through hoses into holes drilled in the rock before excavation takes place. Details are given of the Hany system and the drilling and grouting equipment used. (TRRL)

Tunnels and Tunneling Vol. 12 No. 3, Apr. 1980, pp 41-43, 2 Fig., 4 Phot. ACKNOWLEDGMENT: TRRL (IRRD 247248); ORDER FROM: ESL

15 316595 HONG KONG METRO COMPLETED EARLY AND WITHIN BUDGET. The first 15.6 km long section of the Hong Kong underground railway, completed ahead of schedule and within the projected budget, will be one of the few commuter railways to be financially self-supporting when the other lines are opened in 1983. The Kong Kow line starts on Hong Kong island and crosses the harbour through an immersed tube tunnel to Kowloon where it runs north to Prince Edward. The air-conditioned, eight-car trains can seat 384 passengers with a crush capacity of 3300. At a maximum operating frequency of 2 min, the capacity of each line is 60000 passengers per hour. Fares are automatically collected using magnetically coded tickets. The main tunnels were driven through granite and soft marine deposits using compressed air and ground treatment techniques. The soft ground tunnels were lined with precast concrete and cast iron segments while rock tunnels were treated with in-situ concrete. The 1400 M long immersed tube tunnel has a constant radius of 3000 M and is claimed to be the first such construction built on a continuous curve.

Tunnels and Tunneling Vol. 12 No. 3, Apr. 1980, pp 14-16, 2 Fig., 1 Tab., 4 Phot. ACKNOWLEDGMENT: TRRL (IRRD 247247); ORDER FROM: ESL

15 316737 THE PARIS UNDERGROUND RAILWAY. NORTHERN EXTENSION OF LINE N7 [Metro de Paris-le prolongement de la ligne N7 au nord]. The authors describe: (1) the plan, its advantages and the cost-effectiveness of the project, and the main characteristics of the alignment; (2) the execution of civil engineering works, e.g. Preparatory work, the structures, preliminary injection of small cavities under the structure caused by the dissolution of gypsum lenses contained in marl and gravelly marl, the design of the structures, staging of the sites, local preliminary operations, construction method of subterranean operations, the open-cut method which follows the Berlin method; (3) cost of the first stage. [French]

Bayart, P Francois, P *Travaux* No. 531, May 1979, pp 41-53, 7 Fig., 7 Photos.; ACKNOWLEDGMENT: TRRL (IRRD 109109), Central Laboratory of Bridges & Highways, France; ORDER FROM: ESL

15 316978 TUNNELLING '79. PROCEEDINGS OF THE SECOND INTERNATIONAL SYMPOSIUM, ORGANISED BY THE INSTITUTION OF MINING AND METALLURGY, WITH THE COOPERATION OF THE BRITISH TUNNELLING SOCIETY, THE INSTITUTION OF MINING ENGINEERS AND THE TRANSPORT AND ROAD RESEARCH LABORATORY, HELD IN LONDON FROM 12 TO 16 MARCH 1979. (Continued from TRIS abstracts nos 316976-7).

The following papers are included: Session 8: Ground Freezing for the Construction of the Three-Lane Milchbuck Road Tunnel, Zurich, Switzerland (Bebi, PC and Mettier, KR); Hydrogeological Analysis, Ground Treatment and Special Construction Techniques at Selby; Gascoigne Wood Surface Drift Mine (Forrest, W and Black, JC); Large-Diameter Shield-Driven Tunnel in Thick Water-Bearing Sand Strata: Use of Pilot Tunnel for Ground Dewatering (Miyoshi, M and

Jones, MJ, Editor Bebi, PC Mettier, KR Forrest, W Black, JC Miyoshi, M Okuzono, K Hagan, TN Holmberg, R Persson, P-A Blindheim, OT Saito, T Kobayashi, CE Hill, AJ Grime, D Shutter, GB Bell, GA Boyd, JL Stacey, JR Haswell, CK Umney, AR Berry, NSM Fink, E Provost, AG Griswold, GG; Institution of Mining and Metallurgy, (0143-3911) Monograph 1979, 430p, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 246396)

15 317808 EFFECTS OF TUNNEL AND STATION SIZE ON THE COSTS AND SERVICE OF SUBWAY TRANSIT SYSTEMS. The feasibility of less spacious, less costly underground rail mass transit system designs is studied. The major cost saving expected from alternative tunnel designs results from using precast concrete segment liners in place of steel. The saving expected for a two-foot decrease in the diameter of twin, single track tunnels is about two million dollars per route mile from 13 million dollars for precast concrete segment liners (a saving of about 16%). The cost per route-mile of a double track tunnel appears to be 15 to 25% higher than for the twin, single track tunnels. The effective cost saving expected from stations with four-car train capability instead of the usual eight-car trains is nearly 25% or seven million dollars per route mile. The saving in station costs can be obtained while

improving service to the user (lower transit time and less waiting for trains) up to a capacity of 36,000 riders per hour in each direction.

Dayman, BJ; Jet Propulsion Laboratory, National Aeronautics and Space Administration Final Rpt. UMTA-CA-06-0116-79-2, JPL-PUB-79-67, Apr. 1979, 55 p.; Sponsored by NASA.; Contract DOT-AS-60019; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N80-19989/6

15 317930 SUBSURFACE INVESTIGATION, GREENBELT ROUTE, STATIONS 30530 (E005) TO 65746 (E007) ARS MODIFIED ALIGNMENT AND STORAGE YARD (E008) AND S-CURVE ALIGNMENT [Rept. no. 10 (Final)]. Results are presented of 49 borings of the E-series made in Sections E005 to E008 and 23 borings of the E-series made along the S-Curve alignment in Sections E005 and E006 of Greenbelt Route of the Washington Metropolitan Area Metro system in Prince Georges County, east of the District of Columbia boundary. The line extended east and north along Queens Chapel Road to the B&O Railroad line, passing through College Park, Maryland to the Capital Beltway. The investigation was made to determine subsurface conditions over a length of approximately 38,000 feet for subway construction involving structures at-grade, on piers, in cut-and-cover boxes and mined tunnels between the District boundary and College Park. The report includes continuous geologic sections along the line of the subway on the ARS Modified Alignment and in Sections E005 and E006. Also included are logs of all test borings made in the E-series on this alignment since the inception of these studies, laboratory test data and recommendation regarding design and construction problems.

Mueser, Rutledge, Johnston and DeSimone, New, York. Washington Metropolitan Area Transit Authority, DC. MRJD-78-155, Mar. 1978, 228p; Prepared in cooperation with DeLeuw, Cather and Co., Washington, DC.; Contract WMATA-3Z725M.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-158314

15 317931 SUPPLEMENTARY SUBSURFACE INVESTIGATION, GREENBELT ROUTE, SECTIONS E004 AND E005 [Rept. no. 1]. Results are summarized of a group of twelve deep test borings of the Washington Metropolitan Area Metro system made in the general area of Fort Totten Park and Station. The exploration was carried out to investigate conditions at deep tunnel alternatives in an area where Cretaceous soils lie directly above weathered bedrock. The report includes geological sections taken along the line of the proposed subway structures through the new borings, logs of the test borings, results of laboratory tests on soil samples and comments on potential design and construction problems for the alternative tunnel locations.

Mueser, Rutledge, Johnston and DeSimone, New, York. Washington Metropolitan Area Transit Authority, DC. MRJD-79-162, Aug. 1979, 59p; Contract WMATA-3Z725R; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-158322

15 318485 FIELD EVALUATION OF ADVANCED METHODS OF SUBSURFACE EXPLORATION FOR TRANSIT TUNNELING.

This report presents the results of a field evaluation of advanced methods of subsurface exploration on an ongoing urban rapid transit tunneling project. The objective of this study is to evaluate, through a field demonstration project, the feasibility, applicability, reliability, and cost effectiveness of selected advanced methods of subsurface exploration and instrumentation to produce data usable for rapid transit tunnel design and construction within the time, cost, and schedule constraints common to the industry. Numerous methods of subsurface exploration, including hole advancement techniques, sampling procedures, and geophysical logging tools, were used to predict stratigraphy within a test section on an urban rapid transit project under construction. A test section on the Massachusetts Bay Transportation Authority Red Line Extension-Northwest, Cambridge, Massachusetts, was selected to evaluate methods of subsurface exploration used to investigate stratigraphy, ground water levels, bedrock structure, and other geotechnical parameters. The site represents a typical urban setting with the test section located under a major, four-lane divided street, with structures adjacent on both sides.

Thompson, DE Humphrey, JT Young, LW, JR Wall, CF ; Bechtel Corporation, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UM-TA-80-1, June 1980, 405p; Prepared in cooperation with Haley and Aldrich, Inc., Cambridge, MA.; Contract DOT-TSC-1570; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-200496

15 319172 DESIGN AND CONSTRUCTION OF AERIAL STRUCTURES OF THE WASHINGTON METROPOLITAN AREA TRANSIT SYSTEM. The automated Washington, D.C. area Metro system currently under construction features precast, prestressed; cast-in-place box design; and steel with concrete deck aerial guideways. Both single and double track structures are being constructed with various length spans. The general features, basic and special design considerations, and rail-structure interaction of this 101-mile (163 km) system are discussed. (Author)

Fine, DF (Washington Metropolitan Area Transit Commission) *Concrete International: Design & Construction* Vol. 2 No. 7, July 1980, pp 54-59, 12 Fig.

15 319173 DOUBLE T GUIDEWAYS TO CUT TRANSIT COSTS. A brief outline of testing procedures and results of an 80 ft (24 m), 93-ton (84 Mg) double T girder to be incorporated in the Dade County rapid transit system. Also discussed is a brief description of this rapid transit system which will serve the Miami, Florida area and estimated cost savings. (Authors)

Bhatia, MK Rabbat, BG Russell, HG (Construction Technology Laboratories) *Concrete International: Design & Construction* Vol. 2 No. 7, July 1980, pp 60-62, 4 Fig., 1 Ref.

15 319694 TUNNEL-DRIVING TECHNIQUES UNTIL THE YEAR 2000. The author surveys the various methods of rock disintegration at present being studied in research laboratories throughout the world. Many methods have

been proposed including jet piercing, fusion, electronic heating, pressure waves from spark discharges, ultrasonics, laser techniques, plasma rays and water jets. He suggests that there will be no completely new and revolutionary principle for tunnelling and an evolution of current equipment is more likely. The penetration rate of drills has greatly increased since 1920. Greater automation is forecast to aid with the moving and aligning of drilling booms. Similarly, the equipment for charging explosives, scaling and spraying concrete could be automated and remotely controlled. The continuous working method of full-face boring machines can also be automated, provided tool lives are adequate. Even when an operator is necessary, he could be installed in a protected, air conditioned cab. Remote control will also have increased applications in loading work. The operation of large diesel powered rubber-tyred loaders could be electronically controlled and supervised from a central control room. The control installation would be similar to that of a modern underground transit system. Eventually very few personnel will be required in the drift or tunnel. (TRRL)

Holdo, J *Consulting Engineer* Vol. 44 No. 5, May 1980, p 57, 1 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 248467); ORDER FROM: ESL

15 319965 ANTWERPEN'S PRE-METRO TAKES SHAPE AS CONSTRUCTION SURGES AHEAD. Stage two of Line 1 opened on March 11 and Line 2 is being constructed using a bentonite shield to bore single-track tunnels one above the other.

Wittemans, A *Railway Gazette International* Vol. 136 No. 4, Apr. 1980, pp 279-282, 2 Fig., 6 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

15 322249 TRANSPORTATION CONSTRUCTION IN JAPAN. This report focuses upon the transportation construction industry in Japan. Chapters 2 and 3 each address organizational and institutional factors in the Japanese construction industry. Chapter 2 discusses the structure of the industry and characteristics of Japanese construction administration and management. Chapter 3 gives more specific information on the role of research and education in Japanese construction. Chapters 4 through 7 each examine a specific technological area of interest to transportation construction, especially for projects involving excavation and tunneling. Chapter 4 deals with tunneling technology for shallow urban transit tunnels. Chapter 5 introduces methods for excavation and construction of underground stations and cut-and-cover methods that help reduce disruption to the urban environment. Chapter 6 describes some Japanese improvements on the underwater tube-tunnel concept that has been employed on rapid transit projects in San Francisco and Washington. Finally, Chapter 7 gives an overview of two new inter-urban rail tunnel projects for the high-speed Shinkansen of two new inter-urban rail tunnel projects for the high-speed Shinkansen ("Bullet Train") line. These include the record-breaking Seikan undersea tunnel for the Hokkaido line, and the Nakayama tunnel on the Joetsu line. Both tunnels are setting new world standards for coping with seemingly impossible topographic and geologic conditions. (Author)

Paulsen, BC, Jr ;

Stanford University, Department of Transportation, National Science Foundation Intrm Rpt. Tech Rept 240, Aug. 1979, 155p, Figs., Tabs., 38 Ref., 4 App.; Contract DOT-OS-60150

15 322275 LOW-COST BUS-TUNNELS TO THE CENTRAL BUSINESS DISTRICT. An important aspect of the bus-tunnels proposed in this study is the practicality of converting the bus-tunnel to a subway system. The objectives of this study were 1) to determine if small diameter, unventilated, hence inexpensive tunnels could be used for bus links between the Central Business District (CBD) and outlying areas; 2 to estimate the cost of bus-tunnels; and 3) to indicate the basic features of an underground station and to make a rough cost estimate. The tunnels selected were 16 1/2 ft. inside diameter (same as a single-track tunnel conventionally used for recently constructed U.S. subway rail systems). Concentration levels of exhaust emissions were within acceptable limits to a capacity of 150 diesel buses per hour for a one route-mile bus-tunnel; for a two route-mile tunnel, 54 buses per hour were acceptable. The costs of such an underground guideway are moderate (\$16M per route-mile with simultaneous operations in both directions). The incorporation of an underground station at the CBD end of the bus-tunnel, and the ventilation requirements for a typical station are also examined. cost estimate for the station is in the typical station are The cost estimate for the station is in the range of \$26-39M. Based upon service, operations, and costs, this report states that use of small diameter, unventilated tunnels for bringing diesel buses into the CBD appears attractive and should be considered. (UMTA)

Dayman, B, Jr ; Jet Propulsion Laboratory, Urban Mass Transportation Administration, (JPL Pub. 79-57) Final Rpt. UMTA-CA-06-0116-79-1, Mar. 1979, 61p; Related report is the Effects of Tunnel and Station Size on the Costs and Service of Subway Transit Systems (UMTA-CA-06-0116-79-2); Contract DOT-AS-60019; ORDER FROM: NTIS; N80-19990

15 322543 MODERN "GEO-TECHNIQUES" EASE TRANSIT TUNNELING. The Baltimore Region Mass Transit Project has built 4-1/2 miles of tunnel, much of which is in the congested downtown area. This subway construction has involved shield tunneling, drill-and-blast, cut-and-cover, and slurry-trench walls. Linings utilized include prefabricated steel panels and precast concrete liners. Silica-based grout stabilized soil in a number of locations.

Middleton, WD *Railway Track and Structures* Vol. 76 No. 9, Sept. 1980, pp 44-46, 4 Phot.; ORDER FROM: ESL

15 322567 TYNESIDE REPORT 8. PART 2: CONSTRUCTION. This article describes the constructional features of the new sections of the Tyne and Wear Metro. The largest is the 2.1 km long tunnel from Jesmond, under central Newcastle, to Forth Banks. Tunnel diameters are 4.75 M compared with London's 3.85 M. Tunneling operations were complicated by the need to underpin the foundations of Newcastle Central Station and the need for compressed air in pockets of water-bearing sand. Twin 800 M long bored tunnels beneath Gateshead are flanked by cut-and-cover sections at each end. Two new

bridges have been built. The through-train bridge over the River Tyne was chosen because it was strong, economical and of compatible appearance with the four existing bridges. The 815 M long Byker viaduct spanning a difficult side over a steep sided valley, was the first to use glued segment concrete cantilever construction in the UK. The viaduct has 18 spans and 253 precast deck segments. The Monument station, at the centre of the Metro, has been built in stages and roofed over to keep at least half the street open for buses and pedestrians. For abstracts of parts 1 and 3 of this article see IRRD nos 248772 and 248774.

Haywood, PG Price, JH *Modern Tramway and Light Rail Transit* Vol. 43 No. 510, June 1980, pp 188-193, 1 Fig., 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 248773); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

15 322824 ECONOMIC POTENTIAL OF TUNNEL STANDARDIZATION. An analysis was made of the economic potential of standardization in rail transit tunnel construction. The analysis shows that the potential savings from standardization is in the range of approximately 1.5% to 5.5% of construction costs, with a "most probable" savings of approximately 2% of same. Such savings, though significant, are small with the result that it may not be beneficial to pursue such savings. For example, there is no certainty that the total magnitude of the potential savings would be passed on to the owner. This paper also considers the impact of planning, design and maintenance on tunnel standardization. It is indicated that the greatest potential for cost savings is reducing the time period between initial submission of the grant application and completion of construction, due to the rapid rate of inflation. UMTA, the board of directors of local transit agencies, local politicians and citizen advocate groups are the principal potential sources of delayed decision making which must be addressed in this regard.

Hampton, D (Hampton (Delon) and Associates) McCusker, TG *ASCE Journal of the Construction Division* Vol. 106 No. 3, Sept. 1980, pp 247-265, 13 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 322825 MIXED FACE TUNNELING ON MELBOURNE UNDERGROUND. Adequate preliminary investigation, continued monitoring of ground conditions and construction procedure by the engineer, and a resourceful contractor combined to result in the economical design and construction of a four-track (double-under-double-over) rapid transit railway project in Melbourne, Australia. One tunnel contract required a variety of heading-and-benching-type operations to overcome mixed face conditions, with the soft ground being either on top, underneath, or in the middle of the face. Close monitoring of the tunnel construction by the engineer, skillful execution of the work by the contractor, and a good specification, permitted several variations of the original design resulting in economies.

Petrofsky, AM (Jacobs Associates) *ASCE Journal of the Construction Division* Vol. 106 No. 3, Sept. 1980, pp 409-425, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 322839 HONG KONG EXPERIMENT--A NO-FRILLS MASS TRANSIT SYSTEM. The report deals with the new underground subway system under construction in Hong Kong, including a 1.4 km immersed tube beneath Hong Kong harbor.

World Construction Vol. 33 No. 1, Jan. 1980, p 86 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 322840 SIMULATION MODELING OF INTERMODAL FACILITIES IN THE DESIGN PROCESS. This paper discusses the application of UMTA's newly developed station simulation model (USS) to the transit station design process. The USS program is intended to be a design and evaluation tool to assist in developing alternative configurations for rapid transit stations. The design process described is a sequence of six phases leading to the successful resolution of a complex facility design problem. This report describes where USS can be effectively used in the design process to provide answers to key design questions.

Lutin, JM (Princeton University) Benz, GP *Journal of Advanced Transportation* Summer Vol. 13 No. 2, 1979, pp 45-64, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 323357 DOUBLING MEXICO CITY'S METRO NETWORK. Details are given of some of the work being undertaken with the aid of British rigs on the scheme that will add 41 km of railway track extensions. The rigs are excavating diaphragm walls on 14 km of cut-and-cover tunnel construction. In the inherently unstable subsoil with its high water table and comprising 80% water and clay, the cut-and-cover construction is being carried out between diaphragm walls—a technique adopted in the building of the earlier metro sections. Design of the underground sections is based on a flotation equilibrium principle for the "box" that will contain the tracks and train. The description of the construction details is illustrated by means of a number of photographs of different stages of the process. A brief note is also included on the construction of the elevated lines. With predictions that the city's population is expected to treble by the year 2000, plans are in hand for further extensions to extend the metro system again, to a total of 250 km.

Patey, DR *Ground Engineering* Vol. 13 No. 3, Apr. 1980, pp 31-34, 1 Fig., 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 249718); ORDER FROM: ESL

15 324424 DOWNTOWN CITY SUBWAY TUNNEL FORGES MISSING COMMUTER LINK. Problems associated with the construction of a 1.7-mile cut-and-cover concrete tunnel in downtown Philadelphia, Pennsylvania on track for a run to completion in 1984 are discussed.

Engineering News-Record Vol. 204 No. 22, May 1980, pp 22-23 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 324881 SOME IDEAS FOR REDUCING SUBWAY CONSTRUCTION COSTS. This article presents the conclusions of a major study made during the past few years of both U. S. and European practices in building subways. Among the key conclusions: Planners and designers should consider making subway stations and subway-tunnel diameters smaller. Subway sta-

tions alone can account for up to 80% of the subway cost. The people-carrying capacity of the system shouldn't be larger than necessary. Less restrictive specs on such things as the amount of leakage of water permissible into the tunnel could substantially reduce cost. Other things that could cut cost include better written contracts and better overall project management.

O'Rourke, TD (Cornell University) *ASCE Civil Engineering* Vol. 50 No. 11, Nov. 1980, pp 41-44; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 325708 FATIGUE TESTS OF BOLTED CONNECTIONS DESIGNED BY SHEAR FRICTION. The elevated structure of the Metropolitan Atlanta Rapid Transit Authority involves bolted connections designed to provide composite action between precast concrete deck slab units and the main longitudinal girders. The connection employs pretorqued, high-strength bolts not only to simplify assembly but also to produce a clamping force to maintain compression in the grout layer between girder and deck slab and to eliminate stress changes and minimize fatigue effects. This publication describes 16 test specimens that simulated the joint, producing data concerning the integrity of such connections under repeated loads from 2 to 5 million cycles.

Rabbat, BG Hanson, NW ; Portland Cement Association RD064.01E, 1979, 6p, 7 Fig., 3 Tab., 3 Ref.; ORDER FROM: Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois, 60077

15 325751 UNDERGROUND CONSTRUCTION OF THE REINE ASTRID STATION UNDER A SCREEN OF TUBES DRIVEN IN THE SOIL [La construction souterraine de la gare Reine Astrid sous une grille de tubes foncés dans le sol]. The covering slab of the Koningin Astrid premetro station in Anvers consists of a series of parallel cylindrical beams practically adjoining each other. These beams are obtained by driving in the soil asbestos-cement tubes in which the reinforcement is introduced before they are filled with concrete. The driving is carried out according to the technique of horizontal drilling. A concrete joint built under the soil ensures the closing of the space between adjacent cylindrical beams. Compared to conventional construction methods, this technique has the advantage of allowing traffic and commercial activities to continue on the surface during the duration of the construction operations. [French]

Rits, A Blonde Smet, H Vandervelde *Excavator* No. 422, Jan. 1979, pp 8-30, 12 Fig., 1 Tab., 12 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 109866), Central Laboratory of Bridges & Highways, France, Road Research Centre, Belgium; ORDER FROM: AGRA, Rue Saint-Bernard 11, Brussels, Brabant, Belgium

15 325755 THE BRUXELLES UNDERGROUND RAILWAY, THE USE OF COMPRESSED AIR FOR TUNNEL DRILLING [Le metro de Bruxelles, procede d'excavation de tunnel sous air comprimé]. After having briefly described the construction of a tunnel beneath the water table by means of mud walls, the author studies the geological characteristics and the permeability of the soil in the subsoil in Brussels (sand and clay). Details are given of the erection of the mud walls, of the super structure slab and

in-between levels. Compressed air was used, and the method of calculating the rate of flow of the necessary compressed air is outlined. Details are given of the various preliminary tests conducted before the beginning of the works and those during construction. [French]

Hulet, F *Excavator* No. 436, Apr. 1980, pp 1-27, 11 Fig., 9 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 109895), Central Laboratory of Bridges & Highways, France, Road Research Centre, Belgium; ORDER FROM: AGRA, Rue Saint-Bernard 11, Brussels, Brabant, Belgium

15 325870 DEEP EXCAVATIONS FOR THE MEXICO CITY UNDERGROUND RAILWAY USING ELECTRO-OSMOSIS [Excavaciones profundas para el metro de la ciudad de Mexico empleando electroosmosis]. This paper describes the construction method used in deep excavations for the Mexico City underground railway, through a deposit of volcanic clays of high compressibility and very low shear strength. The soil was excavated between two parallel braced walls of reinforced concrete which had been constructed with the use of bentonite mud. Thereafter, the floor slab was constructed, followed by the inner walls and the roof slab. As the stability of the floor of the tunnel was precarious in spite of the pre-existing system of pumping wells, an electroosmotic treatment procedure was used, applied for an average of 8 days for every 31,5 M of length. The results of laboratory tests made before and after the treatment are presented. The increase in the shear strength of the clay exceeded 20 per cent, while its natural water content was reduced by only 3 per cent and subsidence in neighbouring areas did not exceed 5 cm over four months. [Spanish]

Rodriguez, LB Ruelas, S Escamilla, JM ; Comision Organizadora del VI CPMSIF Vol. 2 Dec. 1979, pp 177-187, 10 Fig., 5 Ref.; Sexto Congreso Panamericano de Mecanica de Suelos e Ingenieria de Cimentaciones, Lima, Peru, 2-7 Diciembre 1979.; ACKNOWLEDGMENT: TRRL (IRRD 250227), Ministry of Public Works, Spain; ORDER FROM: Comision Organizadora del VI CPMSIF, Apartado Postal 11076, Lima, Peru

15 326065 IMPROVED DESIGN OF TUNNEL SUPPORTS. VOLUME 4: TUNNELING PRACTICES IN AUSTRIA AND GERMANY. Volume 4 documents and evaluates extensive information gathered on tunnel construction practices in Austria and Germany, identifies differences compared to U.S. practices, and describes new developments. The objective was to assemble all available information about the economic, contractual, and technical aspects of tunneling in these countries. The cost information includes general cost data as well as specific costs for tunnels recently constructed, and discusses the reasons why tunneling there is often more economical and technically innovative than it is in the United States. The contractual information is based on a review of contractual standards and procedures in these countries and contractual arrangements for selected projects. The technical information includes general information on design philosophy and construction procedures, and detailed information on analytical and empirical methods and design aspects. A large number of transmountain tunnels in Austria and subway tunnel sections in Germany were visited, and many discussions were held with owner-authorities, design firms, and contractors.

Steiner, W Einstein, HH Azzouz, AS ; Massachusetts Institute of Technology, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-80-27IV, June 1980, 469p; See also Volume 3, PB80-225170 and Volume 5, PB80-225196. Also available in set of 5 reports PC E99, PB80-225147.; Contract DOT-TSC-1489; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-225188

15 326403 SEGMENTED CONCRETE TUNNEL LINER AND SEALANT SYSTEMS. Precast reinforced concrete tunnel support lining has been used in Europe for some time as a viable method in tunnel construction. In late 1975 UMTA sponsored a study on segmented concrete tunnel liner and sealant systems. A five-phase study plan was developed and work began in 1976. This report presents the five phases. Phase 1 consists of information gathering and review; Phase 2 consists of the development of segment liner design parameters and trade-off study; Phase 3 consists of the sealant materials and test program; Phase 4 consists of a program to test joint and sealant systems; and Phase 5 addresses the design and manufacture of liner system. The purpose of this study is to identify the design criteria for a bolted circular segmented concrete tunnel liner system; devise, fabricate and test all the components of that system; and develop specifications applicable to the tunneling industry. These specifications are to provide tunnel authorities, designers, contractors, owners, and the general public with proven data for the safe and economical implementation of segmented concrete liners for rapid transit tunnels. Reinforced concrete, a well-established structural material that can be easily designed to withstand the handling, erection, and in situ forces as a tunnel liner, presents the problem of potential leakage at segment junctures. Thus, the main objective of this effort is to identify sealant materials/systems that can demonstrate satisfactory watertightness characteristics at segmented concrete liner joints under simulated soft-ground tunnel environmental conditions.

Selander, CE Nelson, CA Jones, BV ; Water and Power Resources Service, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0100) Final Rpt. DOT-TSC-UMTA-80-31, July 1980, 358p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-105843

15 328247 TRANSIT STATION DESIGN: CASE STUDIES OF PLANNING AND DESIGN METHOD. The application of a previously developed and documented transit station design methodology is described. Two example design scenarios, a central area bus terminal and a rail rapid transit station are illustrated. The experiences with the station design procedures have shown the method to be very useful in selecting and improving upon a station design that compares to the stated design objectives. Technically, many subjective decisions are required even with the formalized method and, thus, objectivity must be stressed in terms of procedure rather than practice.

Virkler, MR Demetsky, MJ Hoel, LA ; Virginia University, Department of Transportation Final Rpt. DOT/RSPA/DPB-50-7914, Feb. 1980, 204p; Contract DOT-OS-50233; ACKNOWLEDG-

MENT: NTIS; ORDER FROM: NTIS; PB81-124786

15 329519 THIN DIVIDER KEEPS TUNNELS UNITED. The paper reports how by using a narrow, 5-ft-thick pillar to separate excavation of parallel subway tunnels in soft earth 52 ft below street level paid off for designers challenged by tight working space in Atlanta. Earth wall between bores is reported to resist cave-in or blowout.

Engineering News-Record Vol. 205 No. 9, Aug. 1980, p 60 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 329520 RECORD-SIZE MOLE BORES DEEP TUNNEL. The paper reports how the slurry mole-33-ft in diameter was boring a 2,920-ft subway tunnel through soft ground in Tokyo, Japan aided by rock crushers and a maze of slurry volume and density sensors. An erector in the mole's tail placed concrete tunnel liner segments as the machine advanced.

Engineering News-Record Vol. 205 No. 4, July 1980, p 29 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 329523 SUBWAY CONSTRUCTION COSTS: THE ROLE OF THE ENGINEER. Methods of controlling costs through design in the underground construction of transit systems are covered. Seven types of stations were developed according to method of excavation, and cost estimates were prepared for different depths of cover to show the potential range of costs. A full-height station with mezzanine inside the train room was established as a reference. The costs of the various types of stations were found to vary as much as 100%. New construction techniques which offer cost saving opportunities are also explored as well as the importance of selecting a designer on the basis of credentials instead of fee.

O'Neil, RS (De Leuw, Cather and Company) *ASCE Journal of the Construction Division* Vol. 106 No. 4, Dec. 1980, pp 447-454, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

15 329968 UNSTEADY AIR FLOW IN UNDERGROUND RAILWAY TUNNELS [Die Instationaere Luftstroemung in U-Bahn-Tunneln]. The author presents equations for calculating breaks in the air flow in tunnels caused by trains by means of an approximation expression for the speed built up of an underground train from the stationary position. The results of the calculations were checked by measurements and displayed a good level of correlation. [German]

Rohne, E *Schweizerische Bauzeitung* Vol. 95 No. 40, Oct. 1977, pp 705-711, 10 Fig., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 311958), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

15 329980 TYNE AND WEAR METRO: BYKER VIADUCT. The design and construction of the 800 M prestressed concrete, box girder Byker viaduct section of the Tyne and Wear Metro system is described. Design studies showed that for the western valley section of the viaduct piling through coal measures would be required, grouting under pier foundations to consolidate

coal seams would be necessary, the valley flanks were unsuitable for founding falsework, and, the overall design should be in sympathy with existing bridge structures. The eastern Byker hill section of the viaduct required foundations in shallow pads located in boulder clay. Details are given of passenger train loadings of the structure which governed fatigue design and critical braking forces while the slow-moving works trains governed the direct bending and shear loads.

Smyth, WJR Benaim, R (Ove Arup & Partners) Hancock, CJ (Mowlem Civil Engineers) *Institution of Civil Engineers, Proceedings* Vol. 68 No. PT1, Nov. 1980, pp 701-718, 7 Fig., 6 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 251423); ORDER FROM: ESL

15 329981 TYNE AND WEAR METRO, BYKER CONTRACT: PLANNING, TUNNELS, STATIONS AND TRACKWORK. The article describes the design and construction

stages for the Byker contract of the Tyne and Wear Metro system. The contract includes a 550 M length of cut and cover tunnel section where the ground consists of coal measures covered by stiff boulder clay with areas of soft laminated clay. As the rocks of the coal measures were found to be standing vertically, an economical form of tunnel was adopted which consisted of thick walls of concrete cast against the vertical rock face with a 200 M thick reinforced concrete arch spanning the tracks. The cement for the concrete walls contained 70% blast furnace slag and 30% portland cement. Details are given of tunnel construction methods and track laying techniques.

Smyth, WJR Benaim, R Hancock, CJ *Institution of Civil Engineers, Proceedings* Vol. 68 No. PT1, Nov. 1980, pp 689-700, 3 Fig., 1 Tab., 4 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 251424); ORDER FROM: ESL

15 330161 URBAN RAIL TUNNELING TECHNOLOGY PROGRAM DIGEST. Following a four-fold increase in urban tunnel construction costs during the 1970s, subway building now will cost up to \$100 million per mile in congested urban areas. UMTA is seeking ways to control and reduce expenditures for urban tunneling and has conducted a research and development program aimed at these objectives. This booklet has individual chapters dealing with each of the major facets of the R&D program: Cost estimating; socioeconomic and environmental impacts; contracting and management; construction monitoring; subsurface exploration; ground-support systems; excavation technology and muck transport; design and construction guidelines; lining and support systems. A glossary and bibliography of pertinent UMTA reports are also included.

Urban Mass Transportation Administration
Reprint UMTA-MA-06-0100-80-3, Oct. 1980,
68p, 4 Fig., 6 Tab., Photos.; ORDER FROM: NTIS;
PB81-165219, DOTL RP

16 047909 RING LASER GYRO FOR BART. The ring laser gyro was tried in an inspection system for measuring track conditions on San Francisco's computer-controlled Bay Area Rapid Transit (BART) system. During testing, the instrument proved its reliability in detecting the slightest variance in car attitude, thus eliminating the once-laborious task of inspecting each individual foot of track.

Sperry Technology Vol. 1 No. 3, 1973, pp 42-43
ACKNOWLEDGMENT: EI (EI 73 037064); ORDER FROM: ESL, Repr PC, Microfilm

16 050593 RATP--THE TRAIN USED FOR CLEANING THE LINES ON PARIS UNDERGROUND [RATP--LE TRAIN DEPOUS-SIEREUR DU METRO DE PARIS]. The problem of cleaning the 340 km of line, with 330 stops, on Paris Underground, was resolved by means of the introduction of a "vacuum-cleaner train", consisting of a motive-power unit together with three vehicles equipped for pneumatic cleaning by means of a combined blowing and suction action. The equipment provided on this train was designed for the cleaning of tracks on ballast, and running tracks with guide rails. More thorough cleaning in stations is ensured by reducing the running speed. The equipment also includes a vacuum-cleaner and fire-prevention installation. [French]

Vie du Rail No. 1387, Apr. 1973, 4 pp, 10 Fig
ACKNOWLEDGMENT: International Railway Documentation; ORDER FROM: International Union of Railways, BDC, 14 rue Jean Rey, 75015 Paris, France Repr PC; 942

16 050895 QUIET "SHHICAGO...". In 1961 the Chicago Transit Authority (CTA) purchased two small rail grinders to remove irregularities (corrugations) from steel rails so as to reduce the high-frequency fluttering noise that is produced by trains passing over a corrugated rail. The grinders were pushed or pulled in tandem by motorized work cars, but because of their size and light weight could be operated only at a restricted speed while making repeated passes over a short stretch of track. The operation could be performed during midnight hours only. A new rail smoother has now been installed that can be operated between regularly scheduled runs; its first operational test was on the Skokie Swift line of CTA. No special crew is required.

Metropolitan Vol. 68 No. 4, 24 pp, 1 Phot
ORDER FROM: Bobit Publishing Company, 1155 Waukegen Road, Glenview, Illinois, 60025 Repr PC

16 051452 FIFTEEN YEARS OF OPERATION OF A NEW TYPE OF STRUCTURE FOR TRACK AND POINTS OF THE ITALIAN NATIONAL RAILROAD AND TRAMWAY ASSOCIATION [QUINDICI ANNI DI ESERCIZIO DI UN NUOVO DI STRUTTURA PER BINARI E SCAMBI DELLA SOCIETA NAZIONALE DI FERROVIE E TRANVIE]. With the aim of reducing maintenance costs of track and points of traditional structure, and, in particular, abolishing expenditure connected with the renewal and maintenance of the ballast, since 1956 experiments have been made by the "Societa di Tranvie e Ferrovie" with a new type of track and points on certain bridges and approaches, on certain stations, yards, and siding tracks and points, on a gage line with 36 UNI 3141 rail. In summarizing the elements

emerging from experience obtained, the first conclusions are given with regard to plant and maintenance costs. [Italian]

Zaquini, G *Ingegneria Ferroviaria* No. 3, Mar. 1973, pp 249-258; ACKNOWLEDGMENT: EI (EI 74 057048); ORDER FROM: ESL, Repr PC, Microfilm

16 051483 MBTA GREEN LINE TESTS-RIVERSIDE LINE, DECEMBER, 1972. VOLUME I. TEST DESCRIPTION. The Urban Rail Supporting Technology Program emphasizes three major task areas; facilities development, technology development, and test program development. The test program development is composed of three sub-areas; vehicle testing, ways and structures testing, and track geometry measurement. The report presents the technical methodology, data samples, and results of tests conducted on the Massachusetts Bay Transit Authority (MBTA) Green Line in December, 1972 prior to initiation of the Green Line refurbishment effort. An instrumented revenue type car was used for the measurement of track geometry, ride roughness, and interior noise. Actual car speed was approximately the same as normal revenue speed. The objectives of the tests were to identify critical track sections for improvement to quantify the benefits produced by the track rehabilitation program, and to provide data for Transportation Systems Center's development of an advanced track geometry measurement system.

Neat, GW ; Transportation Systems Center, (DOT-TSC-UMTA-74-1-V1) Final Rpt
DOT-TSC-UMTA-73-9-V1, Sept. 1973, 133p;
ACKNOWLEDGMENT: NTIS (PB-224207/1); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224207/1, DOTL NTIS

16 054474 TUNNEL CLEANING METHOD. A method has been devised to scrub tunnel surfaces clean by using rotating brushes, water and tunnel washing soap. Proportional Electro-hydraulic Control Valves provide accurate controls for the operator to position boom mounted brush heads on the tunnel surfaces. The four axle, 48,000 GVW carrier vehicle transports 1,000 gallons of water, 700 gallons of soap, operator and driver cabs, as well as all hydraulic components needed to accomplish the task of tunnel washing. Since the speed of operation is related to the amount of contaminant deposited and the surface condition of the tunnel, the effective forward travel speed of the washer varies up to a top speed of 143 ft/min.

Apperson, RW ; California Department of Transportation Final Rpt CA-HY-7107-1-73-01, June 1973, 95 pp; ACKNOWLEDGMENT: NTIS (PB-228511/2); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-228511/2, DOTL NTIS

16 056820 VEHICLE MAINTENANCE AT BAY AREA RAPID TRANSIT. Discusses the design of the maintenance facilities, and the actual use and application of the facilities, with emphasis on some unique pieces of equipment.

Van Overveen, JP (San Francisco Bay Area) ; American Society of Mechanical Engineers Paper N73-WA/RT-8, Nov. 1973; ACKNOWLEDGMENT: EI (EIX740104846); ORDER FROM: ESL, Repr PC, Microfilm

16 057819 TRACK GEOMETRY DEVELOPMENT UMTA URBAN RAIL SUPPORTING TECHNOLOGY PROGRAM. Measurement of transit system track geometry parameters, under normal operating conditions, is essential for planning and conducting an effective maintenance program. The pertinent parameters are profile, gage, alignment, and cross level. Present methods of determining track conditions are inefficient and highly subjective. Several track geometry measurement methods have been investigated.

Rutyna, FJ ; Transportation Systems Center Final Rpt. DOT-TSC-UMTA-73-14, Apr. 1974, 41 pp; Contract UM404/R4731; ACKNOWLEDGMENT: NTIS (PB-233394/6); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233394/6, DOTL NTIS

16 092354 DEVELOPMENT AND TEST OF SIMPLIFIED METHODS TO PREDICT SUBWAY AIR PRESSURE TRANSIENTS. This report is one of many reports leading to final product, a subway environmental design handbook. Simplified models are introduced to predict subway air pressure transients. The models deal with pressure changes due to portal entry, post portal entry, vent passage, portal exit and passing trains. Predictions yielded by the models are compared to full-scale field test data gathered at BART. It was concluded that the models are sufficient to identify pressure transient problem areas, as well as solutions in the early stages of subway system design.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Associated Engineers/A Joint Venture, (DC-06-0010) Tech. Rpt. UMTA-DC-06-0010-74-1, Apr. 1974, 143p; Prepared by Associated Engineers/A Joint Venture, New York.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244654/OST, DOTL NTIS

16 094608 BUS MAINTENANCE FACILITIES. A TRANSIT MANAGEMENT HANDBOOK. An understanding of current urban transit bus maintenance facility capabilities is needed for use in planning new facilities and for the evaluation of requests for aid. Industry guidelines, based on a survey of 55 properties with fleets of 11 to 4300 buses, were developed for garages, shops, service lanes, and capital equipment. Facility ages varied from new to 100 years; 61 percent were older than 21 years. Building costs varied from a low of \$12 to \$28 a square foot for indoor bus storage space, to a high of \$55 to \$82 a square foot for equipment intensive servicing facilities (1975 dollars). Cost multiplier curves for bid forecast years from 1975 to 1985 were developed, including inflation rates varying from 6 to 12 percent per year. Small, single facility properties (less than 100 buses) were found to have greater unit space needs for repairs than large properties.

Thurlow, VS Bachman, JA Lovett, CD ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0004) MTR-7080, UMTA-VA-06-0004-75-5, Nov. 1975, 145 pp; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250475/1ST

16 099299 LOCATION AND DESIGN OF MOTORBUS GARAGES AND DEPOTS: OPEN-AIR, COVERED OR MIXED GARAGING. In an effort to study how an undertaking's garages influences its costs and to determine how ingenious solutions have offset disadvantages to certain types of garaging, 92 transportation undertakings in over 14 European countries were surveyed by questionnaire. The questionnaire dealt with various technical and economic matters. The garage capacity was considered as well as the influence of the type of garage on equipment (fixed installations, rolling stock, operating methods, maintenance etc.) and vehicles. The influence of the type of garage on the staff and on the passengers and the economic consequences of the garaging system used were also considered. The study indicates that open air garaging is not adopted with enthusiasm. Among the arguments against open-air garaging, the most frequently quoted was the cold and the resultant inconvenience.

Mouzet, J (Regie Autonome des Transports Parisiens, France); International Union of Public Transport 5b, 1975, 20 pp, 10 Fig., 18 Tab., 1 App.; Presented at the 41st International Conference of the International Union of Public Transport, Nice, France, 1975.

16 136405 TRANSIT VEHICLE MAINTENANCE PROBLEMS—CAUSES AND SOLUTIONS. BART. Vehicle Maintenance Problems can be divided into two categories; scheduled maintenance and unscheduled maintenance. Scheduled maintenance involves for the most part problems of getting the maximum preventative maintenance for minimum manhours. The second, unscheduled maintenance, mainly involves problems of finding the trouble areas, isolating them, developing patterns, and recommending design changes.

Venturato, A (Bay Area Rapid Transit District) American Transit Association Proc Paper ATA/RT-74/1,2,3, 1974, pp 34-41; Am Transit Assoc (ATA) Rail Transit Conf, San Francisco, California, April 14-16, 1974. Car Equip Sess. Available from NTIS, PB-234824, PB-234825, PB-234826.; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS

16 156228 MODERN VEHICLE MAINTENANCE BY APPLICATION OF DIAGNOSTIC INSTALLATIONS [Fortschrittliche Fahrzeugunterhaltung durch den Einsatz von Diagnoseanlagen]. New methods are reported for checking the position of current collectors, the tire wear and the functioning of the cam-operated switch of electric railroads. The resulting increase of expenditures associated with the maintenance of electric multiple units of the Hamburg rapid transit system in West Germany are discussed. [German]

Jergas, E *Elektrische Bahnen* Vol. 47 No. 5, May 1976; ACKNOWLEDGMENT: EI (EIX770400136); ORDER FROM: ESL

16 165133 THE BUS PARTS BUSINESS—BIG MONEY. Big, fascinating and more than a little bit complicated. Those are all terms which could be applied to the bus aftermarket—the multimillion dollar business of delivering the repair parts and service needed to keep the nation's 50,000-plus transit buses rolling. For the people in charge of maintaining a city's bus fleet,

knowing how and where to get the parts—and at the best price—is vital. Large transit systems usually stock from 6,000 to 7,000 different parts at one time. While many parts are available from the company that built the particular bus—either AM General, Flexible or GMC (General Motors Corporation)—a good percentage of needed parts must be gotten elsewhere.

Kelley, K *Mass Transit* Vol. 4 Apr. 1977, pp 16-19; ACKNOWLEDGMENT:

16 165176 RELIABILITY MODELS FOR TRACK BOUND TRANSIT SYSTEMS. Reliability models for transit system have been presented and the application of state merging and sequential truncation in solving these models has been illustrated. The models and methodology can be suitably modified to suit specific applications.

Singh, C (Ministry of Transportation and Communications, Can); American Society of Mechanical Engineers, American Society for Quality Control, American Institute of Industrial Engineers, Institute of Electrical and Electronics Engineers, Society of Logistics Engineers, Institute of Environmental Sciences, American Institute of Aeronautics and Astronautics, System Safety Society Proceeding 1977, pp 242-247, 4 Ref.; Proceedings of the Annual Reliability and Maintainability Symposium for Meeting in Philadelphia, Pennsylvania, January 18-20 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

16 167604 MODEL FOR COST-EFFECTIVE MAINTENANCE OF RAIL TRANSIT VEHICLES IN URBAN MASS TRANSIT SYSTEMS. A new computer-based model to assist rail transit management in determining maintenance schedules for rail transit vehicles is presented. The model evaluates the aggregate cost and service implications of conducting prescheduled inspections and preventive maintenance activities for the various components of a transit vehicle. The model also consolidates information on size of vehicle fleet, cost of maintenance and repair of vehicle parts, relations between maintenance frequency and subsystem failures, and historical patterns of the different types of in-service breakdowns. On this basis, the model determines relations among preventive maintenance alternatives, average number of transit cars available for peak service, expected number of in-service car failures, and the total cost of maintenance and repair. The model was originally developed for use by the Massachusetts Bay Transportation Authority in Boston. Preliminary findings in the initial application of the model to generate and evaluate alternative maintenance schedules for the authority's Red Line suggest that use of the model could result in noticeable, though probably not dramatic, savings for this particular line. The authority intends to refine the data used in these analyses and to extend the use of this model to its other lines. The model is a conversational FORTRAN program. It can be adopted for use in any rail transit system that has the required data on vehicle maintenance and repair activities. /Author/

Rosenthal, SR Herniter, JD Welam, UP (Boston University) *Transportation Research Record* No. 627, 1977, pp 21-28, 4 Fig., 1 Tab.; From TRB Record 627, Rail Transit.; ORDER FROM: TRB Publications Off

16 168073 REHABILITATION OF SUBURBAN RAIL STATIONS. This paper reports the results of a study of the feasibility of rehabilitating underused suburban railroad stations. Seventy-seven stations on eight commuter lines in New Jersey were surveyed. Each station was inspected, photographed, and evaluated for its restoration potential by criteria that were developed for the study. The Red Bank station was selected as a case study. The study included the development of community and local government participation, the renovation of the 100-year old depot, the redesign of the passenger facility as an intermodal terminal for bus, rail, and taxi the redesign of the pedestrian facilities, and an economic analysis. The municipality has now taken possession of the station, which is used by 1500 daily commuters. Preliminary architectural plans have been drawn up, the station has been designated as an historic site, and the building restoration and sitework are nearly completed. This study is intended to be a prototype for other restoration projects that could modernize urban transportation facilities while preserving historically valuable structures. The emphasis is on maximizing the economic benefits of the project. /Author/

Lutin, JM (Princeton University) *Transportation Research Record* No. 625, 1977, pp 57-63, 5 Fig., 8 Ref.; This article appeared in Transportation Research Report No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

16 178954 SUBWAY CAR INSPECTION AND REPAIR MANAGEMENT SYSTEM. Fifty years after the first subway section was built in Tokyo, the network includes eight lines with a total route length of 164.7 km and 1900 cars carrying 5.2 million passengers daily. This article describes the vehicle inspection and repair management system in detail.

Mochizuki, M (Teito Rapid Transit Authority, Japan) *Japanese Railway Engineering* Vol. 17 No. 4, 1978, pp 12-13, 2 Fig., 1 Phot.; ACKNOWLEDGMENT: Japanese Railway Engineering; ORDER FROM: Japan Railway Engineers' Association, 2-5-18 Otemachi, Chiyoda-ku, Tokyo, Japan

16 182071 MASSTRAM. No Abstract.

Boston University, Urban Mass Transportation Administration 3 Volumes, 1977, 339 p.; Set includes PB-285449 thru PB-285451, RRIS 17 182072 thru 182074 respectively; Bulletin 7901.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285448-SET/ST, DOTL NTIS

16 182072 MASSTRAM: THE DEVELOPMENT OF A COMPUTER SYSTEM FOR THE COST-EFFECTIVE MAINTENANCE OF RAIL EQUIPMENT IN URBAN MASS TRANSIT SYSTEMS. This document is intended as a management oriented guide to the rail vehicle maintenance scheduling problem and to the new model (MASSTRAM) developed for evaluating such schedules. This final report outlines and discusses a three phase project for the development of a conversational computer system for the cost-effective maintenance of heavy equipment in urban mass transit systems. Phases I and II consisted of operations analysis of maintenance activities at selected properties, namely, on maintenance procedures at the Massachusetts Bay Transportation Authority (MBTA). Phase III consisted of the development of a model

called MASSTRAM (Maintenance Analysis and Scheduling System for Transit Management). A new model, MASSTRAM, has been designed to be compatible with whatever information system a transit property uses for collecting and storing information on vehicle maintenance and repair activities. MASSTRAM has the ability to evaluate the cost and service loss implications of any specified maintenance strategy, given the prevailing maintenance/breakdown relationships. In addition, the model can be used to generate an 'optimal' preventive maintenance schedule. A 'User's Manual' has been written for MASSTRAM containing detailed explanations of all options available. MASSTRAM is now operational. MBTA plans to incorporate MASSTRAM in their Computerized Maintenance Records System when their system is completed. The value of MASSTRAM rests with the use to which it is put by transit management and staff, and with the ability of information systems to provide the model with up-to-date accurate information in the required formats.

Herniter, JD Rosenthal, SR Welam, UP ; Boston University, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0073-78-1, June 1977, 199 p.; See also PB-285450. Also available in set of 3 reports PC E06, PB-285 448-SET. RRIS 17 182071; Bulletin 7901.; Contract DOT-MA-06-0073; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285449/5ST, DOTL NTIS

16 182073 MASSTRAM: USER'S MANUAL FOR MASSTRAM. The final report (UMTA-MA-06-0073-78-1) of this project is intended as a management oriented guide to the rail vehicle maintenance scheduling problem and to the new model (MASSTRAM) developed for evaluating such schedules. It outlines a three phase project for the development of a conversational computer system for the cost-effective maintenance of heavy equipment in urban mass transit systems. Phases I and II consisted of operations analysis of maintenance activities at selected properties, namely, on maintenance procedures at the Massachusetts Bay Transportation Authority (MBTA). Phase III consisted of the development of a model called MASSTRAM (Maintenance Analysis and Scheduling System for Transit Management).

Herniter, JD Rosenthal, SR Welam, UP ; Boston University, Urban Mass Transportation Administration UMTA-MA-06-0073-78-2, June 1977, 71 p.; See also PB-285449, and PB-285451. Also available in set of 3 reports PC E06, PB-285 448-SET. RRIS 17 182071; Bulletin 7901.; Contract DOT-MA-06-0073; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285450/3ST, DOTL NTIS

16 182074 MASSTRAM: SOURCE LISTING. The final report (UMTA-MA-06-0073-78-1) of this project is intended as a management oriented guide to the rail vehicle maintenance scheduling problem and to the new model (MASSTRAM) developed for evaluating such schedules. It outlines a three phase project for the development of a conversational computer system for the cost-effective maintenance of heavy equipment in urban mass transit systems. Phases I and II consisted of operations analysis of maintenance activities at selected properties, namely, on maintenance procedures at the Massachusetts Bay Transportation

Authority (MBTA). Phase III consisted of the development of a model called MASSTRAM (Maintenance Analysis and Scheduling System for Transit Management).

Herniter, JD Rosenthal, SR Welam, UP ; Boston University, Urban Mass Transportation Administration UMTA-MA-06-0073-78-3, June 1977, 69 p.; See also PB-285448. Also available in set of 3 reports PC E06, PB-285 448-SET. RRIS 17 182071; Bulletin 7901.; Contract DOT-MA-06-0073; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285451/1ST, DOTL NTIS

16 182076 TRACK GEOMETRY MEASUREMENT SYSTEM SOFTWARE MANUAL. The Track Geometry Measurement System (TGMS) was developed through the United States Department of Transportation's, Urban Mass Transportation Administration by the Transportation Systems Center in Cambridge, Massachusetts under its Test and Evaluation studies to aid transportation planners and maintenance personnel to better assess the quality of track for rapid rail, light rail, and commuter rail systems. The purpose of this document is to describe the TGMS real-time software and provide operating instructions for its use. The TGMS real-time software collects and stores raw data from the TGMS sensors, processes the raw data to compute track geometry parameters, and records and displays the processed data. All of these functions are performed in real time as the raw data is being collected. The current version of the TGMS real-time software is designated TGM6C.

Brownell, D ; Transportation Systems Center, (UMTA-MA-06-0025) Final Rpt. DOT-TSC-UMTA-78-26, UMTA-MA-06-0025-78-6, Apr. 1978, 110 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285558/3ST, DOTL NTIS

16 184884 STORAGE, REPAIR, AND INSPECTION FACILITIES. The results are presented of a study to determine the facilities required to support the operation and maintenance of an expanded transit system (eleven new rapid transit routes comprising approximately forty miles of new subway lines). The study deals principally with the yards and shops facilities thought the system and is primarily concerned with car storage and yard operations, car maintenance functions, and major maintenance-of-way functions. The program consisted of 3 major tasks leading to the development of recommendations of modifications to the existing facilities to accommodate the requirements of the expanded system. The tasks were as follows: inventory of existing system; determination of car requirements and car mileage; investigation and evaluation of operating maintenance practices and procedures.

New York City Transit Authority, (IT-09-0023, TS C190) Final Rpt. Oct. 1975, 122 p., 38 Fig., 25 Tab., 6 App.; The major portion of the work for the New York City Transit Authority by the firm of Seelye, Stevenson, Value and Knecht, Incorporated, Consulting Engineers.; ACKNOWLEDGMENT: New York City Transit Authority

16 198762 TRANSIT STATION RENOVATION: A CASE STUDY OF PLANNING AND DESIGN PROCEDURES. The general techniques and procedures for planning and evaluating transit interface facilities are applied

comprehensively to the problem of station renovation. The 69th Street Terminal in Philadelphia is evaluated in terms of its performance in accomplishing its transportation function, its effectiveness in relation to transportation policies, development objectives and costs. The planning procedures are employed to develop possible improvement programs. The report identifies modifications to the transit station that will produce operational conformity with policy guidelines and suggests alternative renovation plans to meet system and user objectives. The alternatives are evaluated and compared using factor profiles. Modifications of the selected plans are suggested, and the methodology is reviewed in terms of its performance in the renovation planning process.

Griffiths, JR Hoel, LA Demetsky, MJ ; Virginia University, Department of Transportation Final Rpt. DOT/RSPD/DPB50-79/14, 1979, 221 p.; Contract DOT-OS-50223; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298432/6ST

16 308158 THREE "PS" OF BUS MAINTENANCE. A bus maintenance system using "paper, preventive maintenance and personal responsibility" has been set up at NORTRAN, the North Suburban Mass Transit District, which serves 21 suburbs north of Chicago. A detailed set of maintenance forms has been designed for use during each vehicle's periodic inspection (Buses are inspected every 3000 miles, with a more detailed inspection every 1800 miles) which must signed by each mechanic. Furthermore, each driver must note any defects in a bus at the end of a shift. This assigning of individual responsibility insures that preventive maintenance is carried out according to manufacturer recommendations. The detailed forms also speed up operations, since they give specific information about manufacturer recommendations, thus eliminating the need to consult other references. The maintenance program includes testing the engine oil for acidity, viscosity and the presence of harmful particulates. In most cases, the oil is reusable. As a result, oil use has been out by a third, an example of the economies possible with such a maintenance program.

Metro Vol. 75 No. 2, Mar. 1979, pp 34-36, 2 Phot.

16 312322 KEEP OLD BUSES ON THE ROAD. Problems associated with transit bus operations in American cities and counties are discussed together with bus rehabilitation programs.

American City and County Vol. 94 No. 11, Nov. 1979, pp 61-64ACKNOWLEDGMENT: EI; ORDER FROM: ESL

16 319979 ELEVATORS AT RAILWAY AND S-BAHN STATIONS. As a contribution to greater objectivity in the discussion about elevators at main-line and rapid-transit railway stations, the author presents the results of an investigation into what groups of persons use elevators, what experience has been gained with elevators, what technical and other improvements are possible, and under what circumstances they can be used at non-staffed stations. The results can be seen as a challenge to the planners to integrate elevators into the station complex. It was found that elevators are used by all classes of

persons, that negative experience relates only to relatively light usage where the elevators are in out-of-the-way places. New installations should be easily recognizable from a distance and should not be hidden behind stairways and other structures, so that travellers and others can see them immediately. Elevators can also be employed at non-staffed stations in cases where the latter have cable links with an operating control centre, emergency-power sets, etc. [German]

Fiedler, J *Eisenbahntechnische Rundschau* Vol. 29 No. 4, Apr. 1980, p 293; ACKNOWLEDGMENT: British Railways; ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

16 325881 USER'S MANUAL FOR THE MAINTENANCE COST METHODOLOGY FOR HIGH SPEED PASSENGER TRAIN TRUCKS. This document is a user's manual for the simulation cost modeling (SCM) technique as applied to a passenger railcar truck and its component parts. The manual includes application of the technique through the development of an example maintenance schematic diagram, example truck component cost data, and example maintenance procedures. The computer program and its various operating modes are described with the aid of a full set of example data obtained

from Amtrak personnel. A complete listing of the FORTRAN IV program and a set of example data for its operation are contained in the appendixes. A set of cost results from the example Amtrak data cover maintenance expenditures by maintenance actions and by component truck subassemblies. Also listed in the sample results are a set of cost sensitivities related to the modeled maintenance system. In addition to the present application, the SCM technique has been employed successfully for other railroad systems, including track maintenance. The technique is generally useful for fleets in which individual cost data are not available, such as a proposed transit system or the introduction of new sub-systems or components.

Smith, RL Krauter, AI Betor, J; Shaker Research Corporation, Federal Railroad Administration Final Rpt. FRA/ORD-80/70, DOT-TSC-FRA-80-21, Sept. 1980, 252p, 20 Fig., 1 Tab., 2 Ref., 14 App.; Contract DOT-TSC-1619; ORDER FROM: NTIS; PB81-115479, DOTL NTIS

16 330170 PLANNING PROCEDURES FOR TRANSIT-STATION RENOVATION. The application of planning and design procedures to the problem of transit-station renovation is described. The process is illustrated by using as an example the 69th Street Terminal in Philadelphia,

a complex transit terminal that handles many transfer movements and transit vehicle connections and has a variety of system elements that are badly in need of renovation. The performance of the existing station was evaluated based on selected objectives and criteria and in light of its conformance with current policy guidelines. A series of alternative renovation layouts was produced to improve the processing of passengers by reducing conflicts, trip times, and level changes. These plans included consideration of horizontal and vertical separation, station access for fare collection, passenger volumes on each transit line, and accommodations for the disabled. Each alternative renovation plan was then evaluated along lines similar to those for the evaluation of the existing station. The results indicated the priority of each interest group and showed where conflict existed. The next step in the process is the preparation of detailed architectural and structural design plans and specifications, cost estimates, and a financial plan. (Authors)

Griffiths, JR (Tri-County Metropolitan Transp District of Oregon) Hoel, LA (Virginia University) *Transportation Research Record* No. 760, 1980, pp 25-33, 11 Fig., 2 Tab., 3 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

17 044279 AN ELEVATED TAXICAB COMMUTER SYSTEM. The basic attributes of the taxicab are used as design guidelines for a community commuter system. The system consists of many small cablike vehicles with a capacity range of 4 to 6 passengers. These travel in closed, elevated tubes with street level boarding stations every block or every other block. Track system consists of one-directional loops which may be operated independently or interlinked. Stopping and starting are minimized. Accessibility is maximized. Important to the esthetics of the system is the innovation of vertical switching which permits the system to be slim and unobtrusive. The community system discussion is augmented with a brief description of an intercommunity system which would be needed to tie the community systems together. Optimum performance curves are given for the integrated system.

Goodykoontz, JR (New Extensions for Utilizing Scientists) ; American Society of Mechanical Engineers Apr. 1973, 7 pp, 10 Fig; Contributed by the Rail Transportation Division of ASME for presentation at the IEEE-ASME Joint Railroad Conference, St. Louis, Mo., April 11-12, 1973; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

17 046776 PROJECTS FOR DEVELOPMENT OF PUBLIC TRANSPORT OF ZURICH AND ITS SUBURBIA. Comprehensive appraisal of railway, tram and new forms of rapid transit concepts such as aerobus, minirail, taxi-like computer-controlled service, Biel-o-Bil cars and monorail propositions, in relation to a city such as Zurich and its immediate environs.

Meier, GA *Rail Engineering International* Vol. 3 No. 1, Jan. 1973, 7 pp; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

17 046821 NEW URBAN TRANSPORTATION SYSTEMS. Five systems; Alweg, CAT, Coup, H-System and Transurban, developed by German manufacturers which lend themselves to advanced automation techniques and offer compact rapid-transit modes to serve congested inner-suburbs, some particularly suited to link-in fringe residential and dormitory areas.

Meier, GA *Rail Engineering International* Vol. 3 No. 4, Apr. 1973, 4 pp, 4 Phot; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

17 047261 ENGINEERING EVALUATION OF THE TRACKED AIR CUSHION RESEARCH VEHICLE (TACRV). Exceptionally high bid prices were received on the first contract to construct the initial portion of a proposed 22-mile guideway test facility for the TACRV. As a result, production-cost studies were conducted on the guideway construction to determine the factors contributed to the high cost, and a design review was made to determine if an alternate design of lower cost was feasible. (Modified author abstract)

Bernard, DA Houser, CR ; Federal Highway Administration Final Rpt FHWA-RDDP-PC-400, Mar. 1973, 29 pp; ACKNOWLEDGMENT: NTIS (PB-218967/8); ORDER FROM: NTIS, Repr PC, Microfiche; PB-218967/8, DOTL NTIS

EDGMENT: NTIS (PB-218967/8); ORDER FROM: NTIS, Repr PC, Microfiche; PB-218967/8, DOTL NTIS

17 047763 A SUMMARY OF OPTIMIZATION TECHNIQUES THAT CAN BE APPLIED TO SUSPENSION SYSTEM DESIGN. Summaries are presented of the analytic techniques available for three levitated vehicle suspension optimization problems: optimization of passive elements for fixed configuration; optimization of a free passive configuration; optimization of a free active configuration. The techniques are applied to a heavy dynamic model which includes gravity forces, random aerodynamic forces and random guideways making use of penalty functions which include vehicle acceleration, suspension displacement, gap variation, power requirements.

Hedrick, JK ; Arizona State University Final Rpt Mar. 1973, 42 pp; Contract DOT-OS-335; ACKNOWLEDGMENT: NTIS (PB-220553/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-220553/2

17 047848 STUDY OF A MAGNETICALLY LEVITATED VEHICLE. The objective of this program was to design and construct a magnetically levitated test vehicle whose motion was unrestricted in all degrees of freedom except in the direction of motion, and to make elementary measurements of the motion of the vehicle after traversing vertical and lateral offsets in the guideway. The vehicle constructed fulfilled these requirements and consisted of a platform levitated by four super-conducting magnets contained in liquid helium dewars. Position and acceleration sensors and a telemetry package were on board. The vehicle was towed by a winch at speeds up to 12 m/s (approximately 27 mph). Tests were performed on a 400-ft long aluminum guideway. These tests consisted of measuring the vertical and lateral accelerations and vertical position of the center of mass of the vehicle before, during, and after traversing offsets in the guideway. (Modified author abstract)

Coffey, HT Colton, JD Mahrer, KD ; Stanford Research Institute Final Rpt Feb. 1973, 103 pp; Contract DOT-FR-10001; ACKNOWLEDGMENT: NTIS (PB-221696/8); ORDER FROM: NTIS, Repr PC, Microfiche; PB-221696/8, DOTL NTIS

17 047881 PRACTICAL SAFETY CONSIDERATIONS FOR SHORT HEADWAY AUTOMATED TRANSIT SYSTEMS. Continued interest in Personal Rapid Transit (PRT) systems as one solution to urban traffic congestion emphasizes the need for careful consideration of the safety of short headway automated transit systems. Current approaches to the determination of safe headways are reviewed. The reduction in headway which could be achieved by improved braking and signaling hardware is outlined. Improved design of emergency brakes is the most important single factor in the reduction of safe headways. Very short headway systems are reviewed from a safety standpoint. Such systems might be safely operated if operation at intermediate headways (separations on the order of the stopping distance) can be avoided.

Hinman, EJ Pitts, GL *Transportation Planning and Technology* Vol. 1 No. 3, Jan. 1973, pp 219-224, 8 Ref; ACKNOWLEDGMENT: EI (EI 73 037542);

ORDER FROM: ESL, Repr PC, Microfilm

17 047905 PERSONAL RAPID TRANSIT (WITH SPECIAL REFERENCE TO THE MORGANTOWN PROJECT). The PRT project was inaugurated in Morgantown, West Virginia, on Oct. 24, 1972. The installation is a combination line-haul and circulatory system over exceptionally difficult terrain, providing a testing ground for the design and implementation of this new technology. The system utilizes small vehicles on a separate guideway (on, above, and below ground) to convey individuals from origin to destination without intermediate stops. Vehicles are operated entirely automatically and respond directly to passenger demand without any significant waiting period. They are rubber-tired and electrically powered, and therefore nonpollutant and silent in operation. The system is centrally controlled and supervised.

Cunliffe, JP (Harris (Frederic R), Incorporated) ; Society of Automotive Engineers Preprint 730439, 14 pp; Prepared for Meeting 2-4 April 1973.; ACKNOWLEDGMENT: EI (EI 73 030338); ORDER FROM: ESL, Repr PC, Microfilm

17 048184 REVIEW OF TECHNICAL AND OPERATIONAL ASPECTS OF SEVERAL FIXED-GUIDEWAY PUBLIC TRANSPORTATION SYSTEMS. The purpose of this paper is to review the major technical and operational characteristics of several contemporary fixed-guideway public transportation systems and to determine the functional distinctions among them. Six systems are compared with respect to the following characteristics: nature of the vehicle-guideway interface, station layout, vehicle spacing control, general operating specifications, and specifications for nominal levels of vehicle performance. The 6 systems considered range from urban rail transit systems to monorail systems. Although they are unlike one another in many respects, they nonetheless function in much the same manner when contrasted to personal rapid transit systems currently being developed.

Bergmann, DR (General Motors Research Laboratories) *Highway Research Record* No. 449, 1973, pp 71-73, 3 Ref.; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

17 048263 IN THE AIR--THE NEW TOWN TRAIN. It is accepted that the hovertrain has no future because of its disadvantages, although it is considered that the test track could easily be converted and re-employed for testing Professor Laithwaites' magnetically-suspended, linear-motor, vehicle, which could become the ideal form of urban transport.

Engineer Feb. 1973, 2 ppACKNOWLEDGMENT: International Railway Documentation (583); ORDER FROM: International Union of Railways, BDC, 14 rue Jean Rey, 75015 Paris, France Repr PC

17 050086 UNCONVENTIONAL PASSENGER TRANSPORTATION SYSTEMS. To meet the increasing demand for information on unconventional passenger transportation systems, the UITP has prepared this bibliography which deals comprehensively and systematically with the following subjects: Rapid transit systems, so called monorails, horizontal elevators,

people movers, high-speed ground transportation systems (HSGT), tracked air cushion vehicles (TACV), magnetically levitated systems, non-stop fast link systems with rendez-vous manoeuvre, intra-airport systems, airport-access systems, quasi-continuously working capsule systems, escalators, low-and high-speed moving belts, computer-controlled personal rapid transit systems (PRT), new methods of bus operation, dual-mode systems and pallet systems both for buses and private cars, jitneys, public automobile system (PAS), electric cars, and the automatic highway. Transportation systems with electronic control, electric vehicles and concepts respecting the demands of town planning and environmental protection are included. New propulsion systems such as low-pollution Diesel engine, rotary piston engine, liquid gas propulsion, gas turbine, steam engine, Rankine cycle engine, Stirling engine, electric propulsion by means of storage battery, fuel cell, Diesel-electric engine and hybrid engine, and linear induction motor, are also dealt with.

International Union of Public Transport Bibliogr Apr. 1973, 320 pp, 2425 Ref; ACKNOWLEDGMENT: International Union of Public Transport; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels, Belgium Repr PC; 1 400 FB

17 050434 THE HOVERTRAIN AFFAIR. A fundamental fact is that the hovertrain is not a train and probably is unlikely ever to be a convenient vehicle for making up into trains of capacity to suit different volumes of traffic or for switching between tracks. So, any hovertrain system is likely to have to use individual vehicles running in strict order, lacking completely any of the flexibility of present railway systems and ruling it out completely from consideration for any urban transport role as far as can be seen into the future. A second fact is that magnetic levitation is in its earliest infancy--and so are the basic techniques on which magnetic levitation would rely, putting a practical full-scale system probably not less than 20 years away. That leaves air levitation, which is used by the British and French vehicles--the only full-size tracked hovercraft yet built.

Modern Railways Vol. 30 No. 301, Oct. 1973, p 380 ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England Repr PC

17 050460 RAPID TRANSIT AUTOMATION AND THE LAST CREW MEMBER. Rapid transit systems in many cities are being automated, but most transit officials reject the idea of operation without crews on the train as idealistic. At the same time large resources are spent on development of full automation for numerous new systems such as PRT, many of which have no defined role in urban transportation.

Vuchic, VR (Pennsylvania University, Philadelphia) *Railway Gazette International* Vol. 129 No. 10, Oct. 1973, 3 pp, 1 Fig, 3 Phot; ORDER FROM: IPC Transport Press, Repr PC

17 050554 WHAT RONAN WANTS FROM THE CARBUILDERS. Dr. William J. Ronan, Chairman, Metropolitan Transportation Authority, New York, discusses the first five years of the MTA and the future under the headings: What Ronan wants from the carbuilders; for MTA: TACV no, MAGLEV, maybe; the case for operating subsidies; and "Pioneers get shot at".

Railway Age Vol. 174 No. 7, Apr. 1973, pp 22-31, 1 Tab, 3 Phot ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

17 050749 PRELIMINARY DESIGN STUDIES OF MAGNETIC SUSPENSIONS FOR HIGH SPEED GROUND TRANSPORTATION. The report examines certain critical problem areas relative to magnetic suspension of high-speed vehicles and develops a baseline design for a TMLRV (tracked magnetically levitated research vehicle). Both types of magnetic suspension, the repulsive-force suspension and the attractive-force suspension, are considered. The present study has not turned up any problems serious enough to completely eliminate one of these competing suspensions. Areas considered in the report include propulsion systems and their compatibility with magnetically-levitated high-speed vehicles, aerodynamic effects, failure modes, studies of ride quality, and criteria for maximum allowable track roughness. In regard to the repulsive-force suspension, experiments have been carried out to measure ac loss in the superconducting magnets and an assessment of the magnetic shielding requirement has been made. Two model electromagnets for the attractive-force suspension, and their feedback control systems, were built and tested during the present study.

Reitz, JR Borcherts, RH Davis, LC Hunt, TK Wilkie, DF; Ford Motor Company Final Rpt Tasks 2/3, Mar. 1973, 314 pp; Contract DOT-FR-10026; ACKNOWLEDGMENT: NTIS (PB-223237/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223237/9

17 051418 THE URBAN TRACKED LEVITATED VEHICLE. Presented is a brief summary of one of the newest concepts in transportation--the Urban Tracked Levitated Vehicle. Air levitated, magnetically guided, propelled by single-sided LIMs, it is a really new idea in mobility. It holds a practical hope of filling the transportation gap between the 60 mph of autos and the 500 mph plus of aircraft.

Ward, JP (LTV Aerospace Corporation); American Society of Mechanical Engineers Paper 73-ICT-96, Sept. 1973, 8 pp, 12 Fig; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

17 051421 MERGE CONTROL IN AUTOMATED TRANSIT SYSTEM NETWORKS. Many small vehicle automated transit system concepts will require vehicles to negotiate intersections and merge with other vehicles while traveling through a network of guideways. Assuming that the longitudinal control of vehicles is accomplished by what is known as the moving-cell or point-follower approach, the merge control problem becomes one of determining necessary point-skip maneuvers to assure that points equi-distant from a merge junction are not simultaneously occupied by vehicles. This paper describes an original algorithm for intersection control which can satisfactorily resolve such merge conflicts 95 percent of the time for system

traffic densities approaching 80 percent of capacity by monitoring the status of only twelve points on each line. The algorithm is suitable for programming in a small digital computer; one of which is conceptually located at each intersection.

Brown, SJ, Jr (Johns Hopkins University); American Society of Mechanical Engineers Paper 73-ICT-109, Sept. 1973, 12 pp, 3 Fig, 2 Tab, 5 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

17 051461 VICS-120, A TUBE-VEHICLE SYSTEM TEST FACILITY. A large test facility designated the VICS-120 has been designed, constructed and operated at the Caltech Jet Propulsion laboratory as part of the research in support of the aerodynamic and ventilation section of a handbook on subway design. Tests can be conducted under both equilibrium and non-equilibrium model velocity conditions. Design concepts, instrumentation, and an outline of construction details as well as operational procedures and models are described. The kinds of testing suitable for a facility of this type are discussed and examples of the various forms of data obtained are presented.

Marte, JE (California Institute of Technology); Institute of Environmental Sciences Proceeding 1973, pp 448-459, 11 Ref; Institute of Environmental Sciences, 19th Annual Technical Meeting Proceedings, Anaheim, California, 2-5 April 1973; ACKNOWLEDGMENT: EI (EI 74 057607); ORDER FROM: ESL, Repr PC, Microfilm

17 051484 LINEAR INDUCTION MOTOR RESEARCH VEHICLE. SPEED UPGRADING TESTS. A series of linear induction motor research vehicle (LIMRV) runs were conducted at the High Speed Ground Test Center on the 6.2-mile test track. These runs were made primarily to evaluate the dynamic performance of the vehicle at speeds up to the maximum achieved, 187.9 mph. The vehicle was equipped with instrumentation that measured accelerations and displacements. Of particular interest were the motions of the trucks and suspension, and the LIM guidance system. The initial truck dynamics data evaluation indicates an increase in concity resulting from a narrow band of wheel treadwear. Since the next series of tests will be conducted with new wheels, the problem at least initially will not be significant. Other tests run during this program provided acceleration and braking profiles. Also, some LIM electrical performance data was recorded and evaluated. (Author)

D'Sena, GO Leney, JE; AiResearch Manufacturing Company Final Rpt 72-8857, June 1973, 207p; See also report dated Oct 71, PB-212 041; Contract OHSGT-7-35399; ACKNOWLEDGMENT: NTIS (PB-224878/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224878/9, DOTL NTIS

17 051557 OPTIMIZATION OF TRANSIT SYSTEMS BY PARAMETRIC MEANS. The philosophy of this paper has been applied to the Personalized Rapid Transit (PRT) concept which utilizes a rubber-wheeled vehicle propelled by an electric motor travelling along a guideway. The design of a transportation system involves maximizing the beneficial aspects while at the same

time minimizing parameters such as cost, energy consumed, or visual blight. For this study, the decision model developed is a computer program that incorporates the technology of transit vehicles. With a computer program one can do various trade-offs, sensitivities, and optimization in arriving at the optimal transit design with timeliness and credibility. The parameters that are influential in transit design, station spacing, vehicle and station size, vehicle speed, headway, etc., are perturbed and figure-of-merits are determined using several criterion and optimization techniques.

Goldmann, BW (Boeing Company) ; American Society of Mechanical Engineers Paper 73-ICT-63, Sept. 1973, 8 pp, 8 Fig, 1 Tab; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

17 051579 PRELIMINARY DESIGN STUDIES OF MAGNETIC SUSPENSIONS FOR HIGH SPEED GROUND TRANSPORTATION. VOLUME II, EXPERIMENTAL RIDE SIMULATION STUDIES. The report describes an experimental program using human subjects to evaluate the ride quality resulting from specific suspension strategies, and to compare these with a standard ride. The study is part of a more general task to learn how to isolate guideway irregularities from high speed ground vehicles to insure passenger comfort. The results of the study show the following: A ride evaluation by different individuals is a meaningful approach; the discomfort index criterion is roughly correct but has some limitations; the standard ride which was used for comparison, namely, the DOT ride quality specification, is not a particularly good ride; and magnetic suspensions operating on a moderately smooth guideway at 483 km/hr will require active control in order to produce ride quality approaching that of a jet aircraft on a quiet day.

Borcherts, RH Wilkie, DF Davis, LC Reitz, JR Ford Motor Company Final Rpt June 1973, 51 pp; See also Volume I, PB-223 237.; Contract DOT-FR-10026; ACKNOWLEDGMENT: NTIS (PB-224893/8); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224893/8, DOTL NTIS

17 051584 LIM GUIDANCE SYSTEM DYNAMICS. THEORETICAL STUDIES AND EXPERIMENTAL TESTS. The linear induction motor research vehicle (LIMRV) is a test bed constructed to evaluate the LIM as a propulsion system. Satisfactory LIM guidance system performance is vital to the ongoing progress of this research program. The report describes preliminary theoretical studies of LIM guidance system dynamic behavior, and documents the experimental results obtained during the first phase of the LIMRV speed upgrading tests conducted at the DOT High-Speed Ground Test Center, Pueblo, Colorado. After the operational tests, additional analytical work was accomplished, leading to system modifications that provided better control of the LIM/reaction rail clearance (mechanical gap), statically, without adversely affecting dynamic behavior. Guidance system dynamics tests were later performed to confirm the theoretical work.

Chi, CC ;

AiResearch Manufacturing Company Intrm Rpt 73-9065, Sept. 1973, 123 pp; Contract DOT-FR-7-35399; ACKNOWLEDGMENT: NTIS (PB-226283/0); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226283/0, DOTL NTIS

17 052076 LEANWAY: A LEANING SUBWAY. This paper proposes a new type of subway. Surface stations and very deep tunnels would result in steep grades. The Leanway vehicle would have passenger pods that remain level on the grades. Gravity would accelerate and decelerate the vehicles, contributing to energy conservation. Fairly detailed projections are presented, and cost savings compared with contemporary rapid transit subways are claimed. Linear Induction Motors and Magnetic Levitation are considered.

Sottile, AL ; Sottile (Antonine Lafata) 1974, 70 pp, Tabs, Refs; ORDER FROM: Sottile (Antonine Lafata), P.O. Box 28292, Washington, D.C., 20005 Repr PC

17 052083 VAL MAY BE WORLD'S FIRST FULLY-AUTOMATED PUBLIC TRANSPORT. On December 14, 1973 the authority responsible for the new town of Lille-Est decided to construct an 8 km fully-automated metro. Rubber-tired trains with no crew on board running at 80 km/h will serve eight unmanned stations, and 60 sec headways can be maintained by a novel form of central control which enforces constant separation in time rather than a space interval.

Railway Gazette International Vol. 130 No. 1, Jan. 1974, 3 pp, Photos; ACKNOWLEDGMENT: *Railway Gazette International*; ORDER FROM: IPC Transport Press, Repr PC

17 056756 MODERN TRANSPORTATION SYSTEMS. Rohr Industries is committed to developing multiple ground technologies to satisfy transportation's varied needs. This paper discusses the company's diversification from aerospace into ground transportation, starting with rapid transit systems and leading to advanced transportation systems. The two most promising advanced transportation developments include an aerotrain, a tracked air cushion vehicle, and the Romag, a magnetically levitated and propelled vehicle. This paper reviews these events and describes in detail the two new developments.

Hearn, DL (Rohr Industries, Incorporated) Van Dorn, NH ; Society of Automotive Engineers Preprint Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504621); ORDER FROM: ESL, Repr PC, Microfilm

17 056770 ADAPTIVE CONTROL IN TRANSPORTATION. Recent progress in the implementation of adaptive control systems in transportation is summarized. In transportation applications an adaptive control system combines five basic functions: (1) surveillance, to detect traffic; (2) communications, to relay surveillance data and control signals; (3) performance evaluation, to compare the difference between the desired and current operation; (4) on-line data processing, to determine the control signals and scheduling; and (5) overall system operation, i. e. the functional summation of (1), (2), (3) and (4). The applications discussed include control of freeway ramps, urban street traffic, air traffic, and urban rapid transit.

Darling, EM Ricci, RC Colella, AM ; Institute of Electrical and Electronics Engineers pp 74-82, 43 Ref; Presented at the IEEE Conference on Decis and Control, including symposium on Adapt.; ACKNOWLEDGMENT: EI (EIX740502690); ORDER FROM: ESL, Repr PC, Microfilm

17 056773 ARAMIS PRT SYSTEM. The ARAMIS system is an intermediate capacity transportation system. It provides, at the same time, a high traffic capacity (up to 15,000 passengers/hour/day) and a direct service capability. It is now developed jointly between MATRA and the Paris Metro Authority and the first commercial line will be in operation in late 1977 in the Paris suburbs. Its investment cost is moderate, due to the limited civil engineering required and the operating costs are in the range of the conventional subway.

Maury, JP (MATRA, Transportation Division) ; Society of Automotive Engineers Preprint N740143, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504578); ORDER FROM: ESL, Repr PC, Microfilm

17 056774 ACT FORD'S AUTOMATICALLY CONTROLLED TRANSPORTATION SYSTEM. This paper contains a technical description of the Ford Motor Co.'s ACT system which has been designed to meet transportation needs in a wide variety of urban applications. The discussion covers the systems design features and operation of the driverless rubber-tired vehicles, the guideway, and the system's ability to meet expanding needs by a modular approach to the command and control design. Descriptions of Ford's new Cherry Hill Test Track and the first installations at the Fairlane Town Center in Dearborn, Mich., and the Bradley International Airport, Hartford, Conn., are also given.

Logan, JS (Ford Motor Company) ; Society of Automotive Engineers Preprint N7403226, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504622); ORDER FROM: ESL, Repr PC, Microfilm

17 056775 AUTOMATIC URBAN TRANSPORTATION IN BRITAIN. For several years the British Government's Transport and Road Research Laboratory has been working on advanced, automatic, urban transportation systems. Further to this in July 1973, the British Government placed its first contracts with industry for studies leading to the development of these new forms of PRT-like systems. This paper describes the work of one main contract, intended to lead to a public demonstration system in Sheffield. A description is given of the scenario to which this Minitram system must relate, and the organization and institutional situation in Britain is outlined. A brief history of affairs leading to the placing of the contracts, including the Transport and Road Research Laboratory and Hawker Siddeley participation in the Autotaxi and Cab-track PRT projects, is given.

Baker, RC (Hawker Siddeley Dyn, Ltd) Groves, HW ; Society of Automotive Engineers Preprint Feb. 1974; ACKNOWLEDGMENT: EI (EIX740502006); ORDER FROM: ESL, Repr PC, Microfilm

17 056778 PERSONAL RAPID TRANSIT SYSTEM IN MORGANTOWN, WEST VIRGINIA. A unique personal rapid transit system is currently being installed at Morgantown, West Virginia. The system consists of small, automatically controlled vehicles operating on a dedicated guideway either on a scheduled basis or on a passenger-demand basis. The rubber-tired, electric-powered vehicles will carry up to 21 people. The transportation system will connect the business district of Morgantown and the widely separated areas of the West Virginia University campus. The overall project is being built in phases, with the first phase being the construction of approximately 2.1 miles of guideway, five vehicles, three stations, and a maintenance facility. Final installation will be approximately 4.0 miles of guideway, 70-100 vehicles, six stations, and an expanded maintenance facility.

Crowley, RT (Boeing Aerospace Company) ; Society of Automotive Engineers Preprint N740229, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504624); ORDER FROM: ESL, Repr PC, Microfilm

17 056779 RUBBER TIRE VS. STEEL WHEEL TRADEOFFS. The choice of rubber tired or steel wheeled vehicles for a mass rapid transit (MRT) system or for a personal rapid transit (PRT) system involves a number of considerations. For the PRT system, the rubber tired vehicle possesses advantages in its ability to utilize steeper grades and shorter radius curves. The rubber tired vehicle can, if required, operate without a fixed guideway. It is more economical than the steel wheeled vehicle for PRT application. The steel on steel system seems to have little application to PRT as PRT is defined in this paper. For MRT systems, the advantages of the steel on steel system seem quite evident. Capacity, operating speed, and passenger comfort are increased with the steel on steel system. Energy requirements and the need for environmental control are decreased with the steel wheeled system. Capital costs for the infrastructure and the systemwide elements of the system decrease with the use of a steel wheeled MRT system, as do maintenance and operations costs.

Harrison, MC (Tudor Engineering Company) ; Society of Automotive Engineers Preprint N740228, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504623); ORDER FROM: ESL, Repr PC, Microfilm

17 056808 OPTIMIZATION OF AN EQUIPOLAR MAGNET ARRANGEMENT FOR A MAGNETICALLY SUSPENDED TRANSIT SYSTEM [OPTIMIERUNG EINER GLEICHGEPOLTEN MAGNETANORDNUNG ALS ABSTUETZUNGS-SYSTEM FUER EINE MAGNETISCHWEBEBAHN]. For a magnet arrangement consisting of one row each of equipolar vehicle and rail magnets, equations are given for calculating magnetic forces, taking into consideration all interactions between the magnets which exceed a predetermined lower limit. Conditions are determined under which the lowest rail costs are obtained. The results of this optimization are presented graphically. [German]

Henning, G *Krupp Tech Mitteilungen, Forschungsber u Werksber* Vol. 31 No. 1, June 1973; ACKNOWLEDGMENT: EI (EIX740101430); ORDER FROM: ESL, Repr PC, Microfilm

17 056879 WARWICK SYMPOSIUM MOVES AWAY FROM PRT. Two significant changes in outlook were evident at this year's symposium on Advanced Transport Systems in British Cities, held at the University of Warwick from March 27 to 29. Most marked was the shift of emphasis away from the schemes for small four to six passenger cars on fine mesh networks which dominated previous gatherings of this kind to systems having much larger vehicles on coarse-mesh networks approximating more closely to those of conventional rapid transit. Compared with earlier conferences on advanced systems, there was a greatly increased readiness at Warwick this year to discuss steel wheel technology, particularly that of street trams.

Railway Gazette International Vol. 130 No. 5, May 1974, p 188 ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: IPC Transport Press, Repr PC

17 056959 TRANSIT EXPRESSWAY REPORT: PHASE II. Transit Expressway envisions a system operating on fixed guideways with continuous headways as close as 90 seconds. The system is based on operating compact, minimum weight vehicles to provide economy of operations in off-peak hours and still maintain high frequency service. The all electric fully automated vehicles resemble buses and run on 4 pairs of driven pneumatic tires. The project is comprised of 9,360 foot long main guideway, principally on an aerial structure with a short section of at-grade guideway. Forms complete loop with stations at north and south ends. Rolling stock is 3 vehicles operated simultaneously or singularly. Specific discussion of test includes spur roadway with 10% grade, emergency walkway, grounding. Conclusions and recommendations are delineated. Appendices contain a glossary and summary of Phase I report.

MPC Corporation, (UMTA-PA-06-0009) June 1973, 284p; See also report on Phase I, PB-174 757 and shorter version dated 20 Feb 67, PB-231 021.; ACKNOWLEDGMENT: NTIS (PB-231022/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231022/5, DOTL NTIS

17 057147 CAN PRT UNPLUG THE CITIES? Three cities in three countries using three different systems are building personal rapid transit systems. Of the three, Morgantown, West Virginia; Toronto, Ontario; and Nancy, France, the system at Morgantown will be finished first, in 1975. The various types of personal rapid transit are discussed.

Shaffer, FE *Modern Railroads* Vol. 29 No. 5, May 1974, pp 72-74; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

17 057352 NOISE AND VIBRATION OF A STEEL WHEEL/STEEL RAIL PERSONALIZED RAPID TRANSIT SYSTEM. The report describes a test program which has been conducted to establish baseline noise levels and ride characteristics for a state-of-the-art steel wheel on steel rail personalized rapid transit vehicle. A full-scale test vehicle and an 840-foot track, including two 30-foot curves, have been built and used for 128 test runs under various conditions of operation. Permanent records have been made on

magnetic tape and oscillograph paper for future analysis as needed.

Gramse, HE Spence, JH ; Transportation Systems Center DOT-TSC-UMTA-73-2, Jan. 1974, 84 pp; Contract DOT-TSC-436; ACKNOWLEDGMENT: NTIS (PB-232265/9); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232265/9, DOTL NTIS

17 057646 PLATOON-OPERATED STATIONS FOR QUASI-SYNCHRONOUS PERSONAL RAPID TRANSIT NETWORKS. The report focuses on the management and simulation of captive vehicles in a personal rapid transit (PRT) or dual-mode transit (DMT) system. The simulation of a station for a quasi-synchronous network is presented. Quasi-synchronous systems allow slot slipping or advancing at interchanges to avoid merge conflicts. Vehicles are dispatched from stations with the first slot that can converge without conflict at the immediate merge point. The report is a computer simulation of vehicle operations in an off-line, single ramp personal rapid transit station. The major results of interest to station designers are the curves relating throughput to the total number of berths in the station and queue areas. Curves corresponding to 0.5% and 1% abort rates are exhibited.

Dais, JL York, HL ; Minnesota University, Minneapolis, (UMTA-MN-11-0003) Sept. 1973, 30 pp; ACKNOWLEDGMENT: NTIS (PB-232700/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232700/5, DOTL NTIS

17 057818 CONTROL ALLOCATION INVESTIGATION: SAMPLING RATE SELECTION. One of the major considerations facing the design of high performance automated transit systems is the efficient and economical allocation of the control functions between the transportation vehicle and a digital computer located at the wayside. The report examines the non-emergency control of vehicle speed and spacing (i.e., the vehicle regulation problem). The primary goal is to identify the type of information and the rate at which this information must be exchanged across the vehicle/guideway interface in order to achieve precise vehicle regulation. A successful system design keeps the communication requirements within the available channel capacity. The effect of control allocation on these requirements is examined by varying the complexity of the on-board vehicle control system.

Pitts, GL ; Johns Hopkins University, Silver Spring Intrm Rpt. APL-TIR-009, Apr. 1974, 89 pp; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS (PB-233395/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233395/3, DOTL NTIS

17 057907 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSPO 72'. VOLUME XII. The report covers the measurements of the broadband conducted noise present on the A.C. power lines feeding the Personalized Rapid Transit (PRT) systems with all four systems operating simultaneously. The purpose of the measurement effort was to evaluate the electrical environment existing on each of the PRT 'hot' and neutral A.C. power lines and to assess the effect if any, on each individual system with all of the other systems

operating simultaneously. Each system is isolated from the main high voltage line by a stepdown transformer which should filter out most unwanted higher frequency spikes. The measurements obtained during this test will be used for a comparison with data obtained with no PRT systems operating and with each system operating individually.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 125p; See also Volume 11, PB-233 202.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233203/9); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233203/AS

17 057908 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME XI. TTI SYSTEM.

The report covers the measurements of the broadband conducted noise present on the A.C. power lines feeding the Personalized Rapid Transit (PRT) systems at Dulles Airport with each system operating individually. The purpose of the measurement effort was to evaluate the electrical environment existing on each of the PRT 'hot' and neutral A.C. power lines and to assess the effect of each system on the power line with all other PRT systems turned off. The measurements obtained during this test will be used for a comparison with data obtained with no PRT systems operating and with all four PRT systems operating simultaneously.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 26p; See also Volume 10, PB-232 201, and Volume 12, PB-233 203.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233202/1); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233202/AS

17 057909 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME X. MONOCAB SYSTEM.

The report covers the measurements of the broadband conducted noise present on the A.C. power lines feeding the Personalized Rapid Transit (PRT) systems at Dulles Airport with each system operating individually. The purpose of the measurement effort was to evaluate the electrical environment existing on each of the PRT 'hot' and neutral A.C. power lines and to assess the effect of each system on the power line with all other PRT systems turned off. The measurements obtained during this test will be used for a comparison with data obtained with no PRT systems operating and with all four PRT systems operating simultaneously.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 28p; See also Volume 9, PB-233 200, and Volume 11, PB-233 202.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233201/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233201/AS

17 057910 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME IX. FORD SYSTEM.

The report covers the measurements of the broadband conducted noise present on the A.C. power lines feeding the Personalized Rapid Tran-

sit (PRT) systems at Dulles Airport with each system operating individually. The purpose of the measurement effort was to evaluate the electrical environment existing on each of the PRT 'hot' and neutral A.C. power lines and to assess the effect of each system on the power line with all other PRT systems turned off. The measurements obtained during this test will be used for a comparison with data obtained with no PRT systems operating and with all four PRT systems operating simultaneously.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 29p; See also Volume 8, PB-233 199, and Volume 10, PB-233 201.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233200/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233200/AS

17 057911 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME VIII. DASHAVEYOR SYSTEM.

The report covers the measurements of the broadband conducted noise present on the A.C. power lines feeding the Personalized Rapid Transit (PRT) systems at Dulles Airport with each system operating individually. The purpose of the measurement effort was to evaluate the electrical environment existing on each of the PRT 'hot' and neutral A.C. power lines and to assess the effect of each system on the power line with all other PRT systems turned off. The measurements obtained during this test will be used for a comparison with data obtained with no PRT systems operating and with all four PRT systems operating simultaneously.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 35p; See also Volume 7, PB-233 198, and Volume 9, PB-233 200.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233199/9); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233199/AS

17 057912 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME VII.

The report covers the measurements of the broadband conducted noise present on the A.C. power lines feeding the Personalized Rapid Transit (PRT) systems at Dulles Airport with all four systems off. The purpose of the measurement effort was to evaluate the electrical environment existing on each of the PRT 'hot' and neutral A.C. power lines prior to the installation and operation of any of the systems. These data will provide a baseline for use in establishing the relative increase in EMI levels associated with PRT system operation. Data obtained under this effort will enable an evaluation of whether or not existing or potential EMI levels might effect the normal operation of the PRT systems. Such interference could conceivably contribute to breakdown, malfunctions, or safety problems associated with the automated equipment used by the PRT systems in performing normal functions.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 51p; See also Volume 6, PB-233 197, and Volume 8, PB-233 199.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233198/1);

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233198/AS

17 057913 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME VI.

An X-Y plot is made of the radiated electromagnetic signals and noise between 1 KHz and 50KHz at each of the four Personalized Rapid Transit (PRT) sites at Dulles International Airport. The PRT Systems were operated simultaneously in an effort to determine if any interaction existed between systems. A spectrum analyzer was used to view the frequency spectrum broadband prior to recording and a Polaroid scope camera was used in conjunction with the spectrum analyzer to photograph signals between 50KHz and 50MHz. This frequency range was sufficiently broad enough to cover all command and control frequencies of the four PRT systems.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 104p; See also Volume 5, PB-233 196 and Volume 7, PB-233 198.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233197/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233197/AS

17 057914 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME V. TTI SYSTEM.

An X-Y plot is made of the radiated Electromagnetic signals and noise between 1KHz and 50KHz at each of the four Personalized Rapid Transit (PRT) sites at Dulles International Airport. The PRT systems were operated individually to establish the signal characteristics of each system. A spectrum analyzer was used to view the frequency spectrum broadband prior to recording and a Polaroid scope camera was used in conjunction with the spectrum analyzer to photograph signals between 50KHz and 50MHz. This frequency range was sufficiently broad to cover all command and control frequencies of the four PRT systems.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 36p; See also Volume 4, PB-233 195, and Volume 5, PB-233 197.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233196/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233196/AS

17 057915 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME IV. MONOCAB SYSTEM.

An X-Y plot is made of the radiated Electromagnetic signals and noise between 1 KHz and 50KHz at each of the four Personalized Rapid Transit (PRT) sites at Dulles International Airport. The PRT systems were operated individually to establish the signal characteristics of each system. A spectrum analyzer was used to view the frequency spectrum broadband prior to recording and a Polaroid scope camera was used in conjunction with the spectrum analyzer to photograph signals between 50KHz and 50MHz. This frequency range was sufficiently broad to cover all command and control frequencies of the four PRT systems.

Jamison, EE ;

National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 54 pp; See also Volume 3, PB-233 194, and Volume 5, PB-233 196.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233195/7); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233195/AS

17 057916 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME III. FORD SYSTEM. An X-Y plot is made of the radiated Electromagnetic signals and noise between 1 KHz and 50KHz at each of the four Personalized Rapid Transit (PRT) sites at Dulles International Airport. The PRT systems were operated individually to establish the signal characteristics of each system. A spectrum analyzer was used to view the frequency spectrum broadband prior to recording and a Polaroid scope camera was used in conjunction with the spectrum analyzer to photograph signals between 50KHz and 50MHz. This frequency range was sufficiently broad to cover all command and control frequencies of the four PRT systems.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 54p; See also Volume 2, PB-233 193, and Volume 4, PB-233 195.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233194/0); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233194/0

17 057917 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME II. DA-SHAYEYOR SYSTEM. An X-Y plot is made of the radiated Electromagnetic signals and noise between 1KHz and 50KHz at each of the four Personalized Rapid Transit (PRT) sites at Dulles International Airport. The PRT systems were operated individually to establish the signal characteristics of each system. A spectrum analyzer was used to view the frequency spectrum broadband prior to recording and a Polaroid scope camera was used in conjunction with the spectrum analyzer to photograph signals between 50KHz and 50MHz. This frequency range was sufficiently broad to cover all command and control frequencies of the four PRT systems.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. Jan. 1974, 59p; See also Volume 1, PB-233 192, and Volume 3, PB-233 194.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233193/2); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233193/AS

17 057918 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PERSONALIZED RAPID TRANSIT SYSTEMS AT 'TRANSP0 72'. VOLUME I. An X-Y plot is made of the ambient radiated electromagnetic signals and noise between 1KHz and 50KHz at Dulles International Airport for the purpose of assessing the local environment at each of the four Personalized Rapid Transit (PRT) sites prior to operation of each system. A Polaroid scope camera was used in conjunction with a spectrum analyzer to photograph signals between 50KHz and 50MHz. The purpose of the measurements program was to establish some base line information on the electromagnetic signal characteristics

in the Dulles area in the event there was an interaction between the PRT Command and Control Systems and the Federal Aviation Administration Air Traffic Control equipment. The measurements obtained during this series of tests will be used for a comparison with data obtained under the same conditions first with each system operating individually and then with all four systems operating simultaneously.

Jamison, EE ; National Scientific Laboratories, Incorporated Final Rpt. 7401, 78p; See also Volume 2, PB-233 193.; Contract DOT-TSC-375; ACKNOWLEDGMENT: NTIS (PB-233192/4); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233192/AS

17 071764 SERVICE AND CAPACITY OF PEOPLE MOVER SYSTEMS. People mover systems are being advocated as solutions to a wide range of urban transportation problems, including internal circulation within activity centers. People movers are most applicable where trip demands are uniform without extreme peaks, and concentrated at definitive node points well beyond acceptable walking distances. This type of trip pattern occurs at most airports and some activity centers but is not common within the typical central business district. Internal trip patterns within CBD's are comprised of many short multipurpose trips with high peaking characteristics and dispersed rather than concentrated desire lines. Trip patterns of this type are best accommodated by walking. Enhancement of pedestrianism within appropriate activity centers, by providing pedestrian only precincts and grade-separated convenience networks are practical and viable alternatives for improving their internal circulation. Many cities are implementing programs of this type.

Fruin, JJ *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE3, 9942, Aug. 1973, pp 489-497, 2 Fig., 1 Tab., 14 Ref.; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

17 071801 TRANSURBAN SYSTEM. The design of new urban transportation systems must take many factors into consideration, including passenger comfort and safety, reliability and cost of service, economy of operation and installation, integration with existing modes of transportation, varying capacity requirements during peak and off-peak hours, need for low exhaust and noise pollution, and compatibility with a city's character. This paper describes one system which tries to meet these requirements, the Transurban system developed by Krauss-Maffei. Use of 12-passenger vehicles enables the make up of varying train lengths to meet fluctuating demand up to about 15,000 passengers/h. The vehicles are elevated and powered by electromagnets controlled by an electronic system and propelled by linear induction motors.

Rieser, E ; Society of Automotive Engineers Preprint N740144; ACKNOWLEDGMENT: EI (EI 74 805718); ORDER FROM: ESL, Repr PC, Microfilm

17 072045 SOCIAL ASSESSMENT OF NEW LOCAL TRANSPORT SYSTEMS [Gesellschaftliche Beurteilung von Neuen Nahverkehrssystemen]. The Battelle Institute, Prognos AG Basel and the SNV Hamburg made a social

assessment of the introduction of new personal rapid transit systems (Kabinen-Bahn). This report considers questions of demand (objective demand and individual willingness for using rapid transit) and it considers the effect of construction and operation of new local transportation systems on various aspects of life and on future urban development. The report defines the parameters of new systems and studies their economic and social benefits on a long-term basis. It investigates urban areas in which new transit systems should be introduced and tested first and it studies the problems that might arise from introducing such new systems. [German]

Battelle-Institut e.V., West Germany 1974, 41 pp, 1 Fig.; ACKNOWLEDGMENT: TSC

17 072111 ON THE GO-URBAN IMMEDIATE CAPACITY TRANSIT SYSTEM PROGRAM. The legislature of Ontario, Canada is informed by the Minister of Transportation that the contract with the German company Krauss-Maffei for the Go-Urban Demonstration Program at C.N.E. has been terminated. The Ontario Transportation Development Corporation, OTDC, takes over existing research and development data. Ontario will have free access to the Krauss-Maffei test tracks and equipment in Munich. Ontario investment in a demonstration track can therefore be postponed. The future program will be Canadian directed. McDonnell Douglas will share cost and collaborate with ATDC. The new agreement between Ontario, OTDC and Krauss-Maffei is attached to the minister's statement.

Rhodes, J ; Ministry of Transport, Canada Nov. 1974, 10 pp; ACKNOWLEDGMENT: TSC; ORDER FROM: Ministry of Transport, Canada, Tower C, Place de Ville, Ottawa, Ontario, Canada Repr. PC

17 072129 CURRENT TREND AND PROBLEMS CONCERNING NEW TRAFFIC SYSTEMS. In this report the author offers abstracts and his personal opinions of the various new transportation systems discussed in the ECMT conference, June 1973, Paris. As far as Japan is concerned the new transportation system must provide the following: elimination of harmful exhausts, low noise pollution, low energy consumption, safe, public needs, punctuality, low man power, comfort, economy, versatile construction, and attractive design. The method which advocates the division of Personal Rapid Transit and People Mover, and Johns Hopkins University's Fast Transit Link System and Collection and Distribution System may solve some of the traffic problems readily, but lack the long range solution the Japanese transportation authorities seek. The author finds the guideway system the most attractive system among those discussed at the conference. A brief review of available Japanese technology on the guideway system (the KCV, MAT, VONA and Palento-lai) is presented, and Momo-tai New Town, commercial area in Kobe, and Okinawa Oceanographic Fair sight are possible areas for pilot programs. America is the leading researcher on the guideway system (PRT and TTI). Europe is concentration their efforts on High Speed Surface Transit, TRANSRAPID, TRAKSURBAN, CABINEN-TAXI, H-BAHN, TREDIM, VAL, AEROTRAIN, ARAMIS, URBA systems are discussed. [Japanese]

Japanese Road Association Jan. 1974, 21 pp, Figs.; This study was sponsored by the Japanese Ministry of Construction.; ACKNOWLEDGMENT: TSC; ORDER FROM: Japanese Road Association, 3-3-3, Kasumigaseki, Chiyoda-ku, Repr. PC Req. Price

17 072499 PERSONAL RAPID TRANSIT SYSTEMS. Starting with the Urban Mass Transportation Act of 1964, the federal government has sponsored development of transportation alternatives to the automobile in dispersed metropolitan areas, systems which have come to be known as Personal Rapid Transit. This paper discusses the PRT programs of the Urban Mass Transportation Administration, system design requirements as identified in the various studies, PRT performance specifications (including capacity, and speed), and the major subsystems—suspension/propulsion/guideway and command/control. The author concludes that many configurations need to be examined in arriving at optimum designs.

Blood, B (Transportation Systems Center); Institute of Electrical and Electronics Engineers, (74 CHO 833-41A) Proceeding Part II, 1974, pp 729-733, 3 Ref.; This paper was presented at the Ninth Annual Meeting of the IEEE Industry Applications Society, Pittsburgh, Pennsylvania, 7-10 October 1974.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

17 072501 THE APPLICATION OF LEVITATED VEHICLES TO URBAN RAPID TRANSIT. It is generally conceded that transportation looms large in any list of problems affecting our major urban areas. As we search for solutions to such problems, it appears that rapid transit will be called upon to play an increasing role. With the growth in rapid transit construction and expansion, a variety of new systems and system proposals has followed. Of the many types, the levitated vehicle system (LVS) has substantial advantages because of the reduced weight resulting from the elimination of wheels, trucks, and axles. This paper examines these levitated systems in more detail, and explores the advantages and disadvantages they may have in urban rapid transit service.

Miller, DR Sulkin, MA Holden, WH (Daniel, Mann, Johnson, Mendenhall); Institute of Electrical and Electronics Engineers, (74 CHO 833-41A) Proceeding Part II, 1974, pp 701-723, 14 Fig., 9 Ref.; This paper was presented at the Ninth Annual Meeting of the IEEE Industry Applications Society, Pittsburgh, Pennsylvania, 7-10 October 1974.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

17 072689 AN EVALUATION OF THE DYNAMICS OF A MAGNETICALLY LEVITATED VEHICLE. An analytical and experimental evaluation was made of the stability and dynamic characteristics of a small scale magnetically levitated vehicle. The vehicle was levitated over a variety of guideway perturbations in an attempt at stimulating unstable modes of oscillation. No instabilities developed in the five degrees of freedom measured using either passive or active damping. The analytical model was used to simulate the observed motions of the vehicle using a computer. Reasonable agreement was found although more damping was observed than

was simulated using the model. This work was performed as a part of the Federal Railroad Administration's program of research and development on high speed ground transportation for use in intercity passenger service.

Coffey, HT Colton, JD; Stanford Research Institute, (No. 1080) Final Rpt FRA-ORD&D-74-41, Mar. 1974, 160 pp, 75 Fig., 4 Tab., 8 Ref., 2 App.; Related reports are NTIS PB-221696, Study of a Magnetically Levitated Vehicle, and NTIS PB-210505, The Feasibility of Magnetically Levitating High Speed Ground Vehicles. Research was sponsored by Federal Railroad Administration, office of Research Development and Demonstration.; Contract DOT-FR-10001; ACKNOWLEDGMENT: FRA; ORDER FROM: NTIS, Repr. PC; PB-236671, DOTL NTIS

17 072708 ELECTRIC LINEAR MOTOR URBAN TRANSPORTATION SYSTEM. An urban transportation system is outlined which is based on linear motor-driven electromagnetically suspended vehicles. A parallel connected linear motor is described that permits speed control and other unique operating features for the system as a whole.

Lamb, C *Electrical Engineer* Vol. 51 No. 1, Jan. 1974, pp 6-8; ACKNOWLEDGMENT: EI (EI 74 065260); ORDER FROM: ESL, Repr. PC, Microfilm

17 072854 AEROSPACE INVESTORS ARE TAKEN FOR A RIDE. In the late 1960s several US aerospace companies diversified into ground transport, an area where it seemed that high-powered research and development would quickly satisfy a vast market for innovative technology. A stockbroker has analysed the financial results and comments in annual reports of the companies concerned.

Railway Gazette International Vol. 130 No. 10, Oct. 1974, pp 389-392, 4 Phot. ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: XUM, Repr. PC

17 072955 LATEST DEVELOPMENTS AFFECTING MAGNETIC LEVITATION VEHICLES. Prompted by the hope that a novel high-speed ground transportation mode might permit speeds up to 500 kph, worldwide research has more and more concentrated on contact-free track-guided levitation techniques, especially since technical advances have been made in control techniques and data processing. In the German Federal Republic, activities are mainly concentrated on magnetic levitation with groups separately working on electro-dynamic suspension and on electromagnetic suspension techniques. The principles have been shown applicable to railway-type operations. There are still a multitude of problems to be solved. Railways should continue to promote the wheel-on-rail technology, it was concluded.

Lehmann, H (German Federal Railway) *Rail International* No. 10, Oct. 1974, pp 629-637, 6 Ref.; ORDER FROM: ESL, Repr. PC, Microfilm

17 074339 A DEMONSTRATION PROJECT IN URBAN AIR TRANSPORTATION. A Demonstration Project in Urban Transportation is proposed which will prove the technical feasibility, determine operational procedures, test

interfaces with (and effects on) other transportation modes, and prove economic viability, public service, public safety and public acceptance of integrated STOL/VTOL aircraft operation in future urban transportation systems everywhere. The detailed experiments, measurements and results will be documented and analyzed so that this Demonstration Project will supply a sound basis for action on many of the various critical transportation problems confronting urban areas throughout the country.

New York Airways, McDonnell Douglas None, July 1967; ACKNOWLEDGMENT: FLIGHT TRANSPORTATION LAB MIT (FTL 6-1); ORDER FROM: Massachusetts Institute of Technology

17 080045 PERSONAL RAPID TRANSIT (PRT) SYSTEM FOR LAS VEGAS, NEVADA. Las Vegas, Nevada is one of the ideal urban environments for a Personal Rapid Transit (PRT) System. The city operates on a "round the clock" basis and highway traffic congestion is becoming severe with the growth of tourism. The principal industry is tourism and a fare structure can be imposed which will make a PRT system self-supporting. A PRT system is described which meets the anticipated Las Vegas requirements of 24h/day operation, vehicle and service being designed to compete favorably with the automobile. The PRT system elements described include vehicle, guideway, control features, stations, and maintenance facility. The results of a maintenance plan analysis and financial considerations are also discussed.

Hoit, WJ (Monocab Incorporated) Corey, RW; Society of Automotive Engineers Preprint N 740625, 1974, 19 pp; This paper was prepared for a meeting 12-16 August 1974.; ACKNOWLEDGMENT: EI (EI 74 065266); ORDER FROM: ESL, Repr. PC, Microfilm

17 080097 THE SYNCHRONOUS MOVING-CELL CONTROL PHILOSOPHY FOR AUTOMATED TRANSPORTATION SYSTEMS. One of the major factors influencing the capacity of any mode of transport is the degree of control that can be exerted over individual vehicles. For this reason, a system of discrete driverless vehicles traveling on a network of automated single-lane guideways, is seen by many as one possible solution to the problem of congestion in densely populated urban areas. In this paper, the authors discuss the benefits and limitations of the synchronous moving-cell control philosophy that has been developed in recent years as a method of controlling vehicles in such automated systems. The problems of controlling a stream of vehicles, both on an automated main-line guideway and at a merge point, are examined in detail and the advantages of the synchronous moving-cell concept over alternative control schemes are illustrated. Finally, the authors consider some of the practical problems which would arise when implementing such a scheme.

Rumsey, AF Powner, ET (Manchester University Inst of Sci & Tech, England) *Transportation Planning and Technology* Vol. 2 No. 3, 1974, pp 157-164, 6 Fig., 21 Ref.; ACKNOWLEDGMENT: Transportation Planning and Technology; ORDER FROM: ESL, Repr. PC, Microfilm

17 080218 DISPOSITION OF EMPTY VEHICLES IN A PERSONAL RAPID TRANSPORTATION. A basic vehicle management function, associated with operation of a Personal Rapid Transit (PRT) System, is that of continually redistributing empty vehicles throughout the system. In this report a procedure for performing this function is developed and evaluated. The procedure, carried out periodically (e.g. every few minutes) consists of three steps: (a) estimation of the surplus or deficit of empty vehicles at each station; (b) allocation of surpluses to deficits; and (c) preparation of a dispatch list for each station, based on the allocations, the list giving the disposition of successive empty vehicles as they become available. Two computer simulations were constructed to evaluate the procedure. Simulation runs demonstrated that the procedure worked well.

Waddell, MC Williams, MB Ford, BM ; Johns Hopkins University, Silver Spring, Urban Mass Transportation Administration Final Rpt. APL/JHU-TPR-028, May 1974, 132 pp; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS (PB-236015/4SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236015/4SL, DOTL NTIS

17 080974 PERSONAL RAPID TRANSIT II. PROGRESS-PROBLEMS-POTENTIAL. This collection of over 60 papers was presented at the 1973 International Conference on Personal Rapid Transit in Minneapolis, Minnesota. PRT is the class of fixed-guideway systems in which automated vehicles no larger than small automobiles carry people and/or goods nonstop between any pair of stations in a network of slim guideways that serve major activity centers or may span an entire urban area. There is great emphasis on technological issues with relatively little attention given to issues involved with planning, economics, implementation and the implications of PRT for urban society. The papers are classified in ten sections in the volume.

Minnesota University, Minneapolis Dec. 1973, 645 pp, Figs., Tabs., Refs.; These papers were presented at the International Conference on the Personal Rapid Transit, 1973; ORDER FROM: Minnesota University, Minneapolis, Department of Audio Visual Extension, Minneapolis, Minnesota, 55455 Repr. PC

17 081295 ELECTROMAGNETIC ENVIRONMENT MEASUREMENTS OF PRT SYSTEMS AT "TRANSPO 72", VOLUME III--FORD SYSTEM. An X-Y plot is made of the radiated electromagnetic signals and noise between 1 KHz and 50 KHz at each of the four Personalized Rapid Transit (PRT) sites at Dulles International Airport. The PRT systems were operated individually to establish the signal characteristics of each system. A spectrum analyzer was used to view the frequency spectrum broadband prior to recording and a Polaroid scope camera was used in conjunction with the spectrum analyzer to photograph signals between 50 KHz and 50 MHz. This frequency range was sufficiently broad to cover all command and control frequencies of the four PRT systems. The purpose of the measurements program was to establish some base line information on the electromagnetic signal characteristics in the Dulles area in the event there was an interaction between the PRT Command and Control systems

and the Federal Aviation Administration Air Traffic Control equipment. The measurements obtained during this series of tests will be used for a comparison with data obtained with no PRT systems operating and later with all four systems operating simultaneously.

Jamison, EE ; National Scientific Laboratories, Incorporated, (TSC-UMTA-73-15,III) Final Rpt. UMTA-MA06-0031-73III, Jan. 1974, 56 pp; Contract DOT-TSC-375,3; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche

17 081908 CRASHWORTHINESS FOR HIGH-CAPACITY PERSONAL RAPID TRANSIT VEHICLES. This study is concerned with the design of crashworthy vehicles for high-capacity personal rapid transit (PRT) systems. PRT systems offer on-demand, non-stop service from origin to destination over an extensive network of exclusive guideways. Proposed high-capacity PRT systems operate at fractional second headways. The necessity for such short headway operation has resulted in concern for passenger safety in high-capacity PRT. This study is undertaken to establish guidelines for the design of PRT vehicles in which passengers would not be seriously injured even under the conditions of a worst case collision. It is established that even in the case of a collision with a fixed unyielding barrier, adequate passenger protection can be obtained using existing technology provided impact velocities do not exceed 30 to 40 m.p.h. /UMTA/

Gerrard, WL Caudill, RJ Rushfeldt, TR ; Minnesota University, Minneapolis, (MN-11-0037) UMTA-MN-11-0037-74-1, Oct. 1974, 121 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239104/AS

17 082724 THE MOD: A MODULAR URBAN TRANSPORTATION SYSTEM. The MOD is described as an urban transportation system which is based on a very small, two-passenger automotive rental vehicle using existing city roadways at the exclusion of the private passenger car. The proposed units of the MOD system have an empty weight of 300 pounds and have provisions for easy vertical parking. The MOD system is proposed as a self-supporting operation, run by private enterprise as a public utility. The urban transportation offered by the MOD system generates the set of institutional problems involved in proposals which exclude the private passenger car from the city. /Author/

Protopapa, S *IEEE Transactions on Aerospace & Electronic System* Vol. 10 No. 6, Nov. 1974, pp 805-810

17 082997 CABTRACK: COMMUNICATIONS AND CONTROL INSTRUMENTATION FOR A ONE-FIFTH SCALE TEST TRACK. Cabtrack is a proposed high-density urban transport system in which four seat electrically powered vehicles run on a network of segregated tracks under automatic control. A principle of position-lag slot control is discussed whereby vehicles would operate in synchronism with each other on main tracks, but change to asynchronous operation after diverting into a station loop. A one-fifth scale model cabway was constructed to develop and test the methods of control. The communication and control instru-

mentation which was developed to enable up to 14 cabs to operate under the control of a small digital computer is described. The model cabway was successfully operated with 6 cabs of length 66 cm running at 2 m/s with headways of 54 cm (equivalent to a flow of 4000 cabs per hour on a track which is 70% occupied) thereby demonstrating a viable system of control which could be developed for use with various types of vehicle on segregated tracks. (Author)

Gibbs, EW Leedham, HC ; Royal Aircraft Establishment, (BR39806) RAE-TR-73169, Mar. 1974, 45 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; N75-10867/0SL, DOTL NTIS

17 084719 ACCEPTABILITY OF PERSONAL RAPID TRANSIT (P.R.T.) IN EXISTING RESIDENTIAL AREAS. Personal Rapid Transit (P.R.T.), with access points within walking distance from the home, is often put forward as the principal alternative transport mode to the private car in urban areas. This paper examines the aesthetic, accessibility and constructional implications of developing such a system in existing residential areas and concludes that serious problems would be encountered along most existing residential roads which would seriously limit its extensive implementation.

Leake, GR (Leeds University, England) *Intl J Environmental Studies* Vol. 6 No. 2/3, 1974, pp 137-152, 16 Fig., 3 Tab., 18 Ref.; ACKNOWLEDGMENT: International Journal of Environmental Studies; ORDER FROM: ESL, Repr. PC, Microfilm

17 090174 PARAMETER OPTIMIZATION STUDIES OF MAGNETIC SUSPENSIONS FOR HIGH SPEED GROUND TRANSPORTATION. The study investigates efficient, cost-effective methods of high speed ground transportation for intercity travel. Previous aspects of the program have demonstrated the technical feasibility of two types of magnetic suspensions (the attractive-force, and the repulsive-force suspensions) for such applications, and have developed a baseline design for a TMLRV (tracked magnetically levitated research vehicle). The attractive force suspension considers the development of a mathematical model which predicts the magnetic behavior of the magnet-rail system for high speed, and a parameter optimization of the magnet. The repulsive-force suspension examines various track geometries to see if the amount of aluminum in the track could be reduced without loss of performance. Experimental studies have been carried out to support the analytical aspects of the program.

Borcherts, RH Davis, LC Wan, CC Mohdulla, AU Reitz, JR ; Ford Motor Company, Federal Railroad Administration Final Rpt. FRA-ORD&D-74-42, Apr. 1974, 159 pp, 74 Fig., Tabs., 15 Ref., 2 App.; Related reports include NTIS PB 223237 "Preliminary Design Studies of Magnetic Suspensions for High Speed Ground Transportation" (Ford Motor Co.) and FRA-ORD&D-74-41 "An Evaluation of the Dynamics of a Magnetically Levitated Vehicle" (SRI); Contract DOT-FR-10026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238773/6ST, DOTL NTIS

17 090189 SURVEY OF PRT VEHICLE MANAGEMENT ALGORITHMS. The document summarizes the results of a literature survey of state of the art vehicle management algorithms applicable to Personal Rapid Transit Systems (PRT). The surveyed vehicle management algorithms are organized into a set of five major component subcategories: network routing, merge control, empty vehicle management, station management, and blocked segment management. The classification scheme enables the comparison and description of algorithms in common terms. One intent of the survey was to form a data base for system designers and users. Another intent was to use the results of the survey to aid in designing a simulation model to evaluate and develop PRT vehicle management algorithms.

Priver, AS ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-74-10, Sept. 1974, 100 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238942/7ST, DOTL NTIS

17 090453 DUAL MODE TRANSIT SYSTEM, PHASE I. The report describes a dual mode transit system, demonstrates the rationale for design and presents a summary of activities undertaken to develop the system. It documents results of research which combines a demand-activated, high-speed system using pallet transporters that move on a guideway with a feeder bus system that retains flexibility through the use of dial-a-ride. Chapters include discussion of user scenarios, command, control and communication system, malfunction detection, on-guideway vehicle longitudinal and lateral control, vehicle, guideway, system capacity and future expansion, stations, maintenance, environmental impact, safety, reliability, maintainability, availability, and a cost analysis summary.

Transportation Technology Incorporated, Urban Mass Transportation Administration, (UMTA-CO-06-0006) Final Rpt. June 1974, 462 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239841/0SL

17 090471 DUAL MODE TRANSIT SYSTEM, APPENDIX A-E. This volume contains the following information: applicable documents; lists of abbreviations; chassis structure calculations; determination of ratio of buses to transporter required for DMTS; bid specifications-Mercedes Benz diesel bus model 0309D.

System Development Corporation, Urban Mass Transportation Administration, (UMTA-CO-06-0006) Final Rpt. June 1974, 48 pp; See also PB-239 893.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239892/3SL

17 090472 DUAL MODE TRANSIT SYSTEM, APPENDIX F: THE INTERACTION OF DMTS DEMAND AND SERVICE LEVELS. The purpose of the study is to determine likely demand for and operational strategies of the Dual Mode Transit System when implanted in a realistic urban environment. Various large U.S. cities were investigated and the Washington, D.C. and Houston metropolitan areas were chosen as most suitable. A computerized model was built to simulate trip generation, trip distribution and

modal split for any urban area subdivided into a manageable number of zones (20-100). Required input consists of travel time matrices for conventional and DMTS modes, as well as economic and demographic information about each zone. Demand for the DMTS was simulated by trip purpose and time of day. Station and link loads were calculated. Likely service strategy options were identified for different times of day, various trip purposes, and various locations.

Stern, M Jones, T ; International Research and Technology, Urban Mass Transportation Administration, Transportation Technology, Incorporated, (UMTA-CO-06-0006) Final Rpt. IRT-349-R, June 1974, 171 pp; Prepared in cooperation with Transportation Technology, Inc., Denver, Colo. See also PB-239 894.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239893/1SL

17 090536 DUAL MODE POTENTIAL IN URBAN AREAS. The purpose of this study was to determine the potential national applicability of an urbanwide Dual Mode system. The system, consisting of a mixed fleet of specially designed small personal vehicles and 12-passenger dial-a-ride minibuses operating on local streets and on a network of guideways, was examined in three hypothetical urbanized areas reflecting a broad spectrum of 1990 city types. After determining system cost and ridership in each scenario, Dual Mode's applicability as an urbanwide system was determined on the basis of three criteria: the abstract city's ability to pay for the system, the regional cost-benefit characteristics of Dual Mode, and the degree of need for additional high-capacity transportation facilities within the abstract city. The classification of the abstract cities as definite or doubtful candidates for Dual Mode was used to generate population-based applicability ranges, which in turn were used to identify the urbanized areas where Dual Mode appears to have definite or possible potential.

Heaton, C Barber, J Benjamin, P Paules, G Ward, DE ; Transportation Systems Center Final Rpt. DOT-TSC-OST-74-20, Feb. 1975, 91 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240411/9ST

17 090556 OPERATIONAL POTENTIAL OF SUSPENDED VEHICLE SYSTEMS (SVS). Earlier high speed ground transportation (HSGT) studies have confirmed the feasibility of high speed suspended vehicle systems (SVS). This study determines the operating regimes within which the SVS offers potential advantages over other HSGT alternatives such as high speed rail (HSR) and tracked air cushion vehicle (TACV) systems. Each system type provides an equal level of transportation service for typical high speed applications, including 200 mile intercity and 40 mile airport access corridors. Various design options concerning guideway supporting structures for above, below and at-grade construction are examined considering costs and planning and community preferences for each basic land use category. Collocation with existing transportation corridors offers the potential of significantly reduced right-of-way costs and less negative impact on the surrounding community.

Walston, TC Graham, HR Dietrich, WH ; TRW Transportation and Environmental Operations, Federal Railroad Administration Final Rpt. 96034-L012-0, Apr. 1974, 193 pp; Contract

DOT-FR-30004; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240653/6ST, DOTL NTIS

17 090570 SUSPENDED VEHICLE SYSTEMS (SVS). VOLUME 1, SYSTEM ENGINEERING STUDIES. This report discusses generic high speed ground transportation (HSGT) vehicles which are suspended from an overhead guideway. The performance and cost are predicted for trainable revenue vehicles which would use the overhead monorail principle and operate in the 150 to 250 mph speed regime. These vehicles and the necessary elevated guideway structure comprise the suspended vehicle system (SVS), which is an alternative to overriding HSGT systems, such as the tracked air cushion vehicle (TACV) or high speed rail (HSR) systems. The unique feature of the SVS is the vehicle pendulous suspension used to achieve large cabin bank angles (up to 25 degrees) in order to achieve high speeds on curved guideway alignments. The results of system studies are described in which the vehicle and guideway concepts are developed to satisfy the performance and safety requirements.

Meisenholder, SG McGinnis, NF Graham, HR ; TRW Transportation and Environmental Operations, Federal Railroad Administration Final Rpt. 96034-L011-0-Vol-1, Apr. 1974, 207 pp; See also Volume 2, PB-240 760.; Contract DOT-FR-30004; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240759/1ST, DOTL NTIS

17 090571 SUSPENDED VEHICLE SYSTEMS (SVS). VOLUME 2, SUPPORTING ANALYSES FOR SYSTEM ENGINEERING STUDIES. This report describes supporting analyses for the investigation of generic high speed ground transportation (HSGT) vehicles which are suspended from an overhead guideway. Various problems are considered which apply to the design and operation of mass transportation vehicles which would use the overhead monorail principle for operation in the 150 to 250 mph speed regime. These vehicles and the necessary elevated guideway structure comprise the suspended vehicle system (SVS), which is an alternative to overriding HSGT systems, such as the tracked air cushion vehicle (TACV) or high speed rail (HSR) systems. The unique feature of the SVS is the vehicle pendulous suspension used to achieve large cabin bank angles (up to 25 degrees) in order to achieve high speeds on curved guideway alignments.

Meisenholder, SG ; TRW Transportation and Environmental Operations, Federal Railroad Administration Final Rpt. 96034-L011-0-V61-2, Apr. 1974, 215 pp; See also Volume 1, PB-240 759.; Contract DOT-FR-30004; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240760/9ST, DOTL NTIS

17 091066 SUPERCONDUCTING MAGNET SUSPENSIONS IN HIGH SPEED GROUND TRANSPORT. There are a number of magnetic suspensions of which superconducting suspensions are a subset. In these suspensions the movement of the vehicle is used to induce currents in a conducting track which then interacts with the magnets on the vehicle to produce a repulsive suspension force. This work provides a technical

and economic definition of high speed ground transport systems using these suspensions. The full range of common superconducting suspensions and of propulsions are covered with designs produced for speeds ranging from 100 m/s (225 miles/hr) to 250 m/s (560 mile/hr). For operating cost evaluation, throughputs ranging from one to thirty million seats per annum, each way, are considered. Technical descriptions of the vehicles, their suspensions, propulsions and tracks are given in some detail and operating costs are presented for all the systems together with details of the breakdown of costs and the capital costs involved.

Alston, IA ; Cranfield Center for Transport Studies CTS-5, Aug. 1973, 136 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239012/8ST, DOTL NTIS

17 091082 SOME APPLICATIONS OF CRYOGENICS TO HIGH SPEED GROUND TRANSPORTATION. The current status (December 1972) of worldwide research on high speed ground transportation techniques is reviewed. Particular attention is given to studies of magnetic levitation using superconducting magnets, including comparison with alternative magnetic techniques and with air suspension systems. Superconducting levitation appears to be a strong contender in the U.S. Department of Transportation hopes to select in the late 1970's the best of the possible levitation techniques for subsequent advanced development. Cryogenic engineering research needed in support of major development of a superconducting levitated system is identified.

Arp, VD Clark, AF Flynn, TM ; National Bureau of Standards, (NBS-2750101) Tech. Note NBS-TN-635, Feb. 1973, 29p; Previously announced as COM-73-50439 and COM-73-50494.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; COM-75-10177/4ST, DOTL NTIS

17 091186 TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION (A BIBLIOGRAPHY WITH ABSTRACTS). Data relative to the design, dynamics, and feasibility of tracked air cushion vehicles and magnetic levitation systems are presented in these Government-sponsored research reports. Approximately 70 abstracts are included in this bibliography.

Habercom, GEJ ; National Technical Information Service Jan. 1975, 75 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-75/114/9ST, DOTL NTIS

17 091350 ANALYSIS OF DUAL MODE SYSTEMS IN AN URBAN AREA. VOLUME IVB: PROGRAM DOCUMENTATION OF THE TRANSPORTATION ECONOMIC ANALYSIS MODEL (CONTINUED). The contents are; highway-transit cost program; team model users guide; compiled listings-new system cost program.

Benjamin, P ; Transportation Systems Center Final Rpt. DOT-TSC-OST73-16AV4B, Dec. 1973, 245p; Revision of report dated Apr 73. See also Volume 4A, PB-241 361, and Volume 4C, PB-241 363.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241362/3ST

17 091351 ANALYSIS OF DUAL MODE SYSTEMS IN AN URBAN AREA. VOLUME IVC: PROGRAM DOCUMENTATION OF THE TRANSPORTATION ECONOMIC ANALYSIS MODEL (CONCLUDED) [Final rept. Aug 71-Aug 72]. The contents are: Appendix B-Detailed flow diagrams-new systems cost program; Appendix C and D-Typical input and output data-new system cost program; Appendix E-Compiled listings-highway transit cost program; Appendix F and G-Typical input and output data-highway transit cost program; Appendix H-Offline plot program.

Benjamin, P ; Transportation Systems Center, Cambridge, Mass. ol-4C DOT-TSC-OST-73-16A-V, Dec. 1973, 193p; Revision of report dated Apr 73. See also Volume 4B, PB-241 362.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MFS\$2.25; PB-241363/1ST

17 092034 TEST AND EVALUATION OF AN EDDY CURRENT CLUTCH/BRAKE PROPULSION SYSTEM. This report covers the Phase II effort of a program to develop and test a 15 hp eddy-current clutch propulsion system. Included in the Phase 2 effort are the test and evaluation of the eddy-current clutch propulsion system on board a test vehicle. The test vehicle was designed and built to be compatible with an existing monorail track and was instrumented for the duration of the test program.

Adams, GJ ; Mobility Systems and Equipment Company, Urban Mass Transportation Administration Final Rpt. Phase 1, DOT-TSC-UMTA-74-14, Feb. 1975, 98 pp; See also report on Phase 1 dated Oct 73, PB-225 093/4.; Contract DOT-TSC-357; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242686/4ST, DOTL NTIS

17 092154 DYNAMIC INTERACTIONS OF PRT VEHICLES AND ELEVATED GUIDEWAYS. The study provides an analytical basis for preliminary design of Personal Rapid Transit (PRT) system guideways and vehicle suspension systems. Careful attention has been given to the development of high fidelity mathematical models of PRT vehicle dynamics, including primary and secondary suspension systems. The report presents the equations of motion of a nine degree of freedom vehicle model traversing a moving guideway. Also included are the equations of small elastic vibration for both straight and curved elevated guideways, modeled as elastic beams. Vehicle and guideway equations are combined for purposes of system stability analysis and simulation.

Likins, PW ; California University, Los Angeles, Department of Transportation Final Rpt. UCLA-ENG-75-23, DOT/TST-75/104, Mar. 1975, 51 pp; Contract DOT-OS-40080; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243655/8ST, DOTL NTIS

17 092423 ANALYSIS OF POSITION ERROR HEADWAY PROTECTION. An analysis is developed to determine safe headway on PRT systems that use point-follower control. Periodic measurements of the position error relative to a nominal trajectory provide warning against the hazards of overspeed and unexpected stop. A computer program has been developed to model these hazards for arbitrary safety system design

parameters. The results of computer runs indicate that the critical hazard on the main guideway is unexpected stop of a preceding car; on a station entry deceleration ramp, it is overspeed of a following car. The deceleration ramp headways are larger and are more sensitive to system parameters than are the main guideway headways. Typical headways are five seconds on a 30 mph main guideway and 16 seconds on a deceleration ramp for state-of-the-art system parameters. With advanced system parameters and emergency decelerations applicable to well supported, seated passengers, required headways are 2.5 seconds on the main guideway and 3.5 seconds on the deceleration ramp.

Whitten, RE ; Alden Self-Transit Systems Corporation, Transportation Systems Center, Urban Mass Transportation Administration Intrim Rpt. DOT-TSC-UMTA-75-10, July 1975, 104 pp; Contract DOT-TSC-421; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244552/6ST, DOTL NTIS

17 092454 HEADWAY SEPARATION ASSURANCE SUBSYSTEM (HSAS). This report discusses the design, fabrication, test and evaluation of a Headway Separation Assurance Subsystem (HSAS) capable of reliable, failsafe performance in PRT systems. The items designed include both hardware and software packages. These packages are applicable, with minimum modification, to any PRT system, and are designed to allow economical full-scale installation. Tests were performed at 9-3/4 mph with 8-1/3 seconds headway.

Evans, RT Cowes, K ; Alden Self-Transit Systems Corporation, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0031-75-4, DOT-TSC-UMTA-75-11, July 1975, 118 pp; Contract DOT-TSC-421; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244667/2ST

17 092992 PERFORMANCE EVALUATION OF AN AIR-LEVITATED AIR-PROPELLED, PASSIVE VEHICLE PERSONAL RAPID TRANSIT SYSTEM. An eight-passenger Uniflo vehicle was tested to 30 ft/sec on enclosed guideway through curved straight and switch sections. The following parameters were measured: ride quality, as 3 axis acceleration; noise emission as perceived by passengers and in area near guideway, vehicle acceleration and service braking, switch response time, levitation air flow and power requirements, propulsion air flow and power requirements, and performance and reliability between-20F and 90F.

Smoot, CH ; Uniflo Systems Company, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-3, June 1975, 117 pp; Prepared by Urban Mass Transportation Administration, Washington, D.C., and Transportation Systems Center, Cambridge, Mass.; Contract DOT-TSC-367; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244454/5ST, DOTL NTIS

17 093548 AUTOMATED GUIDEWAY GROUND TRANSPORTATION NETWORK SIMULATION. The report discusses some automated guideway management problems relating

to ground transportation systems and provides an outline of the types of models and algorithms that could be used to develop simulation tools for evaluating system performance. The system management problems are related to the routing and scheduling of both passengers and vehicles, as well as to control strategies such as synchronous and quasi-synchronous. The simulation outline provides background material for model descriptive, functional requirements, and simulation structure that can be used in future development activities.

Toye, CR ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-18, UMTA-MA-06-0048-75-1, Aug. 1975, 60 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-246758/7ST, DOTL NTIS

17 093564 THE AVAILABILITY SIMULATION OF AGT SYSTEMS. The report discusses the analytical and simulation procedures that were used to evaluate the effects of failure in a complex dual mode transportation system based on a worst case study-state condition. The computed results are an availability figure of merit and not an absolute prediction with associated confidence levels of system availability. The advantage of this procedure is that it avoids the use of a dynamic network traffic flow simulation which is both costly and time-consuming. The analytical and simulation approach taken encompasses fault tree and failure mode and effect analyses. The novel aspect of this approach is the use of the Monte Carlo technique to determine the physical location of failed vehicles in the system (on or off the guideway, in station berths, or at various merge/demerge sectors).

Toye, CR ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-14, UMTA-MA-06-0048-75-3, Feb. 1975, 33 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247061/5ST, DOTL NTIS

17 093733 EXPERIMENTAL AERODYNAMIC CHARACTERISTICS OF VEHICLES TRAVELING IN TUBES. A simplified theoretical model for a vehicle traveling through an unvented tube under equilibrium incompressible conditions was used to guide the test program, reduce the data, and determine the self-consistency of the results. The results were then used to establish values for the arbitrary coefficients in the theoretical model. Substantial progress was made in understanding the aerodynamic characteristics of vehicles traveling in tubes as exemplified by the good agreement of the theoretical model predictions with the experimental data throughout the Reynolds number range (three orders of magnitude, up to that for an actual full-scale system) and the many geometric variables tested. (Author)

Kurtz, DW Dayman, BJ ; Jet Propulsion Laboratory NASA-CR-143490, July 1975, 69 pp; Contract NAS7-100; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; N75-31010/2ST, DOTL/NTIS

17 094115 CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV). REPULSION SCHEME. VOLUME II. APPENDICES A-F. This report summarizes the studies of a program to establish the technology of magnetic suspension for ultimate use in a passenger-carrying high-speed ground transportation (HSGT) system-at speeds or the order of 134 m/s (300 mph). Magnetic Levitation (MAGLEV) is one of the advanced vehicle suspension concepts considered as alternatives to conventional transportation modes in the short-haul regime. This volume presents some details of the mathematical analysis associated with the MAGLEV vehicle dynamics and control (i.e., ride quality) in Appendices A through D; the noise or acoustic characteristics associated with the baseline Hamilton Standard Q-fan air propulsion system (Appendix E); and the Raytheon final report for the linear synchronous motor (LSM) studies (Appendix F).

Philco-Ford Corporation, Federal Railroad Administration, First Atomic Ship Transport, Incorporated Final Rpt. PF-TMLV-TR-0037A, FRA/ORD-75-21A, Feb. 1975, 142 pp; Prepared in cooperation with Ford Motor Co., Dearborn, Mich. Scientific Research Staff. Paper copy also available in set of 4 reports as PB-247 930-SET, PC\$22.00.; Contract DOT-FR-40024; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247932/7ST, DOTL NTIS

17 094116 CONCEPTUAL DESIGN AND ANALYSIS OF THE TRACKED MAGNETICALLY LEVITATED VEHICLE TECHNOLOGY PROGRAM (TMLV). REPULSION SCHEME. VOLUME III. APPENDIX G. 5 DOF COMPUTER PROGRAM. This report summarizes the studies of a program to establish the technology of magnetic suspension for ultimate use in a passenger-carrying high-speed ground transportation (HSGT) system-at speeds on the order of 134 m/s (300 mph). Magnetic Levitation (MAGLEV) is one of the advanced vehicle suspension concepts considered as alternatives to conventional transportation modes in the short-haul regime. This third volume contains the computer programs for the solution of the equations of motion for 5 degrees-of-freedom, and a summary of the analytical background. These programs provide the capability for performing stability analyses of magnetically levitated vehicles, and for evaluating vehicle response and ride quality characteristics for operation over guideways with irregularities. Each program is listed along with a sample run. The programs are written in BASIC language for use on time-sharing systems.

Philco-Ford Corporation, Federal Railroad Administration, Ford Motor Company Final Rpt. PF-TMLV-TR-0037B, FRA/ORD-75-21B, Feb. 1975, 93 pp; Prepared in cooperation with Ford Motor Co., Dearborn, Mich. Scientific Research Staff. Paper copy also available in set of 4 reports as PB-247 930-SET, PC\$22.00.; Contract DOT-FR-40024; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247933/5ST, DOTL NTIS

17 094484 AUTOMATED GUIDEWAY TRANSIT SYSTEMS VEHICLE-ELEVATED GUIDEWAY DYNAMICS: MULTIPLE-VEHICLE SINGLE SPAN SYSTEMS. Analysis and design techniques are described for synchronously controlled AGT vehicles crossing elevated span structures. Computer simulation programs have been developed to determine time histories of guideway deflections, moments and stresses and vehicle accelerations (peak, total rms and rms in one-third octave bands) for a string of multiple AGT vehicles crossing flexible spans with random vertical, angular, camber and surface roughness irregularities. Specific data has been developed to identify operating conditions corresponding to potential span resonant conditions. A computer-aided design program has also been developed to determine span structural requirements needed to meet stress and passenger comfort conditions. Span designs for both large and small headway operation of 4, 6 and 12 passenger AGT vehicles have been determined.

Snyder, JE, III Wormley, DN Richardson, HH ; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-11-0023) Final Rpt. EPL-81608-1, UMTA-MA-11-0023-75-1, Oct. 1975, 230 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-249353/4ST, DOTL NTIS

17 095240 MONORAIL RAILROADS AS MODERN RAPID TRANSIT SYSTEMS [Einschienebahnen als Moderne Nahverkehrsmittel]. The article reports on various kinds of monorails and their incorporation into rapid transit systems. Alweg railroads are described in detail, and technical particulars regarding the tracks and vehicles of seven realized monorails of this type are given in tables. New track developments in the US aiming at an improvement of the running and riding qualities are compared with previous designs implemented in Japan. [German]

Haubitz, G *Glaser's Annalen ZEV* Vol. 98 No. 11, Nov. 1974, pp 376-382, 15 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 095262 RIDE QUALITY AND GUIDEWAY ROUGHNESS MEASUREMENTS OF THE TRANSPO '72 PRT SYSTEMS. An extensive series of performance and evaluation tests has been conducted on the four Personal Rapid Transit (PRT) systems demonstrated at the Dulles TRANSPO '72 transportation exposition. Included among these tests were the measurement of vehicle ride quality and of guideway irregularity. In the Ride Quality tests, a portable instrumentation system developed at the applied Physics Laboratory, the John Hopkins University, was used to measure the accelerations experienced by passengers aboard the four PRT systems while operating over a wide speed range and during various modes of operation. Volunteer subjects rode the systems and these ride juries provided ratings on ride quality, appearance, safety, and convenience. Guideway Roughness and Alignment tests were conducted to determine the characteristics of the vertical and horizontal running surfaces. These tests are briefly reviewed and a sample of the results is presented. The ride quality tests show that meaningful vehicle accelerations can be measured and that the data can be successfully processed for correlation with ride

quality specifications and subjective judgments. It is shown that accelerations on the seat can be greater than those on the floor and that in some instances measured jerk values were higher than those considered to be acceptable.

Caywood, WC (Johns Hopkins University, Silver Spring) Rubinstein, N *High Speed Ground Transportation Journal* Vol. 8 No. 3, 1974, pp 213-225, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 095264 ENERGY REGENERATION AND CONVERSION EFFICIENCY IN A HYDRAULIC HYBRID PROPULSION SYSTEM. An energy storage system having a limited capacity is employed for the purpose of (i) removing the burden of acceleration from internal and external-combustion type prime movers used in rubber-tired and rail urban mass transit vehicles and (ii) providing an efficient regenerative braking system to significantly increase fuel economy during typical stop-start vehicle schedules. Energy is stored in a hydraulic accumulator which is designed to be an integral part of the propulsion system. Data from laboratory tests are presented to indicate achievable energy conversion efficiencies. Computer simulation of various size vehicles being driven over typical transit-vehicle schedules is used to estimate the reduction in vehicular emissions and energy consumption resulting from the energy storage capability. An increase in fuel economy of up to 30% and an emissions reduction of up to 36% (NO sub x) were observed for the spark-ignited prime mover. When a simple cycle, single shaft gas turbine was simulated, the maximum increase in fuel economy was 24% with up to 50% reduction in emissions.

Wojciechowski, PH (Rochester Institute of Technology) Dunn, H *High Speed Ground Transportation Journal* Vol. 9 No. 1, 1975, pp 383-392, 12 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 095446 NEW TRANSPORTATION SYSTEMS. The papers in this Record report on an intermediate-capacity transit system, station and intersection for a personal rapid transit network, feasibility of an elevated STOL-port test facility, application and development of demand-actuated transportation system, and a moving walkway. Ontario's Program for Intermediate Capacity Transit describes the Province's plan for building and testing a demonstration transit system of intermediate capacity in Toronto, the forerunner for revenue systems in major Ontario cities over the next decade. The paper on PRT networks describes an effort to develop geometric designs for high-capacity systems, stations and intersections with predictions of their performance under quasi-synchronous control at different design and operating conditions.

Transportation Research Record No. 522, 1974, 76 pp, Figs., Refs. ORDER FROM: TRB Publications Off, Repr. PC

17 095742 STRENGTH OF CONCRETE SUBJECTED TO COMPRESSION-COMPRESSION-TENSION STRESS SYSTEMS. An experimental investigation into the failure of a particular concrete subjected to stress fields varying between biaxial compression, compression-compression-tension, and uniaxial tension is

described. The results are compared with published data for related stress systems, and the shape of the failure surface in the compression-tension quadrants of stress space is shown to be of the simple hexagonal pyramid type.

Mahmood, N Hannant, DJ *ASTM Journal of Testing and Evaluation* Vol. 3 No. 2, Mar. 1975, pp 107-112

17 095819 DESIGN ANALYSIS OF STATIONS AND INTERSECTIONS OF HIGH-CAPACITY PERSONAL RAPID TRANSIT NETWORK. This paper describes an effort to develop geometric designs for high-capacity personal rapid transit links, stations, and intersections and to predict and evaluate their performance under quasi-synchronous control at different design and operating conditions. The system assumed 1-way routes and vehicle accelerations and decelerations only on the off-lines. The geometric design of off-lines at stations and intersections considers recommended normal and centripetal acceleration and jerk rates, allowable radius of curvature, required maneuver zone length, and required capacity of the off-line and the line spacing chosen. Typical conditions for a large urban area are considered. In the PRT system, vehicle queues are formed on the upstream and downstream sides of station platforms and intersection turns. The modeling, analysis, and simulation of these queues are described. The excess capacities and the sizes of queuing zones needed can be obtained from simulation results for stations and intersections of different capacities. The resulting average waiting time, the probability of vehicle rejection on the upstream side, the probability of forced switching to prevent the stopping of vehicles on the downstream side, and the achievable guideway density are given as functions of design and operating parameters. The possible trade-offs among design capacity, traffic density, length of queuing zone, and user costs involved at stations and intersections are discussed.

Thangavelu, K Berry, DS Shaefer, BM (Northwestern University, Chicago) *Transportation Research Record* No. 522, 1974, pp 10-27, 19 Fig., 4 Tab., 10 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

17 096029 THE CABTRACK URBAN TRANSPORT SYSTEM. This paper starts from the argument that improved public transport is the best way to mitigate the adverse effects of the motor car on urban life. The disadvantages of existing bus and rail system are such that a contribution would be required from a new form of transport. The features required of a new system are listed, including frequent access points, minimal waiting time, high speed and absence of interchanges. Cabtrack is one system which meets these requirements: automatic four-seater vehicle would provide a demand actuated service along a network of interconnected tracks. Design features of the cabs, cab stops and the track are presented. Methods of system control and the overall capacity of the system are discussed. The environmental impact in terms of noise, pollution and visual intrusion would be acceptable. In conclusion the advantages and disadvantages are summarized. Diagrams and photo-montages are appended to illustrate the system. /TRRL/

Langdon, MG ;

Newcastle-Upon-Tyne University, England
Conf Paper No Date, pp 77-98, 10 Fig., 4 Phot.,
1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD
208407)

17 096032 MCALPINE BACK HANG-UP HOVERTRAIN. This article describes a new suspended hovertrain design known as the bliss pendair system. The vehicle is suspended from a precast concrete box beam track. Portal frames support the track. The problems of detecting obstacles on the track and the effect of snow and ice are minimized in the enclosed track. A suction air cushion generated by a fan is formed between the platform from which the vehicle is suspended and the adjacent inside track surfaces. The platform rotates about its longitudinal axis to form a pendulum suspension which allows for the negotiation of tight curves at speed. The project, backed by a civil engineering contractor, has led to the manufacture of arbitrarily curved beams in a flexible mould. A model of the pendair system and its design detail's are given. It is envisaged that the pendair system will provide rapid urban and suburban transport with a top speed of 100 km/hr although it would be suitable for 500 km/hr vehicles. /TRRL/

Contract Journal Vol. 259 No. 4942, 1974, pp 32-33, 1 Fig., 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD 209875)

17 096396 DYNAMIC WHIP OF ELASTICALLY RESTRAINED PLATE STRIPS TO RAPID TRANSIT LOADS. A plate strip of infinite length and constant width is cantilevered on a uniform elastic support along one edge and free along its opposite edge. A normal line load of constant intensity applied across its width travels along the strip at constant speed. Using plate theory, steady state solutions for the flexural waves are derived in terms of the generalized Fourier integral. Superposition is used to simulate responses to distributed transit loads. Results are applicable to the design of cantilevered guidance panels for air cushion vehicles and also in the design of the metal plates for the linear induction motors sometimes used to power these vehicles. /Author/

Wilson, JF (Duke University) *ASME Journal of Dynamic Systems, Meas and Control* Vol. 96 No. 2, June 1974, pp 163-168, 4 Fig., 4 Tab., 7 Ref.; ORDER FROM: ESL

17 096400 A LOW SENSITIVITY MODERN APPROACH TO THE LONGITUDINAL CONTROL OF AUTOMATED TRANSIT VEHICLES. Modern control and estimation techniques are applied to the design of longitudinal controllers for automated transit vehicles. The sensitivity of dynamic response to changes in vehicle parameters and the effects of noisy sensors on control system performance are studied. A method for sensitivity reduction by augmentation of the state vector with the sensitivity vector is proposed and low sensitivity design is developed which provides excellent dynamic response over a wide range of operating conditions and vehicle parameters. /Author/

Yang, SC (Honeywell, Incorporated) Garrard, WL (Minnesota University, Minneapolis) *ASME Transactions* Vol. 96 No. 2, June 1974, pp 218-228, 13 Fig., 4 Tab., 15 Ref.

17 096527 IS MINITRAM AN ECONOMIC PROPOSITION? "Minitram" denotes an advanced urban transport system employing small automatic vehicles operating on its own track. This paper reports the economic implication of a possible minitram route in Coventry. Data from the transportation survey are used to predict the impact on travel behaviour. Cost-revenue and cost-benefit analyses are conducted and it is concluded that minitram could yield a rate of return close to the 10% minimum for public investment. It is pointed out that as minitram requires a high level of demand it would only be suitable for certain corridors of certain cities. In conclusion, comparisons are made with cartrack systems. /TRRL/

Black, IG Longley, CJ (Warwick University, England) *Traffic Engineering and Control* Vol. 15 No. 10/1, Feb. 1974, pp 489-491, 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 211606)

17 096528 PERSONAL RAPID TRANSIT. A CASE FOR SMALL VEHICLES. This article is concerned with a proposed personal rapid transit system for Gothenburg, Sweden. The system was intended to compete with the private car through: wide area coverage, short travel time, high degree of comfort, direct travel without changes. The main features of the proposed system are then described: dimensions of the network traffic flow, capacity, travel time and costs. The economic implications of the number of passengers per cab are discussed and ways of organizing joint riding considered for the afternoon peak (concentrated departures, dispersed destinations), for the morning peak (dispersed departures, concentrated destinations), and between groups of stations. It is concluded that if a level of service comparable to the private car is to be achieved cabs should carry 3-4 passengers and 5-seater cabs should be used. The concluding section quotes from a report on the future of public transport in Gothenburg. /TRRL/

Oof, R (Kjessler Mannerstale AB) *Traffic Engineering and Control* Vol. 15 No. 15, July 1974, 3 pp, 2 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 211614)

17 096678 HOW BRITAIN CAN STAY FIVE YEARS AHEAD IN TRACKED HOVERCRAFT. This article gives an account of progress that has been made in the research and development of tracked hovercraft. The work carried out by the Tracked Hovercraft Company (THL) is discussed. Its aim is to investigate the economic and technical potential of a high speed ground transportation system using air cushion suspension and linear induction drive. THL found that the air cushion was viable but noisy, and failed to prove the worth of the system. The author also describes the work of a number of organizations who continued the work under research contracts to the government, when THL's work ceased, and activities of other organizations including the Universities of Sussex and Warwick. The work covers both suspension systems (air cushion and magnetic) and linear motors. After discussing the possible future of the THL test track at Earith, the author concludes by referring to work being carried out overseas. Particular reference is made to the work of the U.S. Department of Transportation, the French Aerotrains, and a Canadian Minitram contract near Ontario. /TRRL/

McCallum, P *Engineering* Vol. 239 No. 6183, Sept. 1974, pp 48-50, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 400064S); ORDER FROM: ESL, Repr. PC, Microfilm

17 096682 OPPORTUNITIES IN AUTOMATED URBAN TRANSPORT. The report examines the use of two automated travel systems as solutions to the congestion at present experienced in urban areas. Existing technologies are assessed and desirable characteristics of new systems are described, such as good access, allowance for short trips, above ground and automated. It is argued that some new technology is necessary. The operational attributes and network structure of both systems-minitram and cabtrack are discussed in detail. The former provides for larger movements of people on a fixed network of stops and the latter serves more as a personalized demand-activated service. Visual intrusion is assessed by the use of photomontages, and possible sites for networks are evaluated in Westminster, Southampton and Sheffield. A more detailed description is given of spartaxi-a similar scheme to cabtrack, that is planned for Gothenburg. Concluding, the authors argue that the systems are fast, flexible and cheap. /TRRL/

Grant, BE Russell, WJ ; Matthew, (R), Johnson-Marshall and Partners R&D Rpt. No Date, 46 pp, Figs., Photos.; ACKNOWLEDGMENT: TRRL; ORDER FROM: Mathew, (R), Johnson-Marshall and Partners, Welyn Garden City, Hertfordshire, England Repr. PC

17 097124 HIGH CAPACITY PERSONAL RAPID TRANSIT SYSTEM DEVELOPMENTS. High capacity personal rapid transit (HCPRT) is a system concept which utilizes small, four to six passenger, vehicles at very short headways on exclusive guideway networks. The automatic operation of small vehicles at headways of 1 s or less presents a major technical problem which is amenable to a combination of design approaches. This paper explores the effect of basic parameters such as vehicle length, reaction time, emergency and failed vehicle deceleration rates, and emergency jerk rate on potential minimum operating headway. The results of this analysis are then discussed in the context of five HCPRT programs: Cabtrack (United Kingdom); Aerospace (U.S.A.); MBB-Demag "Cabintaxi" (Germany); CVS "Controlled Vehicle System" (Japan); and Matra "Aramis" (France).

MacKinnon, D *IEEE Transactions on Vehicular Technology* Vol. VT24 No. 1, Feb. 1975, pp 8-14

17 097672 PERSONAL AUTOMATED TRANSPORTATION A PAT SOLUTION FOR AUSTRALIAN CITIES. Despite the rapid rise in material standard of living, cities have become less pleasant places to live in. In order to reverse this trend transportation systems need early attention. An examination of the parameters which set limits to the location and design of an automated transportation system, within the constraints of available technology, lead to the specification for a system designed to serve a major Australian city. A complete description is given of all parts of the system including: layout and station location; the guidance and type of motor to be used; the three types of vehicle to be carried by the system; line speed and average

waiting time. The total cost of the system is calculated in a simple way. The stages in which the scheme would be implemented are discussed. These would involve restructuring the local car industry and changing the form of the taxes levied upon the ownership and use of cars. Appendices describe the technical options available, the method of calculating the cost of the system, and developments in rapid transit systems in other countries. /TRRL/

Loder, JL (Loder and Bayly) *Transportation Planning and Technology* No. 2, 1974, pp 221-262, 13 Fig., 6 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212135)

17 097799 INSTEAD OF CARS. The book deals with the future of transport and has two central themes: the need for revolutionising ideas on moving people and goods and the conclusion that there is no single panacea. The author examines a number of new technologies such as driverless vehicles, electronic guidance systems and moving pavements, and discusses ways in which they can be put to use and their limitations. New ways of using existing vehicles-trains, buses, taxis, bicycles and cars-are also considered, together with new concepts of town planning and life-style that could reduce the need to travel. /TRRL/ /TRRL/

Bendixson, T ; Temple Smith (Maurice), Limited Textbook 1974, 256 pp, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 211924); ORDER FROM: Temple Smith (Maurice), Limited, 37 Great Russell Street, London WC1B 3PP, England Repr. PC

17 097817 DESIGN OF HIGH SPEED MOVING PAVEMENTS FOR MASS TRANSIT. Part 1 of this report is a broad survey of High Speed Moving Pavements (HSMP's), and Part 2 presents a new design for a HSMP. The first part considers the urban transportation problem, and develops the role of HSMP's as a viable solution. Basic use requirements, and operating principles of various concepts are discussed. There follows a review of current HSMP designs, considering safety, capacity, speed, etc. Entry and exit techniques, and some inherent user problems are considered. Thirteen systems, 2 of which exist as working prototypes, are included. Part 2 describes the design of a gravity accelerator which would take passengers from 2 mph walking speed to 8 mph cruising speed. Aspects considered in detail are the use of gravity for acceleration, the geometrical configuration of lenticular pallets, the design of track, the ability of the system to execute horizontal curves, and a design for the drive system. A scale model is described, and results obtained from testing it are used to assess a full-scale system design. A computer program to calculate coordinates for the accelerator track of the above system is listed in full. /TRRL/

Mehni, A Ayers, KB ; Loughborough University of Technology, England R&D Rpt. TT 7410, Oct. 1974, 139 pp, 47 Fig., 4 Tab., 25 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212199)

17 097996 TRAFFIC CONTROL AND TRANSPORTATION SYSTEMS. Proceeding of the symposium include 57 papers that point out the most recent advances in automation and control as applied to the various transport fields with emphasis on the systems aspect. The main topics dealt with are: urban as well as road and

highway traffic control; bus control systems; urban transportation systems on segregated tracks; air and railway transportation systems. In all these fields, the emphasis is placed on the link between the more or less theoretical research and the practical applications. Sessions are also devoted to modeling and decision aids methods as well as to the methods proper to provide harmony between transport planning and social organization planning. Some papers are in French with English abstracts. Following is a partial list of titles and authors of the papers presented. Methodology and Programming Package for Railway Traction Simulation. By Marko Vuskovic and Branko Lusicic. Regulation des Circulations en Gare de Paris-Nord. (Traffic Control on the Paris Nord Railroad in France). By Marcel Aubert and Andre Lemaire. Real Time Systems for Train Scheduling. By Malcolm J. Savage and Royston P. Harrison. Integrated Transport Control on Railways: Reasons for, Results, and Aspects of Future Development Based on Experience with 'Cybernetic Island Hannover'. By Wilhelm Max Wumderlich. Block Automatique de Type Nouveau Fait de Pre-Metro une Solution Moderne au Probleme des Transports en Commun dans les Villes de Moyenne Importance. (Modern Automatic Block System and the Solution Chosen for the Brussels, Belgium Pre-Metro). By Marc Brichaux. Utilisation d'une Console de Visualisation Quadrichrome en Mode Conversationnel pour l'Etude de la Regulation d'un Reseau Ferre Urbain. (Simulation of Urban Railway Transport with Color Graphic Display in Conversational Mode). By Rene Quonten. 'Minitran' in Britain: Automatic Urban Transportation. By Henry W. Groves and Roy C. Baker. Mise en Oeuvre du Pilotage Automatique du Metro de Santiago du Chili. (Implementation of the Automatic Driving of Trains for the Metro of Santiago in Chile). By Michel Blanchard, Jacques Gillon, Jean Pierre Malon and Gabriel Marie. Optimization Aspects in Large Railway Systems. By Robert Genser. Contribution of Optimum Computer-Aided Control of Train Operation. By Horst Strobel, Peter Horn and Manfred Kosemund. Information Processing System of the Musashino Marshalling Yard. By Akira Sato, Akoo Shiyoa, Naotsugu Nozue and Akira Hachiga. Management and Planning of Sugar Cane Railway Transportation Using a CID-201-A Digital Computer. By Jose Luis Toledano Fernandez and Luis Orlando Suarez Arias. Study of Rolling Stock Rostering. By Yoshihisa Iida and Sumio Koga. Application of Reliability Theory and Control Theory to Automatic Transportation System. By Klaus Dieter Wiegand and Jochen Glimm. Evaluation des Criteres Techniques de Mouvement pour les Installation de la Commande Automatique de la Marche des Trains. (Evaluation of the Technical Criteria that Have Influence on the Train Operation When Automatic Train Control Equipment is Used). By Antonio Masiewicz and L.M. Ericsson.

North Holland Publishing Company 1974, 736 pp; Proceedings of the 2nd Intl. Symposium on Traffic Control and Transportation Systems, Monte Carlo, Monaco, Sept. 16-21, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: American Elsevier Publishing Company, Incorporated, 52 Vanderbilt Avenue, New York, New York, 10017 Repr. PC

17 099208 PRT-SEARCH FOR A DEFINITION. Although there is still a large amount of controversy on the subject, "Personal Rapid Transit" appears to be a sound concept. Morgantown, West Virginia, and the Dallas-Fort Worth airport system, are presently the only operating prototypes; Morgantown is still experimental but Dallas-Fort Worth airport is now in revenue service. The article describes the other plans that are presently considered for PRT in North America.

Shaffer, RE *Modern Railroads* Vol. 30 No. 4, Apr. 1975, pp 42-44; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

17 099333 A SIMULATION MODEL FOR PLANNING DUAL-MODE SYSTEMS. The adequacy of the existing techniques in performing the tasks related to the planning of dual-mode transit systems is evaluated and a new model to enhance the analytical capability of the planners is presented. The network analysis and operations analysis phases of the transportation planning process are examined and the limited scope of analysis with programs of the UMTA Transportation Planning Systems (UTPS) is pointed out. A new simulation model for dual-mode systems is described which incorporates the demand responsive characteristics of the system and provides an additional tool in operations analysis. The model which is based on several assumptions, is applied (for illustrative purposes) to a hypothetical problem.

Heintz, TJ Chatterjee, A ; Marquette University Aug. 1974, 30 pp, 3 Fig., 9 Tab., 4 Ref.; Sponsored by UMTA.

17 099351 AUTOMATED GUIDEWAY TRANSIT. This assessment of Personal Rapid Transit and other forms of Automated Guideway Transportation has been prepared in response to a request from the U.S. Senate Committee on Appropriations. Its objectives: To provide the Committee with information on the current status and social and economic aspects of Automated Guideway Transit development; to assess the key problems associated with AGT as perceived by potential riders, the communities and the transit industry; to identify major policy issues and automated guideway transit program alternatives and to explore their implications. It is concluded that to date the Federal AGT R&D program has not produced the direct results which could be reasonably expected from an expenditure of \$95 million.

United States Congress June 1975, 399 pp, Tabs., Refs., 4 App.; This report was prepared at the request of the Senate Committee on Appropriations, Transportation Subcommittee.; ACKNOWLEDGMENT; ORDER FROM: GPO, Repr. PC, NTIS, Repr. PC, Microfiche

17 099748 NETWORK MODEL STUDIES FOR PERSONAL RAPID TRANSIT. The development is described of network models (for personal rapid transit, systems) which contain the basic network geometry and trip-making characteristics and provide a baseline model for service policy/cost trade-off studies as well as for the design of various system management algorithms required to implement a chosen service policy.

This effort involved the determination of the discriminating characteristics of the high performance PRT and high capacity PRT systems developments, the review and classification of planning studies, and the determination of basic forms for the networks and travel patterns. The planning studies were further reviewed to determine special constraints considered in the urban implementation.

Kershner, DL Roesler, WJ ; Johns Hopkins University, Laurel CP 040A/TPR 031A, June 1975, 76 pp, 7 Fig., 15 Tab., 13 Ref., 1 App.; Contract DOT-UT-30010

17 125022 AN ENVIRONMENTAL EVALUATION OF A NEW SYSTEM. This paper reports a process of environmental appraisal of the effects of introducing a system like cabtrack into central London. The characteristics of the system are first considered: cabstops, track, cabs. Criteria for the assessment of the impact of the system are presented and illustrated. The problem of changing a network to avoid conservation areas, listed buildings, areas of good visual quality and narrow streets but take advantage of the opportunities provided by redevelopment areas and inaccessible areas are discussed. It is concluded that the system has sufficient flexibility not to involve excessive environmental costs. The conclusion discusses problems of embodying the potential of new technology into long term planning. The number of the covering abstract of the textbook is IRRD abstract no 212297. /TRRL/

Derbyshire, A (Matthew (Robert), Marshall (Johnson) & Partners) ; David and Charles (Holdings) Limited Textbook 1974, pp 155-168, 3 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 212312); ORDER FROM: David and Charles (Holdings) Limited, South Devon House, Newton Abbot, Devonshire, England Repr. PC

17 125047 MINITRAM-CROYDON OR SHEFFIELD FIRST? This article describes the current potential of minitram for usage in Sheffield. It briefly discusses initial reactions to the scheme and the different attitudes to it between the local authorities, their departments, the government, and TRRL. The need for a public demonstration system and the reasons why Sheffield is suitable are noted. The features of the system such as mechanics, performance, controls, vehicle interior and general exterior design are listed as are a series of criteria for guideway design relating to alignment, power, control, robustness and environmental intrusion. Consultants admit that there will be a degree of intrusion but suggest that suitable treatment may soften the impact. Croydon is also noted as a possible site for an installation for a number of reasons. /TRRL/

Milne, R *Surveyor - Public Authority Technology* Vol. 144 No. 4301, Nov. 1974, pp 10-13, 1 Fig., 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 400118); ORDER FROM: IPC Building and Control Journals Limited, 32 Southwark Bridge, London SE1, England Repr. PC

17 125048 IMPROVEMENTS IN OR RELATING TO GUIDANCE APPARATUS FOR TRACK FOLLOWING VEHICLES. This patent gives details of an invention relating to guidance apparatus for track following vehicles of the kind in which the vehicle is normally guided along the track by a guidance abutment at each

side of the track. The invention incorporates left and right hand secondary guidance, which can be moved by a selector on the vehicle. This prevents loss of vehicle guidance at fork junctions. Figures show (1) the plan and end elevation of a vehicle on a track (2) a plan view of a track junction and (3) a detailed end view of co-operating parts of the vehicle and track. Operation of the guidance apparatus is described. /TRRL/

Langdon, MG ; British Patent Office Patent Specif 1352 246, 1974, 5 pp, 5 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 400114); ORDER FROM: British Patent Office, 25 Southampton Buildings, Chancery Lane, London WC2A 1AY, England Repr. PC

17 125049 CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30 AUGUST 1974. The following papers were presented at the conference. Simulation of train following behaviour in HSGT systems, Barwell, FT and Leech, DJ; Railway cybernetics, Gelbstein, EE and Parkman, WT; Practical Headway Limitations for Personalised Automated Transit Systems, Hinman, ES and Pitts, GL; Longitudinal Track to Vehicle Communications, Hutchings, BW and Cree, DJ; The Solution of Merging and Control Problems of a Deterministic Auto-Taxi System, Jeffries, TO and Cox, F; The Effects of Mandatory Speed Restrictions Upon an Automated Vehicle Following System, Mellitt, B and Calderbank, HJ; Control Strategies of Non-scheduled Traffic in a time tabled system, Mellitt, B and Ward, DP; Safety requirements for the longitudinal control of tracked automatic vehicles after the demerging of contact trains, Perrott, FC. For the covering abstract of the Conference, See IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper Conf Publ 117, 1974, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 400104); ORDER FROM: Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England Repr. PC

17 125050 CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30TH AUGUST, 1974. AUTOMATICALLY CONTROLLED ROAD VEHICLES. This report describes the dual mode concept of vehicle automation being considered at TRRL. Details are given of (1) the lateral control of the guidance system which is provided by a cable buried below the road surface and energised with an audio frequency of 5 KHZ at 150 M.A. Two ferrite-cored pick-up coils are mounted on either side of the front of the vehicle to sense the horizontal component of the electromagnetic field about the cable. The original TRRL guided vehicle, a Citroen ds19, used a hydraulic jack in the steering linkage to provide the steering force. This technique was complex and expensive. Recent advances in dc motor design have now made dc motor drives both feasible and economically attractive. The switching amplifier designed for TRRL is described; (2) the longitudinal control systems which are based on a closed loop control of vehicle speed. Speed commands in voltage form in the range 0-10 volts are supplied to the control

system, the amplitude of the voltage command being proportional to the required vehicle speed. The speed command signal, fed to the speed control loop, is generated by (1) a cruise control selector, (2) a road to vehicle speed command link, and (3) an automatic headway control system. During normal experimental running only one of these three sources is switched on at any time. For the covering abstract of the conference see IRRD abstract No. 400100. /TRRL/

Dobson, JS Penoyre, S Stoneman, BG (Transport and Road Research Laboratory); Institution of Electrical Engineers Conf Paper Conf Publ 117, 1974, pp 138-145, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 400103)

17 125051 CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30TH AUGUST, 1974. The following papers were presented at the conference: control function distribution in automated transit systems, Pitts, GL and Hinman, EJ; Longitudinal Control in Guided transportation schemes using the moving-cell philosophy, Rumsey, AF and Powner, ET; A Longitudinal Control Strategy Derived from the Basic Safety Constraint, Thomas, PD and Hopkinson, J; The Performance of Junction Control Strategies in a Hierarchical Urban Transit System, Thomas, TH and Burrow, LD; Performance of Automatic Transport Systems Under Fixed Schedule Operation, Thomas, TH and Heap, RC; Increasing the Passenger Capacity of a Transportation Network under Deterministic Synchronous Control, Hap, EL and Thomas, TH; Optimised Control of Linear Motion, Yedmans, KA. For the covering abstract of the Conference, see IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper Conf Publ 117, 1974, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 400105)

17 125054 A NEW VERSION OF THE HOVERTRAIN. Very brief details are given of a new version of the hovertrain driven by a rack and pinion system announced by the Aerotrains Company in France. "Tridim" is cheap to build because the track is so light-the cost of a 300 metre test track and model vehicle was less than L25000. The vehicle can be manufactured in sections and assembled at the point of delivery. Individual vehicles carry between 4 and 100 passengers providing an overall capacity of 15-20000 passengers an hour. Its maximum speed is 64 km/h or on incline of 3% and can climb 15% inclines. The car is braked by pads gripping the track. /TRRL/

New Scientist Vol. 63 No. 916, Sept. 1974, p 804, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 400117)

17 125073 TRANSPORTS OF DELIGHT? This is a discussion of innovative transport as applied in Ontario, Canada. \$1.3 billion will be invested over ten years, hopefully giving Canada the lead in the world market. Because of rapid urbanization, the Ontario government has, since 1969, heavily supported public transport. The goal in planning now is to reduce the need for travel, rather than to allow a suburban sprawl.

Toronto is the location for several experiments. A dial-a-bus service operates in the suburbs, while staggered working hours have reduced peak-hour travel. The most important step is the development of an intermediate transit system, in a public park, to test the acceptability of such a system. This could carry up to 30,000 passengers per hour, with far less visual intrusion, noise and pollution than rapid transit or motorways. Eight firms tendered for the design, and Krauss-Maffei of Germany won the contract, with a magnetically-suspended vehicle. A test track and vehicles were built in Germany. They have now withdrawn, leaving the project to the public urban transportation development corporation. Another company, with government help, is designing linear induction motors. The current system design is for a rubber-tyred vehicle powered by linear motors. One large American Firm has a license to market the Krauss-Maffei system in the USA, and is collaborating with the UTDC on the Toronto demonstration. /TRRL/

Croome, A *Nature* Vol. 253 No. 5493, Feb. 1975, pp 580-581, 1 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 212670); ORDER FROM: MacMillan Journals Limited, 4 Little Essex Street, London WC2R 3LF, England Repr. PC

17 125148 USING TRANSPORT MODELS TO FORECAST A LONG RANGE MARKET. This essay sets out the conclusions of a study to estimate the likely overseas market for automated personal rapid transit systems. The UK share of that market is inferred. Personal rapid transit and more conventional systems are considered as competitors for the world market. A survey was made (by questionnaire) of planning officers in 151 cities in 22 countries, to find out their long-range plans, and to gather general data. The data were used to predict demand for prt as a function of location, size of city, etc. In the next 10 years U.S. cities will constitute the sole market; cities elsewhere will lag 5 to 10 years behind. A dynamic model was developed to predict the share of public transport won by a new system. Auto-taxi is best if car-drivers are to be attracted. A probabilistic market model was used to estimate world and U.K. markets. The author warns that development of these markets depends on political and social, rather than technological, forces. A distribution is presented, showing pessimistic and optimistic forecasts of the world market for PRT. Good agreement with two independent estimates is shown. The U.K. share of the market is discussed, although no actual estimate is given. /TRRL/

Love, PE; Her Majesty's Stationery Office R&D Rept. No. PAU, 1974, pp 40-54, 4 Fig.; Programmes Analysis Unit.; ACKNOWLEDGMENT: TRRL (IRRD 211965); ORDER FROM: Her Majesty's Stationery Office, 49 High Holborn, London WC1V 7HB, England Repr. PC

17 125222 CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30TH AUGUST, 1974. The following papers were presented at the conference: Design of a Multivariable Controller for a Magnetically Supported Vehicle, Hazlerigg, ADG and Sinha, PK; Power Amplifier and Magnet Techniques in Controlled Levitation Systems, Hodgkinson, RL; Transducers and their Influence in the

Design of Magnetically Suspended Vehicles, Jayamant, BV, Hodkinson, RL, Wheeler, AR and Whorlow, RJ; Magnetic Suspension of Transport Vehicles, Lhenry, M, Gilles, G and Ivanov, MI; Computing, Designing and Testing Levitation Magnets at Messerschmitt-Boelkow-Blohn, Nave, M; Modelling and a Study of the Maglev Concept, Parker, JH, Charles, RJ, Renfrew, RM, Billing, JR, Crate, GF, Gagne, RE and Amyot, R; Maglev Vehicle Oscillations and Damping Mechanisms, Rhodes, RG, Mulhall, BE and Abel, E; A Controlled Electromagnetic Levitating Frame of a Track-bound Vehicle, Von Thun, HJ and Zimmerman, H. For the covering abstract of the conference, see IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper No. 117, 1974, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 400102); ORDER FROM: Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England Repr. PC

17 125223 CONFERENCE ON CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 28-30TH AUGUST, 1974. The following papers were presented at the conference: Practical Problems in Switching, Guidance and Headway Control of Minitram, Barnard, R and Rossignol, PJ; Simulation of a Minitram System, Bradley, AH; Greenway, P and Horsman, JL; Propulsion and Power Collection for Minitram Systems, Eley, MK; Network Strategies for Minitram Systems, Goodwin, L; The Place of New Transport Modes in the Urban Fabric, Grey, A and Hodgkin, KE; Management of a Minitram System, Howard, MG and Streeter, JH; Urban Transport Systems Capacity with Special Reference to London Transport Underground Railways, Rice, P. For the covering abstract of the conference, see IRRD Abstract No. 400100. /TRRL/

Institution of Electrical Engineers Conf Paper No. 117, 1974, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 400101); ORDER FROM: Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England Repr. PC

17 125530 A REVIEW OF CURRENT DEVELOPMENTS. Four types of urban passenger transport journey are distinguished and the characteristics of the transport systems needed to cater for them are outlined. This leads to a basic distinction between area or network systems and line-haul systems. Technical developments which will make the new systems feasible are outlined. Some studies of the application of particular systems are reported, both in hypothetical and concrete situations. Two major constraints on the adoption of new systems are then discussed: economic viability and environmental impact. The number of the covering abstract of the textbook is IRRD Abstract No. 212297. TRRL/

Mitchell, CGB (Transport and Road Research Laboratory); David and Charles (Holdings) Limited Textbook 1974, pp 131-154, 5 Fig.; ACKNOWLEDGMENT: TRRL (IRD 212311); ORDER FROM: David and Charles (Holdings) Limited, South Devon House, Newton Abbot, Devonshire, England Repr. PC

17 125581 CONFERENCE ON LINEAR ELECTRIC MACHINES, HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 21-23 OCTOBER 1974. Some of the papers presented at the conference were as follows:-Levitation and propulsion of guided vehicles using superconducting magnets-Abel, E, Corbett, AE, Mulhall, BE and Rhodes, RG; The application of permanent magnets to the suspension of surface-guided vehicles-Bahmanyar, H and Ellison, AJ; A new linear electromagnetic motor traklec opens a wide field of application to linear machines- Barthalon, M; An electromagnetic bearing-Bolton, H; Some aspects of a transverse flux linear induction motor design, suitable for high speed application-Chahal, JS; Test results from the US linear induction motor research vehicle program-Chirgwin, KM; Linear motor applications-Davey, AW; Pole-change linear induction motors-Eastham, JF and Balchin, MJ; The application on linear electric motors to the proposed surface-guided transport systems of the future -Ellison, AJ and Bahmanyar, H; Normal force in single-sided linear induction motors-Freeman, EM and Lowther, DA; A catamaran as a magnetically levitated vehicle-Hochhausler, P; Parallel connected linear motor for high speed transportation and rapid transit systems-Lamb, C St J; Application of a linear motor to the hydraulic transportation of ore-Lazarus, JH, Liddiard, RC and Enslin, NC; High-speed, iron-cored, synchronously operating linear motors-levi, E (continued as IRRD Abstract No. 213012). /TRRL/

Institution of Electrical Engineers Conf Paper No. 120, 1974, 250 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 213011); ORDER FROM: ESL, Repr. PC, Microfilm

17 125582 CONFERENCE ON LINEAR ELECTRIC MACHINES HELD AT THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, 21-23 OCTOBER, 1974. (Continued from IRRD Abstract No. 213011). Dc linear motor controlled by thyristors and testing equipment for its high speed characteristics-Matsui, K, Umemori, T, Taketsona, Y and Hosoda, Y; Dynamic interaction between a linear induction motor and elastic reaction rail-Moon, FC and Dowell, EH; Computation of constant voltage operation characteristics of linear induction motors-Nicolas, A and Sabonnadiere, JC; The characteristics of high speed linear induction motors analysed using a space harmonic technique-Nonaka, S and Yoshida, K; Application of a general analysis for single-sided linear induction motors-Skalski, CA; Analysis and control of a linear synchronous motor for high-speed ground transport-Slemon, GR, Turton, RA, Burke, Pe and Dewan, SB; The magneplane linear synchronous motor propulsion system-Thornton, RD; Studies on linear motor in the Institute of JNR-Usami, Y, Fujie, J and Fujiwara, S. /TRRL/

Institution of Electrical Engineers Conf Paper No. 120, 1974, 250 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 213012); ORDER FROM: ESL, Repr. PC, Microfilm

17 125772 QUANTITATIVE ANALYSIS OF SYNCHRONOUS VERSUS QUASI-SYNCHRONOUS NETWORK OPERATIONS OF AUTOMATED TRANSIT SYSTEMS. This paper investigates the performance of the synchro-

nous and quasi-synchronous network control policies proposed for modern automated transit systems. Performance is analyzed from the user point-of-view in terms of the expected travel time delay associated with each policy. Using an idealization of the network layout and uniform demand for service, analytic expressions for the expected delay are derived for each policy in terms of fundamental parameters (line spacing, trip rate, trip length distribution, maneuver region). Comparisons of the performance of each policy are presented in parametric form. /Author/

Kornhauser, AL McEvaddy, P *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 241-248

17 125803 GROUND RAPID TRANSIT SYSTEM WITH MAGNETIC SUSPENSION-1,2,3 [Spurgebundener Schnellverkehr mit Berührungsfreier Fahrtechnik]. Some 24 papers presented at this Seminar are arranged in three volumes that are grouped under the following titles: the system concepts, linear motors, power transmission, tracks, magnetic levitation and control. The safety and reliability of this type of transportation is treated in four papers. [German]

Ministry for Research & Technology, West Germany Dec. 1974, 47 Ref.; This study appeared in 3 separate reports, T74-38 December 1974, 206 pp, T74-39; 233 pp, T74-40, 227 pp.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 125804 PRT IMPACT ON TRANSPORTATION. The increasing congestion of urban areas requires multimodal transportation solutions. Personal Rapid Transit (PRT) is discussed as one of the supporting modes for regional systems as a feeder to high-speed corridors and for circulation and distribution missions. PRT may begin as small loop or linear systems and expand to complex network grids in planned phases. For equal dollars spent, increased ridership and route coverage is possible with PRT systems versus line-haul corridor systems. All modes must complement each other.

Holt, WJ Samusson, L (Rohr/Monocab, Incorporated); Society of Automotive Engineers Preprint 750445, 1975, 13 pp; Prepared for SAE meeting, February 24-28, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 125805 PERSONAL RAPID TRANSIT-MORGANTOWN, W. VA. Personal Rapid Transit (PRT) is a relatively new transportation mode, offering passengers a direct, non-stop, origin/destination ride, on demand. Development has taken various forms, and still continues at a considerable pace with intense interest. The first full operational PRT system in the world is at Morgantown, W. Va., and is described in detail. Some observations are offered on capital and recurrent costs, and means of meeting them through revenue.

Cunliffe, JP; Society for the Advance of Material & Process Engr 1974, pp 36-45; Presented at the 6th SAMPE National Technology Conference, Dayton, Ohio. October 8-10, 1974.; ORDER FROM: Society for the Advance of Material & Process Engr, Box 613, Azusa, California, 91702 Repr. PC

17 125830 NEW TRANSIT MODES: APPLICABILITY AND CURRENT STATUS. A survey of new urban transportation systems around the world reveals that four significant technology classes are presently emerging: Moving Way Transit (MWT), Light Guideway Transit (LGT), Personal Rapid Transit (PRT) and Dial-A-Bus (DAB). The author concludes that LGT a state-of-the-art, that accelerating MWT systems are at an awkward state with respect to the marketplace that high capacity PRT appears to be no less than four years away from state-of-the-art and the DAB systems are operational.

Elms, CP ; Society of Automotive Engineers SAE 750214, Feb. 1975, 19 pp, Figs., Tabs., 3 Ref.; Presented at the Society of Automotive Engineers Automotive Engineering Congress and Exposition, 24-28 February, 1975 in Detroit, Michigan.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 125835 RAPID TRANSIT SYSTEM FOR INNER-CITY TRANSPORTATION. The author discusses a rapid transit system based on his parallel connected linear motor. This motor permits fine and individual digital control of every vehicle on the overhead track to take into account all variables encountered over the route. A possible layout for Sydney, Australia, is discussed.

Lamb, C St J *Electrical Engineer* Vol. 52 No. 2, Feb. 1975, pp 11-13; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 126149 THE DYNAMIC SCHEDULING APPROACH TO AUTOMATED VEHICLE MACROSCOPIC CONTROL. APPENDIX III TO PROJECT EES 276A. In the research reported here a new approach to network control, termed Dynamic Scheduling, is evaluated by simulation techniques. Although this approach utilizes the concept of synchronous slots, it does not employ "preprogramming" or "origin-destination slot reservations" as is common to many schemes, but rather employs a combination of path reservations through interchanges (as each one is approached) and maneuvering-space reservations (for the "next" interchange). Control tasks concerned with individual vehicles (e.g., scheduling and maneuvering) are handled at the local level, and those concerned with vehicles in the aggregate (e.g., "lane flow" distribution and "entrance flow" control) are handled at the central level. Dynamic Scheduling was evaluated by simulations of a variety of networks including directional interchanges; entrance-exit interchanges in a loop; and a twelve-interchange urban network. It was found that: flow rates through interchanges will, in general, be limited by the interactions among vehicles maneuvered on the approach lanes; both a traveler's expected total longitudinal maneuvering delay and its dispersion increase with both the level of demand on the system and the number of interchanges he traverses; and based on simulated egress flow restrictions, it appears that blockages would be effectively handled by this approach. /Author/

Rule, RG ; Ohio State University EES 276A-18, Sept. 1974, 270 pp, 111 Fig., 5 Tab., 44 Ref., 2 App.; Prepared in cooperation with Ohio Department of Transportation and FHWA.

17 126158 PLANNING FOR NEW AND INTEGRATED DEMAND-RESPONSIVE SYSTEMS. SPEAKER 4. The initial success and some problems faced by a demand-responsive transportation (DRT) service in Oakland, California, are briefly described. The passenger response has been 3 times that of other DRT operations of comparable size. Telephone tie-up was experienced when control room operators were instructed to call-back and verify calls for service. The DRT vehicle consisted of a conventional bus from which a 6 ft. section was cut out and then rejoined; this vehicle could then negotiate turns at some difficult intersections (minibuses were found unsatisfactory). The vehicle interiors were tastefully remodeled. Drivers were given an intensive 2-week training session and control room operators who ride with drivers derive the benefit of personal contact. DRT fares are 25 cents and no transfers are issued or accepted. The marketing of DRT services received assistance from the Model Cities Program and from the city of Richmond. The cost of operating the DRT system remains a problem and the question is asked whether the public is willing to pay the price through taxes, fares, or federal/state subsidies.

Ball, LA (AC Transit) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, p 32; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

17 127633 TRIDIM AEROTRAIN--AN ECONOMIC ALTERNATIVE TO URBAN TRANSPORTATION. The Tridim system described uses air-cushion suspension and electric drive. It is intended for transportation traffic densities midway between buses and subway, as for urban traffic in medium-size cities, large suburban areas, or within airports or large business or manufacturing complexes. In such applications, distances between stations stay around a few hundred meters, exceptionally a few kilometers. Thus optimal cruising speed generally stands between 40 and 70 km/h, acceleration performances being often more significant than mere speed. An experimental Tridim program has been on trial since mid 1973. It consists of a short track illustrating lay-out difficulties (20 m radius bend--10 m curve switch--20% slope) and a 4/6 seats test vehicle equipped with a simple on-board automatic program. Motors are all electric, propulsion using pinions on a rack coated with synthetic rubber. The whole prototype installation, including design and testing, has been carried out within a budget of 2.5 million French francs, evidence of the favorable economics of the system.

Bertin, J ; International Electric Vehicle Symp & Expo, 3rd Proc Paper No. 7433, 1974, 12 pp; Symposium held February 19-21, 1974 and sponsored by the Electric Vehicle Council, New York, New York.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 127819 GROUND TRANSPORTATION SYSTEM FOR BRADLEY INTERNATIONAL AIRPORT. An automatically controlled transit system is being installed at Bradley International Airport. The system has two purposes: demonstration of automatic transit for urban applications, and transportation from a remote parking lot to the airport terminal. The 0.7 mile guideway includes both at-grade and elevated sections. A 550 ft bypass at the intermediate station simulates an off-line passenger terminal. Provisions for extension of the guideway to serve future facilities have been included. The two 25 ft long vehicles are each powered by two 60 ph electric motors. An on-board computer controls the operation of the vehicle. The vehicles are air-conditioned and have two-way communication capabilities. Design of the guideway began in November 1973. Construction of the guideway was begun in July 1974 and was essentially complete in December 1974. The construction was completed in April 1975 when the system was energized and testing begun.

Spaulding, JJ (Connecticut Department of Transportation) ; Connecticut Department of Transportation SAE 750627, May 1975, 10 p.

17 129124 QUANTITATIVE ANALYSIS OF SYNCHRONOUS VS. QUASI-SYNCHRONOUS NETWORK OPERATIONS OF AUTOMATED TRANSIT SYSTEMS. This paper investigates the performance of the synchronous and quasi-synchronous network control policies proposed for modern automated transit systems. Performance is analyzed from the user point-of-view in terms of the expected travel time delay associated with each policy. Using an idealization of the network layout and uniform demand for service, analytic expressions for the expected delay are derived for each policy in terms of fundamental parameters (line spacing, trip rate, trip length distribution, maneuver region). Comparisons of the performance of each policy are presented in parametric form.

Kornhauser, AL (Princeton University) McEvaddy, P *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 241-248, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 129282 THE DYNAMIC BEHAVIOUR OF A LOW-SPEED ELECTRO-MAGNETIC SUSPENSION. A control system has been designed, constructed and tested which provides a suspension for a low-speed transport vehicle. The technical concepts have been investigated in great depth. It has been shown that the effects of the non-linearities inherent in the hardware can be minimised. Over a track with irregularities characterised by a secondary railway line the ride in the vehicle is equivalent to that obtained in conventional, modern urban transport vehicles. The physical constraints on the control system specification of the track has been shown to be suitable. of the track has been shown to be suitable.

Pollard, MG Williams, RA *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 188-192; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL, Repr. PC, Microfilm

17 129283 DYNAMICS OF MAGNETICALLY LEVITATED VEHICLES ON FLEXIBLE GUIDEWAYS. Magnetically levitated vehicles have been discussed in recent years for application on personal rapid transit in highly populated areas and high speed transport over large distances. The magnetic suspension control of the vehicle has been usually designed assuming rigid guideways. On the other hand, the dynamics of the guideways has been investigated only for vehicles, with spring-dashpot suspension. However, the suspension control and the guideway dynamics are coupled resulting in a multivariable system. In this paper the complete vehicle-guideway system is considered.

Popp, K Schiehlen, W *Vehicle System Dynamics* Vol. 4 No. 2-3, 1975, pp 195-199; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL, Repr. PC, Microfilm

17 129789 SIMULATION OF A NEW CONCEPT IN SHORT DISTANCE PASSENGER TRANSPORT SYSTEMS [Simulation von Personentransporten mit neuartigen Nahverkehrssystemen]. A cabin with a capacity of 18 persons was used for the simulation programme which is based on a normal timetable (vehicles stop at all stations), express vehicles and a community taxi service. A circular route, a double-track line and a Y-shaped network were examined. Consideration was also given to the number of passengers travelling between several large cities in Federal Germany. The simulation programme makes it possible to evaluate the attractiveness and the productivity of new cabin-type railways particularly as regards travel and stopping times. [German]

Rahn, WH *Eisenbahntechnische Rundschau* Vol. 24 No. 9, Sept. 1975, pp 313-318, 1 Ref.; ACKNOWLEDGMENT: UIC; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

17 129974 FOCUS ON GUIDED URBAN TRANSPORT. MINITRAM IN SHEFFIELD: A CONSULTANT'S VIEW. An outline is given of the minitram demonstration project proposed for Sheffield by Robert Matthew, Johnson-Marshall and Partners, in consultation with TRRL. The aim is to test minitram in public use, and in particular to answer questions related to public acceptance, vandalism and reliability. After giving consideration to hardware, minitram vehicle dimensions, guideways and stations, the author indicates that: (1) the elimination of drivers by automation necessitates the use of new skills in the control room, and thus reduces the expected savings in costs; (2) the location of guideways close to buildings brings about problems of visual intrusion; and (3) if minitram is to be comparable with buses, stations have to be closely spaced and are hence fairly expensive to build. It is concluded that minitram might be suitable for some cities at present considering the introduction of rail rapid transit systems, but that only a public demonstration will reveal its true potential. /TRRL/

Bordass, W (Matthew (Robert) Johnson, Marshall and Partners) *Traffic Engineering and Control* Vol. 16 No. 4, Apr. 1975, pp 172-174, 4 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRR D 215209); ORDER FROM: Printerhall Limited, 29 Newman Street, London N1P 3PE, England Repr. PC

17 130654 TECHNICAL PAPERS. 1975 INTERNATIONAL CONFERENCE ON PERSONAL RAPID TRANSIT. VOLUMES I AND II. The following papers are contained in these two volumes: Role of New Technology in Urban Transportation: An Historical Perspective, A. Kornhauser and L.B. Wilson; Research and Development in the Field of Urban Transportation in the Federal Republic or Germany from the Viewpoint of the Government, H. Zemlin; Public Transportation Service Quality-Some Program Alternatives, L.A. Goldmuntz; The Morgantown PRT Alternatives Analysis Study: An Application of an Evaluation Technique, D.R. Miller; Practical Solutions for the Financing and Construction of P.R.T. Systems, R. MacDonald; Guideway Transit for Southern California: A Policy Analysis, J.R. Lawson et al; The Development of a Model for Analysis of the Cost Effectiveness of Alternative Transit Systems, J.E. Anderson; A Scenario-Specific Methodology for the Evaluation of Personal Rapid Transit Alternatives and Network Designs, S.C. Iverson; A Rationale for Automated Personal and Group Transit Development, R.K. Lay; Performance Limits of Automated Steering Controllers, S.E. Shladover; An Analysis of Merge Control for the Automated Transportation System, M. Sakasita; Analysis and Simulation of Automated Vehicle Stations, R.E. Johnson et al; Automated Guideway Ground Transportation Network Simulation, C. Toye; Normal and Emergency Control of Automated Vehicles at Short Headways, in Particular the Development, Testing and Dynamic Simulation of the Cabin Taxi System, R. Hesse; The Influence of the Size and Number of Vehicles on the Performance and Service Quality of Group Rapid Transit Systems, G. Bahm; An Evaluation of Group Rapid Transit, B.M. Ford et al; Development and Evaluation of Service Policies for Medium Headway Automated Rapid Transit Systems, K. Thangavelu; Operation Issues in Small Vehicle Automated Guideway Systems, P.A. Anderson and J.H. Pejsa; Vehicle Management on Large PRT Networks, J.H. Irving et al; Systems Management Analysis of Large AGT Networks, M.S. Ross and A.D. Melgaard; PRT in the Land-Use Environment: The Implied Changes, A. Kornhauser and C.E. Philip; Using New Transit Technology to Shape Suburban Growth, J.M. Lutin; The Psychological Impact of Personal Rapid Transit, P.B. Everett; The Place of "Autotram" in a Modern British Transportation Planning Mechanism, C.J. Longley; Application of Computer-Drawn Motion Pictures for Demonstration of Urban Transportation Concepts, E.S. Joline and J.C. Hayward; Visual and Environmental Effects of Minitram Guideways, W. Russell; The Design of Elevated Guideways and Stations for Minitram in Sheffield, M. Bayer and W. Grimwade; Operating the Ford Act System in a Snow and Ice Environment, B.K. Barrowcliff; Cost and Performance Relationships for Rubber Tired Automated System Design, J. Putukian; The Cost Aspects of Elevated Guideway Design, E. Prestegaard; The History of Minitram in Sheffield, W.T. Bordass; Design and Application of the Siemens/Duwag-H-Bahm, F. Frederich; Cabintaxi: Technical Level, Market Situation and Targets, K. Becker; CVS (Computer-Controlled Vehicle Systems), T. Ishi et al; Crashworthiness and Crash Survivability for Personal Rapid Transit Vehicles, W.L. Garrard et al; Review of Automobile Crashworthiness Experiments with Respect to PRT Systems, P.M. Miller

and N.E. Shoemaker; Safety Estimates for Urban Transit Systems, D. Morag and T.J. McGean; Safety and Reliability of Automated Urban Transportation Systems, K. Heinrich; Some Reliability, Dependability and Safety Considerations for High-Capacity PRT Systems, C.L. Olson et al; Service Dependability Evaluation and Design Considerations for Automated Transit Systems, A.F. Ems et al; and Network Dynamics in a Large Personal Rapid Transit System Failure, R.M. Wade.

Minnesota University, Minneapolis, Colorado University, Denver Sept. 1975, 938 pp, Figs., Tabs., Refs.; Conference was held September 16-19, 1975, Denver, Colorado.; ORDER FROM: Minnesota University, Minneapolis, Dept. of Audio Visual Library Services, 3300 Univ. Ave, SE, Minneapolis, Minnesota, 55455 Repr. PC

17 130855 PROGRESS IN SIGNALING FOR TRACK GUIDED SYSTEMS. The advantages of tracked systems over nontracked systems, e.g. the case of automation, are presented. Vehicle detection and communication are critical in automatic systems because of the safety, reliability, and cost factors. Current methods of tracked vehicle detection and communication are reviewed: fixed and moving block systems, the use of crossover wires and the choice of signaling frequencies. The advantages of using high frequencies and surface electromagnetic waves are given and current high frequency methods under investigation are reviewed. Because of the high cost of installing waveguides alongside the track, an innovative method is proposed in which the track is used as a surface waveguide. A block diagram of a headway control and collision avoidance system is illustrated. The results are presented for the analysis of a rail adapted to form a waveguide and these indicate the feasibility of this idea.

McAulay, AD (Boeing Aerospace Company) *ASCE Journal of Transportation Engineering* Proceeding Vol. 101 No. TE4, ASCE #11695, Nov. 1975, pp 621-638, 6 Fig., 38 Ref.; Presented at the July 15-19, 1974, EIC/ASCE Transportation Engineering Meeting, Montreal, Canada.; ORDER FROM: ASCE, Repr. PC

17 131230 CONTROL ASPECTS OF NEW FORMS OF GUIDED LAND TRANSPORT. Proceedings includes 31 papers dealing with various aspects of traffic and vehicle control, with emphasis on guided vehicles and the use and development of magnetic levitation techniques. A major portion of papers is devoted to urban rapid transit systems.

Institution of Electrical Engineers Conf. Publ No. 117, 1974, 239 pp; Proceedings of a meeting in London, Aug. 28-30, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 131592 NETWORK MODEL STUDIES FOR AUTOMATED GUIDEWAY TRANSIT: ADVANCED GROUP RAPID TRANSIT MODELS. The development is described of models which include basic network geometries and trip-making characteristics, provide a baseline for service policy/cost trade-off studies and provide for the design of the various system management algorithms required to implement a chosen service policy. Pertinent planning studies

were reviewed to determine special constraints considered in the urban implementation, and basic forms for the networks and travel patterns were determined. Conventional transit systems are reviewed for data on ridership, service quality, and operating parameters in order to provide a frame of reference for studying the performance of automated guideway systems. The design of the network models including the type of information and level of detail required, and format of the models is detailed, and five models (loop/shuttle, line-haul system, CBD circulation, limited urban network, full urban network) representative of potential urban applications of GRT are discussed.

Kershner, DC Rand, RC Roesler, WJ ; Johns Hopkins University, Laurel, (APL/JHU) UMTA-MD-06-0018-75-3, Feb. 1976, 187 pp, 10 Fig., 12 Tab., 10 Ref., 2 App.; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251881/9ST, DOTL NTIS

17 131799 INNOVATIONAL GUIDEWAY SYSTEMS AND TECHNOLOGY IN EUROPE: NEW PRODUCT AND INVESTMENT OPPORTUNITIES. SUMMARY REPORT AND GUIDE. This summary report sets out and highlights the major findings of the investigation which has been fully reported elsewhere. The study covers innovative ground public transport systems that move passengers within and between cities. It is concerned with the "hardware" of the systems and geographically covers western Europe. In chapter 2 there is a lengthy tabulated summary of the various system developments and their status together with information on a number of projects e.g. personal rapid transit, line haul transit and intercity systems. The future prospects for and present trends of the new guideway systems and technology are considered in chapter 3 in the light of relevant factors such as energy, environment, materials and operating costs. The annexes contain a table of contents of the full report, system dossiers on "minitrans" and "pendair", and an index. /TRRL/

Britton, FEK ; Ecoplan International Vol. 7 June 1975, 64 pp, 4 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-216018)

17 132049 THE 1975 INTERNATIONAL CONFERENCE ON PERSONAL RAPID TRANSIT. The 1975 International Conference on Personal Rapid Transit, held in Denver, Colorado, on September 16-19, brought together engineers, planners, architects, economists, politicians, transit-minded citizens, and students from six countries. Since PRT is in the formative stage, opinions differ greatly as to how and whether these systems should be built. Through presentation and discussion of 47 papers and several panels, the conference did much to clarify the characteristics of PRT. Particularly on the basis of economics, urban design, system operations, and public need, a strong case was made the PRT development should receive strong support.

Anderson, JE (Raytheon Company) ; Society of Automotive Engineers SAE 760323, 1976, 7 pp, Tabs., 13 Ref.; Conference of the Automotive Engineering Congress and Exposition, 23-27 February 1976, Detroit, Michigan. International Conference on Personal Rapid Transit, 16-19 September 1975, Denver, Colorado.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-33797)

17 132054 PERSONAL RAPID TRANSIT-HUMAN AND ENVIRONMENTAL SYNTHESIS. The Ford Motor Company's automatically controlled transportation system now installed in the Fairlane Town Center in Dearborn, Michigan and Bradley International Airport, Hartford, Connecticut, represent a coming together of a host of proven technical disciplines which form a mode of transportation that can move people effectively and efficiently within a confined urban setting. This paper reviews the design parameters of Ford's automatically controlled transportation (ACT) from the viewpoint of the traveling passenger and from the visual impact the system has on the surrounding environment in which it must live.

Gollwitzer, WH (Ford Motor Company) ; Society of Automotive Engineers SAE 760251, 1976, 6 pp, Figs., Photos.; Conference, Automotive Engineering Congress and Exposition, 23-27 February 1976, Detroit, Michigan.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-33830)

17 132218 ADVANCED URBAN TRANSPORT. The authors review various forms of automated transport. Types of track, stations, vehicles, methods of suspension and propulsion, control criteria and environmental factors are considered. An economic assessment, based on a study carried out at Coventry, is made and, as a result of the study, the future role of autotram is considered. Developments in the USA, Europe and Japan are outlined and details of nine systems of automated transport at present under development are described in an appendix. /TRRL/

Black, I Gillie, R Henderson, R Thomas, T (Warwick University, England) ; Heath Lexington Books Monograph 1975, 212 pp, 36 Fig., 18 Tab., 6 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-215713)

17 132689 BIBLIOGRAPHY-UNCONVENTIONAL PASSENGER TRANSPORT SYSTEMS. This bibliography deals with: urban and regional transport systems, monorail systems, high-speed interurban transport systems, air-cushion and magnetic suspension vehicles, non-stop underground railways, interval transport systems in airports, systems linking airports to town centres, mini cabs operating nearly continuously, mechanical stairs, low-and high-speed conveyor systems, computer-optimized personal rapid transit systems, new methods of bus operation, dual-mode systems, collective taxi services, electric vehicles, and automatic driving on motorways. /TRRL/ [French]

Nickel, BE *UITP Revue* 1973, 3073 pp, Refs.; ACKNOWLEDGMENT: TRRL (IRRD 102088)

17 132905 LIGHTER-THAN-AIR TRANSPORT. A study is planned of the use of lighter-than-air (LTA) technology in short-range commuter vehicles (possibly delivering passengers to and from an airport), or as a means of moving overweight or oversized cargo. In the present situation in which it is desirable to minimize the nations fuel consumption rate, it is pointed out that since power is not needed for lift, airships can move vast amounts of cargo more cheaply and efficiently than airplanes, and more quickly than ships. Airship designs and applica-

tions have been discussed which include a nuclear-powered dirigible, a giant dirigible packed with 75 million cubic feet of helium capable of lifting payloads of 75 tons, and hybrids which are paired with extra lifting devices such as helicopters or conventional aircraft. Missions envisioned for such craft include cargo movement, natural gas delivery disaster relief, and transportation of equipment too bulky to move over normal highways. Criticisms of the LTA concept are discussed. Safety is recognized as the prime concern. Accidents in which U.S. dirigibles fell apart have been attributed in part to the removal of critical keel reinforcement as a concession to weight reduction, in part to excessive stress suffered in turbulence, and in part to the continuous vibration of up to eight engines in perfect alignment on either side. It has been suggested that LTA development be directed through the military, and that a start be made with the modification of those ships built last by the addition of new technology. Only by an evolutionary program, can a reserve of manpower and experience, in the arts and skills which an operational LTA fleet demands, be developed.

Wargo, J *New Engineer* Vol. 4 No. 11, Dec. 1975, pp 23-28

17 132911 TRANSPORTATION, AUTOMATION AND THE QUALITY OF URBAN LIVING. This discussion of the contribution to be expected from a comprehensive application of modern automation and computer technology in the solution of serious urban traffic problems, pays special attention to the new possibilities provided by recently developed LSI (large scale integrated) electronic systems for control, computation and communications, especially by so-called mini-computers and microprocessors. It is shown that computerized urban traffic control systems play an important role in the improvement of existing transportation systems, especially of urban railway systems and freeway and street transportation systems. Demonstration projects in different countries indicate that automation and computer control may provide the possibility of fundamental changes in existing urban transportation systems during the next ten years. However, problems and conflicting opinions exist regarding the safety and reliability of totally automated systems, cost benefit analysis, risk evaluation, public acceptance, and the prediction of the effects of introducing new modes of transportation on the quality of urban living and city development. At present there is no certainty that automated transportation modes now being developed will bring the needed breakthrough to better urban transportation. However, there is a strong motivation to proceed in the development of new demand-responsive urban transportation systems. Concepts for the reduction of urban traffic problems are discussed and include control of demand and supply. Freeway and road traffic control, traffic control in urban street networks, and integrated urban automobile traffic control systems are discussed, urban railway systems control and new modes of urban transportation are considered.

Strobel, H ; International Institute for Applied Systems Anal Res Rept. RR-75-34, Oct. 1975, 67 pp, Figs., Tabs., Refs.

17 132944 DYNAMICAL MODEL FOR VEHICLE ROUTING IN A TWO-WAY PRT NETWORK. The problem of routing automatically-controlled and guided vehicle through a closed two-way personal rapid transit PRT network is studied. Because of fluctuating passenger demands, a dynamical model is needed to describe the concentration of vehicles in the different network sections. Such a model is derived in this paper. The binary decision to be made at each divert junction is treated as a control variable in the system model. Using a suboptimal strategy to minimize the maximum congestion in the network sections served, the decision is made in a feedback manner based on the average concentrations in the sections. The model was used to study the transient behaviour of flows and concentrations in a simulation of a specific closed two-way PRT network. Some results are presented for this example.

Cunningham, EP (Johns Hopkins University, Laurel) *Transportation Research* Vol. 9 No. 6, Dec. 1975, pp 323-328, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

17 133089 COMMAND AND CONTROL STUDIES FOR PERSONAL RAPID TRANSIT, PROGRAM STATUS, 1974. The document reviews the APL effort on command and control systems for circulation and distribution applications. A brief history of the program is given, together with the results of the work and its effects on system performance. The discussion is divided into an investigation of vehicle management (the controlling of a fleet of vehicles in terms of scheduling, dispatching, empty vehicle allocation, and station operation) and an investigation of vehicle regulation (the controlling of an individual vehicle either alone or within a string of vehicles). A bibliography of the reports, papers, and significant memoranda relating to this work is included, as well as summary descriptions of the major digital computer simulations that have been developed in support of these investigations.

Hinman, EJ; Johns Hopkins University, Laurel, Urban Mass Transportation Administration, (UMTA-MD-06-0018) Tech. Rpt. UMTA-MD-06-0018-74-3, Apr. 1975, 165 pp; See also PB-231681; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250553.5ST, DOTL NTIS

17 133167 A SURVEY OF PROPULSION SYSTEMS FOR HIGH CAPACITY PERSONAL RAPID TRANSIT. The high-capacity personal rapid transit (HCPRT) system must operate with very short headways. To achieve safe operation at these headways, the propulsion system should meet certain unconventional requirements. They include reversible thrust capabilities, short response time, and peak thrust exceeding three times nominal thrust. These requirements were determined by analysis, computer simulations, and data provided by DOT/TSC. Five propulsion systems capable of meeting these requirements have been surveyed in this report. As background to the survey, several vehicle resistance curves were calculated for a baseline vehicle with assumed dimensions and weight. Four types of vehicle suspension methods were considered.

Knutrud, T; Kusko (Alexander) Incorporated, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt.

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UMTA-MA-06-0048-75-2, July 1975, 110 pp; Contract DOT-TSC-203; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250581/6ST, DOTL NTIS

17 133188 THE OPERATION OF HOVERCRAFT IN THE NEW YORK CITY METROPOLITAN AREA. VOLUME I. A TECHNICAL EVALUATION [Final rept. Oct 2-4, 1973]. The report, Volume 1 of a two volume set, examines the technical feasibility of using air cushion vehicles (ACV) in the inland waterways of the New York City metropolitan area. This evaluation was based on 1973 tests with a Wellington Class BH.7 hovercraft along routes representing the main corridors of activity of the New York City regional waterways. The hovercraft was a military configuration without weapons, heavily instrumented for trial and testing for military purposes, and not intended for use as a commercial vehicle. During the 3-day trials, data were collected on speed, docking procedures, fueling requirements, airport access, operating noise levels, and operational flexibility; and observations were made of performance, comfort and convenience. Portions of this document are not fully legible.

New York City Transportation Administration., Office of the Administrator.*Department of, Transportation, Washington, D.C. DOT/TST-75-86, Feb. 1975, 79p; See also PB-251 235.; Contract DOT-PS-40282; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, / MFS2.25; PB-251234/1ST

17 133189 THE OPERATION OF HOVERCRAFT IN THE NEW YORK CITY METROPOLITAN AREA. VOLUME II. ECONOMIC FEASIBILITY. This report is Volume 2 of a two volume set on the feasibility of using air cushion vehicles (ACV) on the inland waterways of New York City. Recent changes in shipping practices have altered the pattern of waterfront use. Revived use of the waterways employing the technology in high speed marine transportation systems could revitalize the waterfront while relieving some congestion on land modes of transportation. The report assesses the value of the city's inland waterways related to a balanced, multimodal, mass transportation system. It identifies commuter corridors, and other routes, where water transportation offers an alternative, or complimentary, service to existing land transportation. A consumer survey was conducted to study human attitudes toward the use of water transportation in lieu of existing land systems.

New York City Transportation Administration., Office of the Administrator.*Department of, Transportation, Washington, D.C. DOT/TPI-76-1, Feb. 1975, 91p; See also PB-251 234.; Contract DOT-PS-40346; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, / MFS2.25; PB-251235/8ST

17 133318 ANALYSIS OF MULTIPLE PARTY VEHICLE OCCUPANCY IN AN AUTOMATED GUIDEWAY SYSTEM. Many proposed new urban transit systems offer demand-actuated service between stations, vehicles being shared by several passengers. An analysis has been made of the operation of multiple-party occupancy systems in which the guideway network consists of a single loop or of several

interconnecting loops. Vehicles circulate freely around the loop or loops of the network. A vehicle enters a station only if it has passengers to discharge or the station has passengers waiting for service and the vehicle can accommodate them. Vehicles placed in storage at each station may be used whenever serious queuing of waiting passengers develops. A means for replenishing storages and a procedure for limiting the number of intermediate stops experienced by a passenger are described.

Williams, MB Ford, BM Waddell, MC; Johns Hopkins University, Laurel, Urban Mass Transportation Administration, (UMTA-MD-06-0018) APLJHU-CP-042TPR-032, UMTA-MD-06-0018-76-1, Mar. 1976, 93 pp; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251930/4ST, DOTL NTIS

17 133451 LONGITUDINAL CONTROL AND CRASHWORTHINESS FOR SMALL AUTOMATED TRANSIT VEHICLES. This study is concerned with longitudinal control and crashworthiness for small, automated transit vehicles. Control system designs and hardware options for relatively short headway operation at moderate speeds are evaluated. Evaluation is based on performance during normal and emergency operations, sensing and communication requirements, and simplicity of design as a measure of cost and reliability. The study is restricted to the vehicle-follower control concept. Controllers are successfully designed for a variety of data sensing and transmission requirements and no problems are encountered in realizing constant safety factor, constant time headway, and constant spacing operational policies. Fundamental analytical results on collision dynamics and the effectiveness of passenger protective devices, shock absorbers, and interior configurations on occupant protection during fore and aft collisions are derived. /UMTA/

Garrard, WL Caudill, RJ Reed, WB; Minnesota University, Minneapolis, (MN-11-0037-76-1-UMTA) Final Rpt. UMTA-MN-11-0037-76-1, Jan. 1976, 252 pp; Contract MN-11-0037; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-251295

17 133456 A SURVEY OF PROPULSION SYSTEMS FOR HIGHWAY CAPACITY PERSONAL RAPID TRANSIT. The high-capacity personal rapid transit (HCPRT) system must operate with very short headways. To achieve safe operation at these headways, the propulsion system should meet certain unconventional requirements. They include: 1) reversible thrust capabilities, 2) short response time, 3) peak thrust exceeding three times nominal thrust. These requirements were determined by analysis, computer simulations, and data provided by DOL/TSC. Five propulsion systems capable of meeting these requirements have been surveyed in this report. As background to the survey, several vehicle resistance curves were calculated for a "baseline" vehicle with assumed dimensions and weight. Four types of vehicle suspension methods were considered.

Knutrud, T; Kusko (Alexander) Incorporated, (DOT-TSC-UMTA-75-15) Final Rpt. UMTA-MA-06-0048-75-2, July 1975, 110 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract DOT-TSC-203; ACKNOWLEDGMENT: UMTA;

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-250581

17 134067 ROUTING ALGORITHMS FOR URBAN RAPID TRANSIT. A basic routing algorithm is presented for finding optimal routes for cars in a rapid transit system. The algorithm uses predicted path cost, depth-first search, and threshold acceptance to minimize computation cost. It is applicable to synchronous, cycle-synchronous, and trans-synchronous control strategies, and will minimize either departure time, transit time, or arrival time as may be needed. Extensions of the algorithm to allow finding empty cars to answer service requests, to dynamically reroute cars in the system, and to handle multistation routes are presented. (A) /TRRL/

Rubin, F (International Business Machines Corporation) *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 215-223, 4 Fig., 2 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217135); ORDER FROM: ESL

17 134235 "CRESTWALK"-A PASSENGER CONVEYOR SYSTEM. A passenger conveyor system is described which may be boarded at any point along its length but which transports pedestrians at speeds of the order of 15 km/h. The conveyor is made up of elements each of which moves forwards with a regular cycle of low and high speeds with intermediate acceleration and deceleration. The cycle of each element differs slightly in phase from those of its neighbours. The effect of this is to produce travelling velocity waves with phase velocity greater than that of the maximum speed of each element. A passenger by walking forwards may maintain himself in the region of maximum speed, but by stopping walking may be decelerated to a safe alighting speed. The system is suggested as a city passenger conveyor for use in the range of journey lengths 400 M-3 km. (A) /TRRL/

Mann, CA *Transportation Planning and Technology* Vol. 3 No. 1, 1975, pp 13-16, 6 Fig., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217379)

17 134237 AN INTERSECTION CONTROL STRATEGY FOR A SHORT-HEADWAY P.R.T. NETWORK. Much PRT development and research is currently being undertaken assuming quasi-synchronous longitudinal control of guideway vehicles. This method of control has the characteristic that intersection performance has a substantial influence on the efficiency of trip demand processing. An algorithm for the control of a PRT intersection is discussed here, which would appear to have significant advantages over all other known existing stratagems. The stratagem is not only efficient but its flexibility facilitates tailoring to diverse local conditions; furthermore, the algorithm does not require intractable computations or excessive computer memory requirements. The algorithm is described and simulation results are presented. A comparative study is also made between this algorithm and its fore-runner. (A) /TRRL/

McGinley, FJ (Monash University, Australia) *Transportation Planning and Technology* Vol. 3 No. 1, 1975, pp 45-53, 10 Fig., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-217383)

17 134302 PASSENGER REQUIREMENTS IN AN AUTOMATED TRANSPORT SYSTEM. This report presents the results from an experimental study which provided human factors data on passenger behaviour in relation to certain aspects of vehicle design and station layout on an urban rapid transit system. An extensive series of tests was carried out using full scale mock-up vehicle and platforms to study, inter alia, the effects on vehicle dwell time of: 1 vehicle size; 2 vehicle door size and using separate doors for entry and exit; 3 the number of people in the vehicle, on the platform and inter-changing between the two; 4 overloading the vehicle with passengers; 5 platform size and layout, including the provision of barriers. The tests were mainly carried out using a static vehicle but in some cases the vehicle was moved in and out of the station to determine the effect of vehicle movement, particularly deceleration, on passenger behaviour at the station. The rapid transit system under study will serve as a proportion as possible of the urban community; the handicapped persons and those inconvenienced with luggage or pushchairs have been given special considerations in the experimental trials. The report also discusses the implication for passenger behaviour, and hence system performance, of choosing certain vehicle and station design features. (A) /TRRL/

Richardson, J Stroud, PC (Loughborough University of Technology, England); Transport and Road Research Laboratory, (0305-1315) Monograph NSR 1, 1975, 150 pp, Figs., Tabs., 1 Phot., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218053); ORDER FROM: TRRL, Crowthorne, Berkshire, England

17 137306 PRT IMPACT STUDY, A PRE-PRT PHASE. VOLUME I. TRAVEL ANALYSIS. Part of a three-volume work, this report describes the analysis performed on travel data collected for the Pre-PRT Impact Study. The data analyzed consist of travel behavior, travel patterns, model utilization and travel costs of various modes of travel in Morgantown before the revenue operation of the PRT in Morgantown. The analysis resulted in estimates of travel by various subpopulations by automobile, university bus and city-county bus systems in Morgantown. Further analysis conducted yielded estimates of traffic flow between various activity centers in Morgantown. Trip generation, trip distribution and modal split were estimated for Morgantown PRT corridor travel before the revenue operation of the PRT.

Elias, SEG Redwine, CN Deshpande, GK; West Virginia University, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06002676/1V1, Mar. 1976, 91 pp; See also PB-254482; Contract DOT-TSC-985-1; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254481/5ST, DOTL NTIS

17 137307 PRT IMPACT STUDY, PRE-PRT PHASE. VOLUME II. DATA COLLECTION PROCEDURE AND CODING MANUAL. The report describes the procedures utilized for collection of data on transportation demand and supply prior to the revenue operation of the Personal Rapid Transit (PRT) System in Morgantown, West Virginia. Most of the report is devoted to describing various surveys which were conducted to obtain information about travel patterns,

attitudes, and demographic characteristics of residents of the Morgantown area. The report also discusses the collection of data reflecting the volume of transportation usage, such as traffic counts, bus ridership counts, and speeds of autos and buses. Also described are the costs of operating an automobile and costs and revenues of the bus systems operating in the Morgantown area. The report includes documentation of the format and codes used for placing the survey data on magnetic tape.

Elias, SEG Redwine, CN Trent, RB Rovelstad, JM Mallik, AK; West Virginia University, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06002676/1V2, Mar. 1976, 163 pp; See also PB-254483; Contract DOT-TSC-985-2; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254482/3ST, DOTL NTIS

17 137308 PRT IMPACT STUDY, PRE-PRT PHASE. VOLUME III. FREQUENCY TABULATIONS FROM FOUR TRANSPORTATION-RELATED SURVEYS. The report gives tabulations of survey responses which were collected in Morgantown, West Virginia, as part of a study to assess the impact of the installation of the Personal Rapid Transit (PRT) System.

Redwine, CN; West Virginia University, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06002676/1V3, Mar. 1976, 151 pp; See also PB-254481; Contract DOT-TSC-985-3; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254483/1ST, DOTL NTIS

17 137438 FUNDAMENTAL STUDIES IN THE AUTOMATIC LONGITUDINAL CONTROL OF VEHICLES. The achievement of safe and efficient longitudinal control is probably the most significant technical problem associated with individual-vehicle transport systems such as PRT, dual-mode, and the automatic highway. The accomplishments over the first year of a two-year study include: (a) the development of a technique, which involves the use of discrete elements embedded in the guideway, for measuring vehicle position; (b) the development of an approach employing audio frequencies and helically wound transmission lines for providing continuous position reference information, to a string of moving vehicles; (c) the partial development of a promising technique for the accurate measurement of instantaneous velocity; (d) the development of a validated model for a vehicle's propulsion system dynamics; and (e) the design and testing of a vehicle controller which provides excellent tracking and a comfortable ride under all normal control conditions.

Fenton, RE Olson, KW Mayhan, RJ Takasaki, GM Chu, PM; Ohio State University, Federal Highway Administration, Department of Transportation Final Rpt. RF-3944A-1-1, DOT/TST-76/79, July 1975, 198 pp; Prepared in cooperation with Federal Highway Administration, Washington, D.C.; Contract DOT-OS-40100; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255953/2ST

17 137454 THE DUNLOP S-TYPE (SPEEDAWAY): A HIGH SPEED PASSENGER CONVEYOR. There is an obvious need for a continuous system to transport large numbers of

passengers at speeds of up to 10 m.p.h. over distances of up to 1 mile. The disadvantages of various systems which have been proposed over the years to provide a high speed moving pavement are discussed. The principle of the operation of the s-type speedway is described together with the ways in which this design overcomes the disadvantages of earlier proposals. The development of the system began in 1968 and led to the building of a full scale prototype which has been operating since 1971. Aspects of the design and the particular attention paid to passenger acceptability and safety are discussed. The point to point s-type speedway has a short constant speed entry section, after which the passenger is accelerated smoothly in a curved path until the main high speed section is reached. The main travel speed is up to 5 times the entry speed and at the end of this zone the passenger is decelerated to step off the system at low speed. Capacity of a single unit is 10,000 people per hour. Applications and installations for high speed moving walkways are described. /Author/TRRL/

Todd, JK ; International Federation of Pedestrian Assoc 1975, 16 pp, 9 Fig., 1 Phot.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 218618)

17 137736 INTERSECTION MERGE CONTROL IN AUTOMATED TRANSPORTATION SYSTEMS. Merging algorithms, capable of resolving conflicts in automated transit systems are studied. The effectiveness of five basic algorithms are compared via theoretical evaluations of the ability of each algorithm to resolve merge conflicts. The measure of efficiency is the miss-turn rate, the probability of successfully completing a desired merge. The miss-turn rate for each algorithm is calculated as a function of guideway density and turn rate. Four of these algorithms are sequential strategies while the fifth is a dependent maneuver philosophy. (a) /TRRL/

Caudill, RJ (Minnesota University, Minneapolis) Youngblood, JN (Alabama University, Birmingham) *Transportation Research* Vol. 10 No. 1, Feb. 1976, pp 17-24, 7 Fig., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219302), International Union of Railways, BD; ORDER FROM: ESL

17 137963 THE SHAPE OF THINGS TO COME. The author outlines the history of the Toronto Transit Commission (TCC). Consideration is then given to surface transit and the subway system. Details are given of the demand-responsive dial-a-bus system. Further areas of experimentation are listed including automatic passenger counting, automatic vehicle monitoring, preferential treatment of buses at traffic signals and computerised scheduling. A brief description is given of the system by which operating staff could choose the mode on which to work and preferred time and it is suggested that there should be improvements not only in technology but also in operating techniques. The discussion which followed the paper is included. /TRRL/

Sansom, JH (Toronto Transit Commission, Canada) Ennor, PD ; Newcastle-Upon-Tyne University, England Proceeding 1974, pp 77-89; ACKNOWLEDGMENT: TRRL (IRRD-219545); ORDER FROM: TRRL

17 138857 A SOLUTION TO URBAN TRANSPORT PROBLEMS? The article describes the design and operation of a minitram system constructed as part of a feasibility and project-definition study by easams Ltd. The vehicle was designed using railway practice utilising steel wheels on steel rails giving an estimated basic noise level of less than 70 dba compared with a range of 65 to 90 dba for A comparable rubber-tired vehicle. A central three-computer control system has been developed. Two paralleled computers carry out functions effecting the safety of the system providing a cross check on each other, the third computer carries out the scheduling of vehicles. The minitram system is shown to be capable of economic operation in urban and rural areas, offering a much improved public transport service. At peak hours a single line can carry up to 20000 passengers per hour using a three-train set, each vehicle carrying 24 passengers, the interval between successive trains falling as low as 12 seconds. Employing a high degree of automation the service can be made to operate continuously, a form of on-demand system would take over during the very quiet hours. /TRRL/ Howard, MG *Public Works, Construction and Transport* Dec. 1975, pp 6-9, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 220117)

17 138913 THE GEC MINITRAM. AUTOMATION IN URBAN TRANSPORTATION. This paper describes the minitram system of automatically controlled vehicles running on their own segregated track. In particular, the TRRL specification for a minitram vehicle is given, the aim of which was its application as A passenger-carrying public demonstration system in sheffield. Details are given of the traction motor which drives both axles, the use of steel wheels running on steel rails and associated noise levels, the guiding system, pneumatically operated disc brakes, and the computer control and signalling system. It is claimed that in peak hours, minitram can carry up to 20000 passengers per hour with the vehicles operating in three-tram sets, and, because of the lack of congestion, journey speeds are high. It is concluded that minitram offers an attractive solution to the problem of transporting people in cities. /TRRL/

Howard, MG *GEC Journal of Science and Technology* Vol. 42 No. 1, 1975, pp 3-8, 5 Fig., 2 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-219992)

17 138939 KINEMATIC RELATIONSHIPS AND ESTIMATES OF ENERGY REQUIREMENTS FOR MINITRAM. The basic equations which describe the motion and energy consumption of minitram are developed. These take account of limitations on maximum speed, acceleration, and jerk, and include the effects of wind on power requirements and energy consumption. The effects on trip time and/or energy consumption of limited power availability during acceleration, regenerative braking, and coasting are also investigated. Numerical examples are given based on the size of vehicle proposed for the Sheffield public demonstration system. For comparative purposes both vehicles with pneumatic tyres and vehicles with flanged steel wheels are considered. (a) /TRRL/

Langdon, MG ; Transport and Road Research Laboratory TRRL SR 202 UC, 1976, 36 pp, 10 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220271)

17 139350 GETTING AROUND TOWN: AUTOMATIC URBAN TRANSIT. This paper which holds that prospects for personal and group rapid transit hinge on technology, safety, politics and economics, discusses personal rapid transit (PRT) systems, group rapid transit (GRT), automatic individual-vehicle systems, and the advanced service concept demonstration project in Morgantown. The automatic, individual-vehicle transit system has found commercial application in many cities and is now being converted to use partial magnetic levitation (maglev) and linear motors. The 3-station Morgantown system includes 8.6 km of a single-lane guideway, most of it elevated, and 45 completely automatic vehicles with a capacity of 8 setting and 12 or 13 standing passengers. A second phase of the MORGantown project will add several miles of guideway, 2 new stations, and additional rubber-tired vehicles. When fully operative, the system will carry about 14.4 million persons per year and will cover its operation costs through 25-cent tickets and \$3.00 monthly passes. Transit systems in France, Germany and Japan are briefly outlined. The controversy about safety standards for large-scale PRTs are discussed and comments are made regarding their efficiency advantage over the automobile. Public acceptance of such systems and the role of politics are also discussed.

Wade, RM (ITT Gilfillan, Incorporated) *IEEE Spectrum* Vol. 13 No. 3, Mar. 1976, pp 55-58, 1 Fig., 2 Phot.

17 139355 RUBBER-TIRED RAPID TRANSIT. The results are presented of a technology survey which were carried out in an effort to evaluate the current state-of-the-art in rubber-tired rapid transit. The survey obtained data from transit properties that have had systems operating for a considerable period of time. Information from operating test tracks was included, as well as data from manufacturing plants and research agencies. The characteristics of 19 of the systems surveyed are tabulated. The systems are organized into 3 categories: medium capacity system (U.S.), medium capacity systems (Japan) and high capacity systems (Canada, Mexico, and Japan).

Sulkin, MA Miller, DR (Daniel, Mann, Johnson and Mendenhall) *ASME Journal of Mechanical Engineering* Vol. 98 No. 5, May 1976, pp 26-33, 15 Fig., 1 Tab.; Based on a paper presented at the 3rd Intersociety Conference on Transportation, Atlanta, Georgia.

17 141073 TRACK DESIGN CRITERIA FOR P.R.T. SYSTEMS IN URBAN AREAS. The potential of personalized rapid transit (PRT) systems is examined, such a system (a public transportation system with small-to-medium sized vehicles independently controlled and travelling on reserved tracks) is viewed against the background of the present urban transportation problems, and the situation is studied in relation to other possible solutions. Using the systems approach, planning goals and objectives are developed. The social economic and physical aspects of the various alternatives are evaluated against these objectives, and suggestions are made for arrangement, operation, and track design. There are four categories of solutions for the present urban situation: removal of congestion by resolving root causes; improvement of

existing transport facilities; new modes of transport; do-nothing option. The new form of public transport considered here are PRT systems and the factors influencing such systems are: social, physical and aesthetic, and economic (demand, cost, fares). The operational and track characteristics of alternatives are studied. The advantages and limitations are outlined of ground level tracks, elevated tracks and tracks in tunnels. Comments are also made on stations-their frequency, relation to track level, and costs.

Copsey, NR (Damas and Smith Limited) *High Speed Ground Transportation Journal* Vol. 10 No. 1, 1976, pp 59-84, 10 Fig., 1 Tab., 15 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 141106 BRINGING LOGIC TO URBAN TRANSPORTATION INNOVATION. To reduce the space needed for transportation, both the physically and the socially perceived size of urban transportation facilities must be reduced. This means reducing the time spacings between moving vehicles, as well as their space consumption when stopped. Reducing time spacings requires automating the driver function--with vehicles under automated operation short headways (time spacings between vehicles) on automated guideways. To equal an eight-lane expressway's capacity, a two-lane guideway would have to carry four times as many vehicles per hour. True personal rapid transit means personalized vehicle service and fraction-second headways. Without fraction-second headways, passengers must be assembled to boost line-haul capacity, service is degraded, and per-mile system costs are increased. Thus, significant improvement in urban transit service in general also requires very-short-headway systems. Fraction-second headways are the only way to lighten transit vehicles and reduce structure size and costs--both direct costs and the social costs of large guideway structures and, similarly, urban highways.

Brand, D (Harvard University) *Technology Review* Vol. 76 No. 3, Jan. 1976, pp 38-45; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 141339 AUTOMATED GUIDEWAYS URGED FOR CITY TRANSIT. High capacity, automated, dual mode guideways allowing the vehicle to travel over automated guideways and traditional roads is regarded as the key to improving urban transportation. Such a system would take up less room than the conventional superhighways and would free the city of massive traffic jams caused by our over crowded highways. The development of a reliable automated guideway that will permit vehicles to travel at speeds of up to 60 mph with only a fraction of a second time-spacing between vehicles, is the central technological problem that needs to be resolved before such a system could be implemented. Recent government trends have emphasized the need for a significant reduction in passenger car mileage in selected urban areas by 1977; these trends assume that public transit and car pooling will take the place of drive-alone auto travel. For certain types of trips, complex travel behavior indicates that proposals to reduce urban travel by private cars may cause serious distortions and diseconomies which will only compound the original problem.

Automotive News Vol. 51 No. 4583, Feb. 1976, p 58

17 142077 ADVANCED URBAN TRANSPORT. The working paper describes a number of advanced transport systems currently under development. The systems have several elements in common--they are automated systems. None of the vehicles need or are intended to carry a driver (although manual operation may be an option). Stations may or may not be manned depending on individual circumstances. They use a reserved track for safety and operational reasons. Their vehicles are generally smaller than those used in conventional urban transport. The largest vehicle described is 2.5 M wide 3.1 M high and carries about 50 passengers, while the smallest is 1.5 M wide 1.8 M high carrying 2-3 passengers. They are under serious development by or in association with large companies often with government assistance. The only exception is Cabtrack which was being developed by the U.K. Government, but whose development has now stopped. Chauvinism persuaded us to include it. A full list of all ideas and innovations, many of which have not reached the prototype stage is given by "Unconventional Passenger Transportation Systems" U.I.T.P. 1973 (306p). Some of the technical and economic features of the 24 systems included in the review are described. /TRRL/

Black, IG Gillie, RF Longley, CJ Thomas, TH ; Lanchester Polytechnic, England Report 21, Dec. 1973, 63 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-220934)

17 142927 PUBLIC ACCEPTANCE OF NEW MASS TRANSIT SYSTEM. This paper presents attitudes of townspeople in the Morgantown, W.Va. area toward the Personal Rapid Transit (PRT) System just prior to its opening. The attitudes are derived from home interviews of a representative sample of 305 nonstudent household heads. Two aspects of community acceptance are identified and examined: (1) Whether the respondents think that the PRT will be an efficient means of transportation; and (2) whether the respondents believe that the PRT is an asset to the community. The data indicate that persons who perceive the new system as contributing to a progressive image for the community were generally favorable toward the PRT. In addition, respondents who now use buses or who anticipate using the PRT are especially favorable toward the system as an asset to the community's image.

Trent, RB Redwine, CN *ASCE Journal of the Urban Plan and Develop Div* Proceeding Vol. 102 No. UP1, Paper 12361, Aug. 1976, pp 225-234; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL

17 143202 MORGANTOWN PERSONAL RAPID TRANSIT LONGITUDINAL CONTROL SYSTEM DESIGN SUMMARY. Experience with the longitudinal control system used on each vehicle in the Morgantown Personal Rapid Transit System has shown that nonlinearities and variations in control system parameters can significantly affect performance if such characteristics are not adequately considered in the system design. A design summary is provided that documents this experience and emphasizes the important analysis and hardware design problems encountered. The performance capability of the final design is computed on the basis of analysis and test results. A description of the detailed nonlinear analytical model developed is included for possible use in future studies. Poten-

tial system improvements are described that may be the objects of future research and development.

Lang, RP ; Boeing Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-23, Dec. 1975, 158 pp; See also PB-202713.; Contract DOT-TSC-994; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256139/7ST, DOTL NTIS

17 143227 PERSONAL RAPID TRANSIT RESEARCH CONDUCTED AT THE AEROSPACE CORPORATION. The report summarizes research conducted on the conceptual and experimental development of Personal Rapid Transit (PRT) during the period from 1968 to 1975. The work considered not only the technical and operational aspects of the PRT concept, but also included estimates of PRT capital and operating costs, analyses of system safety and reliability, analyses of urban applications and associated economics, evaluation of PRT energy utilization, development of PRT planning methodologies, and assessments of PRT deployment impacts. Technology shortfalls associated with the possible future implementation of the specific PRT concept are identified, and research and development activities to overcome these shortfalls are recommended.

Olson, CL Bernstein, H ; Aerospace Corp., El Segundo, Calif.*Urban Mass, Transportation Administration, Washington, D.C., (UMTA-CA-06-0071) UMTA-CA-06-0071-76-1, June 1976, 296p; Contract DOT-UT-60006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256846/7ST

17 143945 EXPERIMENTS IN GUIDEWAY-LEVITATION VEHICLE INTERACTION DYNAMICS. This investigation involves the design and interpretation of laboratory-scale dynamic experiments of vehicles traversing multiple-span or cable-stayed guideways. The nondimensional responses of such systems, including critical span bending moments and vehicle heave accelerations, depend on the system parameters derived in Chapter 2. A point load 'vehicle' and two vehicles closely resembling advanced operational prototypes were designed and tested: the 150 mph Prototype Tracked Air Cushion Vehicle (PTACV), and the 300 mph Tracked Levitated Research Vehicle (TLRV). In Chapter 3, general experiments are designed, all based on these dimensionless system parameters and the capability of instrumentation and data processing minicomputers to measure and interpret response data. The remaining chapters include discussions and comparisons of response data for critical six and three-span guideway moments and for rms vehicle heave accelerations.

Wilson, JF ; Duke University, Federal Railroad Administration Final Rpt. FRA/OR&D-76/259, Jan. 1976, 88 pp; Contract DOT-FR-4-4098; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257941/5ST, DOTL NTIS

17 143946 MODELS FOR ASSESSING TRIP DEPENDABILITY IN AUTOMATED GUIDEWAY TRANSIT NETWORKS. Equipment failures and how to correct them are significant factors affecting the quality of service of Automated Guideway Transit (AGT) systems.

The network configuration, subsystem failure rates, and recovery modes interact to provide the operational configuration that passengers ultimately view in terms of the ability of the AGT system to provide reliable service for their trip. This report describes a procedure that permits evaluation of the Group Rapid Transit networks in terms of trip dependability. The model uses a flow representation of vehicle traffic determined by network topography, demands for travel, and operational service policy. The model has its most useful application in the intermediate design stage where there are tradeoffs to be evaluated.

Kershner, DL Roesler, WJ ; Johns Hopkins University, Laurel, Urban Mass Transportation Administration Tech Rpt. APL/JHU/CP-047TPR036, UMTA-MD-06-0018-76-2, Aug. 1976, 64 pp; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258129/6ST, DOTL NTIS

17 144064 DEVELOPMENT AND TEST OF AN EDDY-CURRENT CLUTCH-PROPULSION SYSTEM. This report covers the Phase I effort which is to develop and to test an AC-propulsion system for personal rapid-transit vehicles. This propulsion system incorporates an AC-induction motor in conjunction with an eddy-current clutch and brake. Also included are development of the propulsion system, fabrication of the propulsion system, description of the laboratory test program, and analysis of the test results.

Adams, GJ (Transportation Systems Center) ; Mobility Systems and Equipment Company, (DOT-TSC-UMTA-73-8) Final Rpt. UMTA-MA-06-0027-731, Oct. 1973, 202 pp; Work sponsored by UMTA, DOT.; Contract DOT-TSC-357-1; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-225093, DOTL NTIS

17 144065 POWER AND PROPULSION CHARACTERISTICS OF THE DULLES TRANSPO '72 PERSONAL RAPID TRANSIT VEHICLES. The Power and Propulsion Characteristics of the four different PRT vehicles demonstrated at Transpo '72 are determined by using analytical descriptions, manufacturers' data, and the test data from the Post-Transpo '72 Test Program. A comparative analysis of the four systems is presented. The performance features necessary to adequately describe each vehicle's power and propulsion characteristics are also discussed.

Raposa, FL Phillips, WE, Jr (Kusko (Alexander) Incorporated) ; Transportation Systems Center, (DOT-TSC-UMTA-74-12) Final Rpt. UMTA-MA-06-0031-752, July 1975, 116 pp; Work sponsored by UMTA, DOT.; Contract MA-06-0031; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-245027, DOTL NITS

17 145153 DYNAMIC INTERACTIONS BETWEEN VEHICLES AND ELEVATED, FLEXIBLE RANDOMLY IRREGULAR GUIDEWAYS. A dynamic interaction model is formulated for the heave-pitch motion of vehicles crossing elevated flexible, randomly irregular spans. Span dynamic motion due to a vehicle passage is modeled using a Bernoulli-Euler beam model and modal analysis techniques. Four types of random irregularities characteristic of elevated guideways are modeled numerically including

vertical span offset, pier misalignment, camber, and surface roughness. Analytical expressions for each irregularity power spectral density are derived and the relative contributions of irregularities to vehicle excitation are examined. The limitations to vehicle passenger comfort levels posed by guideway deflection and irregularity are illustrated for personal and rapid transit types of vehicles.

Snyder, JE, III Wormley, DN (Massachusetts Institute of Technology) ; American Society of Mechanical Engineers Conf Paper 76-WA/AUT-2, Dec. 1976, 11 pp, 10 Fig., 1 Tab., 23 Ref., 1 App.; Contributed by the Automatic Control Division for presentation at the Winter Annual Meeting, New York, N.Y., December 5-10, 1976, of the American Society of Mechanical Engineers.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

17 145181 PERSONAL RAPID TRANSIT III: PROGRESS, PROBLEMS AND POTENTIAL OF A PROMISING NEW FORM OF PUBLIC TRANSPORTATION. An edited version is presented here of the 47 papers presented at the 1975 International Conference on Personal Rapid Transit, as well as of the several panel discussions and luncheon talks. The very informative session on political perspectives stressed the political aspects of the deployment of new transit options. The conference clarified the characteristics of automated guideway transit (AGT) systems and noted that support for the development and deployment of such systems is largely an educational process. Japanese systems highlighted here include 2 guided rapid transit systems and 3 personal rapid transit (PRT) systems. Papers on the economics of PRT systems cover the life cycle of new technologies, benefit-cost ratios, and the value of future savings. Three papers examine the problem of urban form for which PRT systems are most suitable and the kind of changes that could be initiated by these systems. Attention is also focused on the technology of PRT systems and their components.

Minnesota University, Minneapolis June 1976, 506 pp, Figs., Tabs.; This publication was originally reported at the 1975 International Conference on Personal Rapid Transit, Denver, Colorado, September 16-19, 1975.

17 145597 A PRELIMINARY EVALUATION OF ELECTRICAL PROPULSION BY MEANS OF IRON-CORED SYNCHRONOUSLY OPERATING LINEAR MOTORS. The report is a preliminary evaluation of the technical feasibility of using iron-cored, synchronously operating motors to propel ground transportation vehicles in the high cruise speed range. A second consideration is the possibility that the motor might also provide strong attractive and lateral forces. Three motor types, all realizable with passive track rails are investigated: (a) claw-pole synchronous motor, (b) homopolar inductor motor, and (c) heteropolar inductor motor. A rail clearance of 1.5 cm is specified. However, the effect of variations in this and other design parameters is also analyzed. All three types considered compare favorably with an equivalent single-sided induction motor, insofar as weight, efficiency, and power factor are concerned. The calculations are supported by analog simulation experiments.

Levi, E ;

Polytechnic Institute of New York, Federal Railroad Administration Tech. Rpt. FRA-TR-76-128, Jan. 1975, 113 pp; Contract DOT-FR-30030; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258437/3ST, DOTL NTIS

17 145807 LONG DISTANCE RAIL TRANSPORTATION, PART A: RAPID RAIL TRANSPORTATION USING NONCONTACTING TECHNOLOGY [Spurgeführter Fernverkehr. Teil A: Spurgebundener Schnellverkehr mit Berührungsfreier Fahrtechnik]. Status reports are presented on research and development in the Federal Republic of Germany. Topics are centered around magnetic levitation technology. Repulsive and attractive approaches and associated track problems are discussed. Problems connected with a test facility for transportation technologies are outlined. [German]

Federal Ministry for Research and Technology BMFT-FB-T-75-36-PT-A, Dec. 1975, 166 pp; Seri-2. Conf-Proc. Of the Statusseminar, Schliersee, West Germany, March 12-14, 1975.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N76-28111/2ST, DOTL NTIS

17 146104 SUPERCONDUCTING MAGNETS (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1964-Aug 76]. The cited reports include research on materials studies, theory, design, and applications of superconducting magnets. Examples of the applications include particle accelerators, MHD power generation, superconducting generators, nuclear fusion research devices, energy storage systems, magnetic levitation, and bioinstrumentation.

Reimherr, GW ; National Technical Information Service Bibliog. Oct. 1976, 251 pp, 246 Ref.; Supersedes NTIS/PS-75/636; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-760771/6ST, DOTL NTIS

17 147009 POSSIBILITIES OF ENERGY RECOVERY BY GRAVITY TRACTION IN PUBLIC TRANSIT SYSTEMS. About 70 or 80 percent of the traction energy employed in the operation of metropolitan and suburban railways on lines with the stops arranged at short intervals is used for the kinetic energy of the vehicles. If at all, this energy is recuperated only at a rate of approximately 30 percent. Gravity traction allows the kinetic energy of the vehicles to be recuperated at a rate of about 90 percent during deceleration, which would decrease the overall energy input by 63 to 72 percent. However, this requires the line to be arranged uphill and downhill, and a traction system not based on the interaction of forces between a wheel and a rail might be needed. The result would be high average speeds, without requiring more traction power. A relationship is established between the parameters of the trackway and the change of the vertical and horizontal acceleration values as a function of time. (Author) [German]

Jung, V ; Nuclear Research Center (Kernforschungszentrum) KFK-1793, Dec. 1975, 50 pp In German; English Summary.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N76-316 90/OST, DOTL NTIS

17 147396 LINEAR INDUCTION MOTOR ELECTRICAL BRAKING TEST. This report describes the electrical braking characteristics of

a 2500-hp (at 250 mph) linear induction motor (LIM), which is used to propel and brake the LIM research vehicle. Three methods of electrical braking were investigated: ac dynamic braking, dc eddy current braking, and plugging. From the data acquired the following information was derived and is presented herein for each of the braking methods investigated: (1) LIM electrical braking characteristics in terms of braking force developed as a function of vehicle speed, with all data referred to a 2000-A primary current, (2) powerplant characteristics, (3) the location and magnitude of the braking energy dissipated, and (4) power and control equipment requirements. Pertinent LIM design information is also included to enable independent investigators to correlate analytical predictions with the test data published herein.

Powell, RB ; AiResearch Manufacturing Company, Federal Railroad Administration Final Rpt. 75-11969-Rev-1, FRA/ORD-76/264, Apr. 1976, 115 pp; Contract DOT-FR-40016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261851/OST, DOTL NTIS

17 147397 LINEAR INDUCTION MOTOR ELECTRICAL PERFORMANCE TEST. This report describes the electrical performance characteristics of a 2500-hp (at 250 mph) linear induction motor (LIM), based on data acquired while propelling the LIM research vehicle over a 0-to-250-mph speed range. Pertinent LIM design information is included to enable independent investigators to correlate their mathematical models with the test data published herein. The principal end product of this effort is tabulated LIM performance, in terms of thrust, voltage, power factor, efficiency, input and output power, velocity, and percent slip at five excitation frequencies and at 1-Hz slip frequency increments, with all data referred to a 2000-A primary current. From the acquired data the following information was derived and included in this report: LIM performance characteristics (thrust vs slip at constant current, power factor vs slip, and efficiency vs slip), voltage-and current-source presentation of LIM data, influence of LIM end effects, and other LIM data relevant to future design activities.

Powell, RB ; AiResearch Manufacturing Company, Federal Railroad Administration Final Rpt. 75-11919-Rev-1, FRA/ORD-76/265, June 1976, 161 pp; Contract DOT-FR-40016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261856/9ST, DOTL NTIS

17 147863 NATIONAL STUDIES OF URBAN ARTERIAL TRANSPORTATION. A RESEARCH FRAMEWORK. A research framework is presented for the estimation of the national markets and social, economic and environmental impacts of new systems of urban arterial transportation, such as automated guideway and rail and bus rapid transit systems. A statistical step-wise procedure, based upon the extrapolation of results from a limited number of analytical case studies to the set of all candidate metropolitan areas, is specified. Results are provided for the application of all steps in the procedure preceding the conducting of actual case studies: 80 candidate metropolitan areas are classified into nine relatively homogeneous groups with respect to their arterial transporta-

tion needs; the most representative areas within each group are identified as preferred case study locales; and guidelines are developed for the extrapolation of system costs, benefits and market estimates from the case studies to the remaining areas within the groups through sensitivity analyses. In addition, intermediate multivariate statistical results are interpreted as inputs to the development of hypotheses describing relationships between transportation and urban structure. /Author/TRRL/

Golob, TF Cauty, ET Gustafson, RL ; General Motors Research Laboratories Res. Rpt. GMR-1274, Jan. 1973, 43 pp, 1 Fig., 9 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-223238); ORDER FROM: General Motors Research Laboratories, Twelve Mile and Mound Roads, Warren, Michigan, 48090

17 148291 NETWORK DYNAMICS IN A LARGE PERSONAL RAPID TRANSIT SYSTEM FAILURE. The paper discusses the application of some control schemes and containment techniques and shows that methods exist which can reduce a patron's perception of vehicle failures to the category of minor nuisance. The operational workability of large PRT networks appears to be most sensitive to the most common system element the vehicle. In a well designed and maintained system, the remaining components are so relatively few or can be made so reliable as to be of minor concern. Methods exist which can minimize the operational impact of vehicle failures on the riding patron.

Wade, RM (International Business Machines Corporation) ; Colorado University, Denver Conf Paper Vol. 2, Paper 47, 1975, 13 pp; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

17 148292 SERVICE DEPENDABILITY EVALUATION AND DESIGN CONSIDERATIONS FOR AUTOMATED TRANSIT SYSTEMS. The paper describes a method of evaluating service dependability and deriving system reliability and maintainability characteristics, and discusses some candidate reliability design features and failure management strategies.

Ems, AF (TRW Systems Group) ; Colorado University, Denver Conf Paper Vol. 2, Paper 46, 1975, 18 pp; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

17 148296 INTERNATIONAL CONFERENCE ON PERSONAL RAPID TRANSIT, TECHNICAL PAPERS, 1975, VOLUMES 1 AND 2. The volumes contain 43 papers presented at the Conference. They are grouped under the following session headings: new system program perspectives; evaluation of PRT applications; service concepts, system operation and control; social and community impacts; the urban structures of PRT; progress reports on European and Japanese systems; and safety, reliability and

service dependability. An address list of the authors is included. Selected papers are indexed separately.

Colorado University, Denver Proceeding 1975
The Conference, sponsored by the University of Colorado, Center for Urban Transportation Studies, was held September 16-19, 1975 in Denver, Colorado.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

17 148311 ROLE OF NEW TECHNOLOGY IN URBAN TRANSPORTATION: AN HISTORICAL PERSPECTIVE. A framework presenting a broad perspective of technology innovations is developed from a study of past innovations in urban transportation. Observations are forwarded on the characteristic life-cycle of "new" technologies. Key determinants of past successful and unsuccessful innovation efforts are identified and relevant theories examined. The methodology is then used to evaluate the present innovation efforts towards automation of urban transportation, in particular Personal Rapid Transit.

Kornhauser, AL (Princeton University) Wilson, LB ; Colorado University, Denver Conf Paper Vol. 1, Paper 1, 1975, 39 pp; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

17 149225 CONFERENCE SUMMARY. Papers were presented at this conference which dealt with: definitions and descriptions of a variety of alternative dual-mode transportation concepts; comparisons of dual mode with other transportation systems; results of analytical case studies of dual mode transportation system in representative urban locales; estimates of the social, economic, energy resource and environmental impacts of hypothesized implementations; technological considerations including lateral and longitudinal control, communications, propulsion, guideway design, and station design; institutional factors affecting new system implementation; and status reports on dual-mode transit programs in the U.S. and France. This broad category of systems can be operated in both of 2 modes: manually controlled and self-propelled on streets; and automatically controlled or externally propelled or powered on special guideways. Such systems can include both common carrier and private vehicles and provide transport for persons and freight. The most common example described at the conference employed a small bus controlled by a driver on the street system that could also be automatically controlled with or without a driver on a special guideway. An alternative form employs a fleet of transporter vehicles which are captive to the guideway network.

Cauty, ET (General Motors Corporation) *Transportation Research Board Special Reports No. 170*, 1976, pp 3-11, 2 Fig., 1 Tab., 7 Ref.; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149226 LET'S DEMONSTRATE DUAL MODE. This paper which maintains that dual modes systems must be demonstrated in order to gain revenue operating experience and an indication of public acceptance, chides congress for cutting back on UMTA's funds which are necessary to implement demonstration programs. In 1966, Congress called for "National Leadership" in a program of research, development and demonstration of new transportation systems. Eight years later none of the new systems have been demonstrated. UMTA has failed to get any further than the system design stage, fearful of getting into the actual prototype testing, and later, demonstration programs. Procrastination by UMTA in conjunction with insufficient funds has caused this standstill in developing transportation systems for the future. In view of the present energy crisis and concern for environmental protection, new systems must soon replace the existing ones, which have been inadequate for some time and will not serve urban needs much longer.

Reuss, HS (United States House of Representatives) *Transportation Research Board Special Reports* No. 170, 1976, pp 15-17, 4 Ref.; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149227 ISSUES IN NEW TRANSPORTATION SYSTEMS AND TECHNOLOGY. This paper emphasizes that transportation system performance requirements should be defined in terms of level of service as perceived by the users instead of engineering characteristics. Although the management professionals in research and development have been aware of user needs. The problem is that because the research and development team define the service objectives to be attained, these level-of-service parameters go hand-in-hand with the engineering performance targets. It would be preferable to have service needs identified at the local level, where community desires can be accurately expressed. It is important that the initial testing of innovative transportation technologies could be achieved with substitute, lower cost technologies (e.g. an express bus being used to simulate the service characteristics and dual-mode behavior of automated guideway systems). It is also pointed out that the current trend to design vast, comprehensive transportation systems in order to draw a region together need not be the most effective solution. A better approach would be a phased, incremental implementation of a new system in which confidence and public acceptance could grow. Although new transportation systems are the promise of the future, they need to be implemented with restraint.

Orski, CK (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 170, 1976, pp 18-19; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149230 DUAL-MODE, CAPTIVE-VEHICLE PRT, AND PALLET SYSTEMS. This paper discusses the possible disadvantages of a

pure dual-mode system compared with captive-vehicle personal rapid transit systems. A way is presented for combining the desirable features of both systems in a pallet system.

Anderson, JE (Minnesota University, St Paul) *Transportation Research Board Special Reports* No. 170, 1976, pp 33-35, 3 Ref.; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149231 COMPARISON OF DUAL-MODE TRANSIT SYSTEM WITH VARIOUS TRANSIT BUS OPTIONS. The annual costs and level of service of a dual-mode transit system (DMTS) are compared with those of exclusive busway bus (EBB), exclusive busway with small bus feeder (EBB/SBF), expressway bus (EB), and conventional bus (CB) systems. Large-and small-bus versions are studied. The systems, defined for Milwaukee in 1990, all provide the same capacity and routes. The Milwaukee Dual-Mode Study base-line data are used. Trip time and transfer characteristics are used as measures of level of service. Construction of busways and creation of reserved lanes increase vehicle speed that, in turn, increases driver-vehicle productivity and decreases travel time. The use of small buses allows for shorter headways, more privacy, and demand-responsive service. Bus small-bus operations are not economical unless automated operations are used. Transfers may have an unacceptable effect on the ridership of the exclusive busway and small-bus feeder system. The small-bus dual-mode system and large-bus exclusive busway system are the two most comparable systems: Annual cost of the busway system is 21 percent less, but ridership is expected to be 17 percent lower than that of dual mode because the dual-mode perceived trip time is 27 percent shorter. The busway system can be provided at the lowest cost, and implementation does not involve the large capital investment and construction impact. However, the busway system is only practical in cities with extensive freeway networks and provides an unfavorable cost growth characteristics. /Author/

Lieb, JG (Mitre Corporation) *Transportation Research Board Special Reports* No. 170, 1976, p 36; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149233 PALLET RAIL-CARRIER DUAL-MODE TRANSPORTATION SYSTEM. One solution to urban transportation problems incorporates a pallet type of rail-carrier dual-mode transportation system. This system is technically feasible and incorporates a fully electrically propelled and controlled pallet rail-carrier vehicle applying ac drive with eddy current clutch and brakes. Present manual model components of automobiles and buses require limited interface equipment to operate. Automated-mode rail carrier permits speeds as high as 96 to 192 km/h (60 to 129 mph) and is applicable as a means of transportation in urban centers as well as between cities and cross country. Pallet rail-carrier dual-mode systems open the possibility of trans-

forming present automobiles and buses into battery-powered units for electric propelling, which will help reduce considerably the hydrocarbon and nitrogen oxide pollution as well as assist in fossil fuel conservation. The rail system guideway also permits automated operation of rapid transit vehicles or incorporates other mass transit systems with limited additional cost. Ferrying container cargo between cities or across countries could be performed within the system moving at the same high speeds resulting in an economical and effective distribution system throughout the country. /Author/

Adams, GJ (Mobility Systems and Equipment Company) *Transportation Research Board Special Reports* No. 170, 1976, pp 36-37; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149234 TOWARD DUAL-MODE USE OF BICYCLES IN PUBLIC RAPID TRANSIT. It is time to begin using the bicycle as a basic part of the transportation system of the United State. The need for improved public transportation is increasing daily. Because of time delays and funding limitations only a small part of this need can be met by completely new systems and guideways within the next 10 years. With a number of inexpensive changes the capabilities of the bicycle for short trips can be combined with those of existing (or new) public transit systems for longer trips. If a bicycle could be taken aboard public rapid transit, the speed, comfort, and safety of the transit vehicle could be combined with the versatility, energy efficiency, and door-to-door convenience of the bicycle. A car would then be necessary only for some trips, and the need for more than one car per family would be reduced. In this work the facilities and hardware needed for carrying bicycles on buses, planes, trains, and ships are discussed. Results of a bicycle-bus-trailer transportation study sponsored by the California Department of Transportation are presented, including demand analysis, prototype hardware, and operational experience. /Author/

Eggleston, DM (San Diego State University) *Transportation Research Board Special Reports* No. 170, 1976, pp 37; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149238 DUAL-MODE SYSTEM DEVELOPMENT PROGRAM OF THE URBAN MASS TRANSPORTATION ADMINISTRATION. This paper reviews an early study that compared dual-mode and conventional bus rapid transit and that served as background to a three-phase development program of the Urban Mass Transportation Administration. Phase 1 includes system concepts and design; phase 2 includes detailed design and system performance on a test facility; and phase 3 includes prototype development and tests and a demonstration in an urban area.

DeMarco, VR (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 170, 1976, pp 41-43; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a con-

ference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149249 EVALUATION OF DEMAND-RESPONSIVE SERVICE FOR DUAL-MODE BUS SYSTEMS. A basic requirement to be addressed in the development of dual-mode bus transportation is the selection of system operating policies. This decision is of immediate concern because of its influence on system hardware and software design requirements. This paper evaluates a station service policy in which the decision for vehicles to stop at stations is made on a real-time, demand-responsive basis. A steady-state analysis of the impacts of demand-responsive station stopping, from the perspective of the system and the passenger, was performed for an urban dual-mode system. The results of this analysis suggest that demand-responsive operation has a more significant impact on system measures of performance (e.g., CBD station flows, vehicle kilometers and hours of operation). These results imply that operating policies for on-guideway, demand-responsive service should give equal priority to system design and operational considerations and to passenger service goals. /Author/

Kershner, DL *Transportation Research Board Special Reports* No. 170, 1976, pp 80-81; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149251 DUAL-MODE SYSTEM MANAGEMENT. Aspects of construction and operation of an effective dual-mode transit system (DMTS) are considered in this paper. A general network geometry model is suggested for guideway configurations. A preliminary result suggests that the CBD guideway might best be a rectangular form. Off-guideway zoning, based on a modified Manhattan distance approach, provides possible zones with a theoretically minimal distance for vehicle dispatching. The present concept of medium-sized vehicles and liberal headways has reduced the degree of complexity of network control problems. However, future research in controls should concentrate on areas unique to dual-mode characteristics. There is a need for selecting a DMTS network configuration according to an optimal geometry to provide a system with minimum cost. Some methods that can be used to initiate such a study are suggested. However, physical constraints, such as land use and engineering, may yet dominate any changes in the network geometry. As for the command and control of DMTS, this paper emphasizes that future research should be directed toward topics that are particularly significant to the dual-mode characteristics, both in vehicular control and demand-responsive applications. /Author/

Yen, AM (Mitre Corporation) *Transportation Research Board Special Reports* No. 170, 1976, p 81; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149262 SIMULATION DESIGN, AND IMPACT OF DUAL-MODE ACCESS FACILITIES. An approach is described to the functional design and analysis of a typical access facility of a dual-mode system concept being researched at General Motors Research Laboratories. The procedure uses a discrete-event simulation model to analyze the performance capability of the facility during the peak demand period and to establish the design values of the critical elements of the access facility. After several design iterations and analyses, a typical access module was adopted. The most critical element was found to be the preinspection queuing area. The analysis revealed that the queuing area would require a storage capacity for 38 vehicles, given a maximum waiting time of 6 min and the requirement that all vehicles be stored off the feeder arterial street. The entrance module would have three vehicular inspection and automation bays, measure 29.6 x 310.9 m (97 x 1020 ft), require 9308 sq m (2.3 acres) of land, and have a processing capacity of 360 vehicles/hour. The performance and design characteristics of the entrance module would then be fed into a land requirement model, along with peak-hour loadings, to estimate land consumption effects of the access facilities on the affected communities in a case study area.

Camargo, HA Ventura, FL (General Motors Corporation) *Transportation Research Board Special Reports* No. 170, 1976, p 104; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 149265 SYSTEM ASSURANCE FOR CURRENT AND FUTURE GUIDEWAY TRANSPORTATION SYSTEMS. System assurance may be defined as that process by which any system is made safe, reliable, and easy to maintain. Although system safety is not considered explicitly in this paper, a properly designed, reliable, and maintainable system will certainly be a safe system. The paper describes a plan for improving the reliability and maintainability of transportation systems. The reliability budgets for system hardware are presented, and estimates are made of total system performance. An analysis of the relations between system life-cycle cost and system assurance show that the reliability of commercially available subsystems must be improved significantly before planned PRT systems can operate with acceptable assurance. Some recommendations are made as to how such improvements can be accomplished. The paper deals with those factors that can be controlled by system planners and suppliers and that affect the service, comfort, public appeal, and economic feasibility of fully automated, guided transportation systems. Only fully automatic systems are considered, for those systems have been shown to be more economical during the design life than labor-intensive systems. A high degree of automation explains why the Lindenwold Line serving Philadelphia and its New Jersey suburbs is a profitable operation.

Smith, FC (LTV Aerospace Corporation) *Transportation Research Board Special Reports* No. 170, 1976, p 115; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

17 150468 A COMPARISON OF LIMRV LIM GUIDANCE SYSTEM EXPERIMENTAL DATA WITH MATHEMATICALLY PREDICTED VALUES USING REACTION RAIL SURVEY DATA. This document discusses the survey of 1,000 feet of Linear Induction Motor Research Vehicle (LIMRV) reaction rail at the Department of Transportation Test Center in Pueblo, Colo., and a comparison of experimental data from test runs of the LIMRV LIM guidance system with theoretical predictions using the survey data as an input to a mathematical model. While some deviations from predicted values were observed, in general the correspondence between experimental data and predictions was excellent.

Muhlenberg, JD ; Mitre Corporation, Federal Railroad Administration Tech. Rpt. MTR-6618, FRA/ORD-76/25, Oct. 1975, 52 pp; Contract DOT-FR-30015; ACKNOWLEDGMENT: NTIS, FRA; ORDER FROM: NTIS; PB-261921/1ST, DOTL NTIS

17 151149 VEHICLE OPERATING STRATEGIES FOR SMALL AUTOMATED GUIDEWAY TRANSIT NETWORK. The report discusses Automated Guideway Transit (AGT) systems that will offer demand-activated service using an on-line dispatching capability. The AGT system management is identified in this report as a large-scale, multi-criterion optimization problem, and the approach taken is to formulate the service optimization problem into a mathematical form so that known techniques could be used to arrive at solutions. Emphasis is on heuristic solutions by approximation rather than exact solutions through analysis. Actual operating strategies are constructed for point-to-point service with intermediate stops. The strategy involving squared terms of waiting time is found to be optimal for a wide range of demands. The computer simulation reveals that although non-controllable parameters, such as network topology and demand distribution, dominate the basic traffic pattern, service characteristics can be improved by selecting a best feasible strategy based upon the basic traffic pattern.

Yen, AM ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0025) UMTA-VA-06-0025-77-1, Aug. 1976, 116 pp; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-262480/7ST, DOTL NTIS

17 151199 DYNAMIC INTERACTIONS AND OPTIMAL DESIGN OF PRT VEHICLES ON ELEVATED GUIDEWAYS. The report presents research completed on optimum (minimum cost) design of PRT vehicle guideway systems; analysis of periodic motions of PRT vehicles over straight flexible guideways; and continued investigations of vehicle motions over curved elastic guideways. These three areas represent essential ingredients of a mathematical study of the performance of candidate vehicle/guideway designs. The dynamics of PRT vehicles over flexible curved guideways have been investigated with the primary objective being to establish a computationally efficient method for studying this problem. A computer algorithm has been developed and tested in order to optimize its computational efficiency. The algorithm will be used to construct a test track which is made up of straight-transition-curved-transition-straight guideway seg-

ments. Candidate vehicle/guideway designs determined by the optimization algorithm will then be proof tested on this curved track in order to verify the fidelity of the system design.

Likins, PW Nelson, RB Mingori, DL ; California University, Los Angeles, Department of Transportation Final Rpt. DOT/TST-77/15, June 1976, 80 pp; Contract DOT-OS-40080; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262973/1ST, DOTL NTIS

17 151774 SEATTLE PRT STUDY. VOLUME I. SUMMARY. In 1969 and 1970, the City of Seattle became one of five selected medium sized cities to be included in the Center Cities Transportation Project (CCTP). Increased interest in PRT/people-mover technology culminated in a three-party agreement and ultimately led to the current investigation and analysis of automated transit technology. The feasibility of a PRT or people-mover system application is being evaluated in a two-phase study: Phase 1- Site-selection for a people-mover system, and Phase 2- System implementation for the locales selected in Phase 1 study. This is the Interim Report for Phase 1 of the PRT study and is presented in two volumes. This volume consists of a general overview of the total Phase 1 study.

Basmacian, H Stappler, RF ; VTN Washington, Incorporated, Puget Sound Governmental Conference, Municipality of Metropolitan Seattle, Washington State Legislature, Urban Mass Transportation Administration Intrm Rpt. UMTA-WA-09-0006-77-1, Mar. 1974, 104 pp; Prepared by VTN Washington, Inc., Bellevue. Sponsored in part by Puget Sound Governmental Conference, Seattle, Wash., Municipality of Metropolitan Seattle, Wash., and Washington State Legislative Transportation Committee, Olympia. See also Volume 2, PB-264 299.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264298/1ST, DOTL NTIS

17 151775 SEATTLE PRT STUDY. VOLUME II. TECHNICAL SUPPLEMENT. In 1969 and 1970, the City of Seattle became one of five selected medium sized cities to be included in the Center Cities Transportation Project (CCTP). Increased interest in PRT/people-mover technology culminated in a three-party agreement and ultimately led to the current investigation and analysis of automated transit technology. The Technical Supplement Volume consists of ten individually self-contained Appendices documenting a specific study or feature.

Basmacian, H Stappler, RF ; VTN Washington, Incorporated, Puget Sound Governmental Conference, Municipality of Metropolitan Seattle, Washington State Legislature, Urban Mass Transportation Administration Intrm rpt. UMTA-WA-09-0006-77-2, Mar. 1974, 213 pp; Prepared by VTN Washington, Inc., Bellevue. Sponsored in part by Puget Sound Governmental Conference, Seattle, Wash., Municipality of Metropolitan Seattle, Wash., and Washington State Legislative Transportation Committee, Olympia. See also Volume 1, PB-264 298.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264299/9ST, DOTL NTIS

17 151807 MORGANTOWN PERSONAL RAPID TRANSIT SYSTEM. The Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation selected Mor-

gantown, West Virginia, as a site for a prototype personal rapid transit system demonstration because it presented the challenges that such a system must overcome to be successful in any location. This Morgantown Personal Rapid Transit (MPRT) system was funded by UMTA as a research and development task to provide a demonstration system with the following objectives: (1) Demonstrate the feasibility of an automatic, personalized urban transit system; (2) Demonstrate the applicability of the concept to national urban needs; and (3) Qualify the concept for other locations using the UMTA capital grant funds. This MPRT final report contains a description of the final delivered system and a summary of the activities undertaken in its development, including system and subsystem plans, specifications, drawings, test data, and test evaluation. This MPRT system connects downtown Morgantown with two West Virginia University locations, and also provides passengers with non-stop direct to destination service between the central business district and the Evansdale and downtown campuses of West Virginia University.

Boeing Company, Urban Mass Transportation Administration, (UMTA-WV-06-0005) Final Rpt. D191-60016-1, UMTA-WV-06-0005-77-1, Nov. 1975, 229 pp; Contract DOT-UT-20007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263673/6ST, DOTL NTIS

17 151863 VEHICLE FOLLOWER LONGITUDINAL CONTROL FOR AUTOMATED GUIDEWAY TRANSIT VEHICLES. Continuing interest in the use of public transit to help solve problems related to urban transportation has pointed to the use of relatively small automated transit vehicles as a method for providing expanded transit service without the labor costs and reliability problems associated with the bus and without the high capital costs associated with rapid rail systems. Two philosophies for longitudinal control for short headway automated guideway transit (AGT) systems have evolved-(1) the vehicle-following concept, and (2) the point-following concept. This study is concerned with vehicle-follower control at relatively short headways. The objective of this research is to examine basic considerations in vehicle-follower longitudinal control for small, automated transit vehicles operating at moderate speeds and short headways. The relationship between spacing policy, system nonlinearities, and dynamic response of strings of vehicles is discussed.

Caudill, RJ Garrard, WL ; Minnesota University, Minneapolis, Urban Mass Transportation Administration, (UMTA-MN-11-0002) UMTA-MN-11-0002-77-1, Feb. 1977, 282 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264554/7ST, DOTL NTIS

17 151961 NEW SYSTEMS OF TRANSPORTATION IN JAPAN. This paper discusses subways which use rubber tires, monorails, light guideway systems, personal rapid transit (PRT), compound types and other forms of land transportation. In Sapporo City, rubber tires on the wheels of subway trains reduce the noise level. For lateral guidance, each car is equipped with horizontal guide wheels in the middle of its body. Japanese experience regarding the utilization of monorails is very favorable. The VONA and the KRT light guideway systems are described. The

former is a small electric car of the unmanned type running on rubber tires. It may run alone or include several vehicles (up to 12) to form a train. In the PRT, an adoption of the Morgan Town System, horizontal guide wheels are used for steering. Tests are presently being carried out on the MAT which has a central guide system, and the KCV which has the side guide system. Comments are made on the Computer Controlled Vehicle System--a PRT system, and on the compound dual mode systems. The latter include the DMB, a vehicle similar to an ordinary bus but which can enter special guideways for driverless operation. Compound systems also include the Bellica--a moving way system with cabs.

Yasoshima, Y *Tokyo University Collected Papers* Vol. 14 Paper No. 7604, 1976, pp 29-41, 18 Fig., 1 Tab.; This paper was prepared for the Japan Society of Civil Engineers.

17 152606 PENDAIR LIGHT RAPID TRANSIT. The paper sets out the reasons for choosing rapid transit as a first application for the Pendair suspension system and distinguishes between transit and other urban transport functions. A description of Pendair Light Rapid Transit, its performance, economics, and implementation programme, is given and some aspects of environmental intrusion are discussed. Attention is drawn to the relatively high conventional content of the Pendair system and its mode of operation which reduces development risks. Comparisons are made with conventional rail rapid transit and other innovational systems.

Bliss, DS ; International Hydrofoil Society Conf Paper 1976, 18 Ref.; Presented at the biennial International Conference of Hovercraft, Hydrofoils & Advanced Transit Systems, May 17-20, 1976, Amsterdam, Netherlands.; ACKNOWLEDGMENT: EI (EIX770300218); ORDER FROM: ESL

17 152609 US DEVELOPMENTS IN ADVANCED TRANSIT SYSTEMS. While fixed right-of-way transit systems of conventional rail type are technologically mature and ready for deployment, the high costs and low rate of traffic diversion are causing planners to rethink the feasibility of using such systems. The increasing social problems of the automobile as a mode, and the apparent difficulties with conventional transit pose a dilemma; this has encouraged several large US manufacturing firms to attempt to develop more advanced modes using full automation, small vehicles, short headways and demand-responsive operation. These developments have been fraught with enormous difficulties, and have not yet produced a truly advanced system that could begin to resolve the dilemma posed previously. Some institutional changes that might increase the rate of development of new systems are suggested.

Ross, HR ; International Hydrofoil Society Conf Paper 1976; Presented at the biennial International Conference of Hovercraft, Hydrofoils & Advanced Transit Systems, May 17-20, 1976, Amsterdam, Netherlands.; ACKNOWLEDGMENT: EI (EIX770300219); ORDER FROM: ESL

17 152803 FLOW-COORDINATED OPERATING STRATEGIES FOR AUTOMATED TRANSPORTATION SYSTEMS. The main components of two alternative flow-coordinated strategies upon which an overall vehicle management problem might be based, are outlined. A

fundamentally new approach to the vehicle management problem is presented which takes into account station capacity constraints and which is potentially applicable to large, topologically complicated systems operated at high vehicle density levels.

Kiselewich, SJ (Yale University) Tong, YM Morse, AS; Institute of Electrical and Electronics Engineers Conf Paper 1975, pp 553-558, 11 Ref.

Presented at the 14th IEEE Conference on Decision Control, Including the Symposium on Adaptive Processes, held in Houston, Texas, 10-12 December 1975.; ACKNOWLEDGMENT: EI (EIX770200095); ORDER FROM: ESL

17 152805 CONTROL CONSIDERATIONS FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. The objective of the paper is to present a description of the various control functions necessary for the operation of advanced automated transit systems. These control functions are hierarchical in nature and range from scheduling and routing to control of velocity and spacing between individual vehicles. Proposed solutions to the various control problems which arise in advanced automated transit systems are discussed.

Garrard, WL (Minnesota University, Minneapolis) Caudill, RJ Reed, WB; Institute of Electrical and Electronics Engineers Conf Paper 1975, pp 576-572, 24 Ref.; Presented at the 14th IEEE Conference on Decision Control, Including the Symposium on Adaptive Processes, held in Houston, Texas, 10-12 December 1975.; ACKNOWLEDGMENT: EI (EIX770200097); ORDER FROM: ESL

17 155004 TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION (CITATIONS FROM THE NTIS DATA BASE). The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these Government-sponsored research reports.

Habercom, GE, Jr; National Technical Information Service Bibliog. Apr. 1977, 125 pp, 120 Ref. Supersedes NTIS/PS-76/0094, and NTIS/PS-75/114. See also NTIS/PS-77/0179.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, ESL; NTIS/PS-77/0178/2ST, DOTL NTIS

17 155738 PEOPLE MOVERS. A review of recently implemented public transit systems is presented. Among the projects described are the AIRTRANS system at the Dallas/Fort Worth Airport the Group Rapid Trans (GRT) system developed by the Boeing Aerospace Co. under the sponsorship of the Urban Mass Transportation Administration (UMTA) to link the two campuses of West Virginia University at Morgantown, and the Westinghouse, shuttle-loop transit system in use at several airports. Low-cost options to remedy urban transportation problems discussed include computer matching of car-pool riders, dial-a-ride and demand-response van and minibus services, and allocation of freeway lanes to cars carrying more than three passengers. Prototype vehicles incorporating linear induction motors magnetic levitation techniques, under development by Boeing, Otis, and Rohr in a UNTA-sponsored project to design an advanced group rapid transit system, are briefly described.

Mennie, D *IEEE Spectrum* Vol. 13 No. 7, July 1976, pp 85-89, 2 Fig., 2, Phot.; ACKNOWLEDGMENT: Massachusetts Institute of Technology; ORDER FROM: ESL

17 155757 ASTROGLIDE-THE ADVANCED AUTOMATIC GUIDEWAY TRANSIT SYSTEM. The technical and economic aspects of a people-moving overhead monorail system powered by linear induction motors or advanced transverse flux motors, of the type used at Braniff International, Dallas to move airline passengers between the terminal and the parking area, are discussed. The advantages such a transportation system would offer to people using mass transit systems are noted. A demand-responsive fully automatic transportation system, called astroglide, is described and is shown to be far superior to the monorail installation used at Braniff International.

Scelzo, GP (PRT Systems Corporation); Kalerghi Publications Proceeding 1976, pp 29-35

From Hovering Craft, Hydrofoil and Advanced Transit Systems. Proceedings of the 2nd International Conference, Amsterdam, Netherlands.; ACKNOWLEDGMENT: International Aerospace Abstracts; ORDER FROM: American Inst of Aero & Astro Tech Info Service, 750 Third Avenue, New York, New York, 10017; A77-17030

17 155850 MUNICH II--NO ALCHEMISTIC FORMULA. The H-concept design proposal for the new Munich Riem Airport (Munich II) is described. This configuration features decentralized check-in with "Activity Nodes," one-level processing, linkage with the Munich rapid transit system and an international transport system of its own, linear terminal buildings, and an expandable passenger handling capacity. It is emphasized that this concept was arrived at by careful step-by-step group planning.

Steffen, M *Airport Forum* Vol. 5 No. 2, Apr. 1975, p 23, 5 Fig.; ACKNOWLEDGMENT: Massachusetts Institute of Technology

17 155875 DFW AIRTRANS TRANSIT SYSTEM SIMULATION. Description of a mathematical model of an intra-airport rapid transit system designed to transport passengers and baggage at the new Dallas-Fort Worth International Airport. The proposed simulation model moves trains and passengers over a guideway by processing time as an independent variable. All events such as train and passenger movement are associated with a specific simulation time and are processed at that time. At a particular simulation time, a type of event to occur in the future and the time of occurrence are determined. When the simulation time is incremented to the event occurrence time the event is processed.

American Institute of Aeronautics and Astronautics Proceeding AIAA 74-878, 1974, 5 pp; Presented at the Control of Flight Conference, Anaheim, California, August 5-9, 1974.; ACKNOWLEDGMENT: International Aerospace Abstracts

17 155880 AIRTRANS OPERATIONAL READINESS TEST--AIRPORT INTERNATIONAL TRANSPORTATION EVALUATION. Airtrans provides International Transportation at the Dallas-Fort Worth Regional Airport. Operational readiness of the

vehicles is assured by an automated departure test. The test plan was formulated in the conceptual stages of airtrans design. Main objectives of the plan were to make the vehicles testable using existing operational hardware and with no special test connector. Test design features had the same priority as other vehicle operating requirements. Merging test constraints with prime system operating requirements achieved an efficient and very thorough test. In addition, vehicle checkout features aided verification, production and maintenance testing. The results demonstrate that sufficient priority applied to test objectives, early, provides important contributions to overall system design.

Nicholson, RA (LTV Aerospace Corporation); Institute of Electrical and Electronics Engineers Proceeding 1973, 8 pp; From Automatic Support Systems for Advanced Maintainability, International Symposium, Arlington, Texas, November 5-7, 1973.; ACKNOWLEDGMENT: International Aerospace Abstracts

17 155909 AIRPORT TERMINAL PLANNING. Using the Dallas/Forth Worth Airport as an example, it is necessary to point out that airport terminal planning must be done with a broad view of the future and an understanding of the problems of the past. A general criterion concerning expansibility and automation with passenger convenience as a goal is presented. An airport transit system is also described, pointing out the fact that distances between terminals must be traversable in a minimum of time. Moving passengers from their deplaning gate to another terminal or to a remote parking area is a prime consideration. This same transit system is used to move employees, baggage, mail and rubbish throughout its entire circulatory system, thus completely automating the airport. A future convenience for travellers of all kinds could be an inter-city transit system tied in with the airport transit system.

Sullivan, TM; Institution of Civil Engineers Proceeding 1973, pp 79-84; From Airports for the 89's. Proceedings of the 4th World Airport Conference, London, England 3-5 April 1973.; ACKNOWLEDGMENT: International Aerospace Abstracts

17 155916 THE TAMPA AND SEATTLE-TACOMA AIRPORT TRANSIT SYSTEMS. The Tampa and Seattle-Tacoma International Transit Systems have been in service long enough to judge the validity of their concepts and the success of their designs. These two systems have been accepted by the authorities that own and operate them. They have excellent safety and performance records. The public accepts their driverless cars routinely. The two systems are described and compared. They are similar in many respects but differ in their basic application to the airports, one being a shuttle and the other a loop system. As a result of their specific application, the automatic control systems differ. Operating and performance summaries are given. Both systems provide the same level of service and both have an availability over 99%.

Gillespie, PR (Western Electric Company, Incorporated); Society of Automotive Engineers SAE 750624, June 1975, 27 pp, 10 Ref.; ACKNOWLEDGMENT: International Aerospace Abstracts; ORDER FROM: American Inst of Aero & Astro Tech Info Service, 750 Third Avenue, New York, New York, 10017; A75-40528

17 156349 STUDY OF THE EFFECTS OF NEW TRANSPORTATION SYSTEMS ON URBAN TRANSPORTATION AND ENVIRONMENT BY COMPUTER SIMULATION. This paper deals with computer simulation program and the results of computation for the case of three new transportation systems, that is, PRT (Personal Rapid Transit), E/V (Electric Vehicle), ERGS (Electronic Route Guidance System) being introduced for twenty years in a certain city (542 thousand population, 46 zones) which has rapid transit and bus already. The result of computations are given in the form of annual change of 8 indices indicating qualities of urban transportation, for the case without any new introduction, with a single new transportation system, and with simultaneous introduction of several new systems.

Tsuchiya, H (Jizai Engineers Limited) Abe, M Uehara, A Ishikawa, M Harashima, F Itoh, T ; International Federation of Automatic Control Proceeding 1976, pp 245-251; Proceedings of the International Federation of Automatic Control/International Foundation for Information Process/International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI (EIX770400436); ORDER FROM: ESL

17 156887 RESEARCH AND DEVELOPMENT POSITION OF ELECTROMAGNETIC SUSPENSION TECHNOLOGY IN THE FEDERAL GERMAN REPUBLIC [Forschungs-und Entwicklungsstand der Elektromagnetischen Schwebetechnik in der Bundesrepublik Deutschland]. The experimental vehicles and the test equipment brought into service to date include test rigs for stationary and rotational measurement of static and dynamic parameters as well as the detection of eddy currents. Performance tests on the experimental vehicles are reported, in which electromagnetic suspension technology is preferred to air cushion technology. The aims for the experimental vehicles are given as: V max = 400 km/h, 200 to 400 people working load, energy consumption in the region of comparable rail bound vehicles. Asynchronous short stator motors and synchronous long stator motors are compared. A comparison of the principal dimensions demonstrates the pronounced dependency of the actual power supplied on efficiency and phase displacement. /TRRL/ [German]

Winkle, G *Elektrotechnische Zeitschrift, Ausgabe A* Analytic Vol. 96 No. 9, 1975, pp 367-373, 3 Fig., 2 Tab., 9 Phot., 2 Ref.; ACKNOWLEDGMENT: Federal Institute of Road Research, West Germany (BAST48060E), TRRL (IRRD 304260); ORDER FROM: VDE Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12, West Germany

17 157240 VEHICLE MANAGEMENT SYSTEMS FOR HIGH PERFORMANCE PERSONAL RAPID TRANSIT SYSTEMS. The paper presents a class of vehicle dispatching policies predicated on the assumption that vehicle travel costs and passenger waiting costs can be related. The dispatching policies vary as the functions chosen to model passenger waiting costs vary. The computer execution time of each policy in family of policies is most reasonable and thus policies will handle systems with large demands. The dispatching policies are founded on

the results of the two-station models also contained in this work. Two-station model has presented a major result for batch service queues—namely the presentation of the optimal policy for batch service queues with nonlinear customer waiting costs.

Weiss, HJ (Western Illinois University, Macomb) Northwestern University, Evanston Res. Rpt. Publication 1, 1976, 58 pp; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 157401 THE INFLUENCE OF DRIVING SPEED AND ROAD NETWORK ON THE TRAFFIC VOLUME AND COST-STRUCTURE OF A NOVEL PRT SYSTEM ("KABINENBAHN") [UEBER DEN EINFLUSS VON FAHRGESCHWINDIGKEIT UND STRECKENNETZ AUF VERKEHRSMENGE UND KOSTENSTRUKTUR EINER NEUARTIGEN KABINENBAHN]. Starting from basic considerations regarding the absolute and relative braking distance between vehicles following one another and from measured results from test drives of the first prototype of the electrically driven cabs, a vehicle following theory is developed. This gives the traffic flow in vehicles per minute at a road cross section with various maximum speeds, and this shows that the highest driving speed allowable is less than the maximum driving speed. Finally, the cost structure of the PRT system ("kabinenbahn") studied is treated. /TRRL/ [German]

Becker, K ; Technical University of Berlin, West Germany THESIS Dec. 1974, 224 pp, 57 Fig., 8 Tab., 3 Phot., 49 Ref.; ACKNOWLEDGMENT: Transportation Data Coordinating Committee (IRRD 304210)

17 157475 USERS' OPINIONS OF PRT (CAB TRACK) SYSTEMS [Die Meinung der Benutzer ueber Kabinenbahnsystem]. The Federal German Ministry for Research and Technology commissioned a study by the Hamburg Hochbahn AG, the object of which was to determine the suitability of the PRT (Kabinenbahn) and its acceptance by the public. Approximately 20 to 35% of the public are critical for various reasons. Further technical development is recommended. On the question of the introduction of large or small passenger "cabins" or carriages, further individual evaluations are necessary. /TRRL/ [German]

Tappert, H Henrich, K *Nahverkehrspraxis* Analytic Vol. 23 No. 2, 1975, pp 64-68, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-304243), Federal Institute of Road Research, West Germany; ORDER FROM: Ernst Arnold GmbH, Siegburgstrasse 5, Dortmund, West Germany

17 157511 YEAR OF PROGRESS FOR JAPAN'S THREE MAGLEV PROJECTS. With Japanese National Railways's 7-km maglev test track due to be completed and Japan Air Lines' High Speed Surface Transport (HSST) linear induction test car likely to attempt 300 km/h, the development outlook for magnetically levitated transport in Japan remains bright. Work on the Ministry of Transport-sponsored project for a small linear-motor powered vehicle for rapid transit use also continues.

Railway Gazette International Vol. 133 No. 6, June 1977, pp 232-233, Photos. ORDER FROM: ESL

17 157903 ADVANCED GROUND TRANSPORT ON THE MOVE AGAIN?. Two recent developments in this field are briefly reported, both using single-sided linear motors for propulsion. In Canada, a contract with Canadair is reported to complete the development of an intermediate capacity transit system (ICTS) with two-car units running on steel wheels, and without magnetic suspension. The Toronto firm of spar are to provide the propulsion system which includes a self-steering bogey and wheel assembly for the car, and provision is made for fully automatic control. A test track facility about 2 km long is to be built at Kingston, Ontario. In Japan, Japanese Air Lines (JAL) have accepted responsibility for the provision of a rapid transit link between Tokyo and the new international airport 40 miles away at Narita. A prototype vehicle is described as being in the building phase. It is expected to reach 125 mile/h, and financial support is being sought for the construction of A \$600 million track and system. The final vehicle is envisaged as 72 ft long, 12 ft wide and 10 ft high to carry 112 passengers at 190 mile/h, riding on a magnetic cushion produced by 8 electromagnets. /TRRL/

New Scientist Analytic Vol. 73 No. 1034, Jan. 1977, p 80, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 224578); ORDER FROM: ESL

17 158053 A STUDY OF THE COSTS AND BENEFITS ASSOCIATED WITH AVM. Automatic Vehicle Monitoring (AVM) systems provide an information gathering and processing tool for the centralized management and control of urban vehicles. The potential benefits of AVM, namely, increased efficiency and productivity of transit operations, have led UMTA and the Transportation Systems Center (TSC) to explore the technical, operational, and economic feasibility of AVM. This study addresses AVM utilization by bus, police, and taxi operators, and by a cost sharing multiple user fleet. This benefit cost analysis looks beyond field experimentation and focuses on the probable costs and achievable benefits of an AVM system fully deployed in a major metropolitan area. The core of this analysis is a newly developed computerized benefit-cost accounting model. A literature review and AVM-related experience in the U.S., Europe, and Canada have been integrated with research at TSC to develop this cost-benefit model. This model calculates the total life cost of alternative AVM location systems, then determines the dollar value of cost reduction benefits made possible through use of AVM's real-time position location information. AVM payoffs and the sensitivity of the payoffs to the dimensions of the model and the base case fleets are also discussed. This cost-benefit study as a whole analyzes the probable achievability and value of the stated claims. The Appendices contain Base Case Data Inputs, User's Manual for Benefit Cost Model, and Input-Output Formats.

Reed, HD Roos, M Wolfe, M DiGregorio, R ; Transportation Systems Center, (DOT-TSC-UMTA-77-5) Final Rpt. UMTA-MA-06-0041-77-1, Feb. 1977, 258 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract UM711/R7716; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-266293

17 158085 PEOPLE MOVER PROFILE. As part of its ongoing commitment to the concept of technology sharing, the U.S. Department of Transportation has initiated a series of publications on transportation topics which focus on a variety of subject areas. This report is part of such a series. **PEOPLE MOVER PROFILE** acquaints readers with the subject of people movers in conjunction with UMTA's Downtown People Mover (DPM) Project. The project's aim is to demonstrate the benefits of fully automated people mover systems in downtown urban areas. To date, people movers, installed in controlled environments such as airports and recreation parks, have demonstrated that they are proven operational systems. The DPM Project will demonstrate the feasibility of installing a people mover system in the harsher and more demanding environment of downtown urban areas. This profile report is divided into three sections. The first, a narrative overview, briefly discusses the subject of people movers. The second section consists of detailed technical data and photographs of manufacturers and suppliers of existing people mover systems. The third section, the supplementary material, contains a glossary of terms used in this document in addition to the aforementioned UMTA DPM Project material. Technical data in this profile report were obtained from the people mover manufacturers and suppliers who are responsible for its accuracy.

Urban Mass Transportation Administration, (MA-06-0081) Final Rpt. UMTA-MA-06-0081-77-1, May 1977, 36 pp; Contract MA-06-0081; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-268335 DOTL NTIS

17 158094 MPRT O & M PHASE OPERATING, AVAILABILITY AND MAINTENANCE HISTORY. This document describes the operating and maintenance characteristics of the Morgantown Personal Rapid Transit (MPRT) during the first year of passenger carrying service starting September 15, 1975. The Morgantown project is an Urban Mass Transportation Administration demonstration to provide personal rapid transit service between the central business district and the separated campuses of West Virginia University. West Virginia University operated the system with support from Boeing. The first year operation of the Morgantown PRT system successfully demonstrated the concept of an automatically controlled transit system. The purpose of this document is to provide a published account of the MPRT operating, availability, and maintenance history. Data was summarized from program reports compiled during this first year of MPRT operation and maintenance. Data included scheduled and actual operating hours; downtime and downtime events; mean downtime; daily passenger gate count; system availability; trip reliability; system dependability; daily fleet miles; daily fleet size; scheduled versus unscheduled maintenance actions; failures by part number; distribution of failures by time and subsystem; top 25 problem areas; spare parts used by quantity, part number and month; ECP change implementation during the O&M phase; and a summary of the first year's costs. The intent in presenting this MPRT data in this document is that future Automated Transportation Systems studies and designs will learn from the MPRT experience and make use of this data to optimize designs and systems.

Stone, AL ; Boeing Company, (D191-62000-1) UMTA-WA-06-0005-77-2, Jan. 1977, 98 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract WV-06-0005; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-266994

17 158424 ASSESSMENT OF NEW PUBLIC SHORT-DISTANCE PASSENGER TRANSPORT SYSTEMS. The numerous new systems for public short-distance transport which have emerged are summarised in five system groups, an assessment is attempted and, finally the chances of adoption of the new transport systems are stated. /GMRL/

Grabe, W (Hanover Technical University, West Germany) *UITP Revue* Vol. 25 Mar. 1976, pp 160-164; ACKNOWLEDGMENT:

17 159703 APPLICATIONS OF NEW SYSTEMS TO URBAN TRANSPORTATION. New systems to urban transportation are discussed. System characteristics provide the specifications for an urban transport system that will affect the current modal split. Several such systems are considered and their service and cost characteristics are compared.

Rand, RC (Johns Hopkins University, Laurel) Avery, W *Traffic Quarterly* Vol. 29 No. 1, Jan. 1977, pp 97-117, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 159795 NEW URBAN TRANSPORTATION SYSTEMS, THEIR POSSIBILITIES AND LIMITATIONS [Nieuwe stedelijke vervoerssystemen; Mogelijkheden en beperkingen]. This article deals with the development of some related new transport systems, e.g. The minitram and personal rapid transit on one hand and the dial-a-bus and the coin-in-the-slot taxi on the other. Some indications of future developments in the Netherlands are presented. /TRRL/ [Dutch]

Hupkes, G *Verkeerskunde Analytic* Vol. 28 No. 3, Mar. 1977, pp 119-124, 2 Fig., 7 Phot., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225784)

17 159863 USE OF ENHANCEMENT PLATES FOR IMPROVED DOPPLER RADAR PERFORMANCE FOR GROUND TRANSPORT SYSTEMS. A method of improving the performance of X-Band Doppler radars for ground transport vehicles is presented. The technique utilizes small metallic reflectors placed directly below the guideway surface. From the results of preliminary laboratory and on-road tests it is concluded that improved accuracy of on-board position and velocity measurements result. In the safe operation of high-speed short time-headway automatically controlled ground transport systems, there is a need for highly accurate position and velocity sensors. Since the advent of low-cost solid-state X-band sources, much attention has been focused on the use of Doppler radars operating with the rough-surface backscattered signal from the roadway as velocity sensors for ground-based vehicles. The results to date indicate that, while the method may be adequate for conventional applications, some improvement is needed before these radars can be used in high-capacity automated transit systems.

Mayhan, RJ (Ohio State University) Olson, KW Takasaki, G *Institute of Electrical and Electronics Engngs Proc* Vol. 64 No. 11, Nov. 1976, pp

1644-16, 45, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 163529 SYSTEMS AND ENVIRONMENTAL EMC CONTROL PROGRAM FOR THE AIRTRANS AUTOMATED GROUND TRANSPORTATION SYSTEM. This paper describes the EMC program implemented for the AIRTRANS ground transportation system installed at the Dallas-Fort Worth Regional Airport. A review of the EMI techniques applied at the equipment level for the automatic control, propulsion control and surveillance system is provided. A presentation is made concerning derivation of the limits for radiated and conducted emissions from the vehicles; limits which can be reasonably applied to commercial systems yet provide the necessary control to insure the system is operationally compatible and free from mutual interference. The system will operate without interference to adjacent aeronautical, safety and special, and broadcast radio services. Measurement data are provided showing the radiated and conducted emission characteristics of a vehicle operating on-site. These measurements, compared against the limits established for the system, show that the required conditions of electromagnetic compatibility have been achieved.

Koeritz, KW Robson, CA (LTV Aerospace Corporation) *IEEE Transactions on Electromagnetic Compatibility* Proceeding 1975, pp 443-451, 9 Ref.; Proceedings of a Symposium and Technical Exhibit on Electromagnetic Compatibility, Mantreux, Switz, May 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 163758 MAGNETICALLY LEVITATED AND WHEELED MINITRAM COMPARISON STUDY. A programme of theoretical and experimental work has led to the successful demonstration of an electro-magnetic suspension unit for a small, driverless urban vehicle (minitram). The report describes the designs of both magnetically levitated and wheeled vehicles and their guideways and compares them in both technical and economic terms. The system based on magnetic suspension has been shown to be technically feasible with overall costs comparable with those for the equivalent wheeled vehicle system. The authors see more likelihood of cost reductions in a second generation magnetic suspension system than for a wheeled system which is already based on proven technology. They identify the narrower, lighter guideway and lower noise levels as further possible advantages of magnetic suspension over wheels. The authors also find that the magnetic suspension vehicle should have a higher reliability and availability than the wheeled vehicle which leads to a significant difference in maintenance requirements. The major disadvantage of a magnetically suspended vehicle is that the linear motor used for propulsion and braking is inefficient and requires heavy associated control gear. On balance, magnetic suspension does not at present have any outstanding advantage over wheels for the proposed application. /TRRL/

Dobbs, DJ Linder, D Armstrong, DS ; British Railways Board Research Department Monog Rept TR-EDYN5, Jan. 1976, 122 pp, Figs., Tabs., 4 Phot., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227304); ORDER FROM: British Railways Board Research Department, Railway

Technical Centre, Derby, England

17 163759 STATE-BACKED BODIES COMPETE FOR MAG-LEV TRANSPORT PRIZE. The major Japanese rail (JNR) and airline (JAL) companies are independently developing similar high speed, noiseless pollution-free transport systems using magnetic levitation and the linear induction motor. It is hoped that the JAL system will be operational in 1982 running from Tokyo to the airport over an elevated guideway at 300km/h. Electric power for the linear induction motor is picked up from a third rail through a carbon shoe attached to the vehicle. The JNR development is designed to be a 500km/h inter-city system to supplement the present Shinkansen network providing direct competition with domestic airlines. A linear synchronous motor creating a repulsive force is used to levitate and propel the vehicle 300mm above a concrete inverted t-shaped track. The magnets, which are superconductive, also react with a current in track mounted coils to produce the repulsive force. Because the levitation and guidance only function at speeds above 80km/h a rail and wheel system is added for low speeds. However the JNR system has the advantages of greater gap control at high speeds and requires no "third rail" power supply. /TRRL/

New Civil Engineer Analytic No. 248, June 1977, pp 18-19, 2 Fig., 4 Phot. ACKNOWLEDGMENT: TRRL (IRRD-227536); ORDER FROM: Institution of Civil Engineers, 91-93 Farringdon Road, London EC1M 3LE, England

17 163868 THE STRUCTURE OF NEW SYSTEMS FOR PUBLIC TRANSPORT [De structuur van de nieuwe systemen voor openbaar vervoer]. The computer increasingly plays a central part in modern traffic systems. With these advanced technical aids public transport can be improved. Improved public transport can reduce the need for private transport. Improved means of public transport such as tram, "bustaxi", personal rapid transit, dual-mode systems and the Witkar are discussed. /TRRL/ [Dutch]

Kroes, JLB (Delft University of Technology); Genootschap voor Automatisering Monog Rpt. 1976, pp 7-12; ACKNOWLEDGMENT: TRRL (IRRD 226887), Institute for Road Safety Research; ORDER FROM: Genootschap voor Automatisering, 40 Paulus Potterstraat, Amsterdam, Netherlands

17 164454 THE CONCRETE TIE ... NEW LIFE FOR A FALTERING CAUSE. The concrete tie has not won widespread acceptance from track engineers, but various North American properties have tested or adopted such ties. In a series of five articles, various aspects of the current situation are discussed: Concrete ties on CN: The scenario behind the decision; Concrete ties for MARTA ballasted track; This concrete-tie test features conventional rail anchors (Santa Fe); Concrete-tie test criteria: What type of loading? How important are cracks?; and Interspersing concrete ties with wood ties: A look at Seaboard experiment 10 years later.

Railway Track and Structures Vol. 73 No. 8, Aug. 1977, pp 23-36, 3 Fig., 1 Tab., 15 Phot. ORDER FROM: ESL

17 165029 COST AND PERFORMANCE RELATIONSHIPS FOR RUBBER TIED AUTOMATED SYSTEM DESIGN. The paper discusses the cost sensitivity of the vehicle/elevated guideway system to the important vehicle operational and performance characteristics. For the vehicle system, relationships for obtaining a first cut cost estimate of an electrically driven automated rubber tired vehicle as a function of the vehicle's physical & operating characteristics are presented. Also presented are important vehicle performance characteristics that affect the fleet size and hence the vehicle system capital cost.

Putkian, J (Transportation Systems Center); Colorado University, Boulder Conf Paper Vol 2, Pap 34, 1975, 18 pp, 13 Ref.; Presented at the International Conference on Personal Rapid Transit, Denver, Colorado, September 16-19, 1975; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Boulder, Center for Urban Transportation Studies, Boulder, Colorado, 80302

17 165030 DEVELOPMENT AND EVALUATION OF SERVICE POLICIES FOR MEDIUM-HEADWAY AUTOMATED RAPID TRANSIT SYSTEMS. Two innovative service policies—the dynamically scheduled service and the advanced scheduled service—were developed for these systems combining the features of scheduled and demand services. These operate a large number of fixed service routes formed by connecting station groupings in the network. The level of service provided by these policies, the system operating and design requirements and the network performance characteristics were evaluated using three typical networks and a set of eight computer programs. Dynamic scheduling provided a high level of service with a low passenger waiting time at the stations and no requirement for passenger transfers. Advanced scheduling provided a marginally lower service level but resulted in higher vehicle occupancies and substantial reduction in fleet requirements.

Thangavelu, K (De Leuw, Cather and Company) Colorado University, Boulder Conf Paper Vol 1, Pap 20, 1975, 26 pp; Presented at the International Conference on Personal Rapid Transit, Denver, Colorado, September 16-19, 1975; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Boulder, Center for Urban Transportation Studies, Boulder, Colorado, 80302

17 165033 RUBBER-TIRED RAPID TRANSIT--1. SYSTEMS CONCEPTS. Rubber-tired transit technology is receiving much attention for application to medium capacity rapid transit systems due to superior traction capability and the potential for reduced noise generation. Data from a worldwide survey identify other surprising benefits. This technology appears to merit inclusion as an alternative in technological assessments for urban rapid transit application. Part I reviews the state-of-the-art in the world today and describes typical system concepts.

Sulkin, MA Miller, DR *ASME Journal of Mechanical Engineering* Vol. 98 No. 5, May 1976, pp 26-33; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 165034 RUBBER-TIRED RAPID TRANSIT--2. TECHNICAL CHARACTERS. This second article in a series provides a detailed look at some of the more important characteristics of today's rubber-tired rapid transit systems as described in Part 1. Data covering the wide variety of switching, guidance, and support concepts; tire loadings and operational capabilities are analyzed and correlated to provide a better understanding of the state-of-the-art. In the interest of energy conservation a comparative analysis of energy utilization of both steel-wheeled and rubber-tired vehicles is included.

Sulkin, MA Miller, DR *ASME Journal of Mechanical Engineering* Vol. 98 No. 6, June 1976, pp 39-45; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 165175 CONTROL OF LATERAL MOTIONS OF THE TERRAFOIL TRANSIT VEHICLE. The active ride control system for the TERRAFOIL vehicle is described. The passenger compartment of this vehicle is supported above the roadway by long flexible struts, and its undercarriage is enclosed in an underground guideway. Lateral loads are imposed on the vehicle by cornering maneuvers, winds, and guideway roughness. This study shows that electrohydraulic servomechanisms designed to apply control moments at the base of the supporting struts can adequately confine the lateral motions of the passenger compartment within specified limits, even with extreme load disturbances. A dynamic model including the flexible strut shows the system to be controllable through the servo-valve input signal and observable through feedback signals from the servopiston and an accelerometer mounted on the passenger compartment. Feedback control is achieved through a state estimator and an optimal control law matrix.

Furman, JE, Jr (Boeing Aerospace Company) Hartz, BJ Clark, RN *Journal of Spacecraft and Rockets* Vol. 14 No. 2, Feb. 1977, pp 118-123, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 166497 AUTOMATED SMALL VEHICLE FIXED GUIDEWAY SYSTEMS STUDY. The purpose of the study is to provide sufficient, reliable information to citizens and public officials of the Twin Cities Metropolitan Area as a basis for determination of the best form of automated fixed guideway system to satisfy needs of the area. For purposes of comparison, an overall objective of the SVS study process was to develop small vehicle alternatives which would be comparable in cost to the 57-mile Intermediate Capacity Rapid Transit (ICRT) system approved by the Twin Cities Area Metropolitan Transit Commission in December 1972, and which would offer a more demand-responsive service.

De Leuw, Cather and Company, Bather-Ringrose-Wolsfeld, Incorporated, Honeywell, Incorporated, Twin Cities Area Metropolitan Transit Commission, Urban Mass Transportation Administration, (UMTA-MN-09-0010) UMTA-MN-09-0010-77-1, Mar. 1975, 255 pp; Prepared in cooperation with Bather-Ringrose-Wolsfeld, Inc., Edina, Minn., Honeywell, Inc., Minneapolis, Minn., and Twin Cities Area Metropolitan Transit Commission, St. Paul, Minn.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270297/5ST, DOTL NTIS

17 166500 POINT-FOLLOWER AUTOMATIC VEHICLE CONTROL: A GENERIC ANALYSIS [Final rept.]. The three-part study examines the generic characteristics of the point-follower approach to vehicle control for Automated Guideway Transit Systems, under which vehicles are constrained to follow electronic signals that move along the guideway with predetermined speeds and spacings. The first part of the study involves a kinematic analysis of point-follower control during speed transitions and point-transfer maneuvers that are generally required to resolve merge conflicts. The second part consists of a dynamic analysis of point-follower control, formulated as a problem in classic control theory. The final part addresses the traffic merging problem by development of quasi-synchronous control algorithms for resolution of merge conflicts at network intersections of various geometries.

Brown, SJJ ; Johns Hopkins Univ., Laurel, Md. Applied Physics, Lab.*Urban Mass Transportation Administration., Washington, D.C. UMTA-MD-06-0022-77-1, May 1977, 161p; Contract DOT-UT-30010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270354/4ST

17 167288 A STATE-CONSTRAINED APPROACH TO VEHICLE-FOLLOWER CONTROL FOR SHORT-HEADWAY AGT SYSTEMS [Final rept.]. Vehicle-following in an automated-guideway transit (AGT) system is a longitudinal control scheme where the state of a given vehicle is determined by the behavior of the preceding vehicle. The study represents the initial phase of an investigation that is to be continued in order to determine the feasibility of implementing a state-constrained vehicle-following controller into a real system. The report documents an investigation into the automatic longitudinal control of vehicles using a vehicle-follower strategy in the short-headway range operation (0.5 to 3 s). The study states that at short time headways a kinematic constraint on vehicle operation arises as a consequence of the velocity, acceleration, and jerk limits imposed to assure passenger comfort. This constraint requires a trailing vehicle to maintain a spacing such that it may react to nominal preceding-vehicle maneuvers without collisions and without exceeding service jerk and acceleration limits. A nonlinear feedback controller is designed to force the vehicle to follow the kinematically required spacing until the desired headway is attained. The design is based on a technique that uses an optimal feedback control with state constraints. Several suboptimal controls with reduced informational requirements are also presented, thus producing an easily instrumentable controller that properly responds to all possible nominal maneuvers of a preceding vehicle. This report concludes that the technique presented has shown to admit a workable solution to the vehicle-following problem at short headways.

Pue, AJ ; Johns Hopkins Univ., Laurel, Md. Applied Physics, Lab.*Urban Mass Transportation Administration., Washington, D.C. UMTA-MD-06-0022-77-2, Aug. 1977, 123p; See also report dated Jul 75, PB-255 953; Contract DOT-UT-60042T; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272239/5ST

17 167298 ANALYSIS OF SHORT RAMPS FOR DUAL-MODE AND PRT STATIONS. The report is the result of continuing efforts to understand the safe-headway trade-offs for Personal Rapid Transit (PRT) and dual-mode systems. It adds a new dimension to the traditional interactions among control complexity, safety, and acceleration. Analyses and computer programs are developed to determine how short it is possible to make the ramps leading into and out of off-line PRT stations. Simplified reference solutions are obtained and results are presented for state-of-the-art, improved, and advanced system parameters. Potential savings in the costs of stations are very large, due to the high construction cost of station ramps. Both point-follower and vehicle-follower control systems are considered. For point-follower control systems, the acceleration ramp can usually be eliminated. For vehicle-follower control systems, small deviations in the speed of through cars allows both acceleration ramps and deceleration ramps to be appreciably shortened.

Wright, RD Whitten, RP ; Transportation Systems Center, Alden Self-Transit Systems Corporation, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-77-3, UMTA-MA-06-0048-77-2, July 1977, 125 pp; Prepared in cooperation with Alden Self-Transit Systems Corp., Natick, Mass.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272351/8ST

17 167545 DESIGN AND TESTING OF A LOW SPEED MAGNETICALLY SUSPENDED VEHICLE. Technologies of magnetic suspensions as applied to urban transport and a foundation for extension to high speed ground transport are presented. An experimental 5 place vehicle and a 100 m long test track are in the process of being tested on a dynamic laboratory rig. The test track incorporates a minimum radius lateral curve and a transition from a 1 in 20 rising gradient to a 1 in 20 falling gradient. Suspension performance and energy consumption are evaluated, and test results show technical viability of the principle.

Linder, D (British Railways Board) ; Institution of Electrical Engineers Proceeding No. 142, 1976, pp 96-99, 4 Ref.; Institution of Electrical Engineers Conference Publication. 2nd Conference on Adv in Magn Mater and their Application, London, England, September 1-3, 1976. Also available from Institution of Electrical Engineers.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 167552 DYNAMIC BEHAVIOR OF STRINGS OF AUTOMATED TRANSIT VEHICLES. This paper examines the effects of spacing policy and control system design on the dynamic response of strings of automated transit vehicles operating under vehicle-follower control. Constant-separation, constant-time-headway and constant-safety-factor spacing policies are implemented and their operational implications are discussed. The dynamic response of a string of five vehicles during speed changing, merging, emergency stopping, and failed-vehicle pushing is examined.

Garrard, WL (Minnesota University, Minneapolis) Caudill, RJ ; Society of Automotive Engineers Preprint SAE 770288, 1977, 15 pp, 15 Ref.; From SAE Meeting, February 28-March 4, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 167553 NEW DEVELOPMENTS IN MAGNETIC SUSPENSION AND PROPULSION FOR TRANSPORTATION. This paper describes the most recent accomplishments in the on-going development of the magnetically levitated and propelled ROMAG transportation vehicle.

Holt, WJ (Rohr Industries, Incorporated) Ross, JA ; Society of Automotive Engineers Preprint SAE 770428, 1977, 7 pp; From SAE Meeting, February 28-March 4, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 167565 VARIATIONAL FINITE-ELEMENT SOLUTION FOR DISSIPATIVE WAVEGUIDES AND TRANSPORTATION APPLICATION. A procedure is developed for determining the complex propagation constants and associated complex electromagnetic fields as a function of frequency for electromagnetic waves propagating along an inhomogeneous waveguide composed of dissipative materials and having a complicated shape. The wave equation, which is complex because of the presence of dissipative materials, is transformed for computer solution into a matrix eigenvalue equation by the application of the Rayleigh-Ritz variational method in conjunction with the finite-element method. The results are reviewed for several simple dissipative waveguides for which analytical results are computed for comparison. A novel proposal is then investigated in which a railroad track acts as a surface waveguide for a rapid-transit collision-avoidance system. The results illustrate the usefulness of the numerical method developed and suggest that the modified steering rail warrants further investigation for rapid-transit systems.

McAulay, AD (Honeywell Mar System) *IEEE Transactions on Microwave Theory Technology* Vol. MTT No. 5, May 1977, pp 382-392, 28 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 167924 BART'S OWN RAIL GRINDER SMOOTHS THE RIDE. Bay Area Rapid Transit has its own Speno rail grinding train which operates each weekend when no passenger service is operated. Regular cycles of grinding, dependent on location, are scheduled for all of BART's 142 miles of double-track line. Curvature, stations, and segments where corrugations develop come in for concentrated attention.

Progressive Railroading Vol. 20 No. 10, Oct. 1977, p 61, 2 Phot. ACKNOWLEDGMENT: Progressive Railroading; ORDER FROM: Murphy-Richter Publishing Company, 20 North Wacker Drive, Chicago, Illinois, 60606

17 167937 ELEVATED GUIDEWAY COST-RIDE QUALITY STUDIES. Automated transit system simple and continuous span concrete elevated guideway structures are analyzed to determine the influence of structural design properties and construction tolerances on vehicle ride-quality and guideway cost. Ride quality has been determined as a function of guideway rigidity, span surface roughness, span vertical misalignment, span camber and pier misalignment as well as vehicle speed and suspension properties. Guideway costs have been computed as a function of span length, cross-section shape, method of construction, degree of continuity and overall construction tolerances.

Wormley, DN (Massachusetts Institute of Technology) Hedrick, JK Eglitis, L Costanza, DW ; American Society of Civil Engineers Proceeding 1977, pp 150-153; Second Annu ASCE Eng Mech Div Spec Conf. Adv in Civ Eng Through Eng Mech, N.C. State Univ, Raleigh, May 23-25, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE

17 167972 MODEL EXPERIMENTS OF CABLE-STAYED GUIDEWAYS. With the advent of electrically driven and computer controlled rapid transit vehicles for mass intraurban use, it has become necessary to investigate the dynamic efficiency of different types of elevated spans for these vehicles. In previous work involving moving point forces on continuous span bridges with hard piers, dynamic moments of nearly five times the static response of its simple span counterpart were measured. This paper looks to the alternative of a continuous cable-stayed bridge for a reduction in the moment amplification. Energy is expected to be distributed in more vibrational modes and partially absorbed by the cable supports.

Hunt-Atwater, KM (Duke University) Wilson, JF ; American Society of Civil Engineers Proceeding 1977, pp 142-145; 2nd Annu ASCE Eng Mech Div Spec Conf. Adv in Civ Eng through Eng Mech, NC State Univ, Raleigh, May 23-25 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 167991 STANDARDIZATION REQUIREMENTS FOR THE IMPLEMENTATION OF AGT SYSTEMS. The development of Automated Guideway Transit Systems has already followed the classical patterns exhibited by other transit technologies in the early stages of their development. It is important for AGT systems, and in particular for PRT that this evolutionary process should be condensed into as short a time frame as possible consistent with a full investigation of all practical options in technology. The object of this paper is to discuss those elements of AGT systems which are susceptible to standardization and to propose a course of action which would rationalize the wide range of hardware and software presently under development. The nature of this paper is necessarily philosophical; however, it is intended to produce a catalytic effect which will stimulate thought rather than present an analytical solution.

MacDonald, R (De Leuw, Cather and Company) Society of Automotive Engineers Preprints SAE 760359, 1976, 7 p., Figs., Tabs., 2 Ref.; Preprint for meeting, February 23-27, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 167999 MAGNETICALLY SUSPENDED VEHICLES FOR URBAN TRANSPORT SYSTEMS. Of the five different levitation technologies, two are likely to be applicable to low-speed operation. One system using controlled dc electromagnets to suspend large weights such as passenger carrying vehicles has become progressively more feasible technically, owing to advances in solid-state electronics. It is largely through these that a 1 t 4-passenger vehicle operating on a 30 m track has been built in the Applied Science Laboratories of the University of Sussex and has been demonstrated publicly. The operating experience of this vehicle has shown

clearly that the controlled electromagnetic suspension is capable of providing a transport system that possesses passenger-attraction potential. This is meant to be a system that provides a frequent and thus highly reliable operation; for city-center or urban application it must be noiseless, and, if it is fully automatic and operating on segregated tracks, the guideway structure must be visually nonintrusive. Although the principal aim of eliminating physical contact is not so much to save energy as to obtain very high reliability, it is worth noting that a vehicle carrying eight passengers at 30 mile/h and using controlled dc electromagnets for suspension is likely to require less power than that wasted in the transmission unit of a car.

Jayawant, BV (University of Sussex, England) *Electronics and Power* Vol. 23 No. 3, Mar. 1977, pp 235-238; ACKNOWLEDGMENT: EI, British Railways; ORDER FROM: ESL

17 168094 JAPAN AIR LINES' HIGH SPEED SURFACE TRANSPORT. Japan air lines plan to use a linear induction motor powered high speed surface transport (hsst) to provide a 14 minute journey over the 65 km between the new international airport at Nasita and central Tokyo. Aerospace technology has been used to give low drag and weight, good stability and reliability. The power consumption at cruising speed is 5 kw per passenger and it is thought that the system cost would be returned in the first five years of operation. Although the Japanese system caters for a captive market and is not suitable for the transport of heavy freight, it could be adapted for general urban mass transportation. The concept has very good environmental impact, producing little noise, exhaust and vibration. Attractive electro-magnets are used for levitation and guidance. The magnetic field created is similar to that of a normal electric train motor.

Cole, RA *Hovering Craft and Hydrofoil Analytic* Vol. 16 No. 9/10, 1977, p 14, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-229041); ORDER FROM: ESL

17 168985 COMPARISON OF EXPERIMENTAL AND THEORETICAL REACTION RAIL CURRENTS, RAIL VOLTAGES, AND AIRGAP FIELDS FOR THE LINEAR INDUCTION MOTOR RESEARCH VEHICLE. Measurements of reaction rail currents, reaction rail voltages, and airgap magnetic fields in tests of the Linear Induction Motor Research Vehicle (LIMRV) were compared with theoretical calculations from the mesh/matrix theory. It was found that the rail currents and magnetic fields predicted by the theory are within 20 percent of the measured currents and fields at most motor locations in most of the runs, but differ by as much as a factor of two in some cases. The most consistent difference is a higher experimental than theoretical magnetic field near the entrance of the motor, and a lower experimental than theoretical magnetic field near the exit. The observed differences between the theoretical and experimental magnetic fields and currents do not account for the differences of as much as 26 percent between the theoretical and experimental thrusts. (Color illustrations reproduced in black and white)

Elliott, DG ; Jet Propulsion Laboratory, National Aeronautics and Space Administration, Federal Railroad Administration Final Rpt. FRA/ORD-77/33, 77-36, July 1977, 84 pp; Contract NAS7-100; ACKNOWLEDGMENT: NTIS,

FRA; ORDER FROM: NTIS; PB-274039/7ST

17 169122 SUPERCONDUCTING MAGNETS. VOLUME 2. SEPTEMBER 1976-SEPTEMBER 1977 (A BIBLIOGRAPHY WITH ABSTRACTS). The cited reports discuss research on materials studies, theory, design, and applications of superconducting magnets. Examples of applications include particle accelerators, MHD power generation, superconducting generators, nuclear fusion research devices, energy storage systems, and magnetic levitation. (This updated bibliography contains 122 abstracts, all of which are new entries to the previous edition.)

Reimberr, GW ; National Technical Information Service Oct. 1977, 127 pp; Supersedes NTIS/PS-76/0771, and NTIS/PS-75/636. See also Volume 1, 1964-Aug 76, NTIS/PS-77/0913, RRIS 11 169123; RRIS Bulletin 7802.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0914/0ST

17 169123 SUPERCONDUCTING MAGNETS. VOLUME 1. 1964-AUGUST 1976 (A BIBLIOGRAPHY WITH ABSTRACTS). The cited reports include research on materials studies, theory, design, and applications of superconducting magnets. Examples of the applications include particle accelerators, MHD power generation, superconducting generators, nuclear fusion research devices, energy storage systems, magnetic levitation, and bioinstrumentation. (This updated bibliography contains 246 abstracts, none of which are new entries to the previous edition.)

Reimberr, GW ; National Technical Information Service Oct. 1977, 251 pp; See also Volume 2, NTIS/PS-77/0914/0ST, RRIS 11 169122; RRIS Bulletin 7802.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0913/2ST

17 169956 USING NEW TECHNIQUES TO TRACE VEHICLE DEFECTS [Mit neuen Technologien den Fahrzeugfehlern auf der Spur]. "Hamburg-Consult", consultants for Hamburg's Hochbahn AG (overhead railway) have developed prototype computer-based equipment for detecting vehicle defects called the BEFUND system. This device can be used for underground and urban transport systems as well as for buses, it checks vehicles constantly while they are actually in operation. As transport systems become more and more automated, it will be possible to use the BEFUND system for organizational and maintenance purposes as well. [German]

Bus und Bahn Vol. 11 No. 119, 1977, pp 4-5, 2 Phot. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Alf Teloecken-Verlag KG, Roemerstrasse 9, 4000 Dusseldorf 30, West Germany

17 170010 NEW CONCEPTS IN URBAN TRANSPORTATION. This newsletter is published intermittently by the Transportation Research Board Committee on New Systems Technology, for the purpose of disseminating information on the nature and performance of new transportation systems, research and development of those systems, and conferences and literature related to them. New technology, PRT, GRT, dual-mode, as well as many other new developments that are being proposed for urban

transportation of people and goods are covered. *New Concepts* (Volume 3 Number 1) was first published by TRB in November 1973. Earlier issues were published bi-weekly by the University of Minnesota. Volume 2 consisted of 23 numbered issues; issue number 12 was published on January 15, 1973. Volume 3 had 1 issue; Volume 4, 1974 had 3 issues; Volume 5, 1975 had 1 issue; and no issues were published during 1976.

New Concepts Newsletter Back issues are NOT available. There is no charge for current issues.; ORDER FROM: TRB Publications Off

17 170466 NEW TRANSIT TECHNOLOGIES AND CONTROL OPTIONS. Automated guideway transit systems feature vehicles which are capable of fully automatic operation under computer control on separated running surfaces (guideways). While just emerging on the urban transit scene such systems offer the potential for improved service and cost effectiveness. Paramount to the successful implementation of automated transit are the control algorithms required to operate the vehicles. A description is given of some of the features of near term deployment configurations and applicable vehicle control options.

MacKinnon, D (Urban Mass Transportation Administration) ; Institute of Electrical and Electronics Engineers Proceeding Vol. 1 N77CH 1220-3CS, 1977, pp 388-394, 25 Ref.; Proc of the JT Autom Control Conf, San Francisco, California, June 22-24, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 170467 EFFECTS OF PARAMETER VARIATIONS AND SENSOR NOISE ON THE LONGITUDINAL DYNAMIC RESPONSE OF AUTOMATED GUIDEWAY TRANSIT VEHICLES. Experience with existing automated guideway transit (AGT) vehicles has shown that variations in vehicle parameters can significantly affect dynamic response. A study is presented of the magnitude of headway errors resulting from variations in parameters such as mass, tire radius, and propulsion and control system gains. In addition, the effects of sensor bias and noise on dynamic response is determined. A typical rubber-tired, electrically-powered AGT vehicle operating at moderate speeds (15 m/s) and headways (15 s) is modeled for the purpose of establishing numerical estimates of headway errors. This vehicle model is based on the Morgantown, West Virginia AGT system.

Gerrard, WL (Minnesota University, Minneapolis) ; Institute of Electrical and Electronics Engineers Proceeding Vol. 1 N 77CH 1220-3CS, 1977, pp 395-400, 8 Ref.; Proc of the JT Autom Control Conf, San Francisco, California, June 22-24, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 170468 STEERING CONTROLLER DESIGN FOR AUTOMATED GUIDEWAY TRANSIT VEHICLES. The fundamental lateral performance capabilities of rubber-tired automated guideway transit (AGT) vehicles operating under automatic steering control on exclusive guideways are discussed. Control is achieved by steering the front wheels in response to signals derived from the position errors between the vehicle and a guideway-based reference containing random irregularities. Optimal control techniques are used to synthesize controllers which

minimize a performance index consisting of mean square lateral acceleration and tracking error, defining a frontier which limits the performance of steering controllers. Simple single-sensor proportional steering controllers are found to offer performance comparable to the optimum for a typical AGT vehicle. The degradations in performance arising from dynamic lags in the steering actuator and operation at off-design speeds are shown.

Shladover, SE (Massachusetts Institute of Technology) Wormley, DN Richardson, HH Fish, R Institute of Electrical and Electronics Engineers Proceeding Vol. 1 N 77CH 1220-3CS, 1977, pp 408-414, 14 Ref.; Proc of the Jt Autom Control Conf, San Francisco, California, June 22-24, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 170587 ON THE AUTOMATIC LONGITUDINAL CONTROL OF INDIVIDUAL GROUND VEHICLES. The achievement of safe and efficient longitudinal control is probably the most significant technical problem associated with individual-vehicle, automated ground transport systems such as automated guideway transit and the automatic highway. Four essential aspects of such control are considered: a) Sector-level operations; b) Communications between each controlled vehicle and the sector computer; c) The development of techniques for obtaining accurate estimates of a vehicle's state; and d) The control of each individual vehicle. Recent advances, pertaining to the design, development and testing of these facets will be described in the context of achieving safe and efficient operations under high-speed (to 93 ft/sec), small time-headway (1-2 sec) conditions.

Takasaki, GM (Ohio State University) Fenton, RE Olson, KW ; Institute of Electrical and Electronics Engineers Proceeding Vol. 1 No. 77CH 1220-3CS, 1977, pp 415-420; Proc of the JT Autom Control Conf, San Francisco, California, June 22-24, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 172370 GETTING MOVING ON PEOPLE MOVERS. This article describes the growing market and popularity of people movers. Recent improvements of the Morgantown system has renewed the interests of the Urban Mass Transportation Administration (UMTA). In 1976, UMTA committed a total of \$220 million to build people movers in Cleveland, Houston, Los Angeles, and St. Paul. In addition, Baltimore and Miami were allowed to build people movers if funds could be appropriated from previous federal funding. In 1978 Congress asked that Baltimore, Indianapolis, Jacksonville, St. Louis, and Norfolk be permitted to apply for DPM capital grants. These seven second-tier cities will be asked for additional planning before requesting preliminary engineering money. A status report on the individual downtown people mover (DPM) projects in the first four-tier cities are included in this article. Although the systems are called downtown people movers, their use is not limited to the CBD. People movers could theoretically be installed wherever there is a sufficient demand for collecting and distributing people. The DPM's major advantages include total automation and low labor costs.

Ichniowski, T *Railway Age* Vol. 178 No. 23, Dec. 1977, pp 25-26, 5 Phot.

17 173990 HSST: A VIABLE ALTERNATIVE FOR RAPID AIRPORT-CITY CENTRE TRANSPORTATION. A radically improved High Speed Surface Transport (HSST) system is well along in development by Japan Air Lines. Speeds of nearly 230 km/h have been achieved and the goal is 300 km/h. The HSST resembles an aircraft without wings or landing gear "flying" noiselessly only millimeters above a guideway. The levitation is produced by magnetic attraction and a linear induction motor is used to propel the vehicle. The next phase will be to build a system prototype and operational guideway with commercial use between Tokyo and the new Narita Airport now slated for 1980. With its high cruising speed it will cut time between Tokyo and Narita Airport to 15 minutes instead of two to three hours by expressway.

Hayashi, A (Japan Air Lines) *ICAO Bulletin* Vol. 33 No. 1, Jan. 1978, pp 21-24, 2 Phot.; ORDER FROM: International Civil Aviation Organization, 1080 University Street, Montreal 101, Quebec, Canada

17 174396 LOW-SPEED VEHICLE DYNAMICS AND RIDE QUALITY USING CONTROLLED D.C. ELECTROMAGNETS. The aim of this paper is to establish that attraction type systems, i.e. with controlled d.c. electromagnets, can be successfully employed for the suspension of urban transit vehicles, having speeds around 70 km/hr, without the aid of secondary suspension. A single degree of freedom suspension system is considered. The methods of characterizing track roughness and acceptable ride qualities are outlined and the ride characteristics that can be achieved through the design of feedback control systems are considered. Some of the basic factors which influence the performance and stability of the system are briefly discussed and some experimental results from a vibrating test suspension system are presented to illustrate the performance of the proposed system.

Jayawant, BV (Sussex University, England) Sinha, PK *Automatica* Vol. 13 No. 6, Nov. 1977, pp 605-610, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 175502 ASSESSMENT OF OPERATIONAL AUTOMATED GUIDEWAY SYSTEMS- JETRAIL. The report is an assessment and evaluation of the Braniff International Airlines Jetrail system located at Love Field in Dallas, Texas, the first operational completely automated, demand-responsive, group rapid, intra-airport transportation system. It connects a parking lot at the entrance to Love Field and the Braniff terminal with three-quarters of a mile of double-lane mono-rail and has ten suspended vehicles, a maintenance facility, and three stations. The system was intended to retain passengers in the face of increased congestion at Love Field. Jetrail operated successfully from April 1970 to January 1974, at which time Braniff moved to the new Dallas-Ft. Worth Regional Airport. Over six million passengers were carried 1.3 million miles during this period without a fatality or major mishap. The system did this in spite of the engineering novelty and early, low reliability of the propulsion and control system. The Jetrail system continues to be used as an engineering test-bed for a prototype linear induction motor propulsion system. This latter system,

Astroglide, is being developed by PRT Systems Inc. Since the motor has no moving parts, it is more simple than the rotary motor and drive train of the Jetrail system. This report provides information on the Jetrail operational experience and the Astroglide prototype for transportation planners, designers, developers, and operators of AGT systems for intra-airport, urban, recreational, and freight applications.

Anagnostopoulos, G Wlodyka, RA Mitropoulos, IA Putukian, J Kangas, RD ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0067) Final Rpt. DOT-TSC-UMTA-77-55, UMTA-MA-06-0067-77-1, Dec. 1977, 276 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278521/OST

17 175908 TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 278 abstracts, 24 of which are new entries to the previous edition.)

Habercom, GE, Jr ; National Technical Information Service Mar. 1978, 285 pp; Supersedes NTIS/PS-77/0179.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0266/3ST

17 176137 PASSENGERS IN CONTAINERS. A futuristic vision of future passenger and cargo transport is presented. To speed up lengthy transit operations, passengers would be accommodated in comfortable, compartment-like containers. Several diagrams show how such containers can be accommodated aboard an aircraft or a helicopter, on a truck, or in a railroad car. A system would result in great economy in both cost and time. Of particular importance is such a system for cargo traffic.

Tarkhanovskiy, V ; National Aeronautics and Space Administration NASA-TM-75078, Dec. 1977, 7 pp; Tran-Transl. Into English from Sots. Industriya (Ussr), 21 Apr. 1977 p 4. Subm-Transl. By Transemantics, Inc., Washington, D. C.; Contract NASW-2792; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-18989/1ST

17 176925 THROTTLE OPEN OR THROTTLE DOWN. SCENARIOS FOR THE FUTURE OF THE TRANSPORTATION SYSTEM PART I AND II [Gasgeven of afremmen. Toekomstscenarios voor ons vervoerssysteem. Band I en II]. The book is printed in two volumes. Volume I contains the text, Volume II tables, figures and references per chapter. After an introduction, Volume I is in three parts. Part I describes the methodological background for the study in two chapters: the nature and methods of future research and systems-analysis of mobility. Part II discusses the past, the present and the future of the separate subsystems that make up the passenger transportation system in the Netherlands. The systems are: the motor car system, the air industry, the railway system, local and regional public transport, new systems of public transport, the taxi system, and the unprotected systems. Part III integrates the subsystems into two scenarios for the future of the complete

transportation system and analyses the cost and external effects of each. The author prefers the scenario with the emphasis on walking, the two-wheeler and public transportation, and a slower rate of expansion of the motor car and air industry. [Dutch]

Hupkes, G ; Uitgeverij Kluwer BV Monograph 1977, 498 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-231881), Institute for Road Safety Research; ORDER FROM: Uitgeverij Kluwer BV, 8 Strommarkt, Deventer, Netherlands

17 178149 QUANTITATIVE ANALYSIS OF QUASI-SYNCHRONOUS PRT FLOW CHARACTERISTICS. A flow-modeller has been developed which is believed to reproduce, faithfully and inexpensively, guideway flow characteristics. The combined interactions of stations, interchanges and trip-demand, necessary for modelling fidelity, are accurately represented at the car-by-car level. A description of the flow-modeller is presented. Flow-modelling has been undertaken for a number of flow conditions with interchange control, in each case, being provided by each of a pair of highly efficient algorithms. The approach adopted was to fit, using the method of maximum likelihood, a number of likely empirical distributions to observed vehicle bunch and gap frequency data. A new flow-generator is proposed.

McGinley, FJ (Monash University, Australia) *High Speed Ground Transportation Journal* Vol. 11 No. 2, 1977, pp 129-156, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 179364 EVALUATION OF ALTERNATIVES: MORGANTOWN PRT: EVALUATION MATRIX AND SUPPORTING DOCUMENTATION. Ten alternatives for the Morgantown PRT system were evaluated. They were: operate the existing three-station, 2.2 mile system as designed; expand the system by adding one, two, or three more stations; operate the three-station system with (a) manual operation of the 45 vehicles currently in production or (b) replacement of the PRT vehicles with buses operating on a modified guideway as well as existing streets; remove the PRT and (a) operate the existing shuttle bus system, (b) make low-capital improvements to the street system, (c) include a high-capital group of roadway improvements, and (d) reduce total person-trip demand. Each alternative was evaluated on a number of criteria in six goal areas; mobility, practicality, research potential, financial aspects, environmental considerations, and development potential. The end product of the research was an unweighted goals-achievement matrix indicating the value of each alternative for each criterion measured. A method for continuing the evaluation process through the steps of weighting, normalizing, summing, and analyzing was presented. Traffic studies were undertaken and reported on. These studies were used to determine that composition of present auto users in the affected area and the potential of the PRT to divert traffic and reduce congestion. /Author/

Barton-Aschman Associates, Incorporated, (3390-32) Final Rpt. Apr. 1975, 171 pp, 17 Fig., Tabs., 6 App.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract DOT-UT-50008

17 180135 UNDER-APRON TRANSIT FOR ATLANTA TERMINAL. Expansion and passenger transit plans for the Hartsfield Atlanta International Airport are described. Construction on a terminal designed to accommodate 55 million passengers a year has begun, and beneficial occupancy of the building is anticipated in December 1980. Phase one will consist of 104 wide-body aircraft gates, which can eventually be increased to 130 gates. A fourth east-west parallel runway is planned. The airport transit system will normally operate as a continuous-loop system with 17 80-passenger rubber-tired vehicles in three car trains, although the system could convert to a shuttle system when necessary. Moving walkways are planned within the passenger mall. Concourses and the location of baggage handling facilities are also described.

Jacobsen, PS *Airports International* Oct. 1977, 4 pp; ACKNOWLEDGMENT: National Aeronautics and Space Administration (A78-15343); ORDER FROM: AIAA; A78-15343

17 180279 THE AIR-CORE SYNCHRONOUS LINEAR MOTOR USED FOR TRACTION PURPOSES WITH A NEW RAPID TRANSIT SYSTEM [Der eisenlose Synchronlinearmotor als Fahrzeugantrieb in einem neuartigen Schnellverkehrssystem]. Description of the structure, characteristics, working and control of the air-core synchronous linear motor. Reminder of experiments done on two test benches. Tests are to continue with a full-size vehicle on the Erlangen circuit. [German]

Duell, HJ *Eisenbahntechnische Rundschau* Vol. 27 No. 3, Mar. 1978, pp 143-158, 4 Tab., 14 Phot., 4 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

17 180385 DIRECTIONAL CONTROL AND STABILITY OF CVS PASSENGER VEHICLES. The Computer-controlled Vehicle System (CVS) is a pure personal rapid transit system and is reported to make it possible to cope with present-day traffic conditions by providing good service quality and transit capacity of 15,000 passengers per hour for network transportation. This paper presents the results of experimental and theoretical analyses of the unique guide-mechanism by which the driverless operation of CVS vehicles has been made possible. It is shown from the results of the study that the designed vehicle has satisfactory ride comfort and stability at speeds lower than 60 km/h.

Iguchi, M (Tokyo University, Japan) *Minami, T High Speed Ground Transportation Journal* Vol. 12 No. 1, 1978, pp 23-40, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 181322 FIRE DETECTION, EXTINGUISHMENT, AND MATERIAL TESTS FOR AN AUTOMATED GUIDEWAY TRANSIT VEHICLE. This report describes 27 fire tests performed in a mockup (modified school bus) of an automated guideway transit vehicle. There were a number of significant findings relative to fire safety in this type of vehicle. First, Halon 1301 was found to be effective in extinguishing typical seat fires, but generated extremely high noise levels during discharge; however, significant reductions in noise were achieved by modifying the discharge nozzle. Another important finding

was that in all tests fires, the photoelectric detector responded more quickly than did the ionization detector. Finally, by studying various seat fire ignition sources, it was concluded that the underseat fire was the most severe condition. (Author)

Hill, RG Johnson, GR ; National Aviation Facilities Experimental Center Final Rpt. FAA-NA-76-52-REV, Nov. 1977, 30 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A056229/8ST

17 182002 VEHICLE LATERAL CONTROL AND SWITCHING TECHNOLOGY REVIEW STUDY PROGRESS REPORT. The Vehicle Lateral Control and Switching (VLACS) project has been established to investigate alternative steering and switching systems applicable to a wide variety of automated transit vehicle types. This project is part of the Automated Guideway Transit Technology (AGTT) development program derived from the Urban Mass Transportation Administration's experience with automated transportation systems. The objectives of the project are to: (1) reduce the cost, complexity and weight, and increase the life, reliability, maintainability, ride quality, and switching capability of VLACS systems; (2) develop specific performance requirements and guidelines for lateral control and switching systems for SLT, GRT, and PRT vehicles in trained and untrained configurations; (3) develop and evaluate baseline VLACS hardware designs reflecting project objectives; (4) provide experimental data to demonstrate capability of VLACS system and subsystem designs to meet performance requirements including line speed switching; (5) provide a comprehensive analytical evaluation of contact (mechanical) and non-contact (wire-follower) lateral guidance approaches; and (6) perform an assessment of the positive retention capabilities of automatic switching systems.

Haines, GA Fry, CM McHugh, T Greeson, JO ; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt. OTIS/TTD/VLAC-020, OTIS/TTD/VLAC-023, Mar. 1978, 155 p.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284799/4ST

17 182060 INNOVATION IN PUBLIC TRANSPORTATION: A DIRECTORY OF RESEARCH, DEVELOPMENT AND DEMONSTRATION PROJECTS, FISCAL YEAR 1976 AND TRANSITION QUARTER, JULY 1, 1975-SEPTEMBER 30, 1976. The purpose of UMTA's Research, Development and Demonstration (RD&D) Program is to provide information about possible improvements to urban mass transportation systems which communities can use in selecting the best way to deal with their particular transportation requirements. The principal means of providing this information is to publish annually a compilation of reports on the status of UMTA's projects. Research projects are intended to produce information about possible improvements in urban mass transportation; development projects involve fabrication, testing and evaluation of new equipment; facilities, and systems or methods; and demonstration projects introduce, on an experimental basis, new methods, equipment or systems of urban mass trans-

portation into a representative urban environment. This publication is a supplement to the 1972 comprehensive volume and contains description of current RD&D projects sponsored and funded by UMTA. The directory is divided into the following subject areas: bus and paratransit, rail, new systems and automation, socio-economic and special projects, and safety and product qualification, service and methods demonstrations, and policy and program development.

Urban Mass Transportation Administration UMTA-UPA-1-2, Sept. 1976, 95 p.; See also report dated 30 Jun 72, PB-213228, report dated 30 Jun 74, PB-285244 and report dated 30 Jun 75, PB-285245. 751cd; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-285246/5ST

17 183380 BUS-TRAINS-POSSIBLE PRINCIPLES [Busstaag-taenkbara loesningsprinciper]. In order to meet the variation in the demand for public transport during the day a possible solution is the formation of bus-trains by linking buses together. Each bus unit of the train is controlled by an electric cable in the roadway. This study deals with two principles for controlling the bus-trains: (1) controlled front and back wheel, (2) controlled front wheel. A theoretical discussion and a practical evaluation of the space requirement for both principles are presented. Finally, principles and design of bus-train couplings are described. /TRRL/ [Swedish]

Hultqvist, B Kristiansson, H ; Chalmers University of Technology, Sweden Thesis 1977, 107 p., 4 Fig., 3 Tab., 4 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 234408), National Swedish Road & Traffic Research Institute

17 183821 HYDROGEN-POWERED MASS TRANSIT SYSTEM. Hydrogen's application to mass transit systems is considered. A 21-passenger bus is converted to hydrogen using a Dodge engine which was modified for high compression operation. Backfiring and nitric oxide pollution formation are controlled by a water injection technique. Hydrogen fuel storage for the experimental prototype is accomplished by two metal hydride containers using an iron-titanium alloy. Data are presented regarding equipment conversion and design, energy resource utilization, economics, and safety.

Billings, RE (Billings Energy Corporation) *International Journal of Hydrogen Energy* Vol. 3 No. 1, 1978, pp 49-59, 18 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 184579 AUTOMATED MIXED TRAFFIC VEHICLE (AMTV) TECHNOLOGY AND SAFETY STUDY. This report discusses technology and safety related to the implementation of an Automated Mixed Traffic Vehicle (AMTV) System. An AMTV system is one which follows a buried cable and is used in areas that require low-speed vehicles. The purpose of this study is to review the technology used in an AMTV system, to identify areas where further development is required or desirable, and to conduct a safety analysis on an AMTV system. The results are intended as a guide for further efforts in AMTV system design and technology for both near and long-term applications. The systems discussed include a low-speed system and a hybrid system which can operate at the low speed and at a higher speed within a protected right-of-way. The

low-speed system is a candidate for a near-term demonstration and can be used in pedestrian malls, large campuses, and recreational parks. The hybrid system may have application, after further development, on urban streets, in airports, or in situations where longer distances may be involved. The report describes a comprehensive safety analysis which was conducted to examine potential hazards caused by hardware failure and by events unrelated to hardware failure. Corrective and preventive actions in terms of modification or operational procedures are suggested. The major findings are that development using current technology will make it possible to demonstrate a low-speed AMTV system in 2 to 5 years. With a prudent, fail-safe design, and appropriate right-of-way protection, the system can operate safely in an environment containing pedestrians. /UMTA/

Johnston, AR Peng, TKC Vivian, HC Wang, PK Jet Propulsion Laboratory Final Rpt. UMTA-CA-06-0088-78-1, JPL Pub 78-12, Feb. 1978, 126 p.; Contract UMTA-CA-06-0088; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; N78-25257/4ST

17 186034 ANALYSIS OF OFF-GUIDEWAY ENERGY STORAGE/PROPULSION SYSTEMS FOR DUAL MODE TRANSIT SYSTEMS. Vehicles in dual mode systems may travel on civil streets in the densely populated central business districts and on dedicated fixed guideways on the runs to suburban areas. In the sparsely populated suburban districts, the vehicles in these dual mode systems have the option of returning to civil streets for flexible station access. Dual mode systems would be controlled by human operators off-guideway and be under automatic control on-guideway. Thus they offer the potential for flexible routing with the reduced cost of automated operation on long runs. In addition, on-guideway propulsion energy would be electrical and have all of the inherent advantages associated with central power supply systems. Some evaluation criteria and a method for combining these criteria for the selection of an energy storage/propulsion system for off-guideway operation of a dual mode transit system are presented. In addition, technical options for these energy storage/propulsion systems are discussed. These options are drawn from mechanical, chemical, and electrical energy storage systems. The selection criteria discussed are used to select "attractive" near term system option. (ERA citation 03:043226)

Sacks, IJ ; Voorhees (Alan M) and Associates, Incorporated, Department of Energy CONF-780426-1, Mar. 1978, 25 p.; Advanced Transit Association international conference, Indianapolis, IN, USA, 25 Apr 1978; Contract W-7405-ENG-48; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCRL-80874

17 186107 ASSESSMENT OF THE AUTOMATICALLY CONTROLLED TRANSPORTATION (ACT) SYSTEM AT FAIRLANE TOWN CENTER. This report contains the interim findings of an assessment of the Automatically Controlled Transportation (ACT) System for passenger transport in the Fairlane Town Center at Dearborn, Michigan. SRI International conducted the assessment as part of a program sponsored by UMTA, and is under contract to

assess the systems at Sea-Tac International Airport, Fairlane Town Center, Tampa International Airport, Houston Intercontinental Airport, Walt Disney World, and King's Dominion Amusement Park. The purpose of the site reports is to provide a uniformly documented presentation of AGT installations for UMTA's AGT Socio-Economic Research Program, and to gain an in-depth understanding of existing domestic and foreign AGT systems. The overall objectives are to: (1) obtain factual engineering and operational data; (2) obtain descriptive economic, system performance, and user perception data; and (3) review the design, development, and implementation process. The findings are intended to establish the state of the art of AGT systems for ultimate use in planning, evaluating, producing, and deploying. This report addresses the approach used in the Fairlane assessment; the engineering systems description; operation, maintenance and reliability, and passenger-oriented system performance; systems economics; and the development history.

Yen, AM Henderson, C Sakasita, M Roddin, M Cronin, R ; SRI International, Urban Mass Transportation Administration, (SRI-5949) Final Rpt. UMTA-IT-06-0135-77-2, Dec. 1977, 120 p.; Contract DOT-UT-70034; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286524/4ST, DOTL NTIS

17 186111 VEHICLE LATERAL CONTROL AND SWITCHING TECHNOLOGY EVALUATION MODELS STUDY PROGRESS REPORT. COST AND WEIGHT MODEL. The Vehicle Lateral Control and Switching (VLACS) project has been established to investigate alternative steering and switching systems applicable to a variety of automated transit vehicles. The VLACS project tests include a review of existing lateral control and switching technology, detailed mathematical modeling analysis and simulation, detailed hardware studies, experimentation with alternative designs, and development of guideline specifications for VLACS systems. A usable life-cycle cost and weight model is available for immediate application to automated guideway transit (AGT) nominal designs and control alternatives from these designs. The model incorporates the design goals delineated herein; a test case has been successfully run. This document contains a description of the cost and weight model for VLACS systems. The model is a life-cycle cost and weight model which focuses on system components which vary with lateral control option. This model is to be used to evaluate the cost and weight of VLACS design for four classes of AGT vehicles: Shuttle Loop Transit (PRT), Group Rapid Transit (GRT) large and small, and Personal Rapid Transit (PRT). Numerous illustrations and tables related to the model, its programs and subroutines, as well as a list of references are contained herein. This report concludes that the model has been structured to allow for evolution to keep the model current and usable. Relative inflation rates will be added to this model in the immediate future, and a test case using data for the SLT nominal design will be run at General Research Corporation. The model will then be converted to Otis equipment and an updated version of this report will be prepared.

Graver, CA Fry, CM ; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt. OTIS/TTD-VLACS-025, UMTA-IT-06-0156-78-4, Apr. 1978, 142 p.; See also report dated Mar 78, PB-284799.; Contract

DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286551/7ST, DOTL NTIS

17 186150 ASSESSMENT OF THE TUNNEL TRAIN SYSTEM AT HOUSTON INTERCONTINENTAL AIRPORT. This report describes and assesses the Tunnel Train System at Houston Intercontinental Airport; it was installed in 1972 as a replacement of an earlier battery-powered tug system. It provides a good example of the problems associated with fitting an AGT system into an existing environment. Information and data were collected by the authors through surveys of technical literature; formal site visits; interviews with operators, management, and engineering personnel; and a visit to the system manufacturer. In the proposed extension of the terminal, the airport will have to decide whether to upgrade or extend the tunnel train or to install a new system. In terms of current demand, the system serves its purpose adequately.

Yen, AM ; SRI International, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0135-77-3, Dec. 1977, 98 p.; See also PB-281820.; Contract DOT-UT-70034; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286641/6ST, DOTL NTIS

17 186162 ASSESSMENT OF THE WEDWAY PEOPLEMOVER SYSTEM AT WALT DISNEY WORLD. SRI conducted this study as part of an assessment program sponsored by UMTA. The purpose of the program is to gain an in-depth understanding of the performance, capabilities, and limitations of the AGT systems at WALT DISNEY WORLD, Seattle-Tacoma International Airport, Fairlane Town Center, Tampa International Airport, Houston Intercontinental Airport, and King's Dominion Amusement Park, as well as to provide a uniformly documented presentation of automated guideway transit (AGT) installations for UMTA's AGT program and for use by other research groups and interested parties. This final report, one of six site reports, describes and assesses the WEDway PeopleMover System, an automated guideway transit system used for passenger transport at WALT DISNEY WORLD in Lake Buena Vista, Florida. Information and data were collected by the authors through surveys of technical literature; formal site visits; interviews with operators, management, and engineering personnel; and a visit to the system manufacturer. The WEDway system represents the state-of-the-art in passive vehicles; it is completely passive except for its mechanical running gear. WEDway consists of a single 4,600-ft closed loop with only one station. Although it carries more than 4.5 million passengers/yr, there have been no serious accidents. The system design has resulted in a very reliable system. The use of a linear induction motor as the prime mover has shown efficiencies both in operation and maintenance. The authors state that although the WEDway exceeds its operational requirements, future work is necessary to explore the advantages/disadvantages of a passive system before durability of the system is determined.

Yen, AM ; SRI International, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0135-77-5, Dec. 1977, 96 p.; See also report dated Dec 77, PB-281820.; Contract DOT-UT-70034; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-286935/2ST, DOTL NTIS

17 186166 ACCELERATING MOVING WALKWAY SYSTEMS. TECHNOLOGY ASSESSMENT. REPORT B. This report is part of a series that assesses the technology and development of Accelerated Moving Walkway Systems (AMWS). The system has the capacity to accelerate pedestrians to 4 to 5 times the conventional system speed through changing treadway configuration. The purpose of this assessment is to determine the current status of AMWS technology, to establish potential candidates for a public demonstration, to fix definitive cost and operational data, and to establish user acceptability and safety. The objective is to produce a system which will operate with a line speed of twice the speed of walking and which will provide a time and human saving advantage to extend the effective moving way system range. This report includes a history of moving way system development and summarizes the available information necessary to describe and assess the systems of five AMWS developers which are at, or near, the hardware prototype stage of development and testing. The systems are Speedway, Trax, Applied Physics Laboratory, Boeing, and Dean. The systems considered in this study vary in their dimensional environs, thus affecting their adaptability to site applications. The variations are between the designs forming a single linear configuration similar to existing moving way systems, and other designs forming loop or 'S' shaped configurations.

Fruin, J Marshall, R Zeigen, M ; Port Authority of New York and New Jersey, Urban Mass Transportation Administration, (UMTA-IT-06-0126) UMTA-IT-06-0126-78-2, Apr. 1978, 92 p.; See also PB-287 083.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-287082/2ST

17 186168 ACCELERATING MOVING WALKWAY SYSTEMS. SAFETY SEMINAR PROCEEDINGS. REPORT G. This report is part of a series that assess the technology and development of Accelerating Moving Walkway Systems (AMWS). The system is a pedestrian assist device with the capability through changing treadway configuration to accelerate pedestrians to 4 to 5 times the normal entrance speeds after boarding, and to decelerate prior to discharge. On April 18, 1977, a seminar devoted to the discussion of the safety and human factors associated with the development and public use of AMWS was held at the New York World Trade Center. The attendance included representatives of the escalator and moving walk industry, AMWS developers, safety consultants, physically handicapped persons, and representatives of government agencies. The objective of the seminar was to provide a forum for discussion on the potential problems that might be associated with the use of AMWS technology based on its current state-of-the-art. The proceedings included a presentation of films and photographic slides providing illustrative design details of several systems under development; presentations by four consultants concerning AMWS safety; and workshops in which all attendees participated. The four systems considered for a public demonstration program are: Dunlop Speedway; Trax; Applied Physics Laboratory; and the Boeing System. The

meetings closed with the understanding that most of the raised problems can be solved, provided that sufficient efforts are devoted to their study. It was agreed that the proposed demonstration project would be a valuable asset to the development of an acceptable AMWS research program. Appendices 1 and 2 in this report are: The Conference Program and List of Conference Attendees, respectively.

Port Authority of New York and New Jersey, Urban Mass Transportation Administration UMTA-IT-06-0126-78-7, Mar. 1978, 81 p.; See also PB-287 083.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-287084/8ST

17 186214 AGT GUIDEWAY AND STATION TECHNOLOGY. VOLUME 3: GUIDEWAY AND STATION REVIEW. This report is one of eight volumes associated with the AGT Guideway and Station Technology Project. The project objective is to develop guideway, station, and weather-protection concepts which will reduce the cost and implementation time associated with AGT systems and improve performance. The outputs are intended to aid planners, designers, administrators, and others interested in AGT systems and their application to specific transportation needs in urban areas. Automated Guideway Transit (AGT) systems in the United States comprise more than 64 km (40 mi) of guideway, over 70 passenger stations, and nearly 700 vehicles. This report reviews the guideways and stations found at 30 AGT systems and purports to establish the existing state-of-the-art. Related conventional rail transit stations are briefly reviewed to supplement the AGT station material. Information presented was derived from a literature search, personal contact with system manufacturers, operators, and personal experience. This review summarizes the considerations in the design of AGT guideways and includes discussions of vehicle interface, power distribution, weather-related effects, structural alternatives, site-related effects, and ride comfort. For stations, the design considerations include station description, site relationships, and station elements. This coverage of design considerations for both guideways and stations gives an overview of the issues and illustrates them by examples from specific AGT installations. The review also includes a discussion of the codes used in the design of the structures, the construction techniques, and the contracting methods employed for the design and construction of existing AGT guideways and stations.

Stevens, RD ; De Leuw, Cather and Company, ABAM Engineers, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0152-79-2, Sept. 1978, 301 p.; See also Volume 2, PB-281632. Prepared in cooperation with ABAM Engineers, Inc. Tacoma, WA.; Grant DOT-UT-70066; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287522/7ST, DOTL NTIS

17 186476 SUPERCONDUCTING MAGNETS. VOLUME 2. SEPTEMBER, 1976-AUGUST, 1978 (A BIBLIOGRAPHY WITH ABSTRACTS). The cited reports discuss research on materials studies, theory, design, and applications of superconducting magnets. Examples of applications include particle accelerators, MHD power generation, superconducting generators, nuclear fusion research devices, energy

storage systems, and magnetic levitation. (This updated bibliography contains 271 abstracts, 149 of which are new entries to the previous edition.)

Reimherr, GW ; National Technical Information Service Oct. 1978, 276 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/1063/3ST

17 186850 PROCEEDINGS-CONFERENCE ON AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY DEVELOPMENT.

Twenty-eight papers were presented by experts from government and industry on system operations, passenger security, vehicle control and reliability, guideway and station structures, all-weather operation, ride comfort, deployed system assessments, automated highways, and developments in Canada, France and West Germany. The formal presentation of papers was followed by working sessions in the areas of system operations, vehicle systems and reliability, safety and security, wayside systems and all-weather operation, innovative transit, and social and economic factors. This report contains the proceedings of the conference.

Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-78-28, UMTA-MA-06-0048-78-1, Aug. 1978, 614 p.; Proceedings of conference, Held at Cambridge, MA. on Feb 28-Mar 2, 1978.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287864/3ST

17 186851 INDEPENDENT STUDY OF PERSONAL RAPID TRANSIT, AUTOMATED GUIDEWAY TRANSIT TECHNOLOGY PROGRAM. The objectives of the Urban Mass Transportation Administration's Automated Guideway Transit (AGT) Technology Program are to: (1) develop estimates of the cost, service, reliability, safety and performance of AGT systems in representative urban deployments; (2) generate performance specifications for future AGT engineering development programs; (3) synthesize guideline standards for AGT systems to include safety and reliability; and (4) identify critical technology shortcomings that currently impede the implementation of viable AGT systems and develop the required technology. A portion of the Program consists of independent studies in specific areas by organizations that have expertise in those areas. This report summarizes the findings of an independent study in the area of Personal Rapid Transit (PRT) and was conducted by the Aerospace Corporation. This study consists of four Tasks which are presented separately. Existing hardware and software technology is reviewed for applicability to implementation of future U.S. PRT systems. The systems reviewed include Aerospace, Aramis, Cabtrack, Cabintaxi, and the Computer-Controlled Vehicle system. Environmental and energy impacts of PRT are estimated and compared with alternate forms of AGT and conventional urban transportation modes. A general methodology for establishing the feasibility of PRT in an urban area is defined and applied to the Los Angeles Basin for demonstration purposes. Areas where research and development are required to make a future PRT system deployment feasible are described, and an approach to fulfill the noted technology shortcomings is provided. The study concludes that further developments are required of the

PRT full-scale systems and in most of the critical subsystem areas as well.

Olson, CL ; Aerospace Corporation, Urban Mass Transportation Administration UMTA-CA-06-0090-77-1, Dec. 1977, 365 p.; Contract DOT-UT-60052T; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287869/2ST

17 186863 DYNAMIC EXPERIMENTS OF ALTERNATIVE GUIDEWAY-VEHICLE SYSTEMS, PART I. This is an experimental investigation of vehicle-elevated guideway response dynamics. First, descriptions are given of the laboratory system components, which are: the spans (single, multiple and cable-stayed); the vehicles (tandem point loads and an Automated Guideway Transit (AGT) vehicle model); the vehicles' linear induction motor propulsion system; and the span-vehicle data retrieval system. Second, data are presented for a variety of vehicle-guideway configurations. Measured moment responses of simple spans to tandem loads show reasonable agreements with theory. Also, the six-span configuration, for a variety of transit loadings, shows less dynamic response compared to its single-span counterpart, but only up to certain vehicle speeds (or passage frequency ratios). Further, experiments on three-and six-span cable stayed guideways with a transit point load and an AGT vehicle show the importance of designing with medium-stiff cables if both span responses and vehicle heave acceleration are to be minimized. The last study summarizes current analyses on horizontal guideways of constant radius of curvature, and the response of such guideways to transit loads. It is concluded that such model experiments are needed and preliminary tests show that they are feasible. As for the straight spans, such data can be presented in nondimensional forms, directly applicable in the full-scale dynamic design of urban transit systems.

Wilson, JF ; Duke University, Department of Transportation Final Rpt. DOT/RSPA/DPB50-77/11, June 1978, 110 p.; Contract DOT-OS-60130; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288244/7ST

17 187973 PROCEEDINGS OF THE 11TH CANADIAN SYMPOSIUM ON AIR CUSHION TECHNOLOGY. Papers presented at the Symposium covered many divergent topics. These include: in service applications of air cushion technology, technological and manufacturing developments, and directions for continuing development. The current state of research on air cushion technology in the United States is also presented.

Canadian Aeronautics and Space Institute 1977, 253 p., Refs.; Canadian Symposium on Air Cushion Technology, 11th, Vancouver, B.C., September 19-21, 1977.; ACKNOWLEDGMENT: Arctic Science and Technology Information System (ASTIS 8273); ORDER FROM: Canadian Aeronautics and Space Institute, Air Cushion Technology Section, Ottawa 4, Ontario, Canada

17 189812 OPERATIONS CONTROL FOR THE H-BAHN RAPID TRANSIT SYSTEM [Betriebsleittechnik des Nahverkehrssystems H-Bahn]. The fully automatic H-Bahn overhead cabin system has been developed to help solve the urban rapid transit problem. The H-Bahn will offer a frequent service on scheduled routes and

will provide transport until late at night. To be able to solve the highly diversified automation problems of the H-Bahn system, the automatic control system has been structured into a three-level hierarchy comprising an operations control level, traffic control level and safety level. Siemens 300/16-Bit System process computers take charge of operations and traffic control. [German]

Birnfeld, B *Siemens Review* Vol. 52 No. 9, Sept. 1978, pp 513-516; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 190280 PERFORMANCE OF STEERING CONTROLLERS FOR AUTOMATED GUIDEWAY TRANSIT VEHICLES. Automated Guideway Transit (AGT) is a class of urban transportation system in which vehicles are operated under automatic longitudinal and lateral control on exclusive guideways. This paper discusses the performance of automatically steered rubber-tired vehicles on both straight and curved guideway, subject to the conflicting requirements of tracking accuracy and passenger comfort. The optimal performance for operation on straight guideway containing random lateral reference errors is presented. This performance is the best achievable with any controller of the class considered and provides a standard against which simpler suboptimal controllers can be evaluated. A simple proportional controller using a single displacement sensor is shown to produce near-optimum performance for the typical vehicle studied when operated at the design speed. By appropriate location of the position sensor, steady-state errors in curving can be made small for the practical range of curve radii. Curve entry transients are simulated for a curve having no transition spiral and a steady-state lateral acceleration of 0.223 g at 13.4 m/sec. Acceleration and tracking error overshoots are both less than 13.3% for well-chosen gains.

Shladover, SE (Massachusetts Institute of Technology) Fish, R Wormley, DN Richardson, HH Swets and Zeitlinger *Proceeding 1978*, pp 127-135, 9 Ref.; Dynamics of Vehicles on Roads and on Tracks, Proceedings of the 5th Vehicle Systems Dynamics (VSD) Symposium and 2nd Int Union of Theoretical and Applied Mechanics (IUTAM) Symposium, Technical University of Vienna, Austria, September 19-23, 1977; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Swets and Zeitlinger, Keizersgracht 487, Amsterdam, Netherlands

17 190301 DYNAMIC ENTRAINMENT OF AUTOMATED GUIDEWAY TRANSIT VEHICLES. This paper explains the advantages when Automated Guideway Transit (AGT) vehicles are capable of operating both individually and entrained, either in mechanically-coupled trains or functionally-linked platoons. It is demonstrated that dynamic entrainment is a promising way to provide personal rapid transit service at a reasonable capacity level, and the advantages of entrainment for other, less advanced, forms of AGT operating at higher capacity are also shown. The reliability and safety implications of entrained operation are explained, and the operational advantages of dynamic en/entrainment (vehicles entering and leaving trains at cruise speed on the mainline guideway) are discussed. The paper concludes by demonstrating why

entrainment can be useful for promoting rational, timed-staged implementation of new AGT services under general conditions.

Shladover, SE (Massachusetts Institute of Technology) *High Speed Ground Transportation Journal* Vol. 12 No. 3, 1978, pp 1-27, 37 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 190971 AIRTRANS URBAN TECHNOLOGY PROGRAM. PHASE I. FINAL DESIGN REPORT. AIRTRANS is an Automated Guideway Transit (AGT) System which provides inter-terminal transit service for passengers at the Dallas/Ft. Worth Airport. The successful deployment of this system has prompted the investigation of the extension of AGT technology into the urban environment to relieve the congestion and pollution caused by increasing auto and bus transit. Phase I of the AIRTRANS Urban Technology Program (AUTP) covers the activities of the Vought Corporation, which tested the system for operation in an urban application. Independent assessments were made to determine what changes would be required, which were: (1) higher operating speeds; (2) better passenger acceptance; (3) reduced capital and operating costs; (4) increased reliability; (5) better all-weather capability; and (6) increased energy efficiency. The AUTP was structured into a two-phase program. Phase I was completed in 1977, and includes the development and demonstration of the subsystem improvements necessary for higher speed operations, while maintaining or improving reliability, availability, cost, and performance characteristics of the overall AIRTRANS system. This consisted of baseline tests with the test vehicle at speeds of 17 and 30 mph using the existing AIRTRANS propulsion, collector, steering, and control and communications systems. After a thorough analysis of the data from these tests, design changes were incorporated and new components were acquired or fabricated. This equipment was installed on the vehicle and guideway testing was again conducted. The overall conclusion reached in Phase I is that the existing AIRTRANS AGT system can be improved to make it a viable transit system for urban deployments. The basic design, with improvements expected from AUTP Phase II will provide for the successful deployment of urban AIRTRANS systems.

Albach, WC Hall, VW Koonce, BL Preston, OH, III Payne, JN ; Dallas/Fort Worth Regional Airport Board, Vought Corporation, Urban Mass Transportation Administration, (UMTA-TX-06-0020) UMTA-TX-06-0020-78-1, Jan. 1978, 289 p.; Prepared by Vought Corp., Dallas, TX. Systems Div. Errata sheets inserted.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291128/7ST, DOTL NTIS

17 191959 TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION. VOLUME 1. 1970-1975 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 212 abstracts, none of which are new entries to the previous edition.)

Habercom, GE, Jr ; National Technical Information Service Apr. 1979, 220 p.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; NTIS/PS-79/0274/5ST

17 191960 TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION. VOLUME 2. 1976-FEBRUARY, 1979 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 81 abstracts, 17 of which are new entries to the previous edition.)

Habercom, GE, Jr ; National Technical Information Service Apr. 1979, 87 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0275/2ST

17 193772 MIXED-MICRONS MAGNETIC LEVITATION FOR ADVANCED GROUND TRANSPORT SYSTEM. The possibility of applying the mixed-micron principle for magnetic levitation to ground transport systems is examined. The system is developed specifically for suspension and useful lift to passive weight ratios exceeding 8:1 have been calculated. Application to a hybrid system where conventional wheel drive is used in conjunction with magnetic levitation is explained for urban transport.

Russell, FM ; Science Research Council RL-77-076/B, Dec. 1977, 24 p.; ACKNOWLEDGMENT: Energy Research Abstracts, NTIS; ORDER FROM: NTIS; RL-77-067/B

17 195532 REPORT OF A CONFERENCE ON ADVANCED TRANSIT AND URBAN REVITALIZATION, INDIANAPOLIS 25TH-28TH APRIL, 1978. This report on the three day conference organised by the U.S. Advanced Transit Association is on the application of advanced transit to U.S. and West German cities, including the UMTA downtown people mover (dpm) programme. "People mover" is described as a compact, automatic public transport system using driverless vehicles which run on their own segregated guideway. A description is given of some 80 formal technical and non-technical papers (including seventeen from West Germany), and reports on informal sessions involving local government, property developers, community groups and public transport operators. The first dpm is expected to be in operation in 1981/2, and several more by 1984. /TRRL/

Baker, RC ; British Aerospace Dynamics Group Monograph 1978, 50 p.; ACKNOWLEDGMENT: TRRL (IRRD 240503)

17 196366 ENGINEERING, OPERATION AND STATE OF DEVELOPMENT OF THE H-BAHN SYSTEM. The H-Bahn is a track-bound rapid transit system arranged in the form of a suspension railway with vehicles of various sizes. By selecting suitable vehicles and the appropriate type of operation this adaptable system can solve the most varied traffic problems. The H-Bahn system can be operated automatically. The instrumentation and control equipment provided for this permits various degrees of automation and modes of operation. In all operating modes, railway safety requirements are maintained.

Mueller, S *Siemens Review* Vol. 45 No. 12, Dec. 1978, pp 523-527; ACKNOWLEDGMENT: EI;

ORDER FROM: ESL

17 197319 DYNAMIC THEORIES AND EXPERIMENTS OF ALTERNATIVE GUIDEWAY-VEHICLE SYSTEMS, PART II. In both the companion report (Part I) and the present study, the broad purpose is to investigate theoretically and experimentally guideway-vehicle system dynamics. Four alternative systems are studied here in terms of nondimensional parameters. First, critical moment responses are predicted for simple, horizontally curved spans subjected to a variety of transit force distributions and torques. These results are validated with a series of laboratory-scale experiments. Second, measured moment responses are presented for curved, multiple spans with both even and uneven pier spacings and with several types of end constraints, all subjected to tandem vehicle loads. Results show that span dynamic responses may exceed 4 or 5 times those for vehicles at crawl speed. Third, dynamic responses are predicted for several three and six-span cable-stayed guideways subjected to a constant speed, vertical point force. These results are also validated with laboratory experiments. Finally, a statistical response analysis is presented for an AGT vehicle traversing a rigid, statistically rough, banked, curved guideway. With solutions of the covariant propagation equation, those design parameters are identified which strongly affect the lateral rms accelerations and mean suspension system strokes. The results obtained in all of these studies are directly applicable to the design of analogous intraurban and intercity transport systems.

Wilson, JF ; Duke University, Department of Transportation Final Rpt. DOT/RSPA/DPB/50-79/4, Mar. 1979, 189 p.; See also Part I, RRIS 11 186863; Bulletin 7902.; Contract DOT-OS-60130; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294247/2ST, DOTL NTIS

17 197417 GUIDELINES FOR THE DESIGN AND EVALUATION OF HUMAN FACTORS ASPECTS OF AUTOMATED GUIDEWAY TRANSIT SYSTEMS. This document has been compiled to provide guidance in the planning, design, fabrication, and evaluation of human factors aspects of Automated Guideway Transit (AGT) Systems, including Downtown People Mover (DPM) systems. It is based on the present state of knowledge in the areas covered and as such it draws on: (1) past and ongoing research; (2) applicable national and international codes and standards; and (3) current practice in transportation construction, law enforcement, fire safety, and military operations. Design concepts such as passenger safety, security, comfort, and convenience are discussed in relation to various AGT subsystems, including the vehicle, the guideway, the command and control center, and the terminal. Potential interactions between AGT systems and the surrounding community are considered. The guidelines also address such issues as accommodation of elderly and handicapped passengers, design to facilitate emergency evacuation, determination of acceptable levels of ride quality, and the optimal assignment of command and control tasks to humans and machines. The appendix summarizes the major guidelines presented in the text in a convenient checklist format; it is intended for use in the planning and evaluation of existing and proposed

AGT systems. The bibliography provides references for the reader who needs more detailed information than that provided in the guide.

Wichansky, AM Sussman, ED ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0081) Final Rpt. DOT-TSC-UMTA-79-12, UMTA-MA-06-0081-79-1, Mar. 1979, 197 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294817/2ST, DOTL NTIS

17 197459 AUTOMATED GUIDEWAY TRANSIT TECHNICAL DATA. The intent of this compendium is to provide background data for general, management-level discussions of Automated Guideway Transit (AGT) programs, systems, and other urban transportation modes. Data are presented on general system characteristics, cost, energy, and environmental issues for AGT, rapid rail, light rail, and transit bus systems. In addition, a summary of 19 Downtown People Mover (DPM) proposals is provided. Raw data and assumptions are supplied in an appendix to provide a base for additional study. Data are divided into four main sections: Section 1.0, AGT Overview, provides a perspective of AGT development through review of UMTA AGT programs, vehicles, guideway lane miles installed, and systems in use, proposed, or under construction; Section 2.0, Transportation System Economics, presents data on capital, operating and maintenance costs of various transportation modes (AGT, bus, rail, and light rail); Section 3.0, Energy and Environmental Issues, emphasize energy consumption and energy resource supply and production allocations; Section 4.0, Downtown People Mover Summary, presents data from the proposals of 19 cities selected by UMTA for detailed evaluation in the DPM Project. The information includes city estimates of DPM capital cost, operating and maintenance cost, ridership, and operating hours. Raw data and background information used in calculating the system economic parameters of Section 2.0 and the energy consumption of Section 3.0 are provided in the Appendix.

Chambliss, A ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0041) UMTA-VA-06-0041-79-4, Apr. 1979, 124 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295095/4ST

17 197655 INDUCTIVE COMMUNICATION SYSTEM DESIGN SUMMARY. The report documents the experience obtained during the design and development of the Inductive Communications System used in the Morgantown People Mover. The Inductive Communications System is used to provide wayside-to-vehicle and vehicle-to-wayside communications for command and control signaling. To aid future designers, system design and supporting analyses are discussed.

Johnstone, TN ; Boeing Aerospace Company, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMAT-78-49, Sept. 1978, 187 p.; Contract DOT-TSC-1275; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295413/9ST, DOTL NTIS

17 197658 INNOVATION IN PUBLIC TRANSPORTATION: A DIRECTORY OF RESEARCH, DEVELOPMENT AND DEMONSTRATION PROJECTS. The purpose of UMTA's RD&D program is to provide information about a wide spectrum of possible improvements to urban mass transportation systems which communities can use in selecting to best way to deal with their particular transportation requirements. The principle means of providing this information is to publish annually a compilation of reports on the status of UMTA's projects. The report contains the following sections: Bus and paratransit technology; Rail and construction technology; New systems and automation; Automated guideway transit (AGT) applications; Safety and product qualification; Socio-economic research and special projects; Service for special user groups; Fare and pricing policies; Conventional transit service innovations; Paratransit; Transportation planning and management; Policy and program development; and University research and training grant program.

Transportation Systems Center Ann Rpt. UMTA/TSC-79/1, 1977, 172 p.; Contract DOT-TSC-1; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295536/7ST

17 197705 INVESTIGATION OF THE DYNAMICS OF A MAGLEV VEHICLE TRAVERSING A FLEXIBLE GUIDEWAY: THEORY AND EXPERIMENT. This report presents the results of a research program conducted jointly by the United States Department of Transportation and the Federal Republic of Germany Ministry for Research and Technology. The object of this program was to study the dynamics of a maglev vehicle traversing a flexible guideway. Work in the U.S. was carried out at MITRE/Metrek in McLean, Virginia; work in the FRG was carried out at Transrapid-EMS in Munich. Two types of experiments were conducted using the full-scale KOMET test track in Manching, Germany. In the first, sinusoidal guideway deviations were deliberately introduced, and the KOMET vehicle was run over these at various speeds up to 324 KM/HR. The second type of test involved removing pier supports from the test track in order to make it more flexible. Theoretical predictions of the dynamic motions from a MITRE computer program are compared to the experimental results.

Katz, RM ; Mitre Corporation, Department of Transportation Final Rpt. DOT-TSC-RSPA-19110, Apr. 1979, 136 p.; Contract DOT-TSC-1263; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295786/8ST, DOTL NTIS

17 199046 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. VOLUME 3. LONGITUDINAL CONTROL ANALYSIS AND DESIGN, PART A: SLT AND GRT SYSTEMS. Automated Guideway Transit (AGT) systems are a potential means of providing convenient, dependable, cost-effective urban transportation. Prior to deployment, technical obstacles in the areas of network operation, vehicle control, safety, reliability, and maintainability must be resolved. The Urban Mass Transportation Administration (UMTA) has established the Automated Guideway Transit Technology Program to overcome these obstacles. Since the longitudinal control system encompasses most of the essential vehicle subsystems, it

plays a critical role in the guideway operation. The VLCR project addresses those areas where technological improvements at the subsystem level can substantially improve the deployability of AGT systems. This report describes the activities performed in developing single-thread longitudinal control system designs which permit short-headway operation. The study relates to current systems which operate at headways greater than 20 seconds using fixed-block protection as well as systems which operate at headways in the 5-second regime, using moving-block protection. Conclusions and recommendations are included in this report.

Petrino, E ; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt. OTIS/TTD/VLCR-061-1, UMTA-IT-06-0148-79-7, May 1979, 836 p.; See also PB-298767, Part B, RRIS 11 199047; Bulletin 8001.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298766/7ST

17 199047 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. VOLUME 3. LONGITUDINAL CONTROL ANALYSIS AND DESIGN. PART B: PRT SYSTEMS. This report, Volume 3, Part B, documents the analytic design and simulation work performed for the Personal Rapid Transit (PRT) longitudinal control system. The objectives of this study were to develop and evaluate candidate longitudinal control systems for the very-short-headway operation of small transit vehicles. The study included a general view of the state-of-the-art in PRT systems, a detailed evaluation of applicable operating policies for such systems, an evaluation of available control design techniques, and an assessment of key hardware implementation issues. The major conclusion of this study is that PRT systems with time headways as low as 0.5 second appear to be feasible. It was found that conventional operating policies are not appropriate for such systems, but that alternate policies can be defined which assure safe and efficient system operation. One such alternative, the "safe-approach" policy, was developed in the course of the study. The study addresses the "safe-approach" policy develops a controller, and proceeds to analyze and test the controller via simulation. The longitudinal controller operated satisfactorily at a headway of 0.5 second for steady-state, overtake, and other maneuvers, as shown by the extensive simulation results which are included. Appendices are included which derive acceleration profiles, contain simulation source code, evaluate key PRT technology issues, and present and discuss a conceptual control system implementation.

Schumacher, P ; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt. OTIS/TTD/VLCR-061-2, UMTA-IT-06-0148-79-8, May 1979, 178 p.; See also report dated Feb 79, PB-297129, and PB-298766.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298767/5ST

17 199053 STUDY ON HYDROSTATIC DRIVES FOR SMALL AGT VEHICLES. This report presents an analysis of hydrostatic drives applicable as propelling units for Automated Guideway Transit (AGT) small vehicles. The study includes a comprehensive state-of-the-art survey of hydrostatic drive units and the develop-

ment, design, and performance requirements for a 15 HP hydrostatic drive propulsion system for an AGT system. The study included a series of testing on a 15 HP unitized hydrostatic unit to evaluate performance characteristics and acoustic noise. Acoustic noise of hydraulic equipment, especially the hydrostatic drive, has been studied and the findings reported herein. A series of tests were performed on the unitized 15 HP hydrostatic drive to simulate an AGT small vehicle duty cycle using a 20 and 29 GPM hydraulic motor. These tests were conducted on an eddy-current clutch dynamometer, 35 HP capacity, and utilized specially designed and developed processor to produce the simulated duty cycle during the tests. In addition, noise level tests were performed on the unitized hydrostatic drive with the 20 and 29 GPM hydrostatic motor and applied with and without shield constructed as a box to dampen hydrostatic drive noise. Also, a trade-off analysis comparing the hydrostatic drive unit with the AC electric drive motor with eddy-current clutch/-brake and DC electric motors for application as AGT vehicle propulsion system was done.

Adams, GJ Hoover, LR ; Mobility Systems and Equipment Company, Urban Mass Transportation Administration, (UMTA-CA-06-0089) Final Rpt. MSE-0277/1, UMTA-CA-06-0089-78-1, Oct. 1978, 121 p.; Contract DOT-UT-60043; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298805/3ST

17 199111 AGT GUIDEWAY AND STATION TECHNOLOGY. VOLUME 7: GUIDEWAY AND STATION CONCEPTS. The objective of the project is to develop guideway, station and weather protection concepts which will reduce the cost and implementation time associated with AGT systems. The purpose of this report is to present concepts for AGT guideways and stations which will minimize overall costs and implementation time. The concepts presented fall into four areas: guideways, stations, power distribution, and contracting methods. The guideway concepts work includes a discussion of various materials and construction techniques and assesses their applicability to AGT. Selected existing AGT guideway designs are examined and modified to reduce costs. Power distribution concepts and costs compare AC and DC power, single versus multi-point incoming service, and basic versus dual-redundant substations. Four baseline station concepts are developed and costed, and sensitivity variations of these concepts are examined. A selected number of the developed guideway and station concepts are evaluated and illustrated through photomontages and models. Fifteen alternative contracting methods for guideways and stations are developed and evaluated.

Stevens, RD ; De Leuw, Cather and Company, ABAM Engineers, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0152-79-6, July 1979, 418 p.; See also Volume 2, PB-281632. Prepared in cooperation with ABAM Engineers, Inc., Tacoma, WA.; Contract DOT-UT-70066; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299411/9ST

17 199118 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. VOLUME 4. RELIABILITY ENHANCEMENT ANALYSIS AND DESIGN TEST REPORT. The Vehicle Longitudinal Control and Reliability (VLCR) Program is a part of the Automated

Guideway Transit (AGT) Technology Program that provides for reliability improvement to be considered a separate task. A summary of reliability enhancement techniques is a part of this task; it is intended to provide a comprehensive body of reliability enhancement information applicable to AGT systems. It is also a step in accomplishing the enhancement of the specific control systems that are being considered in the enhancement of the four generic control system designs. This document is the final report of the Reliability Enhancement Studies for the VLCR Project. It contains the results of the literature search, the development of reliability enhancement techniques, AGT component enhancement, the use of redundancy, enhanced AGT design, and a detailed implementation of selected VLC systems. In this report, techniques for enhancement are listed in terms of their applicability of a system's hardware tier level, beginning with those that are applicable to the component level, to the subsystem level, and to the systems level. The documents annotated in Appendix I (Annotated Bibliography of Applicable Reliability Documents) represent only those which have information directly applicable to the VLCR project. The objective of this Reliability Enhancement Task is to develop techniques to enhance the reliability of VLC systems, and it includes an extensive survey of reliability enhancement techniques previously employed by U.S. Government and Industry programs.

Womack, WC ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0148) Final Rpt. OTIS/TTD/VLCR-069, UMTA-IT-06-0148-79-9, May 1979, 321 p.; See also report dated Feb 79, PB-297129, Volume 3, Part A, PB-298766, and PB-299526.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299525/6ST

17 199119 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. LONGITUDINAL AND LATERAL CONTROL COST AND WEIGHT MODEL. UMTA's Automated Guideway Transit Technology (AGTT) Program is oriented toward the analyses of systems and the development of system elements which may be used in a variety of advanced urban transportation systems. The Vehicle Longitudinal Control and Reliability (VLCR) Project is the part of the AGTT program that focuses on the performance of longitudinal control systems. The project includes a review of the status of existing technology, specification of design goals and requirements, detailed mathematical modeling, analysis and simulation, development and specification of design concepts and their mechanizations, and experimental validation of the designs. This document describes an automated cost and weight model for Vehicle Longitudinal and Lateral Control (VLC) Systems. The model is a life-cycle cost and weight model which focuses on system components which vary with lateral control option. This model is to be used to evaluate the cost and weight of VLC designs for four classes of AGT (GRT) large and small, and Personal Rapid Transit (PRT). The report is organized in three technical sections: (1) Methodology and model description (includes design goals, model structure, basic equations, and a detailed description of the model); (2) Model use

(includes input requirements, output and factor selection; and (3) Model growth potential. Conclusions are provided in the last section with the model code reproduced in the Appendix. The authors state that a usable life-cycle cost and weight model is available for immediate application to AGT nominal designs and control alternatives.

Womack, WC Graver, CA ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0148) Final Rpt., 1 OTIS/TTD/VLCR-063, UMTA-IT-06-0148-79-1, June 1979, 150 p.; See also report dated Feb 79, PB-297129, and PB-299525; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299526/4ST

17 199123 A QUANTITATIVE EVALUATION OF SERVICE-DEPENDABILITY MODELING APPROACHES FOR AUTOMATED GUIDEWAY TRANSIT. Automated guideway transit (AGT) systems, which are intended to operate without vehicle and station personnel, are controlled remotely from a central operations area. Such an operational concept has focused the attention of system planners and designers on the impact of equipment malfunctions and the means for adapting system operations to carry on service in the face of a malfunction, while simultaneously removing the cause of the malfunction and restoring normal service. Dependability modeling attempts to develop quantitative relationships that express the effects on passenger service brought about by network configuration, operations policy, equipment malfunction characteristics, and recovery-system design characteristics. The purpose of this study is to provide a quantitative assessment of several different types of models to identify their applicability, data requirements, and computational cost. A case-study approach was used whereby a specific test scenario was defined, and each model to be evaluated was applied to the scenario. Quantitative comparisons require that the models provide estimates of the same set of performance measures and be executed in a similar computer environment. The modeling approaches were modified to meet this requirement, were programmed in the PL/1 language, and were operated as executable load modules on the IBM 360/91 computer to obtain computational cost estimates.

Roesler, WJ Haberman, S Chiu, HY ; Johns Hopkins University, Laurel, Urban Mass Transportation Administration Tech Rpt. APL/-JHU-CP-071TPR043, UMTA-MD-06-0025-79-1, May 1979, 117 p.; Contract DOT-UT-70036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299584/3ST

17 199124 LIFE CYCLE COSTS AND APPLICATION ANALYSES FOR NEW SYSTEMS. This paper reflects the view that both the accelerating walkway (AW) and the automated mixed traffic vehicle (AMTV) system can provide service for short urban trips. In this paper, estimated life cycle costs of the two promising feeder and local circulation systems, AW and AMTV, are examined. Cost functions for the AW and the AMTV are described; their sensitivity to some of the design, operating and cost parameters is examined. The two systems are placed in the context of hypothetical applications to identify typical user costs.

Lenard, M ;

Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0041) Conf Paper MTR-7858, UMTA-VA-06-0041-78-2, May 1978, 28 p.; Presented at the Conference on Automated Guideway Transit Technology Development Held at Boston, Massachusetts on February 28-March 2, 1978; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299586/8ST

17 260227 ANALYSIS OF SATELLITE AIR TERMINAL SYSTEM. A systems approach is used to analyze the satellite air terminal concept for large metropolitan areas. A mathematical model formulates the problem as a fixed charge selection-allocation problem, and computes optimum locations for the satellites in the megalopolis. The analysis also enables comparison among the transportation modes used to transfer passengers between the satellite collection ports and the main airport. A heuristic algorithm is used in conjunction with the model to compute locations for collection ports when a rapid transit network is used to transfer passengers to the main airport. To demonstrate the practical applicability of the models, a satellite air terminal system is "designed" for the San Francisco Bay Area. Depending upon parameters and 1980 traffic forecasts, up to seven satellite airports and four satellite collection ports connected to the San Francisco International Airport by rapid transit link extensions to the Bay Area Rapid Transit System, are found to constitute an optimum system.

Sud, IK (International Bank for Reconstruction and Develop) Gray, P (University of Southern California) *ASCE Journal of Transportation Engineering* Vol. 99 No. TE4, Proc. Paper 10174, Nov. 1973, pp 935-953, 2 Fig., 3 Tab., 22 Ref., Apps.

17 260283 THE BIMODAL SYSTEM. The Bimodal System currently under development is an answer to municipal transportation problems of jammed streets with consequently poor service, coupled with rising costs. The Bimodal System aims at improving comfort in the bus, building up the system for existing vehicle and expressway techniques and designing and building a nonpolluting engine fueled with liquified natural gas. It also plans the construction of private rights-of-way, leading to the possibility of electrifying the vehicles and automating driving functions with a guidance system, which would eventually eliminate the driver altogether over special route sections. /Author/

Morand, A ; Linguistic Systems, Incorporated NASA-TT-F-15056, Oct. 1973, 30 pp; Translation into English from "Le Systeme Bi-Mode" Rueil, France, Tregie Press, May 1973 32 pp; Contract NASW-2482; ACKNOWLEDGMENT: NTIS (N73-33925/1); ORDER FROM: NTIS, Repr. PC, Microfiche; N73-33925/1

17 260567 NEW TRANSPORT SYSTEMS-A REVIEW 1970/1971. This summary first defines the elements of the new transport technology. Automatic vehicle control, which fully controls the movements of a vehicle by itself and in relation to others, can be applied to a public transport system of small vehicle units with close spacing. This calls for precise information between the vehicle and control units, and track selection capability. Electrical propulsion systems with a linear induction motor are being re-

searched, and have been applied in fast, inter-regional transport systems. New vehicle support principles include the air-cushion, magnetic cushion, and the opposite of the air cushion, where the lift is achieved by a vacuum. A definition of terms for the new transport technology is given along with a brief description of the types of systems included in the three categories. A manu-system is one where the vehicles are driver-controlled, and includes the omni-car, taxibus, and rapid transit train. An auto-system consists of automatically-controlled, driverless systems, including the moving platform, moving cab-system, autotaxis, and the autobus. Ambi-systems are composed of vehicles that can be operated both manually and automatically, such as the ambicar and ambibus. Only recently have countries been investing funds in the research of new transport systems, rather than on solving existing problems. Town planning can be affected by the new systems, which may allow greater freedom than the traditional star-shaped structure created by old public transport systems. Costs of these new systems cannot yet be accurately estimated. [Swedish]

Gunnarsson, SO Westerlund, Y ; Chalmers University of Technology, Sweden No T29:1973, 1973, 2 pp; Appeared in Synopsis and Summaries from the National Swedish Building Research reports.; ACKNOWLEDGMENT: National Swedish Institute for Building Research

17 262589 USE OF STATE OBSERVERS IN THE OPTIMAL FEEDBACK CONTROL OF AUTOMATED TRANSIT VEHICLES. The theory of optimal control and the theory of observers is applied to the design of feedback systems for longitudinal control of vehicles in automated, high-capacity transit systems. The resulting controllers require only measurement of position and velocity errors and excellent dynamic response is achieved for mainline operation, for merging and demerging from stations, for maneuvering at intersections, and for emergency stopping.

Garrard, WL (Minnesota University, Minneapolis) Kornhauser, AL (Princeton University) *ASME Journal of Dynamic Systems, Meas and Control* Vol. 95 No. 2, June 1973, pp 220-227, 12 Fig., 2 Tab., 9 Ref.

17 262964 WHAT ABOUT WITKAR?. THIS NOTE DESCRIBES THE WITKAR, WHICH IS A SMALL SELF-DRIVE ELECTRIC TAXI RECENTLY INTRODUCED INTO AMSTERDAM. THE CARS ARE POWERED BY A 2000 WATT, 24V ELECTRIC MOTOR RUNNING OFF A QUICK-CHARGING 55AH NICKEL-CADMIUM BATTERY. AN OVERHEAD CURRENT RAIL RECHARGES THE CARS WHEN THEY ARE PARKED AT A STATION. THE SYSTEM IS OPERATED BY INSERTING A MEMBERSHIP CARD IN A COMPUTER TERMINAL AT ANY STATION AND DIALING THE INTENDED DESTINATION. AFTER THE MEMBERS' RECORDS HAVE BEEN CHECKED, THE CAR IS BOOKED OUT AT A COST OF LESS THAN \$1/HOUR. A NETWORK OF STATIONS CONNECTED BY TELEPHONE TO A CENTRAL COMPUTERIZED CONTROL IS ENVISAGED. 35 CARS AND 5 STATIONS ARE AVAILABLE NOW BUT 125 CARS AND 15 STATIONS ARE

PLANNED. INSUFFICIENT RECHARGING TIME HAS LED TO SOME CARS STALLING. /TRRL/

Surveyor-Public Authority Technology Vol. 143 No. 4272, Apr. 1974, pp 30, 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD 209940)

17 264348 MORGANTOWN DEMONSTRATION RAISES DOUBTS ON FUTURE PRTS. UMTA's personalized rapid transit project in Morgantown, West Virginia, has been temporarily shut down due to higher than expected operating costs. Administration officials, however, are not disillusioned with PRT projects in themselves, only with the Morgantown demonstration project, which presented peculiar difficulties. The university is separated into two campuses on opposite sides of the city, so the PRT was designed to facilitate rapid transit between the two. The engineering problems involved in the construction of this particular guideway will not be encountered at other sites where the PRT system is proposed. Although the increased costs have forced UMTA to drop the project for awhile, there are plans to seek a federal grant in order to expand the system.

Engineering News-Record Vol. 191 No. 22, Nov. 1973, p 12

17 264594 THE PREDICTION OF SHRINKAGE FOR AUSTRALIAN CONCRETE. Shrinkage data for Australian concretes from all States is compared with shrinkage predictions from four codes. It is concluded that no very accurate prediction of shrinkage is possible and that predictions that include the effect of mix proportions are markedly worse than those that do not. In cases where a reasonably precise prediction of shrinkage is required it is necessary to carry out tests using the actual materials and mix proportions which will be used on the job. For other cases, a method of prediction is proposed which is believed to be the most precise possible at the present time. /Author/

Campbell-Allen, D (Sydney University) *Institution of Engineers (Australia) Civ Eng Trans* Vol. CE15 No. 1&2, 1973, pp 53-57, 5 Fig., 6 Tab.

17 264694 NEW TRANSIT TECHNOLOGIES: AN OBJECTIVE ANALYSIS IS OVERDUE. New urban transit systems incorporating inefficient and obsolete technical features are being promoted, discussed and funded. Typically they involve automatic operation with rubber tire guidance and very frequent headways. Rail systems which are clearly superior are concurrently ignored. The authors urge transit planners, operators and equipment manufacturers to exploit the great potential of rail technology rather than pursuing innovation for its own sake. The viable, proven concept of rail technology is neglected because of acceptance of irrational claims that "rail is obsolete" by those unaware of modern rail technology. Appropriate research and development for rail systems should include full automation for LRT, smaller rail vehicles, reduction of cost of construction and operation, and reduction of vehicle weight with consequent lower energy consumption and noise.

Vuchic, VR Stanger, RM *Railway Gazette International* Vol. 130 No. 10, Oct. 1974, pp 384-387

17 264842 NEW LOCAL TRANSPORT? [Neue Nahverkehrsmittel?]. The technical features of 6 American and 3 German cab transportation systems are compared in a table. The USA systems—frequently also called PRT (Personal Rapid Transit)—are merely electrified minibuses, and are not efficient.

Foerdmern und Heben ACKNOWLEDGMENT: TRRL (IRRD 301265)

17 265105 DYNAMIC STABILITY AND STRESS ANALYSIS OF ALTERNATIVE GUIDEWAYS FOR LEVITATION VEHICLES. Responses are predicted for several kinds of guideways subjected to the constant, transit pressures of levitation-type vehicles. The studies include: Stresses in subterranean tunnel liners with alternative vehicle support structures; comparative dynamic efficiencies of simple and two-span elevated guideways with several distributions of transit loads; dynamics of multiple, flexible post and rigid panel guidance walls; dynamics of segmented (open-jointed) guidance plates and of continuous plate strips with arbitrary foundation restraints; responses to transit moments of plate-type levitation surfaces on elastic foundations; and applications of these dynamic theories in determining stresses for alternative at-grade guideways of current importance.

Wilson, JF ; Duke University Dec. 1973, 322 pp; Contract DOT-FR-30029; ACKNOWLEDGMENT: NTIS (PB-233643/6); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233643/6

17 265264 LINEARIZED MODELS, STABILITY CRITERIA AND EXPERIMENTAL VERIFICATION FOR PLENUM AIR CUSHIONS WITH COMPRESSOR-DUCT INTERACTIONS. An analytical and experimental investigation of the static and dynamic behavior of nearly full scale plenum-type air cushion suspensions is described, including the effects of compressor-duct dynamics and secondary suspension characteristics. The results indicate that cushion-duct interactions may strongly affect cushion stability unless the lowest resonant frequency of the duct is much higher than the cushion unsprung mass natural frequency. Criteria are suggested for selecting appropriate duct models for use in suspension dynamic analysis. For most practical systems a second- or at most fourth-order duct model will adequately represent the distributed duct dynamics. The report is the latest in a series of investigations whose goal is experimentally verified models, advanced concepts and design criteria for pressurized air cushions which will permit safe and comfortable operation of high speed tracked levitated vehicles over economically feasible guideways.

Sweet, LM Richardson, HH Wormley, DN ; Massachusetts Institute of Technology, Federal Railroad Administration May 1974, 127 pp; Contract DOT-FR-10007; ACKNOWLEDGMENT: NTIS (PB-235750/7); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235750/7, DOTL NTIS

17 265478 HOUSTON AIRPORT'S LOW COST PEOPLE-MOVER. A description is given of the new automatic, electric powered transportation system linking the two airport terminals and hotel. It replaces a first generation, battery powered system which has been in opera-

tion since the airport was completed in 1969. Six trains, 36 passengers each, operate continuously on a 6,000-ft (1.830-m) loop, providing service at each of eight stations every 3 min. Cost, including new station gate sets and graphics, was less than \$1,000,000. Overall airport traffic circulation, including the role of the train system, is considered. A description is made of major components; vehicles, suspension, guidance, propulsion, braking, switching, station gates, power distribution, and controls. Figures are presented to illustrate the text.

Puckett, HK Williamson, JC (Lockwood, Andrews and Newman, Incorporated) *ASCE Journal of Transportation Engineering* Vol. 100 No. TE1, Proc. Paper 10330, Feb. 1974, pp 255-262, 5 Fig.; ORDER FROM: ESL

17 267023 LOW SENSITIVITY DESIGN OF OPTIMAL FEEDBACK SYSTEMS FOR LONGITUDINAL CONTROL OF AUTOMATED TRANSIT VEHICLES. Many new urban transportation systems involve the use of automatically controlled vehicles. Some new systems, such as Personal Rapid Transit (PRT) and Dual Mode, are characterized by small automated transit vehicles traveling on exclusive guideways. The number of passengers per vehicle is small and short headways are necessary for high capacity. This requires a versatile, efficient and safe control system which maintains proper spacing between vehicles on guideways without causing passenger discomfort. The longitudinal control system is an essential part of the overall control system for automated transit vehicles. It must be capable of closely following the acceleration-deceleration profiles as commanded by wayside computers during merging, maneuvering to avoid conflicts at intersections, pushing a failing vehicle or stopping for an emergency. This report was devoted to the design of such a longitudinal control system by using modern control technology. A detailed mathematical model of the longitudinal motion of automated transit vehicles in an external-reference system is presented. The model is nondimensional so that results are applicable to a variety of systems. From the results of the study, it appears to the author that optimal control theory can be usefully applied to the design of a longitudinal control system for automated transit vehicles. A bibliography is included and appendices include "Flow Charts of Computer Programs" and "Derivation of Steady-State Behavior of the Observer."

Yang, S ; Minnesota University, Minneapolis UMTA-MN-11-0003-73-5, July 1973, 158 pp; ACKNOWLEDGMENT: UMTA (MN-11-0003); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231441

17 291005 NEW URBAN TRANSPORTATION SYSTEMS. Brief details are given of 5 transport systems: Alweg Monorail System, Cat-System, Container-System of Krupp (Coup), H-system of Siemens, and Transurban-System of Krauss-Maffei, all developed by German manufacturers. The systems lend themselves to advanced automation techniques and offer compact rapid-transit modes to serve congested inner-suburbs, some being particularly suited to link-in fringe residential and dormitory areas.

Meier, GA (Zurich Municipal Transport Undertaking) *Rail Engineering International* Vol. 3 No. 4, Apr. 1973, pp 154-157, 5 Phot.; ACKNOWLEDG-

MENT: TRRL (IRRD 400004)

17 301175 COMPARATIVE MEASURES ON THE RIDING STABILITY BETWEEN NEW AND CONVENTIONAL SHORT DISTANCE MEANS OF TRANSPORT [Vergleichende Laufruhemesungen an neuartigen und konventionellen Nahverkehrsmitteln]. Comparative measurements have been made in the United States and in Federal Germany at the request of the Federal Ministry for Research and Technology, in order to assess the riding stability of the recent automatic guideway transport. Tests have shown that both the systems with "H" type cabins and cabin taxis, gave results as satisfactory as railway transport. Results are less satisfactory for the bus and the American systems with tracked cabins, i.e. the "Morgantown-PRT" and "AIR TRANS" types. [German]

Bamberg, W Ludwig, H *Nahverkehrspraxis* Vol. 27 No. 4, 1979, pp 155-160, 8 Phot., 4 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Arnold Verlag, Siegburg Strasse 5, 4600 Dortmund, West Germany

17 301198 DEVELOPMENT OF MAGNETIC LEVITATION VEHICLES [Gegenwaertiger stand und Entwicklungstendenzen im bau von Magnetskissenfahrzeugen]. A survey is given of current trends in development in a rapid transit system using cars with repulsive magnetic levitation both for short and long distance lines. [German]

Dannehl, A *Technik* Vol. 34 No. 4, Apr. 1979, pp 197-201, 25 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 301573 FUNDAMENTALS OF PERSONAL RAPID TRANSIT. This book summarizes the work on Personal Rapid Transit (PRT) carried out at the Aerospace Corporation from 1968 to 1976. It is intended as a reference for experts and a text for students of transportation engineering. Emphasis is on describing concepts rather than engineering details. PRT is an automated taxicab system, a public transit system of 3- to 6-passenger vehicles operating automatically on a network exclusive guideways separate from street and pedestrian traffic. The book reports on both theoretical studies about economics, networks, traffic management, vehicle propulsion and control and also on experiments testing concepts of propulsion and control.

Irving, JH Bernstein, H Olson, CL Buyan, J (Aerospace Corporation); Lexington Books No Date, 332 p., Figs., Tabs., 2 App.; ORDER FROM: Lexington Books, Heath (DC) and Company, Lexington, Massachusetts, 02173

17 301601 DEVELOPMENT OF EFFICIENT CENTRAL MANAGEMENT STRATEGIES FOR ADVANCED GROUP RAPID TRANSIT SYSTEMS. This paper presents a summary of a computer-aided method for developing efficient central management system strategies for advanced group rapid transit systems by use of medium-sized, automatically controlled vehicles that travel on dedicated guideways. Some efficient central management system strategies developed for a test network that uses the method are presented and discussed in detail. The method consists of an iterative process in which experienced transit system operators make complex,

judgmental decisions and a computer performs extensive and repetitive computations. This computer-aided method allows transit system operators to compare the consequences of various central management system strategies in terms of such measures as passenger wait times, number of passenger intermediate stops, vehicle fleet size, vehicle load factor, and vehicle flows in various guideway sections and at various passenger stations. After studying such measures, operators can develop a set of efficient and realistic central management system strategies. The computer-aided method and the associated computer simulation program are general in nature and can be used to develop central management system strategies for a variety of network configurations and trip demand data. /Author/

Siddigee, W Wong, PJ Nielsen, NR (SRI International) *Transportation Research Record* No. 708, 1979, pp 8-16, 8 Fig., 4 Tab., Refs.; This paper appeared in *Transportation Research Record* No. 708, New Transportation Systems and Technology-1979.; ORDER FROM: TRB Publications Off

17 302728 CABIN RAILWAYS IN GERMAN TOWNS. ASPECTS OF THEIR USE IN PRACTICE [Kabinenbahnen in deutschen Staedten. Aspekte des praktischen Einsatzes]. Proceeding of a seminar on automatic cabin railways organised by the German Transport Science Company Deutsche Verkehrswissenschaftliche Gesellschaft) in Hamburg on 24 and 25 January 1979. Feasibility and profitability studies into new systems based on the work, tests and research done in several Federal German towns. [German]

Weigelt, H *Internationales Verkehrswesen* Vol. 31 No. 3, May 1979, pp 137-145, 6 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

17 303201 SIMULATION OF A HIGH PERFORMANCE PRT CONTROL SYSTEM. In connection with the second phase of the Advanced Group Rapid Transit (AGRT) project, the design of a control system for a high-performance (3-second headway) Personal Rapid Transit (PRT) system has been refined. The control system utilizes a variable length moving block control algorithm, and features a combination of multiple wayside and vehicle-borne computers that are connected by a wide bandwidth data link to achieve the desired performance. In this phase of the project, a major effort was directed toward developing a highly detailed simulation of the entire control system. This simulation was undertaken to verify that the deployed system would meet previously defined performance specifications. This paper discusses the implementation of the simulation and describes its use in verifying system operation at both macroscopic and microscopic levels. Examples of microscopic operations studied include effects of communication delays and errors on system operation and scheduling of different processes on the same computer. Examples of macroscopic operations studied include the operation of several vehicles merging at a junction, the response of several vehicles in a string during normal station stopping maneuvers, and responses to various failures that require emergency action.

Birnbaum, D (General Railway Signal Company) Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1378-9VT, 1979, pp 212-215; IEEE Vehicle Technology Conference, 29th, Conference Record of Papers, Arlington Heights, Illinois, March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 303203 MAG-TRANSIT--DEVELOPMENT AT BOEING. Mag transit is a combination of magnetic levitation and propulsion for people mover applications. Linear electric motors are used for levitation, propulsion, braking, guidance and suspension. Since there are a minimum of moving parts there is a potential for a substantial increase in system reliability and availability as compared to conventional systems. Modern solid state technology provides the capability to condition sufficient quantities of electrical energy to control motor excitation, and thereby levitation, within a closed loop servo system. Real time measurements of air gaps and vehicle accelerations are used to compute the desired levitation force. In addition the solid state electronics provides the ability to independently control the speed of the vehicle by a continuously variable excitation frequency to the motors.

Gilliland, RG (Boeing Aerospace Corporation); Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1378-9VT, 1979, pp 148-157; IEEE Vehicle Technology Conference, 29th, Conference Record of Papers, Arlington Heights, Illinois, March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 303205 DPM--APPLICATION OF CURRENT TECHNOLOGY. In April of 1976, the Urban Mass Transportation Administration announced the initiation of a Downtown People Mover (DPM) demonstration program to show the benefits of simple, fully automated transit systems--or people movers. This paper defines the existing people mover technologies which may be used to satisfy program requirements.

Marino, JL (Urban Mass Transportation Administration) Willingham, FL; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1378-9VT, 1979, pp 137-147, 18 Ref.; IEEE Vehicle Technology Conference, 29th, Conference Record of Papers, Arlington Heights, Illinois, March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 303206 MORGANTOWN PEOPLE MOVER SERVICE AVAILABILITY AND O&M COSTS --HISTORY AND PROJECTIONS. The Morgantown People Mover System (MPM) was operated in public service from October 1975 to July 1978. Its fleet of fully automated 21 passenger cars has moved 4.5 million passengers without a single system related passenger injury. A fleet mileage of 1.66 million miles was accumulated during the 33 month Phase IB operational period. The system is now undergoing a substantial expansion and will emerge in July 1979 as the Morgantown People Mover Phase II. The purpose of this paper is to report on two aspects of the MPM System that have not received much attention in the technical literature, system reliability and operating costs. This paper summarizes system reliability in the form of operational availability and operating and maintenance costs for the Phase IB time period

and projections of these performance measures for Phase II.

Hacker, RM (Boeing Aerospace Company) Bates, RJ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1378-9VT, 1979, pp 130-134; IEEE Vehicle Technology Conference, 29th, Conference Record of Papers, Arlington Heights, Illinois, March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 304616 AGT GUIDEWAY AND STATION TECHNOLOGY. VOLUME 8. WEATHER PROTECTION CONCEPTS. The objective of the project is to develop guideway, station, and weather protection concepts which will reduce the cost and implementation time associated with AGT systems as well as to improve performance. In Volume 8, weather protection concepts are presented for guideways associated with AGT systems, with emphasis on minimizing costs and energy consumption while maximizing system operability/reliability during winter weather. The concepts include a comparison of embedded pipe and electric heating systems with varied heated widths, heating densities, and amount of utilization.

Stevens, RD Nicarico, TJ McGean, TJ Easley, SM Easley, TL; De Leuw, Cather and Company, Urban Mass Transportation Administration, (UMTA-IT-06-0152) Final Rpt. UMTA-IT-06-0152-79-7, Aug. 1979, 249 p.; See also Volume 2, PB-281632.; Contract DOT-UT-70066; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299746/8ST

17 304629 PRT (PERSONAL RAPID TRANSIT) IMPACT STUDY. No abstract available.

West Virginia Univ., Morgantown.*Transportation, Systems Center, Cambridge, MA.*Urban Mass, Transportation Administration, Washington, DC. July 1979, 305p-in 3V; ñSet includes PB-300 341 thru PB-300 343. ñ; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300340-SET/ST

17 304630 PRT (PERSONAL RAPID TRANSIT) IMPACT STUDY. THE PHASE 1 PRT IMPACT ON MORGANTOWN TRAVEL TRAFFIC AND ASSOCIATED ACTIVITIES. A new and revolutionary public transportation system, the Morgantown Personal Rapid Transit (PRT) System began regular passenger service operation in Morgantown, West Virginia, in October 1975. This is a study of the impact of Phase I Morgantown PRT, the first fully automated transportation system operational in a city environment. The study was designed to record the effect of the system operation on traffic and associated activities in the areas adjacent to the PRT. The intent of the study was to provide information useful to other areas contemplating the Automated Guideway Transit (AGT) type installations. The PRT system served approximately 38% of the Morgantown residents. During the course of the study, it was concluded that the system was a major force in influencing travel habits, and that residents of the service area used autos for their trips less often than they did prior to the PRT. Compared to the bus system, which it replaced, the PRT is carrying more than the bus's previous share of the total trips.

Elias, SEG Ward, RE; West Virginia University, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt.

UMTA-MA-06-0026-79-1, DOT-TSC-UMTA-79-1, July 1979, 88p; See also Volume 1, PB-300342, PB-254481, and PB-254483. Also available in set of 3 reports, PB-300340-SET.; Contract DOT-TSC-1316; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300341/5ST

17 304631 PRT (PERSONAL RAPID TRANSIT) IMPACT STUDY. OPERATIONAL PHASE. VOLUME I: TRAVEL ANALYSIS. To study the impact of the Personal Rapid Transit (PRT) on Morgantown, a substantial amount of data was collected in an attempt to capture the state of transportation related conditions before and after passenger service. This report contains an analysis of the latter set of data; namely, that collected in the spring of 1977. The data described in this report, together with those reported in the Pre-PRT Phase, allows assessment of the PRT system impacts on the city of Morgantown. The completed assessment provides other cities considering implementation of AGT systems, sufficiently detailed information to determine whether they can effectively and efficiently utilize a Morgantown type PRT system to satisfy their transportation needs.

Elias, SEG Ward, RE; West Virginia University, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0026-79-2, DOT-TSC-UMTA-79-2, July 1979, 98p; See also Volume 2, PB-300341, PB-300343 and report dated Mar 76, PB-254481. Also available in set of 3 reports, PB-300340-SET.; Contract DOT-TSC-1316; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300342/3ST

17 304632 PRT (PERSONAL RAPID TRANSIT) IMPACT STUDY. OPERATIONAL PHASE. VOLUME II: DATA COLLECTION PROCEDURE AND CODING MANUAL. The report documents the procedures used by researchers at West Virginia University (WVU) in collecting data which describes transportation-related conditions in Morgantown, West Virginia following the commencement of passenger service on Phase I of the Morgantown Personal Rapid Transit (PRT) System. The record of data collection and data processing decisions given here provides essential documentation for researchers who may be performing subsequent analysis of the data.

Elias, SEG Ward, RE; West Virginia University, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0026-79-3, DOT-TSC-UMTA-79-3, July 1979, 119p; See also Volume 1, PB-300342 and report dated March 76, PB-254482. Also available in set of 3 reports, PB-300340-SET.; Contract DOT-TSC-1316; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300343/1ST

17 304635 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. A REVIEW OF ENTRAINMENT TECHNOLOGY. This report documents the results of a survey of entrainment technology conducted for the VLCR project. The technology review was conducted to evaluate the state-of-the-art in train formation and to identify those areas requiring special attention for Automated Guideway Transit (AGT) systems. The information which is sum-

marized herein was derived through: (1) a literature search and review; (2) discussions with coupler manufacturers; (3) a questionnaire to rapid transit operators; and (4) a study of transit authority coupler specifications. The methods and the results obtained within each of these activities are described within the report. The literature search involved both manual and computerized search techniques. The most applicable documents are listed in the Appendix: "Annotated Bibliography". The discussions with coupler manufacturers allowed the formation of a list of existing coupling equipment applicable to systems and the assessment of potential difficulties in the adaptation of coupling equipment to AGT vehicles. Areas probably requiring significant further development were also identified. A questionnaire dealing with automatic coupling equipment and techniques was then prepared and transmitted to seven transit system operators. Through automatic entrainment and extrainment (or train separation) of individual vehicles, it is hoped that the operational efficiency of AGT systems may be improved. The report concludes, in part, that due to the lack of information in the area of automatic vehicle longitudinal control, the formulation of appropriate concepts in this area will require more original and basic work. The report presents a number of preliminary conclusions.

Schumacher, P; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt. OTIS/TTD/VLCR-059, UMTA-IT-06-0148-79-1, Feb. 1979, 92 p.; See also PB-300373.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300372/OST

17 304636 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. A REVIEW OF AGT PROPULSION, POWER CONDITIONING, BRAKING AND POWER DISTRIBUTION TECHNOLOGY. The report assesses the current state of the art of each technology. The review was performed to obtain top level information that can be used by system designers, specification writers, and regional planners as baseline considerations. The main sections of this report are: Section 2 discusses propulsion motor technology. It concludes information on both dc and ac motors; Section 3 discusses power conditioning options for converting guideway power to a suitable form for the motor being used; Section 4 presents the findings on electrical and mechanical braking; and Section 5 sets forth some power distribution and collection considerations.

Schumacher, P; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt. OTIS/TTD/VLCR-064, UMTA-IT-06-0148-79-2, June 1979, 78 p.; See also PB-300372, and PB-297129.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300373/8ST

17 304646 OPERATION OF AUTOMATED GUIDEWAY TRANSIT VEHICLES IN DYNAMICALLY RECONFIGURED TRAINS AND PLATOONS (EXTENDED SUMMARY). This project grew out of a conviction that an automated guideway transit (AGT) system had the flexibility of operating either with individual vehicles or with functional multi-vehicle trains, with the capability of forming (entraining) and splitting (extraining) trains during trips.

could offer significant advantages over either single vehicles or fixed train systems for some urban applications. The study serves as a broad-based preliminary evaluation of the potential advantages and disadvantages of entrained AGT. It includes an investigation of the applications for which entrained AGT is well suited, and an assessment of how much capacity improvement it can offer. The study shows that passenger capacity of AGT systems may be increased by operating vehicles in dynamically-reconfigured trains or platoons. It is estimated that a minimum lane capacity of 5,000 to 10,000 passengers per hour is needed to make single-party AGT economically competitive with buses and that this capacity requires the use of trains. The longitudinal control systems needed to effect dynamic en/extraintment with platoon operations at spacings of 30-60 cm are developed herein with particular attention to stability, jerk limiting requirements, safety and passenger comfort. The capacity advantage of entraining is demonstrated for a single guideway link and for merge junctions, using Monte Carlo simulation. Variable-slot-length point-follower control is shown to reduce merge delays and maneuver ramp lengths compared with fixed-slot methods. The "zero gap" merge scheme developed produces dramatic improvement compared with conventional merge strategies.

Shladover, SE ; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-MA-11-0029) Final Rpt. UMTA-MA-06-0085-79-1, Apr. 1979, 112 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300513/9ST

17 304683 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MA., ON NOVEMBER 16-17, 1978. VOLUME III: AGT AND ADVANCED SYSTEMS WORKSHOPS. The document is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on AGT and Advanced Systems. Part I of this report deals with AGT socio-economic research and AGT applications and includes discussions of the AGT Socio-Economic Research Program, the Morgantown and Airtrans People Movers, and the Downtown People Mover (DPM) Program. Part II-AGT and Advanced Systems and Technologies-contains discussions of the AGT R&D Program, the Advanced Group Rapid Transit (AGRT) Program, and the Automated Guideway Transit Technology (AGTT) program. This volume contains seven resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-3, Nov. 1978, 90 p.; See also Volume 2, PB-300987, and Volume 4, PB-300989.; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300988/3ST

17 304723 DEVELOPMENT OF RESEARCH IN THE CONSTRUCTION OF TRANSPORTATION FACILITIES: A STUDY OF NEEDS, OBJECTIVES, RESOURCES, AND MECHANISMS FOR IMPLEMENTATION. This second-year report concentrates on two topics related to the subject matter of the study. One concerns the implementation of research results and innovative techniques. Incentives and obstacles to such implementation are identified. Proposals for more rapid and effective application of research results are made. Increased utilization of demonstration projects, bid alternates, turnkey contracts, and follow-up measures are discussed. A special study of measures by the Japanese construction industry to achieve cost reduction through innovation is included. The second topic concerns problems created by early planning, design, and organizational decisions. Experience originating in current or recent projects such as BART, WMATA, and MARTA is examined to identify such problems that have serious impact both on costs and the environment desirable for innovative efforts. This second-year report concludes with a number of recommendations that the researchers believe could be beneficial in achieving needed improvements in both topic areas.

Fondahl, JW Paulson, BC, Jr ; Stanford University, Department of Transportation Final Rpt. DOT/RSPA/DPB/50-7912, Aug. 1979, 146 p.; See also report dated Sep 77, PB-277419.; Contract DOT-OS-60150; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301389/3ST, DOTL NTIS

17 305554 NETWORK ANALYSES OF ADVANCED GROUP RAPID TRANSIT SYSTEMS. The Advanced Group Rapid Transit (AGRT) system concept, currently under development by the Urban Mass Transportation Administration (UMTA), is characterized by moderate capacity (12 passenger), computer-controlled vehicles operating at headways as low as 3 seconds over a dedicated network of guideways with off-line stations. This report covers work conducted under the heading of network analyses for UMTA. The purpose of this work is to provide assessments of AGRT in various urban applications. AGRT is being designed and developed as a system capable of deployment in urban applications ranging from circulation systems to urban regional transportation systems. This report analyzes the operational and performance characteristics of AGRT for moderate-to-large network configurations. Three AGRT network scenarios, ranging in extent from 26 to 187 lane miles of guideway were evaluated. The evaluation of each scenario was performed by a computer network assessment model and includes studies of operating policy parameters, system capacity, life-cycle costs, and service dependability. The flow of vehicles, passenger service, system costs, and energy utilization characteristics of AGRT were computed and presented for each scenario.

Kershner, DL ; Johns Hopkins University, Laurel, Urban Mass Transportation Administration, (UMTA-MD-06-0025) Tech Rpt. APL/JHU/CP070/TPR042, UMTA-MD-06-0025-79-2, Apr. 1979, 86 p.; Contract DOT-UT-70036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-112006

17 305570 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. A REVIEW OF AGT (AUTOMATED GUIDEWAY TRANSIT) CONTROL AND MEASUREMENT SYSTEM TECHNOLOGY. VOLUME 2, PART A [Final rept.] The report discusses theoretical and implemented longitudinal control concepts as they apply to four categories of AGT vehicles: shuttle-loop transit, large and small group rapid transit, and personal rapid transit vehicles. This report is organized into two sections. Section 2 describes the theoretical aspects of longitudinal control and briefly describes the longitudinal systems for five state of the art AGT systems. The theoretical control review includes vehicle follower, point follower and fixed block systems along with the control of merging vehicles. Section 3 reviews the options available for measuring vehicle states. The measurement technology review includes sensors for measuring vehicle velocity, position and separation between vehicles. Appendix A of this report provides a classification matrix for ten operational AGT systems.

Petrino, E ; Otis Elevator Co., Denver, CO. Transportation, Technology Div.*Urban Mass Transportation, Administration, Washington, DC. OTIS/TTD/VLCR-066, UMTA-IT-06-0148-79-4, June 1979, 58p; See also Volume 2, Part C, PB-300 373. n; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-114036

17 305803 OPERATIONAL CONCEPTS AND IMPLEMENTATION TECHNIQUES FOR VEHICLE-FOLLOWER CONTROL OF AGT SYSTEMS. This report presents a new baseline approach for the vehicle-follower for the longitudinal control of Automated Guideway Transit (AGT) vehicles. It is shown that for the short headways (0.5 to 3.0 s) contemplated for such systems, a kinematic constraint on the spacing between vehicles exists during speed transit maneuvers. This constraint is a nonlinear function of the service jerk and acceleration limits imposed on vehicle operation and also on the instantaneous values of the state variables of neighboring vehicles. The constraint is explicitly included in an analytical development of the control law, which is then shown to control satisfactorily vehicles during overtaking maneuvers and merging maneuvers up to full line capacity, and to regulate perturbations about nominal operating conditions. Modification of the kinematic constraint is then shown to generalize the approach to the problem of vehicle egress from an off-line station into main line traffic flow, including gap generation. Minimum required station egresslane lengths are then established as a function of headway. The station egress control is shown to be safe and effective even in the event of off-nominal behavior of vehicles in the main line traffic flow. Finally, the implementation requirements for the control are shown to be best satisfied by a "smart" vehicle control configuration, with state variables for vehicle spacing, velocity, and acceleration transmitted through wayside equipment at intervals of approximately one-fifth operational headway. Other headway-dependent factors determined in the implementation analysis are the permissible time delay for data transmission, the required on-board computation rate, and required levels of digital quantization. Results indicate that the control is compatible with existing microprocessor technology.

Pue, AJ Chiu, HY Brown, SJ, Jr ; Johns Hopkins University, Laurel, Urban Mass Transportation Administration Final Rpt. JHU/APL/CP-074TPR041, UMTA-MD-06-0038-79-1, Aug. 1979, 327 p.; Contract DOT-UT-80009; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-120207

17 305812 MORGANTOWN PEOPLE MOVER (MPM) OPERATING, AVAILABILITY, AND MAINTENANCE HISTORY, OCTOBER 1976 THROUGH JUNE 1978. The report covers the period of operation, dependability, and maintenance history of the Morgantown system (now known as the Morgantown People Mover-MPM) from October 1976 through June 1978. System performance in general improved greatly during this period. System availability on an annual basis rose from .880 for the year 1975-76 to .977 for the year 1977-78. Single vehicle reliability, as expressed in terms of mean time between downtime events, rose from approximately 85 hours at the end of the first year to approximately 150 hours at the end of the second year. The graphs in the report show that performance varied from month to month, but the trend was upward. Sixty-nine component failure types or other causes accounted for all the downtime recorded during the last year. About 61 percent of all the downtime events were due to only 17 causes. The other 39 percent were spread over 53 causes. A complete computer printout of the entire Morgantown data base is found in the Appendix of the report.

Watt, CW ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0081) Final Rpt. DOT-TSC-UMTA-79-45, UMTA-MA-06-0081-79-2, Oct. 1979, 100 p.; See also report dated Jan 77, PB-266 994.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-121460

17 305865 ASSESSMENT OF THE BUSCH GARDENS AUTOMATED ANHEUSER-BUSCH SHUTTLE SYSTEM. This report describes an independent assessment of the operation of the shuttle system at the Busch Gardens theme park in Williamsburg, which has been in operation since 1975, and is part of the ride system in the park. The system connects two stations, the Garden Station at the theme park, and the Hospitality Center at the brewery. It is a single lane loop with one two-car train which stops on-line at each station, and is capable of operating in either the clockwise or counterclockwise direction. The information and data presented in this report were collected through surveys of literature, site visits, a visit to the manufacturer, and interviews with site and manufacturer's personnel. The report presents a description of the technical subsystems, as well as a review of performance, reliability, and maintainability. Where important, the review of technical subsystems includes applicability and modifications and/or improvements for application in an urban environment.

Theumer, HA Elms, CP ; Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0188-79-4, Nov. 1979, 166 p.; Contract DOT-UT-80025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-127384

17 305866 ASSESSMENT OF THE MUELLER AEROBUS SYSTEM: THE SYSTEM INSTALLED AND OPERATED FOR THE BUNDESGARTENSCHAU 1975, MANNHEIM, GERMANY. This report describes the results of an assessment of the Mueller Aerobus System as it was installed and operated for the Bundesgartenschau 1975 (Federal Garden Show 1975) in Mannheim, Germany. This was the first application of this new transportation system which is based on cableway technology. It provided dual direction, scheduled passenger service between two distant points of the Garden Show, from April 18, 1975 to October 19, 1975. The report provides factual engineering information concerning the technical subsystems. System operational performance, system assurance, human interface, and safety and security were assessed. An evaluation of the distribution of capital and operating and maintenance costs, unit costs of service, and equivalent costs is presented. System development and implementation history are also summarized. Information and data for this study were collected from site visits, visits to the developer/manufacturer, interviews with representatives of the operator and system developer and other literature.

Bamberg, W Elms, CP Hosenthien, HH Voss, W Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0189-79-2, Sept. 1979, 262 p.; Contract DOT-UT-80002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-130636

17 305892 ROOSEVELT ISLAND TRAMWAY SYSTEM ASSESSMENT [Final rept. Mar 77-Mar 78]. The Roosevelt Island Tramway serves as an urban transit system in New York City. The system is based on conventional cable technology and connects a new urban community on Roosevelt Island in the East River to Manhattan. This system is the first urban transit application based on aerial tramway (cableway) technology and has been in service since May 1976. The goals and objectives of this assessment were to provide information with regard to: (1) factual engineering and operating data concerning the technology which can be used in the planning and implementation of similar cable systems; (2) descriptive information on system performance, economics and ergonomics, which can be used in planning for the assessment of the feasibility of subsequent system installations; and (3) design, development, and implementation experience with cable technology, to determine what has been learned and how future urban installations can most effectively be carried out. The report findings are based on literature searches, Roosevelt Island Tramway documentation, analyses of system records and logs, and observations and interviews during site visits. The report provides factual engineering information concerning the technical subsystems. System operational performance, system assurance, human interface, safety and security were assessed; an evaluation of the distribution of capital and operating maintenance costs is presented; and system development and implementation history are summarized.

Bamberg, W Elms, CP Hosenthien, HH Voss, W Lea (N. D.) and Associates, Inc., Washington, DC. Urban Mass Transportation Administration, Washington, DC. Office of Technology Development, and Deployment., (NDL-19-2) UMTA-IT-06-0189-79-1, Aug. 1979, 210p; Con-

tract DOT-UMTA-UT-80002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-129224

17 305920 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. VOLUME 8: VLCR DATA BASE. This document provides a catalog of the data base material gathered and classified as part of the Vehicle Longitudinal Control and Reliability (VLCR) Project. The purpose of this effort is to assemble a comprehensive national data base which will help designers or developers, urban planners, program managers, and government officials evaluate and select automated guideway transit (AGT) systems. The VLCR data base incorporates the results of the VLCR Project, that is, final contractual deliverables, illustrated descriptions of domestic and foreign AGT systems, as well as reports describing the procedures and results of the VLCR experimental program. In addition, the data base encompasses a large number of other technical documents dealing with vehicle longitudinal control, command, control, and communication systems, propulsion, braking, reliability, and other related subjects. The basic organization of the VLCR data base catalog consists of two sections: (1) an annotated bibliography, and (2) a subject index. The annotated bibliography offers an alphabetical, sequentially numbered listing of all the documents contained in the data base. It gives complete bibliographical information of these documents so that they can be obtained with reasonable ease through any library service. The subject index is not a dictionary nor a thesaurus. It is an alphabetical compilation of the main concepts used in the base documents. It includes all the keywords listed in the annotated bibliography, as well as entries, subentries, and cross-references.

Gary, MJ ; Otis Elevator Company, Urban Mass Transportation Administration Final Rpt., 3 OTIS/TTD/VLCR-075, UMTA-IT-06-0148-79-1, Sept. 1979, 217 p.; See also Volume 5, PB-299 798.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-132541

17 307704 CAB SIZE AND OPERATION OF NEW PUBLIC TRANSPORT SYSTEMS [Kabinengroesse und Betriebsablauf Neuer Nahverkehrssysteme]. The thesis considers 58 methods of transport with a view to their possible application in passenger public transport systems. The objective of the study was to research the influence of cab size in a new type of passenger public transport system on the characteristics of its operation. It transpired that the possible introduction of the small cab which allows a completely individual method of operation on demand cannot be introduced because of economic considerations. Instead the group containing the large cabs took precedence. /TRRL/ [German]

Bahm, G ; Technical University of Karlsruhe, West Germany Monograph Feb. 1977, 138 p., 87 Fig., 5 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 307938), Federal Institute of Road Research, West Germany

17 307722 IMPORTANT INCREASES IN PUBLIC PASSENGER TRANSPORT THROUGH THE USE OF NOVEL PUBLIC TRANSPORT SYSTEMS? [Erhebliche Zunahmen im Öffentlichen Personennahverkehr Durch Einsatz Neuartiger Nahverkehrssysteme?]. In the future allowance must be made for an increasing individual use of vehicular transport, which must be contrasted with a declining or at best stagnant demand for conventional public transport systems in many areas. By the introduction of novel public transport systems it should be possible to increase the number of passengers using public transport and at the same time achieve a more efficient use of the road network. Despite the many difficulties in predicting the public acceptability of novel modes of transport, it should be possible through further development of existing modal-split models in conjunction with special enquiries to estimate the future demand for various modes of transport taking into account the effect of introducing new public transport systems. [German]

Schreiber, K (Ingenieurgruppe Fuer Verkehrswesen, West Germany) *Internationales Verkehrswesen* Vol. 29 No. 5, Sept. 1977, pp 326-329, 2 Fig., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 307717), Federal Institute of Road Research, West Germany

17 308148 INNOVATION IN PUBLIC TRANSPORTATION. This annual directory contains descriptions of current research, development and demonstration projects sponsored and funded by the U.S. Department of Transportation's Urban Mass Transportation Administration (UMTA) in the fiscal year 1978. The projects are grouped into four sections. Section one on technology development and deployment, lists projects on bus and paratransit vehicle and operational technology, rail and construction technology, new systems and automation, automated guideway transit applications, safety and product qualification and socio-economic research and special projects. Section two on service and methods demonstrations includes projects on transportation services for special user groups, fare and pricing policies, conventional transit service innovations, and paratransit. The section (3) on transportation planning and management focuses on projects relating to planning methods and support, special planning studies, and transportation management. The last section (4) is on policy development and research. This section includes policy and program development projects and university and training grant program projects. The funding for major program areas is tabulated, and funding and other important information about UMTA projects are summarized in charts. Dates are listed to indicate when the project was approved and the expected completion. Other federal agencies which support and complement UMTA are also listed. Information for potential contractors and grantees on participation in UMTA R&D programs, the submission of proposals, proposal evaluation and university research grants are covered in an appendix.

Urban Mass Transportation Administration UMTA-MA-06-0086-80-1, 1978, 221 p., Figs., Tabs., Photos., 2 App.; For Fiscal Year 1978.; SPONSORING AGENCY; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS

17 309353 NEW TYPES OF TRANSPORTATION [Neuartige Verkehrssysteme]. The Environmental Conference 78, was concerned with the form of novel public transport that would best combat the trend towards private transport. This transport system must provide such advantages as short journey time, widespread availability, comfort, competitive cost and minimum adverse environmental effects. In addition to cabin-type vehicles, the dual-mode system and the demand-controlled bus, the magnetic suspension system (as opposed to rail bound systems) and the linear motor are the major innovations; the advantages and disadvantages of these are discussed in the light of the requirements listed above. It is pointed out that on the one hand in view of the increasingly restricted state funds available for investment-it is hardly possible to envisage the widespread introduction of a new transport system, and on the other hand that the beneficial effects of the new systems on the environment remain in question; so that in parallel with the research into new transport systems there will be a considerable stimulus to the further development of conventional public transport systems. (TRRL) [German]

Meyer, W Wurm, A *Umwelt* Vol. 8 June 1978, pp 54-58, 2 Fig., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 308327), Federal Institute of Road Research, West Germany

17 309902 ECONOMICS OF ELECTRIC BUSWAYS. Busways have been proposed as alternatives to rail rapid transit in many cities. Diesel buses have always been assumed but electric vehicles, drawing power from wayside, live conductor rails are technically possible. Busways would be completely grade separated, eliminating any danger to pedestrian traffic in this arrangement. Using trolleybus cost data it is shown that electric busways could be competitive with diesel operated busways for peak hour volumes exceeding about 5,000 passengers per hour. It is argued that improving the comfort characteristics of buses for busway service, by eliminating steps and increasing vehicle width and seat pitch is an important first priority if the busway concept is to be successfully demonstrated in Australian cities (a). The number of the covering abstract of the conference is IRRD no. 239554.

Elliott, SJ (Western Australian Institute Of Technology) ; Institution of Engineers, Australia Preprint 1979, pp 82-86, 3 Fig., 3 Tab., 8 Ref.; National Conference Publication No. 79/2. Electric Energy Conference, Brisbane, 17-18 May 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239555), Australian Road Research Board; ORDER FROM: ESL

17 309915 DEVELOPMENTS FOR MEDIUM-CAPACITY URBAN PUBLIC TRANSPORT. This paper has been written so as to be of wide interest and to summarise current situations, and is therefore not highly technical, although the subject of the currently evolving systems towards which the discussions lead provides considerable scope for high technology. The paper starts by briefly setting out the assumptions as to the longer-term requirements, basically electric propulsion and automation. Rail rapid transit is discarded because it is a high-capacity system and personal rapid transit because it is too futuristic. This leaves, for serious discussion in the context of the title, various existing systems and their

development as a background to the principal subject of the review, i.e. automated guided transit. Sources of energy are referred to briefly and some tentative conclusions are drawn from informed sources as to the likely fields for battery-powered vehicles, synthetic-fuel internal-combustion engine, mechanical storage of energy and hybrid vehicles. If electric vehicles using a wired supply are assumed, it is now necessary to consider automation, and this is discussed briefly in relation to trolleybuses, trams, light-rail systems and fully automated systems such as l.g.t. and personal rapid transit. Various mechanical and electrical concepts available for l.g.t. systems are enumerated and tabulations made of more than 30 systems currently under development. This leads to a broad picture of the development status and of preferences for different concepts as regards such features as support systems, vehicle guidance, type of drive and control. The advantages and disadvantages of some of these variants are discussed, e.g. wheels/air-cushion/magnetic-levitation, different forms of vehicle switching and different methods of headway control. Electrical power systems are discussed, a.c. and d.c. and different types of motor and of power control. Mechanical features and train-control systems are discussed in general terms with reference to safety and system capacity. Capital cost of l.g.t. as compared with l.r.t. and r.r.t. from various sources are compared and discussed. The likely trends of development, as suggested by the considerations set down in the paper, are finally summarised.(a)

Calverley, HB *IEE Reviews* Vol. 126 No. 11R, Nov. 1979, p 1097, 7 Fig., 13 Tab., 14 Phot., 54 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244381); ORDER FROM: ESL

17 309922 MINITRAM-THE TRRL PROGRAMME. The laboratory's work on the automatic tracked vehicle system called minitram is described, and the future programme of studies with industry is outlined. A discussion of the environmental aspects concentrates on the visual effects of a new system in a town.(a) for abstracts listing papers in volumes 1 and 2, see IRRD abstracts nos 243565-6.

Waters, MHL (Transport and Road Research Laboratory) ; Loughborough University of Technology, England Volume 1, No Date, 9 p., 2 Tab., 8 Ref.; Symposium on the Environment and Transport Technology, 10th to 13th September 1973, Volume 1.; ACKNOWLEDGMENT: TRRL (IRRD 243567); ORDER FROM: Loughborough University of Technology, England, Department of Transport Technology, Loughborough LE11-3TU, Leicestershire, England

17 309973 ELECTROMAGNETIC WHEELS. The evolution of several kinds of magnetic suspension is proceeding with no indication that the ideal compromise to satisfy the many conflicting requirements has been reached. Some basic control problems are discussed, and the case for its use in urban and intercity transport systems is presented.

Sinha, PK Jayawant, BV *Electronics and Power* Vol. 25 No. 10, Oct. 1979, pp 723-727, 9 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

17 310762 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME I: PROCEEDINGS OF GENERAL SESSIONS AND SUMMARIZED REPORTS OF WORKSHOPS. This is a compilation of material that was presented at the Third Urban Mass Transportation Administration Research and Development Priorities Conference. It contains proceedings of the General Sessions and Summarized reports of the eight workshop sessions as well as a listing of conference participants. Detailed proceedings of the workshop sessions may be found in Volumes II through IX (Reports No. UMTA-DC-06-0157-79-2 through UMTA-DC-06-0157-79-9), which consist of eight separately titled volumes, namely: Volume II, Bus and Paratransit Technology Workshops; Volume III, AFT and Advanced Systems Workshops; Volume IV, Service and Methods Demonstrations Workshops; Volume V, UMTA Special Technology Programs Workshop; Volume VI, Rail and Construction Technology Workshops; Volume VII, Transit Management Workshops; Volume VIII, Access for Elderly and Handicapped Persons Workshops; and Volume XIX, Urban Transportation Planning Workshop. All volumes are available through the National Technical Information Service and a listing of them with their Government accession numbers and costs is included as Appendix B to this volume. (UMTA)

American Public Transit Association, (DC-06-0157) Proceeding UMTA-DC-06-0157-79-1, Nov. 1978, 72 p., 2 App.; Sequel to Reports No. UMTA-DC-06-0136-7601 (PB-255898) and UMTA-DC-06-1057-77-1 (PB0255158) Proceedings of the UMTA R&D Priorities Conference (February 1976) and Proceedings of the Second R&D Priorities Conference (November 1976).; SPONSORING AGENCY: Contract DOT-UT-70026; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB80-161532

17 311442 THE "TRANS UNION S 21" ELEVATED MONORAIL [El mono-rail elevado apoyado "Trans Union S 21"]. On an experimental circuit, an elevated monorail is being constructed for urban transport, with self-driven vehicles and pneumatic tyres both for traction and for control, on a rolling track of prestressed concrete, consisting of a single beam-rail in the form of an inverted "U". Amongst the advantages of this system are: (1) sufficient width of route to guarantee stability; (2) lowering of centres of gravity and of lateral wind force to approximately the plane of guidance or control, so that the capsizing moments produced by the horizontal forces are reduced to a minimum; (3) minimum height of the vehicle-beam system, at least of the surface presented to lateral wind force and forces on the supporting columns; (4) for the special case of rapid acceleration and jumping of ramps, the unit possesses a force of adherence which is independent of its own weight, with lateral traction; (5) its construction and maintenance are economical; (6) it has a large transport capacity; (7) speed of construction; (8) adaptability to very diverse conditions and minimum requirement of plan area; (9) total safety, the train is incapable of being de-railed. (TRRL) [Spanish]

Cambroner, C *AIT-Revista* No. 20, Feb. 1978, pp 45-48, 2 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 108338), Ministry of Public Works, Spain;

ORDER FROM: Asociacion de Investigacion del Transporte, Alberto Alcocer 38, Madrid, Spain

17 312089 URBAN SERVICE AND ENVIRONMENTAL STRESSOR: THE IMPACT OF THE BAY AREA RAPID TRANSIT SYSTEM (BART) ON RESIDENTIAL MOBILITY. We examine the impact of a relatively new mass transit line on residential mobility, utilizing a survey of respondents living adjacent to the Bay Area Rapid Transit (BART). The hypothesis is that as perceived costs (e.g. Noise) of the system increase, preferences for outward mobility will increase, while as local benefits increase (e.g. Accessibility to the system), preferences for inward mobility will increase. Preferences for outward mobility per se were unrelated to BART's local attributes. However, BART-related reasons for moving varied as predicted. Residents near aerial trackways, which maximize local environmental costs, had greater preferences for outward mobility. Residents near stations, which maximize the service's local benefits, had the highest reports of inward mobility. We examine the mediating effects of local environmental and social circumstances and discuss the implications of this particular study for other metropolitan regions.(a)

Baldassare, M Knight, R Swan, S *Environment and Behaviour* Vol. 11 No. 4, Dec. 1979, pp 435-450, 2 Tab., 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246149); ORDER FROM: Sage Publications Limited, 28 Banner Street, London, England

17 312615 SENSITIVITY ADAPTIVE CONTROL OF A MAGNETIC SUSPENSION SYSTEM. This project is concerned with the study of the behavior of a particular stochastic system, the magnetic suspension system, under the application of the Sensitivity Adaptive Feedback with Estimation Redistribution (SAFER) Control Algorithm. Matrix factorization techniques are used in the controller and estimator design for the system. Simulation results indicate that the magnetic suspension system can operate satisfactorily under the SAFER control method; and factorization techniques indeed enhance the numerical stability of computations. However, due to the complex structure of the SAFER control method, real time application of the algorithm may require faster computing device or simplified mathematical model. Its application will be most pertinent to systems with slow time constants. (Author)

Chan, YM ; Illinois University, Urbana MS Thesis DC-25, May 1979, 97 p.; Sponsored in part by Grants AFOSR-78-3633 and NSF-INT77-20969. Also available as rept. no. R-843.; Contract DAAG29-78-C-0016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; ADA077148/5

17 313120 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. A REVIEW OF AGT (AUTOMATED GUIDEWAY TRANSIT) COMMUNICATION SYSTEM TECHNOLOGY. PART B. This report assesses the current state-of-the-art. The review concentrates on the communication links used within the longitudinal control loop. It discusses the criteria for establishing data rate, and the major aspects of a communication system starting with the

transmission media modulation techniques, followed by noise and error considerations. The review is concluded with a brief summary of data communication in existing AGT systems.

Schumacher, P ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0148) Final Rpt. OTIS-TTD-VLCR-065, UMTA-IT-06-0148-79-3, July 1979, 28 p.; See also Part A, PB80-114036.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-138142

17 313148 OPERATION OF AUTOMATED GUIDEWAY TRANSIT VEHICLES IN DYNAMICALLY RECONFIGURED TRAINS AND PLATOONS. VOLUME I. PART I. APPLICATIONS ANALYSIS. PART II. VEHICLE DYNAMICS. This study shows that the passenger capacity of AGT systems may be significantly increased by operating vehicles in dynamically reconfigured trains or platoons. It is estimated that a minimum lane capacity of 5,000 to 10,000 passengers per hour is needed to make single-party AGT economically competitive with buses and that this capacity requires the use of trains. Trains also offer several non-capacity-related operational advantages. In this report, the longitudinal control systems needed to effect dynamic entrainment with platoon operations at spacings of 30-60 cm are developed with particular attention to stability, jerk limiting requirements, safety and passenger comfort. The capacity advantage of entraining is demonstrated for a single guideway link and for merge junctions, using Monte Carlo simulation. Variable-slot-length point-follower control is shown to reduce merge delays and maneuver ramp lengths compared with fixed-slot-length methods. The "zero gap" merge scheme developed here produces dramatic improvements compared with conventional merge strategies. The study suggests that the concepts of dynamic entrainment and platooning deserve more detailed study and testing because of the significant advantages they offer.

Shladover, SE ; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-MA-06-0085) Final Rpt. UMTA-MA-06-0085-79-2, July 1979, 534 p.; See also report dated Apr 79, PB-300 513.; Contract DOT-UT-80013; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-142862

17 313205 SUMMARY OF CAPITAL AND OPERATIONS AND MAINTENANCE COST EXPERIENCE OF AUTOMATED GUIDEWAY TRANSIT SYSTEMS COSTS AND TRENDS FOR THE PERIOD 1976-1978. SUPPLEMENT I. This costs supplement is presented in the form of a series of tables and figures which summarize the data obtained as well as the results of analysis. Comments and explanatory notes relative to tables/figures are made where appropriate. Also included herein is information on operating and maintenance and capital costs for bus and rail transit; it indicates how AGT cost experience compares with the conventional modes. This report summarizes operations and maintenance cost experience for the following Automated Guideway Transit systems for the period 1976-1978: Airtrans, Dallas/Fort Worth Airport, Texas; Morgantown People Mover, Morgantown, West Virginia; Satellite Transit System, Seattle-Tacoma International

Airport, Washington; Passenger Shuttle System, Tampa International Airport, Florida; and WEDway People Mover System, Disney World, Florida. Capital cost data on these and the following additional systems are also reviewed: People Mover, Atlanta-Hartsfield International Airport, Georgia; Busch Gardens People Mover, Williamsburg, Virginia; Satellite Transit Shuttle, Miami International Airport, Florida; AGT System, Fairlane Town Center, Dearborn, Michigan; and UMI Tourister AGT System, King's Dominion, Ashland, Virginia.

Cooke, F Elms, CP Muoth, DU Theumer, HA Dooley, TM; Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration, Transportation Systems Center DOT-TSC-UMTA-79/38, Oct. 1979, 60 p.; See also report dated Jun 78, PB-294 306.; Contract DOT-UT-70090; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-146483, DOTL NTIS

17 313414 HIGH SPEED GUIDED GROUND TRANSPORT OF PASSENGERS. The subject of the study was a comparison between the use of magnetic and other suspension systems, in particular wheel-on-rail, for the transport of passengers at speed higher than those currently used. The objectives of the study were firstly to investigate the technical problems associated with each technology, secondly to assess any differences in environmental impact and thirdly to make an economic comparison between the systems. (Copyright (c) Crown Copyright 1979.)

Linder, D; Transport and Road Research Lab., Crowthorne, (England). 50 TRRL-SUPPLEMENTARY-4, c1979., 45p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-127814

17 313897 IMPACT OF ADVANCED GROUP RAPID TRANSIT TECHNOLOGY. This assessment of advanced group rapid transit (AGRT) was made in response to a request of the House Committee on Appropriations to evaluate the need for this technology and its relationship to national mass transportation goals. Increases in traffic congestion, petroleum shortages, and decreasing mobility for the transit-dependent reflect a growing need for more efficient and effective transportation options. This report examines the need for further advances in automated guideway transit (AGT) technology and evaluates their potential impacts on various stakeholder groups.

Office of Technology Assessment OTA-T-106, Jan. 1980, 68 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-153323

17 313962 PASSENGER SAFETY AND CONVENIENCE SERVICES IN AUTOMATED GUIDEWAY TRANSIT. VOLUME I DATA COLLECTION, SCENARIOS, AND EVALUATION. The major objective was to produce a guidebook detailing the most effective methods and procedures for the accommodation of Systems Safety and Passenger Security. The primary intent of this document is to provide guidance associated with abnormal occurrences that have an impact on routine passenger services or safety. The report discusses literature and personal interview findings documenting methods and procedures for detecting and resolving Passenger Safety and Convenience Service (PS&CS) problems in current transit operations; scenarios depicting

potential PS&CS problems applicable to the AGT systems; selection of methods and procedures from current practices for detecting and resolving PS&CS problems in AGT; analysis and evaluation of the effectiveness of selected candidate methods and procedures; and recommended methods and procedures for accommodating PS&CS problems in AGT.

Dauber, RL; Vought Corporation, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-48-I, Dec. 1979, 83 p.; See also Volume 2, PB80-167067.; Contract DOT-TSC-1314-1; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-167059, DOTL NTIS

17 313963 PASSENGER SAFETY AND CONVENIENCE SERVICES IN AUTOMATED GUIDEWAY TRANSIT. VOLUME II. GUIDEBOOK. Current practices have been reviewed, analyzed, and evaluated for their effectiveness in accommodating Passenger Safety and Convenience Services (PS&CS) problems in AGT. These practices for providing PS&CS in both conventional and AGT have been assessed as applicable to highly automated transit systems. These guidelines have been developed suggesting methods and procedures to provide these services for AGT systems. The final objective of this guidebook is to provide the most effective methods and procedures for ensuring passenger safety and convenience services in AGT systems. Its contents provide guidance for AGT system planners, designers, operators, and evaluators in identifying potential problems and assessing proposed methods and procedures.

Dauber, RL; Vought Corporation, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-7948-II, Dec. 1979, 133 p.; See also Volume 1, PB80-167059.; Contract DOT-TSC-1314-2; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-167067, DOTL NTIS

17 314006 AGT AESTHETICS: A HANDBOOK FOR PLANNING AND DESIGN OF AUTOMATED GUIDEWAY TRANSIT (AGT) SYSTEMS. The Handbook presents (1) a broad range of aesthetic problems and opportunities which the designer or local official is likely to encounter in planning for an AGT system and identifies planning and design responses to these problems and opportunities; (2) describes planning and design tools and resources available to the users of this book; (3) contains descriptions of the various techniques that can be used to analyze the aesthetic effects of AGT systems; (4) describes techniques for organizing and presenting these data to community residents, business people, and local officials; and (5) references other reports that may assist the user in identifying and responding to aesthetic concerns.

Skidmore, Owings, and Merrill, Urban Mass Transportation Administration, (UMTA-IT-06-0165) UMTA-IT-06-0165-79-2, Feb. 1980, 114 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA.; Contract DOT-UT-70008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-173594

17 314010 AIRTRANS URBAN TECHNOLOGY PROGRAM-PHASE II. VOLUME 1: CONTROL SYSTEM IMPROVEMENTS. AIRTRANS, an Automated Guideway Transit

(AGT) system built by the Vought Corporation, has provided transit service for passengers at the Dallas/Fort Worth Airport since January 1974. This successful deployment of AGT technology prompted the investigation of the extension of the technology. Independent assessments were made by the Transportation Systems Center and by Vought to determine what changes or improvements would be required to operate AIRTRANS in an urban application. The recommendations were: higher operating speeds; better passenger acceptance; reduced capital and operating costs; increased reliability; enhanced all-weather capability; and increased energy efficiency. The AUTP was structured into a two-phase program. Phase I was completed in 1977. The first phase covered the development and demonstration of the improvements necessary for higher speed operation, while maintaining or improving reliability, availability, cost, and performance characteristics of the overall system. Using Phase I as a building block, other recommendations for improvements in AIRTRANS for urban applications were addressed in Phase II. This volume describes the control system improvements incorporated in the P40 vehicle and the AIRTRANS supervisory data system software additions for dual block occupancy alarm features and P40 passenger vehicle identity. Under the control system improvements, the objectives have been to continue development of the longitudinal velocity control systems as embodied in a new third generation Vehicle Control and Electronics Unit; implement improved functional design features in the areas of data communications, directional reversability, dual side doors, automatic test and checkout capability, built-in manual control, slip/slide detection, supervisory data system software and improved entrainment capability. Significant progress in the AIRTRANS control system's area has been demonstrated in simulation, laboratory tests, and guideway evaluation.

Beberstein, JN Robison, JE Scott, WA Sellers, DF; Vought Corporation, Transportation Systems Center, (UMTA-TX-06-0020) Final Rpt. UMTA-TX-06-0020-79-2, Oct. 1979, 63 p.; See also Volume 2, PB80-175201.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-175193

17 314011 AIRTRANS URBAN TECHNOLOGY PROGRAM-PHASE II. VOLUME 2: IMPROVED PASSENGER COMMUNICATIONS. AIRTRANS, an Automated Guideway Transit (AGT) system built by the Vought Corporation, has provided transit service for passengers at the Dallas/Fort Worth Airport since January 1974. This successful deployment of AGT technology prompted the investigation of the extension of the technology. Independent assessments were made by the Transportation Systems Center and by Vought to determine what changes or improvements would be required to operate AIRTRANS in an urban application. The recommendations were: higher operating speeds; better passenger acceptance; reduced capital and operating costs; increased reliability; enhanced all-weather capability; and increased energy efficiency. The AUTP was structured into a two-phase program. Phase I was completed in 1977. The first phase covered the development and demonstration of the improvements necessary for higher speed operation, while maintaining or improving reliability, cost, and

performance characteristics of the overall system. Using Phase I as a building block, other recommendations for improvements in AIRTRANS for urban applications were addressed in Phase II. This report, Volume 2, covers the Improved Passenger Communications Task activities of the Vought Corporation, during Phase II of the AIRTRANS AUTP. The primary objectives of the program were to design, build, and demonstrate: (1) an onboard television surveillance system; (2) a programmable audio-announcement unit; (3) a dynamic graphic system; and (4) a time-to-arrival display unit for passenger stations. All of these systems were built and successfully demonstrated as part of the operation of a prototype urban AGT vehicle in the Dallas/Fort Worth AIRTRANS system.

Jacobsen, RS Schultz, CM ; Vought Corporation, Urban Mass Transportation Administration, (UMTA-TX-06-0020) Final Rpt. UMTA-TX-06-0020-79-3, Oct. 1979, 54 p.; See also Volume 1, PB80-175193, and Volume 5, PB80-157704.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-175201

17 314016 NONCONTACTING SUSPENSION AND PROPULSION FOR GROUND TRANSPORTATION. A research program has been conducted: (1) to assess critically the technological base available for evaluation of noncontacting vehicle suspension and propulsion systems in urban and intercity transport systems and (2) to develop analytical and experimental performance data for two specific systems-attractive, ferromagnetic suspension systems and air cushion suspension systems.

Wormley, DN Richardson, HH Hedrick, JK Lambert, DA Mercaldi, D ; Massachusetts Institute of Technology, Department of Transportation Final Rpt. DOT/RSPA/DPB/50-7934, Dec. 1979, 461 p.; Contract DOT-OS-60135; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-176274

17 314051 ASSESSMENT OF THE PHASE I MORGANTOWN PEOPLE MOVER SYSTEM. This assessment describes the installation and operation of Phase I of the Morgantown People Mover System at West Virginia University in Morgantown, West Virginia. A detailed description of the technical subsystems is included as well as a review of performance, reliability, maintainability, and cost. A system implementation history is also provided. Where important, the review of technical subsystems includes applicability, modifications, and/or improvements for application in an urban environment. Information and data presented were collected through surveys of the literature, site visits, a visit to the manufacturer, interviews with site and manufacturer's personnel, site measurements, reviews of operating and maintenance logs, and compilations generated by the manufacturer, the operator, and the U.S. Department of Transportation. A draft of this report has been reviewed by the operator, the manufacturer, and UMTA. Their comments have been incorporated where it has been possible to do so without compromising the objectivity of the assessment.

Elms, CP Meritt, H McGean, T Cooke, F Bamberg, W ; Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0157) Final Rpt. UMTA-IT-06-0157-79-1, Dec. 1979, 273 p.; Prepared in cooperation with SNV Studiengesellschaft

Nahverkehr mbH, Hamburg (Germany, F.R.); Contract DOT-UT-70023; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-177926

17 314060 AIRTRANS URBAN TECHNOLOGY PROGRAM: EXECUTIVE SUMMARY. The AIRTRANS system at the Dallas/Fort Worth Airport, Texas, is representative of automated guideway transit (AGT) as it will likely develop in cities in the United States and around the world. AIRTRANS is composed of 13 single-lane miles of concrete guideway connecting 53 stations in 6 major terminal and parking areas of the airport. There is a fleet of 68 fully automatic electrically propelled vehicles, 59 of which currently operate over this guideway network. As of December 1979, the system had completed more than 19 million vehicle miles and carried 29 million passengers. The system is operating with a high percentage of availability and degree of passenger acceptance. This report summarizes the AIRTRANS Urban Technology Program (AUTP) performed under a federal grant from UMTA to the Dallas/Fort Worth Airport Board. Improvements to the AIRTRANS AGT technology in speed, passenger acceptance, cost, reliability, and all-weather capability for urban applications have been made and evaluated during the program.

Albach, WC ; Vought Corporation, Urban Mass Transportation Administration, Dallas/Fort Worth Regional Airport Board, (UMTA-TX-06-0020) Final Rpt. UMTA-TX-06-0020-79-8, Feb. 1980, 32 p.; See also report dated Oct. 79, PB80-179062. Sponsored in part by Dallas/Fort Worth Regional Airport Board, TX.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-179070

17 314071 CONTROL LAW IMPLEMENTATION FOR SHORT HEADWAY VEHICLE-FOLLOWER AUTOMATED GUIDEWAY TRANSIT (AGT) SYSTEMS. Automated guideway transit (AGT) systems are a new class of urban transport in which automatically controlled vehicles operate on dedicated guideway networks. This report examines the implementation of a vehicle-follower control law for short headway AGT systems in terms of required sensor accuracy, controller structure, and data transmission requirements. In this report controller configurations are recommended for headways of 0.5 and 3.0 s that require an 8 bit uplink word at intervals of 0.1 and 0.5 s, respectively. Accomplishments, recommendations, and areas for further study are also presented.

Pue, AJ ; Johns Hopkins University, Laurel, Urban Mass Transportation Administration, (UMTA-MD-06-0038) Final Rpt. UMTA-MD-06-0038-79-2, Oct. 1979, 181 p.; Contract DOT-UT-80009; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181019

17 314366 ACCELERATING WALKWAY SYSTEM ANALYSIS AT WASHINGTON NATIONAL AIRPORT. An accelerating walkway system (AWS) is a high capacity, continuously available mode of public transportation that has the potential of filling the service gap between walking or conventional moving walkways and conventional vehicular transit systems. This study examines the site and passenger

demand characteristics at the Washington National Airport and analyzes the physical, service, and economic feasibility of using an AWS to provide a pedestrian connection service between the Metro Rapid Rail Station and the air terminal. An economic feasibility of the AWS was performed that included investigation of the capital cost, operating and maintenance cost, and life cycle cost of five different AWS manufacturers (Dunlop, APL, Dean Research, TRAX, and Boeing). This report contains numerous charts illustrating the airport facilities, passenger demand, and the various costs associated with the AWS.

Chung, CC ; Mitre Corporation, Urban Mass Transportation Administration UMTA-VA-06-0041-79-3, June 1979, 79p; See also PB-290 682.; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-183841

17 314455 SIMULATION MODELS FOR THE ELECTRIC POWER REQUIREMENTS IN AN AUTOMATED GUIDEWAY TRANSIT SYSTEM. This report describes a computer simulation model developed at the Transportation Systems Center to study the electrical power distribution characteristics of Automated Guideway Transit (AGT) systems. The objective of this simulation effort is to provide a means for determining the power distribution requirements of AGT systems and for evaluating their performances under varied operating conditions. Typical systems which could be modeled include the Morgantown Personal Rapid Transit System, the Dallas-Fort Worth Airtrans System, or one of the proposed Downtown People Movers. This report specifically describes a Fortran computer program which models the electric power requirements of a typical AGT system.

Williams, GH ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-80-2, UMTA-MA-06-0048-80-2, Apr. 1980, 137p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-193386

17 315021 OPERATIONAL SAFETY OF CABIN SYSTEMS. SEMINAR ON TRAFFIC, TECHNICAL AND LEGAL ASPECTS [Betriebssicherheit von Kabinenbahnen. Seminar Behandelte Verkehrliche, Technische und Juristische Aspekte]. The seminar on "cabin vehicles in German towns-aspects of practical use" took place at the end of January 1979 in Hamburg. The focal points were adaptation to the urban structure, legal principles, and technical and operational concepts. Trials undertaken so far have proved their greater attractiveness and environmental quality compared with conventional systems. Three different systems (cabin track, elevated railway and magnetically suspended railway) are presented, and details given of their step by step development and their particular features, particularly those which determined their practical application. [German]

Muckelberg, E TUE Vol. 20 No. 4, Apr. 1979, pp 158-161, 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 311268), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

17 315082 INNOVATION AND PUBLIC POLICY; THE CASE OF PERSONAL RAPID TRANSIT. Technological advancement has always moved rather unevenly in combination with the political environment and innovation is particularly susceptible to policy direction. This discussion of the course of PRT development and its role in the public transportation issue provide a carefully plotted illustration of the interaction of sciences and government.

Burke, CG ; Pergamon Press, Incorporated, (0 669 03167 4) 1980, 416p, Figs., Tabs.; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

17 315330 PASSENGER TRANSPORTATION IN THE YEAR 2000. Cost-and energy-efficiency will be an increasingly important factor in passenger transportation during the next few years. For example, the Amtrak intercity rail passenger system has proved to be inefficient compared to bus service over all and should be pruned and limited to those densely populated regions, such as the Northeastern corridor where it would be most cost effective. In the meantime, bus travel will be at a disadvantage due to the subsidy of rail transportation and will continue to lose ridership. This could be offset however, by increased fuel costs making private automobile travel less desirable. Due to decreased rates of economic growth, the emphasis of economic efficiency also obtains in the airline industry (Aviation users have demonstrated that low fares are more important to them than technological virtuosity). The latest models of aircraft tend to concentrate on more economical operation, improved energy efficiency, and reduced noise levels. As in the case with intercity travel, it is the author's opinion that local public transit planners should de-emphasize capital-intensive rail systems in favor of bus systems, particularly in low density suburbs which would also be more amenable to demand-responsive rather than fixed-route system.

Mulvey, FP (Northeastern University) *Transportation Research Board Special Report No. 189*, 1980, pp 67-76, 1 Tab., 22 Ref.; This paper appeared in Transportation Research Board Special Report No. 189: State Transportation Issues and Actions.; ORDER FROM: TRB Publications Off

17 316255 MODEL FOR THE TEST & EVALUATION OF ADVANCED GROUP RAPID TRANSIT (AGRT) SYSTEMS. The design and evaluation of the Central Management System (CMS) for an Advanced Group Rapid Transit (AGRT) system is a very complex undertaking. The CMS is responsible for the routing and scheduling of hundreds of vehicles and for the making of thousands of passenger-vehicle assignments per hour in order to transport passengers between the various guideway stations in the network. This volume of decision making, coupled with the level of detail and complexity commonly found in CMS algorithms, forces the system designer/evaluator to employ computational tools to assist him in his work. A description is given of such an analysis tool. The simulator actually encompasses two different systems. One system models the actual decision logic of the CMS algorithms. Thus, vehicle locations and waiting passengers are tracked at all

times, and the appropriate vehicle routings and passenger-vehicle assignments are made. The simulator is designed to accommodate a very broad range of network configurations, traffic loads, vehicle populations, and operating policies via parametric adjustments, so that this tool can be used by a broad community of investigators.

Nielsen, NR Siddigee, W Sanfilippo, MS Wong, PJ ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1437-3 SMC, 1979, pp 377-389, 5 Ref.; Winter Simulation Conference, San Diego, California, December 3-5, 1979; Volume 2.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 316256 ADVANCED GROUP RAPID TRANSIT (AGRT) OPERATIONAL SIMULATION. This study reviews an example of the use of simulation models to analytically implement command and control systems in fully automated surface transportation systems. An attempt is made to stress the importance of auxiliary simplified models as an aid in developing more complex simulations.

White, WW (Boeing Computer Services Company) ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1437-3 SMC, 1979, pp 621-626, 2 Ref.; Winter Simulation Conference, San Diego, California, December 3-5, 1979; Volume 2.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

17 316589 PEOPLE MOVERS AND THE MARCH OF THE MICROCHIP. Details are given of the new vehicle automatic train control (VATC) system from Westinghouse. It is a microprocessor-based vehicle control system which is compatible with both steel wheel and rubber-tired people mover systems. The system is currently being manufactured for the Sao Paulo metro subway and for systems at the new Atlanta and Orlando airports in the USA. By 1982, a pair of rubber-tired cars holding about 30 people will be shuttling to and fro on a 300 M track between the main building at Gatwick and a satellite terminal on the northern Apron. A dual microprocessor control system approach has been followed in the design of the vehicle ATP (automatic train protection) system. The redundant control channels in this design have been implemented using 2 microprocessors in a checked redundant fashion to achieve safety. Train detection is accomplished by utilisation of two of the rails in the power collection system. This system is described with reference to the speed code generation system (a six bit, comma-free code). Other features described are: the overspeed detector circuit, the vehicle ATO system (automatic train operation) and the automatic line supervision.

Mandel, A McDonald, M (Westinghouse Electric Corporation) *Control and Instrumentation Vol. 12 No. 3, Mar. 1980*, pp 45-49, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 246959); ORDER FROM: Morgan-Grampian Limited, 30 Calderwood Street, London SE18 6QH, England

17 316825 THE FUTURE OF TELECOMMUNICATIONS IN TOWNS AND RURAL AREAS [Toekomstige telecommunicatie in stad of streek; additioneel van verkeers vervoersvervangend]. Developments in communication and transport techniques that will improve the quality

of life in towns are discussed. The techniques discussed are: magnetically levitated trains, underground train systems, free lane public transport, suspended railways and computer guided traffic systems in urban and regional traffic. The use of micro-processors in offices, households and traffic regulation is also discussed and also the social consequences of their use. (TRRL) [Dutch]

Henny, B (Siemens Nederland Nv) *Tijdschrift voor vervoerwetenschap Vol. 14 No. 4, 1978*, pp 350-356; ACKNOWLEDGMENT: TRRL (IRRD 2446618), Institute for Road Safety Research

17 317425 RAPID TRANSIT VIA THE SUN. This paper deals with the theory of a national transit system utilizing electrically powered vehicles and computerized roadbeds which are powered by solar energy. Of the several concepts under investigation at this time for harnessing the sun's energy, the tower concept, Solchem, and solar satellite are most applicable for providing energy for a national transit system.

McConville, J (Bankard Association) ; Delaware University, Newark No. 2.1, 1978, pp 971-973, 3 Ref.; Proceedings of the Annual Meeting of the American Section of the International Solar Energy Society, Incorporated: Solar Diversification, Denver, Colorado, August 28-31, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: Delaware University, Newark, American Sect of the International Solar Energy Soc, Inc, Newark, Delaware, 19711

17 317961 FEASIBILITY OF THE BRANIFF JETRAIL OPERATION IN WACO, TEXAS [Final rept]. The study shows preliminary feasibility and should encourage both the City of Waco and private enterprise to proceed with development. The analysis of the feasibility of operating the Braniff Jetrail in Waco in one context or another consists of two separate investigations. Economics Research Associates initiated an investigation for the City of Waco concerned with operating and fiscal details involved with purchasing the Braniff Jetrail equipment. Several concerns were manifest in the city's interest in unique transportation in the central business district area of Waco.

Prehm, WL ; Waco, TX.*Economic Development Administration, Washington, DC. Publications Div. EDA-80-041, Jan. 1980, 34p; Prepared by Economics Research Associates, Dallas, TX.; Grant EDA-08-06-02086; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-159700

17 318086 GUIDEWAY TRANSPORTATION. 1964-APRIL, 1980 (CITATIONS FROM THE NTIS DATA BASE). The bibliography cites research on automated guideway transportation (AGT), in which passengers can be transported along tubes or rails under automatic control. The carriers, termed personal rapid transit vehicles or people movers, can accommodate individuals or small or larger groups. The reports cover many aspects of technology, such as demand actuated service, networks, elevated structures, monorail, light rail, computer aided control, vehicle merging, headway safety, shuttle loops, guideway designs, magnetic levitation, suspended vehicles, and dual mode. Discussions are made of steering control, ride quality, airport services to move people or baggage, gravity assistance in accelerating and braking, test vehicles, and maintenance.

Other topics are cost comparisons of AGT with conventional transit, fares, and equipment failure. Air cushion vehicles are excluded. (This updated bibliography contains 234 abstracts, 49 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Apr. 1980, 241 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-808124

17 318098 TRACKED AIR CUSHION VEHICLE AND MAGNETIC LEVITATION, 1964-MARCH, 1980 (CITATIONS FROM THE NTIS DATA BASE). The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these Government-sponsored research reports. (This updated bibliography contains 141 abstracts, 6 of which are new entries to the previous edition.)

Habercom, GE, Jr ; National Technical Information Service Apr. 1980, 147 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-809833

17 318099 TRACKED AIR CUSHION VEHICLES AND MAGNETIC LEVITATION, 1976-MARCH, 1980 (CITATIONS FROM THE ENGINEERING INDEX DATA BASE). The feasibility, design, and track dynamics of tracked air cushioned and magnetically levitated vehicles are investigated in these abstracts of reports gathered in a worldwide literature survey. (This updated bibliography contains 110 abstracts, 29 of which are new entries to the previous edition.)

Habercom, GE, Jr ; National Technical Information Service Apr. 1980, 116 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-809841

17 318170 PREDICTING AUTOMATED GUIDEWAY TRANSIT SYSTEM STATION SECURITY REQUIREMENTS. This study addresses the issues of personal security on Automated Guideway Transit (AGT) Systems, as they might be deployed in typical urban residential and non-residential settings. Based upon a literature review, it outlines basic characteristics of existing transit crime; compares station design concepts for AGT and conventional rail transit; reviews the key environmental characteristics of AGT stations which may influence crime potential; inventories both existing and proposed countermeasures for transit crime reduction; identifies additional neighborhood resources which might be mobilized as countermeasures; reviews available techniques for predicting transit crime; and reviews techniques available for both predicting transit crime and assessing countermeasure effectiveness and offers recommendations for analysis strategies to be employed in local AGT studies. Traditional as well as innovative analysis techniques are covered. This report recommends a general approach for AGT station security requirements analysis which can be used by localities in site-specific AGT planning and engineering studies. This report provides a list of references as well as an annotated bibliography.

Ray, C Stuart, D Thomson, D Rouse, V Botts, J Rouse (WV) Associates Limited, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-80-5, Mar. 1980, 148p; Contract DOT-TSC-1454; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-194244

17 318179 EVACUATION AND RESCUE IN AUTOMATED GUIDEWAY TRANSIT. VOLUME I: DATA COLLECTION, SCENARIOS, AND EVALUATION. The objective of one segment of this program, the Systems Safety and Passenger Security (SS&PS) Study, is the development of guidelines for the assurance of actual and perceived passenger safety and security in AGT systems. The evacuation and rescue task of the project has as its objective the production of a guidebook detailing the most effective methods and procedures for providing evacuation and rescue in AGT systems. In conventional transportation systems, transportation personnel can help to evacuate and rescue passengers. AGT systems, however, because of their unmanned nature and unique configurations, present a number of problems related to evacuation and rescue. Operation of AGT systems with elevated guideways also present significant problems. Serious injuries and loss of life can result from situations in which inadequate means of evacuating and rescuing passengers exist. The purpose of this portion of the SS&PS program was to identify these problems and where possible, recommend solutions. This document is Volume I of the final report on evacuation and rescue in AGT, and describes the methodology used in developing evacuation and rescue guidelines.

Benjamin, DE ; Vought Corporation, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-79-47-I, Dec. 1979, 84p; See also Volume 2, PB80-195779; Contract DOT-TSC-1314; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-195761

17 318180 EVACUATION AND RESCUE IN AUTOMATED GUIDEWAY TRANSIT. VOLUME II: GUIDEBOOK. The objective of one segment of the AGTT program, the Systems Safety and Passenger Security (SS&PS) Study, is the development of guidelines for the assurance of actual and perceived passenger safety and security in AGT systems. The evacuation and rescue task of the project has as its objective the production of a guidebook detailing the most effective methods and procedures for providing evacuation and rescue in AGT systems. In conventional transportation systems, transportation personnel can help to evacuate and rescue passengers. AGT systems, however, because of their unmanned nature and unique configurations, present a number of problems related to evacuation and rescue. Operation of AGT systems with elevated guideways also present significant problems. Serious injuries and loss of life can result from situations in which inadequate means of evacuating and rescuing passengers exist. The purpose of this portion of the SS&PS program was to identify these problems and where possible, recommend solutions. This Guidebook is Volume II of the final report on evacuation and rescue in AGT and provides guidelines and other information relative to evacuation and rescue of passengers from AGT systems. The report addresses a description of the problems and solutions as they exist on conventional and AGT systems, a discussion of the types of planning that are required to produce satisfactory evacuation and rescue solutions, and recommendations of suitable methods and procedures for AGT evacuation and rescue.

Benjamin, DE ; Vought Corporation, Transportation Systems Center, Urban Mass Transporta-

tion Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-79-47II, Dec. 1979, 97p; See also Volume 1, PB80-195761; Contract DOT-TSC-1314; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-195779

17 318196 OPERATION OF AUTOMATED GUIDEWAY TRANSIT VEHICLES IN DYNAMICALLY RECONFIGURED TRAINS AND PLATOONS. VOLUME II. PART III. SYSTEMS OPERATIONS ANALYSIS. This study shows that the passenger capacity of AGT systems may be significantly increased by operating vehicles in dynamically reconfigured trains or platoons. It is estimated that a minimum lane capacity of 5,000 to 10,000 passengers per hour is needed to make single-party AGT economically competitive with buses and that this capacity requires the use of trains. Trains also offer several non-capacity-related operational advantages. The longitudinal control systems needed to effect dynamic en/entrainment with platoon operations at spacings of 30-60 cm are developed with particular attention to stability, jerk limiting requirements, safety and passenger comfort. The capacity advantage of entraining is demonstrated for a single guideway link and for merge junctions, using Monte Carlo simulation. Variable-slot-length point-follower control is shown to reduce merge delays and maneuver ramp lengths compared with fixed-slot-length methods. The "zero gap" merge scheme developed here produces dramatic improvements compared with conventional merge strategies. The concepts of dynamic entrainment and platooning are shown to deserve more detailed study and testing because of the significant advantages they offer.

Shladover, S ; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-MA-06-0085) Final Rpt. UMTA-MA-06-0085-79-3, Oct. 1979, 236p; See also report dated Jul 79, PB80-142862; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-198856

17 318457 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME I. PROJECT SUMMARY. This report is one volume of a six-volume final report of the Vehicle Lateral Control and Switching (VLACS) Project sponsored by the Urban Mass Transportation Administration of the Department of Transportation. Volume I, this report, summarizes the results and significant findings of the project. The project objectives are to investigate and improve the steering and switching capabilities of automated transit vehicles through analysis, simulation, and test of lateral control of switching systems and to develop guidelines for the development of these systems. Three types of steering systems are investigated: (1) wire-follower power-assisted steering; (2) wall-follower power-assisted steering; and (3) passive wall-follower steering. The significant findings and major conclusions from each project task are included in this report. Also summarized and included in this report are the contents of the final project reports which describe the hardware studies, the design and simulation activities, the test program, and the data base report. Recommendations for future related studies are presented.

Haines, G Fry, M Mayer, F Peckham, G ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final

Rpt. OTIS-TTD-VLACS-049, UMTA-IT-06-0156-79-1, Mar. 1980, 143p; See also Volume 2, Part A, PB80-199730, and report dated Apr 78, PB-286 551. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199722

17 318458 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME II. DESIGN AND ANALYSIS. PART A. VLACS MODELS. This report contains design and analysis results from UMTA's Vehicle Lateral Control and Switching (VLACS) Project of the Automated Guideway Transit Technology (AGTT) Program. The objective of the VLACS project is to develop lateral control and switching systems which will reduce the cost and improve the performance of these systems on automated transit vehicles. The VLACS project tasks include a review of existing lateral control and switching technology, detailed mathematical modeling, analysis, simulation, detailed hardware studies, experimentation with alternative designs, and development of guideline specifications for VLACS systems. In this report, lateral control system models are developed for wire-follower, wall-follower active, and wall-follower passive lateral control systems, including the vehicle, lateral position sensors, and actuators. Vehicle dynamic models are developed for vehicles having Ackermann steering geometry and for vehicles with wagon-wheel steering. AGT vehicle models developed include ten-degree-of-freedom models used for ride quality analysis and simpler three-degree-of-freedom models used for lateral control system design and analysis. Part A of this report contains a description of VLACS model development.

Fry, CM McHugh, T Greeson, J ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final Rpt. OTIS-TTD-VLACS-050A, UMTA-IT-06-0156-79-2, Mar. 1980, 470p; See also Volume 1, PB80-199722, and Volume 2, Part B, PB80-199748. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199730

17 318460 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME III. DETAILED HARDWARE STUDIES. Volume III, this report, contains a description of the hardware for the test vehicle and for nominal vehicle design for each of four vehicle classes (Shuttle Loop Transit, Group Rapid Transit Large, Group Rapid Transit Small, and Personal Rapid Transit) is described. The test vehicle which incorporates 2 or 4 wheel Ackerman steering and 2 or 4 wheel drive is configured to implement wire and wall-follower steering systems. Test data is used for mathematical model validation and for lateral control system evaluations. Nominal vehicle designs are described which are typical of lateral control system implementations used on AGT systems. Cost and weight estimates for the typical designs are presented.

Evans, T Mayer, F Haines, G Oliver, W ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final Rpt. OTIS-TTD-VLACS-051, UMTA-IT-06-0156-79-4, Mar. 1980, 169p; See also Volume 2, Part B, PB80-199748, and Volume 4,

PB80-199763. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199755

17 318461 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME IV. TEST PROGRAM. In this report, major emphasis is given to the results of three alternative steering techniques using the VLACS test vehicle and simulations. Use of test data for mathematical model validation is discussed. The three types of steering systems for rubber-tired transit vehicles which have been investigated are: (1) mechanical sensing without power steering (herding); (2) mechanical sensing with power steering; and (3) electromagnetic (wire-follower) sensing.

Peckham, G Fry, M Mayer, F Haines, G ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final Rpt. OTIS-TTD-VLACS-052, UMTA-IT-06-0156-79-5, Mar. 1980, 139p; See also Volume 3, PB80-199755, and Volume 5, PB80-199771. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199763

17 318462 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME V. DATA BASE. Volume V, this report, provides a catalog of the data base material gathered and classified as part of the VLACS project. It contains (1) an annotated bibliography, which includes short summaries of the documents listed, a list of descriptors, and a series of user designators, and (2) a subject index, which includes numerous entries and subentries, and cross-references. The data base lists technical works dealing with vehicle lateral control, switching and steering systems, vehicle dynamics, ride quality, and other related topics. Its purpose is to help planners and designers find the material they need to evaluate and select automated guideway transit (AGT) systems.

Gray, MJ ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final Rpt. OTIS-TTD-VLACS-053, UMTA-IT-06-0156-79-6, Aug. 1979, 135p; See also Volume 4, PB80-199763, and Volume 6, PB80-199789. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199771

17 318463 VEHICLE LATERAL CONTROL AND SWITCHING. VOLUME VI. SOFTWARE MANUAL. In this report, a description of the software developed for the VLACS project for study of AGT vehicle lateral control and switching systems is discussed. A simulation employing a ten-degree-of-freedom vehicle model for ride quality analysis and a simulation employing a three-degree-of-freedom vehicle model for lateral control studies are described. Also included is a description of the VLACS switching system analysis program.

Fry, CM McHugh, T ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0156) Final Rpt. OTIS-TTD-VLACS-054, UMTA-IT-06-0156-79-7, Mar. 1980, 323p; See also Volume 5, PB80-199771. Also available in set of 7 reports PC E99, PB80-199714.; Contract DOT-UT-

70088; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-199789

17 318512 SUMMARY OF CAPITAL AND OPERATIONS AND MAINTENANCE COST EXPERIENCE OF AUTOMATED GUIDEWAY TRANSIT SYSTEMS. COSTS AND TRENDS FOR THE PERIOD 1976-1979. SUPPLEMENT II. This report summarizes O&M cost experience and trends for the following AGT systems for the period 1976-1979: AIRTRANS, Sea-Tac, Tampa, Disneyworld (WED-way), and Morgantown (O&M data on the Morgantown system is reported through 1978). Capital cost data is reviewed on Morgantown Phase I, AIRTRANS, Tampa, Sea-Tac, Miami, Busch Gardens, Disneyworld, King's Dominion, and Fairlane. New capital cost data has been obtained from the Atlanta and Orlando Airports and the Minnesota Zoological Gardens. In addition to presenting capital and operating and maintenance costs and trends, this report includes analysis of the factors influencing these costs. A section on the differences between urban and non-urban settings of AGT systems has also been included and shows how the costs of existing non-urban systems might relate to a system in an urban deployment in terms of site conditions and site requirements.

Comparato, TF von Rosenvinge, ME Kendall, DC ; Transportation Systems Center, Urban Mass Transportation Administration Cost Rpt. DOT/TSC/UMTA-80-19, UMTA-MA-06-0069-80-1, Mar. 1980, 74p; See also Supplement 1, PB80-146483.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-204878

17 319698 MAGNETICALLY SUSPENDED VEHICLES FOR TRACKED HIGH-SPEED TRAFFIC. The author discusses the history of the development of magnetic levitation and the possible methods which could be used to power rapid transport systems. Development of a West German suspension system with permanent magnets was stopped due to the high cost of installing magnets on the guideway. The principles of the normal flux and zero flux procedures for electrodynamic magnetic suspensions are explained. Under the normal flux system, the vehicle has to start on wheels and does not levitate until a speed is reached where eddy-current braking forces are suitably reduced. The zero flux system has the advantage that brake losses were much less and it is more suited to positive guidance of the vehicle. Electrodynamic systems were considered to be uneconomical, and so electromagnetic systems using d.c. energized controlled electromagnets have been developed. The concept of the magnetic wheel, which improves the ride quality and reduces the dynamic requirements of the magnets is outlined.

Mayer, WT *Electric Vehicle Developments* No. 6, June 1980, pp 14-16, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 248461); ORDER FROM: Institution of Electrical Engineers, Savoy Place, London WC2R 0BL, England

17 322552 THE "H-BAHN": AN AUTOMATIC LOCAL TRANSPORT SYSTEM. In view of the worsening living conditions in towns and cities filled to overflowing with private cars, but also for economic reasons and to reduce great dependence on oil imports, there must be greater

use of local public transport. But only a much improved service can bring this about. The automatic "H-Bahn" (or suspended rail system) developed by Siemens A.G. and DUWAG Waggon-fabrik Uerdingen A.G. offers such an opportunity at a cost which is comparable with conventional local transport. Its features are a frequent service with comfortable vehicles not only during the busy times of day, fast connections on a track unobstructed by other traffic, and the safety which is inherent in a tracked system. Trials have been carried out with the "H-Bahn" on a 1.4-km-long test track with six cars and three halts built at the Siemens research centre in Erlangen. It was shown that the short construction and assembly times causes only minimal hindrance to road traffic and also that the investment is profitable. During the trials, with so far 180,000 vehicle-kilometres and continuous running lasting several days, full success was achieved with the hierarchic automation structure, the computers and their programmes, the safety level and the vehicles with their D.C. or asynchronous linear motors. The trials suggested some improvements in detail and these are now being incorporated into the system. The "H-Bahn" is thus ready for public transport service. The first layout is to be built for Dortmund University and is scheduled to go into service at the end of 1982. [German]

Ziegler, W *Eisenbahntechnische Rundschau* Vol. 29 No. 6, June 1980, p 415; ACKNOWLEDGMENT: British Railways; ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

17 322805 WHY NEW TECHNOLOGIES CANNOT RADICALLY IMPROVE THE QUALITY OF URBAN TRANSPORTATION. In recent years a great deal of time and effort has been expended on the development of new modes of transport for cities. It is argued in this paper that this work is unlikely to be very productive because the major remaining flaw in the provision of transportation services—the inability of one mode to provide a good service to concentrated and dispersed trip ends—seems unavoidable. To make the required breakthrough a new mode must be frugal in its demands for space, flexible in its operation and fast. But an analysis of the performance of existing and prototype modes suggest that there is a fundamental technological barrier that precludes any one mode from performing well in more than two out of these three ways. This implies that any further improvements in travel for the urbanite must be made through existing modes and their derivatives and will be quite limited. It also suggests that the only possible way of substantially improving urban transportation is to build or rebuild towns so that one of the important mode attributes mentioned above is rendered superfluous. (a)

Poulton, MC *Transportation Planning and Technology* Vol. 6 No. 2, 1980, pp 75-80, 7 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 248839); ORDER FROM: ESL

17 324399 COMPUTER-AIDED PLANNING AND DESIGNING SYSTEM FOR URBAN GUIDEWAY TRANSIT SYSTEMS—TRANSPLAN. The paper presents a computer-aided planning and designing system developed for urban transit systems. The system calculates the performance of a transit system, including auto-

matic train operation, signal, traffic control, electrification, and track and vehicle functions, with a flexible dynamic simulator which was developed by the use of structural analysis and the hierarchical modeling concept.

Miyamoto, S Ihara, H Takaoka, T Ohshima, H Kariya, S *Hitachi Review* Vol. 29 No. 1, Feb. 1980, pp 1-6, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 324439 DRIVE CONCEPT OF H-BAHN VEHICLES. Selection and demands on drives for the track-bounded automatic rapid transit system (H-Bahn) are discussed. Advantages and disadvantages of the drive systems based on linear induction motors and on DC motors are described. Mechanical and electrical design of the drives and operating experience on test tracks are considered.

Brehm, W Buchberger, H *Siemens Power Engineering* Vol. 1 No. 2, Feb. 1979, pp 39-43, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 324882 THE PROMISE OF MAGLEV. Two versions of the linear motor for magnetic levitation vehicles are compared—the short stator and the long stator motors. General economic estimates for an electromagnetic levitation/propulsion railway link are presented along with the data on the most favorable energy consumption regimes.

Glatzel, K Schulz, H *IEEE Spectrum* Vol. 17 No. 3, Mar. 1980, pp 63-66; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

17 326270 SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS: CLASSIFICATION AND DEFINITION OF AGT (AUTOMATED GUIDEWAY TRANSIT) SYSTEMS. The report describes the development of an AGT classification structure. Five classes are defined based on three system characteristics: service type, minimum travelling unit capacity, and maximum operating velocity. The five classes defined are: Personal Rapid Transit (PRT); Small Vehicle Group Rapid Transit (SGRT); Intermediate Vehicle GRT (IGRT); Large Vehicle GRT (LGRT); and Automated Rail Transit (ART). All classes except LGRT and ART are further stratified on the basis of speed, resulting in a total of eight subclasses. Forty-four existing and proposed AGT systems are summarized and used to define ten representative systems in terms of nominal values and ranges of selected characteristics. A summary of the system information compiled and used to complete this task is presented in Appendix A of this report. This report also provides a bibliography, list of text references, and a glossary of terms.

Lee, RA Alberts, FSA ; General Motors Technical Center, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-79-50, Feb. 1980, 165p; See also report dated Apr 80, PB80-193386; Contract DOT-TSC-1220; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226509

17 326294 SYSTEMS OPERATION STUDIES FOR AUTOMATED GUIDEWAY TRANSIT SYSTEMS. SUMMARY REPORT. In order to examine specific Automated Guideway Transit

(AGT) developments and concepts and to build a better knowledge base for future decision-making, UMTA has undertaken a new program of studies and technology investigations called the Urban Mass Transportation Administration (UMTA) Automated Guideway Transit Technology (AGTT) Program. The objectives of one segment of the AGTT program, the Systems Operation Studies (SOS), are: (1) to develop models for the analysis of system operations; (2) to evaluate AGT system performance and cost; and (3) to establish guidelines for the design and operation of AGT systems. The results of the SOS project are summarized in this final report. The characteristics of 43 existing or proposed AGT systems were inventoried, and the information was used to develop a system classification structure. Classes of metropolitan and activity center demand applications were defined and demand matrices based on survey data from representative locales were generated. A restricted number of combinations of system classes, demand types, and network types were developed as representative deployment scenarios for analysts. An extensive list of possible performance measures was developed and then condensed to an initial set of 14 system level measures. A comprehensive set of computer software has been developed and tested. The various computer programs permit the simulation of entire AGT systems as well as major subsystems, including stations, links, merges, and inter-sections.

Lee, RA Thompson, JF Oglesby, RN Bonderson, LS ; General Motors Technical Center, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. UMTA-MA-06-0048-8012, Feb. 1980, 132p; Contract DOT-TSC-1220; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-101693

17 326449 STATIC AND DYNAMIC TESTS OF FULL SCALE DOUBLE-TEE GIRDERS FOR DADE COUNTY RAPID TRANSIT SYSTEM. Metropolitan Dade County, Florida, is now in the process of building a new rapid transit system of about 50 miles. The first-stage construction of this new system scheduled for completion in 1984, consists of 22.5 miles, and includes 21.5 miles of aerial guideways. The aerial structures to be used for the guideways are prestressed concrete double-tee girders, which is a first in the use of such a structure in a U.S. transit system. In view of large capital investment involved, and the fact that a double-tee has not been used on any rapid rail transit system, the Urban Mass Transportation Administration agreed to fund full-scale tests. These tests were to serve three purposes: (1) to prove the adequacy of all design methods; (2) to check some of the construction and reinforcement details; and (3) to verify the dynamic performance of the girders. Demonstration tests were carried out on three full-size 80 feet long by 5 feet deep by 12 feet wide precast prestressed double-tee girders proposed for the aerial guideways. Two of the three girders cast in Miami were shipped by rail to P.C.A. Laboratories in Skokie, Illinois for extensive static and dynamic testing, with the third girder kept in Miami to monitor camber and loss of prestress. Static test results of uncracked and deliberately precracked girders showed that ser-

vice torsional rotations, which were in close agreement with a theoretical mixed torsion analysis, were small enough to ensure rider comfort. Fatigue resistance of the girders was fully established by two separate test spectra involving 5 and 6 million cycles of loading representing the cumulative damage of sixty years of operational life. No deterioration whatsoever was observed in terms of flexural and torsional stiffness, crack propagation, or strand stresses. Post-cracking behavior of the girders showed adequate strength and ductility with an ultimate capacity of 1.6 times the required factored severe derailment loading including 100% impact. This test report concludes that the excellent behavior of the girders from serviceability and strength considerations, substantiated all the design analyses and details used.

Hsu, TTC ; Dade County Office of Transportation Admin, Urban Mass Transportation Administration, (UMTA-FL-06-0017) Final Rpt. UMTA-FL-06-0017-80-1, Oct. 1979, 164p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-115388

17 327743 AUTOMATED MIXED TRAFFIC TRANSIT MARKET ANALYSIS. This report addresses the need for an automated vehicle mode that could use existing rights-of-way with minor modification. This system concept, Automated Mixed Traffic Transit (AMTT) System, refers to a system of driverless electric vehicles for mixed traffic use. Such systems would significantly decrease the labor costs associated with transit operations. Their use of existing rights-of-way indicates that system capital costs would be relatively low compared to conventional modes. The AMTT system has now reached the stage where it has become necessary to examine and identify its potential market. This report examines the characteristics and associated costs of AMTT vis-a-vis its conventional transportation alternatives. A parametric analysis is performed between electrically powered driverless AMTT and internal combustion conventional bus transit to identify appropriate service and operating conditions for AMTT. In this report, an examination of potential application areas indicates that AMTT would be less costly on a total annual cost basis than conventional bus transit in areas where fleet requirements are relatively low and high amount of service, as measured in vehicle kilometers, is

desired. This report states that AMTTs may find potential application in medical centers, airports, CBD malls, some universities and colleges, new towns, large shopping centers, and in a number of recreation areas and amusement parks.

Chung, C Anyos, T ; Mitre Corporation, Urban Mass Transportation Administration MTR-80W00067, UMTA-VA-06-0056-80-3, Sept. 1980, 194p; Prepared in cooperation with SRI International, Menlo Park, CA.; Contract DTUM-60-80-C-71020; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-105801

17 328220 PASSIVE VEHICLE-AUTOMATED GUIDEWAY TRANSIT. DOCUMENTATION OF PREVIOUS WORK AND ASSESSMENT OF IMPACT OF NEW TECHNOLOGY ON THIS CONCEPT. In the early 1970s, the Vought Corporation developed a small vehicle (three to six passengers) Automated Guideway Transit (AGT) system called LectraVia which utilized passive vehicles (PV) operating on an active guideway. This report documents the development of this PV-AGT system and assesses its potential as a concept that could provide technology to improve AGT system operational costs. The documentation includes a full description of the system, the application and cost studies performed, details of the control system, the 1/5-scale operational model, the results of the full-scale LIM motor thrust verification tests, fullscale engineering prototype system and test results. A cost/benefit analysis relative to conventional AGT systems is presented. Application study results are given which show the effect of vehicle size on costs, service, and performance. The technical and economic feasibility of modular construction of the Active Guideway System is also explored. The critical technology required for full development and deployment of passive vehicle systems is identified and a plan for implementation of this development is presented. This report not only describes the PV-AGT system concept in detail but also evaluates the economics of the system through a comparative analysis of the passive vehicle (LectraVia) versus the active vehicle (AIRTRANS) proposals made for the Las Vegas application. The results indicate that the passive vehicle has the advantage of superior system availability at equal or slightly lower costs than can be expected for the active vehicle systems.

Larson, AR, Jr Jacobsen, RS Hall, VW Randolph, DG, Jr ; Vought Corporation, Urban Mass Transportation Administration, (UMTA-TX-06-0030) Final Rpt. UMTA-TX-06-0030-80-1, Aug. 1980, 133p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-117079

17 328335 OVERVIEW OF ESCALATOR APPLICATIONS IN RAIL TRANSIT. New rail transit systems have made extensive use of escalators, increasing the importance of escalator reliability and cost. The project objectives were to determine the difference in operating environment and in construction between escalators in transit and non-transit use, the impact of recent escalator innovations, and areas which could benefit from UMTA sponsored research and development. Several factors causing a more severe transit escalator operating environment were identified. There are no significant design differences between transit and non-transit escalators. Recent innovations that have affected performance and cost include outdoor escalators, extra flat steps at both landings, and modular escalators. Conventional escalators have one drive motor located at the top landing. Motors on a modular escalator are spaced at intervals along the truss. Data were collected by interviews at transit agencies.

Deshpande, G Rubenstein, L ; Jet Propulsion Laboratory, Urban Mass Transportation Administration Final Rpt. JPL-PUB-80-76, UMTA-CA-06-0116-80-2, July 1980, 50p; Contract DOT-AT-80015; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-128720

17 329529 GAMBLING WITH A LOSER. A HISTORY OF THE LAS VEGAS PRT PROJECT. This paper compiles a history of the project derived from more than 90 newspaper articles and planning documents, supplemented by conversations with individuals close to the project. It is shown that problems in planning,

coordination and demand estimation were the primary causes for the defeat of the system.

Lutin, JM (Princeton University) Falls, MD *Transportation Research. Part A: General* Vol. 14A No. 3, June 1980, pp 185-196, 59 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

21 046833 SKIP STOP OPERATION AS A METHOD FOR TRANSIT SPEED INCREASE. The efficiency of Rapid Transit lies in its speed for short to medium distance trips in urban areas. However, for longer trips, particularly when there is a competing freeway facility, the requirement for speed is rather high. Since many station spacings are adopted on the basis of area coverage, high operating speed of the trains often cannot be achieved. Thus, typical lines of urban rapid transit with average interstation spacings of approximately one-half mile have only limited length on which their speeds are satisfactory; for distances longer than, typically, 5-7 miles, they often become too slow. This is becoming an increasing problem with the spatial spread of cities.

Vuchic, VR, Associate Professor of Civil and Urban Engineering (Pennsylvania University, Philadelphia) *Traffic Quarterly* Apr. 1973, p 307; ACKNOWLEDGMENT: Traffic Quarterly; ORDER FROM: Eno Foundation for Transportation, Incorporated, Saugatuck, Connecticut, 06880 Repr PC

21 047877 RAPID TRANSIT SYSTEM SIMULATION WITH INTERACTIVE GRAPHICS DISPLAY. A mathematical model, employing computer techniques and a TV-readout of results, is utilized to present a visual display of system operation. Shown are track layout, time (simulation), train position on the track, and the number of passengers riding on each train and waiting at each platform or station.

Huffman, RA (Vought Aeronautics Company) Walker, JL *Transportation Planning and Technology* Vol. 1 No. 3, Jan. 1973, pp 205-217, 2 Ref; ACKNOWLEDGMENT: EI (EI 73 037541); ORDER FROM: ESL, Repr PC, Microfilm

21 047879 TRAFFIC CONTROL, TIMETABLING AND ORGANISATIONAL PROBLEMS IN THE ESTABLISHMENT OF TRANSIT SYSTEMS IN CONURBATION AREAS. The article discussed the difficulties and problems encountered in the planning and operation of an S-Bahn system and the use of reduced crews by having the driver control door closing and train departure. Automatic computer-controlled trains, running in combination with a continuous control system and automatic driving and braking, can improve profitability by regulating the current consumption via the speed in relation to the timetable.

Sitzmann, E *Rail International* Vol. 4 No. 4, Apr. 1973, pp 481-498, Refs; ACKNOWLEDGMENT: EI (EI 73 041115); ORDER FROM: ESL, Repr PC, Microfilm

21 048228 RAILWAY'S SHARE OF PUBLIC PASSENGER TRANSPORT IN LARGE CONURBATIONS. At Lausanne, the Enlarged Meeting of the Management Committee of the IRCA in Collaboration with UIC discusses public transport theme in its widest sense taking into account environment, overlapping economic factors of municipality and railway administrations and the need for railwaymen to speak with the authority possessed by wide experience.

Rail Engineering International Vol. 3 No. 7, Sept. 1973, 5 pp ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

21 050457 HAMBURG COMPLETES THE FIRST STAGE OF U-BAHN CONSTRUCTION. With the opening of the complex central section of Line U2, the U-bahn construction programme launched in 1955 is now complete. Work continues on the cross-town S-bahn link, which is closely integrated with the U-bahn and should be opened in 1975. Excellent interchange between the two rail systems in the central area is complemented by well-planned bus feeders further out, and D. Scott Hellewell explains how this high level of integration results from the establishment of a common policy-making body (HVV) in 1965.

Railway Gazette International Vol. 129 No. 10, Oct. 1973, 3 pp, 2 Fig, 2 Phot ORDER FROM: IPC Transport Press, Repr PC

21 050691 DEVELOPMENT AND APPLICATIONS OF A SIMULATION MODEL FOR METROPOLITAN RAILWAY OPERATIONS. The Rotterdam metro authorities are currently extending the metro line. A simulation model has been developed in order to study the problems arising in the extended network. For the purpose of this study the existing line is investigated to determine the factors influencing train-running. Measurements carried out on the actual train-running have shown that regulation of train-running serves to limit the standard deviation of the travelling time. The measurements are used to dimension the simulation model. This model is described in detail. The validity of the model is tested by simulating the existing North-South line. Future developments and simulation experiments are indicated.

Breur, MWKA (Delft University of Technology) *Rail International* No. 6, Sept. 1973, 10 pp, 9 Fig, 8 Ref; ACKNOWLEDGMENT: Rail International; ORDER FROM: International Railway Congress Association, 17-21 rue de Louvain, 1000 Brussels, Belgium Repr PC

21 051950 ENLARGED MEETING OF THE MANAGEMENT COMMITTEE OF THE IRCA. SECTION I: GENERAL PLANNING. GREATER LONDON: RAILWAYS IN THE CHANGING SCENE. This paper attempts briefly to present some aspects of Greater London, its region and its railways in the perspective of over-all social and economic planning. It gives a personal view of the context for railway operations and their significance not on a national scale but as related to London and its life and work.

Stott, PF (Greater London Council) *Rail International* No. 2, Feb. 1973, 9 pp, 4 Fig.; ACKNOWLEDGMENT: Rail International; ORDER FROM: ESL, Repr PC, Microfilm

21 051951 ENLARGED MEETING OF THE MANAGEMENT COMMITTEE OF THE IRCA. SECTION 3: OPERATION AND AUTOMATION. CAPACITY OF SUBURBAN LINES. THE MEANS TO BE EMPLOYED TO ADAPT IT TO THE DEVELOPMENT OF TRAFFIC. The development of urbanisation, the manifold movements within the congested areas, the increase in distances between the town centres and their zones of influence, are characteristic phenomena of our times which one finds in every country of the world. They have, consequently, a growing importance for the railways, insofar as suburban traffic is concerned. It is thus that in

respect of the SNCF, in the outskirts of Paris, where this traffic covers 950 km of lines, one has in the course of the last ten years recorded an increase of 22% in passenger carryings and of 40% in passenger-kilometers, and the demographic and urbanisation prospects lead to the estimation that this trend will continue in the years to come. To meet the new needs effectively, the existing nets often prove insufficient and inapt and the difficulties experienced in their operation could result in an extension of these nets by the creation of new tracks. But in an urban area this solution would require works the cost of which is considerable and must be reserved for the zones where the railway is still absent or when no alternative more economical solution can be found.

Charles, J Meyer, M (French National Railways) *Rail International* No. 2, Feb. 1973, 9 pp; ACKNOWLEDGMENT: Rail International; ORDER FROM: ESL, Repr PC, Microfilm

21 051952 ENLARGED MEETING OF THE MANAGEMENT COMMITTEE OF THE IRCA. SECTION 4: DESIGN AND EQUIPMENT OF FIXED INSTALLATIONS AND EXAMPLES OF COMPLETE REALISATIONS. BRUSSELS: TWENTY YEARS OPERATION WITH AN URBAN RAIL CONNECTION. Situated in the centre of the network, Brussels, the capital of the country, represents the most important railway junction point in the country. Each day, the eight main lines carry a total of some 370,000 passengers into and out of Brussels. In the international context, the Belgian capital handles rail transit traffic from England to Switzerland and Germany, and from France to the Netherlands. In actual fact, the rail intersection point of Brussels has been operating with its present layout for some twenty years only, from the time the Nord-Midi Link line was opened.

Lefebvre, M Depaelelaere, D (Belgian National Railways) *Rail International* No. 2, Feb. 1973, 15 pp, 7 Fig, Tabs; ACKNOWLEDGMENT: Rail International; ORDER FROM: ESL, Repr PC, Microfilm

21 052070 A FIVE YEAR PLAN FOR IMPROVED DATA PROCESSING AND OPERATIONS CONTROL. With the long-range development plans of CTA, effective and timely reporting of all operations to management becomes increasingly significant. Moreover, with clerical costs rising the adoption of advanced data processing techniques becomes more essential. This report summarizes the results of a review initiated and conducted by CTA and Arthur Andersen & Co. The review was basically a high-spot evaluation of management reports and clerical activities in the scheduling, purchasing, accounting and related departments. A potential for improvement exists in almost every area of the present accounting operations and in many related clerical activities.

Chicago Transit Authority 49 pp, Figs; ACKNOWLEDGMENT: Chicago Transit Authority; ORDER FROM: Chicago Transit Authority, Merchandise Mart Plaza, P.O. Box 3555, Chicago, Illinois, 60654 Repr PC

21 052140 PROJECT FARE TASK IV REPORT. URBAN MASS TRANSPORTATION INDUSTRY FINANCIAL AND OPERATING DATA REPORTING SYSTEM. VOLUME I. TASK AND PROJECT SUMMARY. The report contains a description of the uniform reporting system for the urban mass transit industry designed and tested in Project FARE. It is presented in five volumes. Volume I contains a description of how Task IV was accomplished and the conclusions and recommendations reached at the end of the task. It also contains a summary of the conduct of the entire project.

Harvey, DL Nagel, JW Van Lieshout, WT Malachuk, DJ ; Andersen (Arthur) and Company Nov. 1973, 80 pp; Paper copy also available from NTIS \$20.00/set of 5 reports as PB-226 353/SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-226354/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226354/9, DOTL NTIS

21 052154 PROJECT FARE TASK IV REPORT. URBAN MASS TRANSPORTATION INDUSTRY FINANCIAL AND OPERATING DATA REPORTING SYSTEM. VOLUME IV. COMMUTER RAIL REPORTING SYSTEM INSTRUCTIONS. The report contains a description of the uniform reporting system for the urban mass transit industry designed and tested in Project FARE. It is presented in five volumes. Volume IV contains general system instructions, prescribed accounting standards to be employed for this reporting and detailed definitions of all reporting categories in the system for commuter rail operations.

Harvey, DL Nagel, JW Van Lieshout, WT Mamachuk, DJ ; Andersen (Arthur) and Company Vol. 4 Nov. 1973, 145 pp; Paper copy also available from NTIS \$20.00/set of 5 reports as PB-226 353/SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-226357/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226357/2

21 052155 PROJECT FARE TASK IV REPORT. URBAN MASS TRANSPORTATION INDUSTRY FINANCIAL AND OPERATING DATA REPORTING SYSTEM. VOLUME V. COMMUTER RAIL REPORTING SYSTEM FORMS. The report contains a description of the uniform reporting system for the urban mass transit industry designed and tested in Project FARE. It is presented in five volumes. Volume V contains examples of all of the forms used in the system for commuter rail operations. Each form shows a cross reference to the applicable instructions in Volume IV.

Harvey, DL Nagel, JW Van Lieshout, WT Malachuk, DJ ; Andersen (Arthur) and Company Vol. 5 Nov. 1973, 46 pp; Paper copy also available from NTIS \$20.00/set of 5 reports as PB-226 353/SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-226358/0); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226358/0

21 056956 MANAGERIAL RESOURCES AND PERSONNEL PRACTICES IN URBAN MASS TRANSPORTATION. The primary purpose of this project was to identify and evaluate policies, practices and other conditions relating to the supply of managerial personnel in the urban mass transit industry. The study, conducted

during 1972-1973, sought to provide information concerning the following: An inventory of management, technical, and supervisory personnel in the industry; a current profile of management and technical personnel; a summary of personnel practices and training methods now being used in the industry; an assessment of manpower demand and supply in the industry by administrative levels; and a review of the roles of UMTA, universities and the industry in improving the training of personnel in the transit industry with respect to training methods, course contents, level of support for trainees and related matters.

Mundy, RA Spychalski, JC ; Pennsylvania State University, University Park, (UMTA-PA-11-0010) TTSC-7317, Nov. 1973, 321p; ACKNOWLEDGMENT: NTIS (PB-231433/4); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231433/4, DOTL NTIS

21 071767 SCHEDULE AND TIMETABLE FOR COMMUTER RAILROAD. This paper describes a set of techniques developed to assist in planning the operations of a commuter railroad and similar types of public transport. Computer models are used for generating information and processing data with the planner making the value judgment decisions regarding the degree to which various objectives are achieved. The method attempts to balance the objectives of the user (travel time and comfort), the system operator (operating cost), and the owner-financier (capital investment). The first portion of the method deals with schedule planning, in which the overall trade offs between quality of service and costs are addressed, and the general plan of operations (such as whether or not to include express service) is developed. Once the general plan has been (tentatively) set, then the detailed construction of a specific timetable, including equipment and crew assignments, is addressed.

Morlok, EK Vandersypen, HL *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE3, 9922, Aug. 1973, pp 627-636; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

21 071808 WAITING TIME AND OCCUPANCY IN SYSTEMS. This paper presents the results of computer simulations of various forms of people-moving (transit) systems, with particular attention to travel and waiting components of total trip time. The formulations permit a heavier psychological weighting for the latter in comparing the various forms of service. Service options studied are: scheduled and unscheduled; all-stop, skip-stop, intermediate-stop, and non-stop from origin to destination. Comparisons are also made for a wide range of headway values and vehicle/train capacities.

Sher, NC (Honeywell Incorporated) Anderson, PA *Honeywell Computer Journal* Vol. 7 No. 4, 1973, pp 228-237, 3 Ref; ACKNOWLEDGMENT: EI (EI 74 700716); ORDER FROM: ESL, Repr PC, Microfilm

21 071842 ATA RAIL TRANSIT CONFERENCE HELD IN SAN FRANCISCO, CALIFORNIA ON APRIL 14 AND 16, 1974. OPERATIONS SESSIONS. Five of the papers concern BART's operating experience including the coordination of BART with the bus service on

the East side of the San Francisco Bay, passenger relations, and evolution of the BART Police Services Department. Also discussed is some of the history of the planning for BART, the highlights of operating experience and plans for future extensions of service. Four of the papers relate to ridership promotion and fare reduction or incentive techniques of winning new riders to transit. The paper by Victor Strom relates to transit energy conservation programs.

Raush, RW Bingham, AL McDowell, WW Breiner, LW Lindsey, RM ; American Transit Association Papers ATA/RT-74/2, Aug. 1974, 106p; Prepared by Bay Area Transit, AC Transit, Mass. Bay Transportation Authority, Chicago Transit Authority, and Port Authority of N.Y. and N.J. Paper copy also available in set of 3 reports as PB-234 823-SET, PCS12.00.; ACKNOWLEDGMENT: NTIS (PB-234825/8); ORDER FROM: NTIS, Repr. PC, Microfiche; PB 234825/8, DOTL NTIS

21 072017 HAMBURG TRANSPORT COMMUNITY, AN EXAMPLE OF COORDINATION AND INTEGRATION IN PUBLIC TRANSPORT. The Hamburg Transport Community was established in 1965 to coordinate transport operations and integrate services. A joint fare system was introduced the following year. Public transport is no longer fragmented and services are broader. Planning is more efficient and can be better coordinated with regional planning. Competition has been eliminated, without hindering initiative on the part of the Community members, which include subway, urban, urban rail, tram, and bus lines.

Pampel, F ; Hamburg Transport Community 30 pp, 13 Fig., Tabs.; ACKNOWLEDGMENT: TSC; ORDER FROM: Hamburg Transport Community, Hamburg, West Germany Repr. PC

21 072464 THE CASE OF THE THREE ENGINEERS VS. BART. This article is intended to focus on the complexities of ethics and employment practices, not on the technical aspect of the Bay Area Rapid Transit system. Nevertheless, the two are related, so some of BART's history, as it is perceived by those interviewed, is included. A lawsuit was recently filed against BART by three of its former engineer-employees. As early as 1971 the three became concerned with the design of the system's Automatic Train control. These engineer's fears eventually became public and all three were fired. BART management apparently felt its three critics had made disclosures as the bugs were in the process of being worked out and such disclosures were unethical. The article is of special interest to engineering practitioners.

Friedlander, GD *IEEE Spectrum* Vol. 11 No. 10, Oct. 1974, pp 69-76; ORDER FROM: ESL, Repr PC, Microfilm

21 080306 HEURISTIC SCHEDULING PROCEDURES FOR PRT SYSTEM. While rapid transit systems have been suggested as alternatives to our automobile clogged cities, they have faced a problem in providing passengers with the type of service that they expect from their automobile. In an effort to provide for a rapid transit system that offers the advantages of the automobile but has greater capacity, the Morgantown Personal Rapid Transit System was conceived. A Personal Rapid Transit (PRT) system is characterized by relatively small vehicles that

provide direct station to station travel without intervening stops. Service is essentially provided on demand much the same way as an elevator operates. In order to compete with the automobile, the PRT must be operated as efficiently as possible in order to keep passenger waiting time to a minimum. This paper is concerned with the development of efficient scheduling algorithms which will keep passenger waiting times at an acceptable level while providing for efficient usage of the system. Before examining these procedures, a brief description of the Morgantown PRT system will be given.

Esposito, PR Byrd, J, Jr (West Virginia University) *ASCE Journal of Transportation Engineering* Vol. 100 No. TE4, Nov. 1974, pp 845-853, 2 Fig., 5 Tab., 7 Ref.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr. PC, Microfilm

21 080354 ALGORITHM FOR MECHANOGRAPHIC DETERMINATION OF THE TIMETABLES OF URBAN TRANSPORT LINES [Un Algoritmo per la determinazione meccanografica degli orari delle linee urbane di trasporto]. An algorithm is proposed for the mechanized determination of the timetables of urban transport lines, which in contrast with the methods used in the past, makes use of manual techniques with the necessary schematization. The procedure, an example of which is given, eliminates the possibility of an increase in vehicles as compared with those strictly necessary and minimizes the periods of standing at terminals. [Italian]

Piccione, C *Ingegneria Ferroviaria* Vol. 29 No. 6, June 1974, pp 35-40; ACKNOWLEDGMENT: EI (EI 74 080402); ORDER FROM: ESL, Repr. PC, Microfilm

21 084986 URBAN CORRIDOR DEMONSTRATION PROGRAM. MANHATTAN CBD-NORTH JERSEY CORRIDOR CBD BUS ROUTE. The project concentrated on the implementation, demonstration, and evaluation efforts necessary to modify two existing CBD bus transit routes. This project linked the Port Authority Bus Terminal, the major transfer facility for commuter bus travel from New Jersey to midtown Manhattan, with destinations poorly served by the CBD transit system by diverting buses from portions of the existing routes with low patronage levels. This problem was previously identified by a planning study also performed for the Urban Corridor Demonstration Program. After 20 months of operation, the more successful reroute has 2100 peak-period passengers boarding at the Port Authority Bus Terminal. Passenger surveys revealed between one-quarter and one-third were new transit riders. Nearly three-quarters of all passengers felt their trips were faster or more enjoyable than their previous modes. Both reroutes are not permanent components of New York City's transit system. The project demonstrated that minor modifications to existing transit routes can produce significant patronage increases.

Ruby, DD ; New York City Transit Authority Final Rpt. TS-7970, Nov. 1974, 24 pp; Contract DOT-FH-11-7778; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS, Repr. PC, Microfiche; PB 240361/AS

21 090535 TRANSIT PASSENGER COUNTS: ERRORS, CONTROLS, ANALYSIS. The paper reports work performed to determine the accuracy of two methods of counting bus riders (by onboard and by roadside observers), and to provide estimates of the errors inherent in the procedures. Bus riders were counted by both methods at selected locations on a screen line in San Francisco. Based on statistical estimates of error, it was concluded that the standard counting procedure, using roadside observers, contributed relatively little to the overall variability of the data. The largest source of variation, and the one that controlled required sample sizes, was the normal fluctuation of ridership between buses. It was estimated that five-day samples taken in two observation periods would be required to permit the detection, on the average, of a 10% change in total daily ridership crossing a single screen line station.

Ungar, A ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development WP-11-1-75, Nov. 1974, 53 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240410/1ST

21 090537 ASSESSMENT OF THE IMPACTS OF THE AC TRANSIT STRIKE UPON BART. The Alameda-Contra Costa Transit District (AC Transit) and the Bay Area Rapid Transit District (BART) provide bus and rapid rail public transportation, respectively, on the east side of San Francisco Bay. On July 1, 1974, AC Transit employees began a strike that was to last 62 days. This study assesses the impacts of the strike on BART travel, on travel between the east side of the Bay and San Francisco, and on the travelers who normally used AC Transit.

Cohn, SG Ellis, RH ; Metropolitan Transportation Commission, Urban Mass Transportation Administration, Peat, Marwick, Mitchell and Company MTC-TM-11-3-75, Feb. 1975, 80 pp
Sponsored by Contract UMTA-CA-09-0042. Prepared in cooperation with Peat, Marwick, Mitchell and Co., Burlingame, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240414/3ST, DOTL NTIS

21 090561 PROVIDING INCREASED TRANSIT CAPACITY DURING PEAK PERIODS: EXAMINATION OF TWO TECHNIQUES. It is shown that reduction of bus route lengths increases the number of round trips per bus possible in a given time period. For bus routes accessed mainly by auto, it is shown that significant savings in energy due to reduced auto miles travelled are possible by decreasing the lengths of multistop bus routes. Little or no savings are achieved with express bus routes. Staggering work hours has the effect of greatly increasing the fraction of new transit demand that can be satisfied. It is shown that both the length of the peak period and the percentage travel in the peak hour affect potential transit utilization. Since staggering work hours has detrimental effects on carpooling potential, these effects are also examined. It is found that the benefits to transit of staggering work hours probably exceed the disadvantages to carpooling.

Ward, DE Kendall, DC ; Transportation Systems Center Final Rpt. DOT-TSC-OST-75-7, Feb. 1975, 63 pp; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240679/1ST

21 090874 ANNUAL REPORT 1974. The report includes such highlights of the year's accomplishments as groundbreaking in Maryland and receipt of first Metro rolling stock and 620 new Metrobuses. The year closed with 39 miles of route and 39 stations under construction, including 26 for which finish contracts had been awarded. About 4.6 miles and six stations of Metro service is scheduled to begin in early fall of 1975, with a total of 18 miles and 25 stations in service during the Bicentennial year. The price for building Metro has gone up from \$2.98 billion to \$4.45 billion, reflecting inflation, materials shortages, a major court decision, various delays, storms, strikes and other factors.

Washington Metropolitan Area Transit Authority WMATA-75/8, Dec. 1974, 26 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240334/3ST, DOTL NTIS

21 090878 WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY—A STUDY OF BUS MANAGEMENT AND OPERATIONS. The report evaluates the effectiveness of the management and operational practices within the Metrobus system in relation to the level of services provided, and in relation to the emerging budgetary deficits. An objective was to determine those practices that have merit and identify others that could be improved with modification. The study was limited to WMATA's bus operations but there is some impact on the rail operations. The study presents 81 recommendations in a section entitled 'Executive Summary.' Content includes sections dealing with organization, finance, and operations.

Creasp, McCormick and Rapet, Incorporated, Washington Metropolitan Area Transit Authority, Barton-Aschman Associates, Incorporated Final Rpt. Feb. 1975, 258 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240164/4ST

21 090929 STAFF COMMENTS ON METROBUS MANAGEMENT REPORT. The response was prepared with intent of providing a balanced array of data and opinion to assist the WMATA Board of Directors in its deliberations. Special attention has been given to objectivity in determination and presentation of the staff position. Nearly 60 of the consultant's 81 recommendations have staff concurrence. Early approval of an action plan is urged to achieve study objectives. With exception of a few recommendations principally in the area of organization, staff believes the study can make a positive contribution toward fulfillment of WMATA's mission.

Graham, J ; Washington Metropolitan Area Transit Authority WMATA-75/10, Mar. 1975, 71 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240163/6ST

21 091365 VEHICLE SCHEDULING AND DRIVER RUN CUTTING. RUCUS PACKAGE OVERVIEW. This report describes the Run Cutting and Scheduling (RUCUS) package, which is a set of computer programs designed to assist in headway sheet development, vehicle scheduling and driver run cutting. The purpose of using computer programs for this task is to cut

down on the time involved in designing schedules while improving the accuracy of the finished product. The RUCUS package seeks to avoid the three major pitfalls which have been responsible for a lack of success in previous attempts to design a computer scheduling system. The RUCUS package attempts to cover all phases of the scheduling department's activities, yet still be suitable for stage or partial implementation.

Roberts, KR ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0004) M71-58-Rev-2, Nov. 1973, 25p; Supersedes Rept. no. PB-222 675.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241501/6ST

21 091619 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT 1974 STRIKE IMPACT STUDY. From August 12 until October 18, 1974, the Los Angeles area public transportation system was operationally shut down by a labor strike. The SCRTD system regularly operates some 1869 buses, serving about 650,000 daily riders, over a 2000 square mile area within the Los Angeles Basin. Although Los Angeles is correctly characterized as an auto oriented urban area, with mass transit carrying only 2 to 3% of weekday person trips, there were apparent impacts--on traffic congestion, on mobility, and on commerce. Nine strike-impact areas were evaluated, including effects on business, on auto traffic and occupancy rates, on unemployment and welfare benefits attributable to the strike, and various other resultant conditions.

Crain, JL Flynn, SD ; California Department of Transportation, Bigelow-Crain Associates Final Rpt. DMT-004, Jan. 1975, 51 pp; Prepared by Bigelow-Crain Associates, Menlo Park, Calif.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241352/4ST

21 093920 RUCUS (RUN CUTTING AND SCHEDULING) IMPLEMENTATION MANUAL. The Run Cutting and Scheduling (RUCUS) package is a set of computer programs designed to assist transit properties in developing headway sheets, scheduling vehicles, and making driver work assignments. RUCUS has been extensively field-tested and is currently supporting the scheduling activities at a number of properties. The package, which is now available to the transit industry (through the Transportation Systems Center in Cambridge, Massachusetts) includes detailed program documentation, descriptions of the required input data, output reports and messages, and the program source code. This handbook provides guidance in implementing the RUCUS systems at the user's property, outlining such steps as obtaining and organizing the necessary resources, constructing the initial data base, and using the RUCUS programs. This handbook is to be used as an adjunct to existing documentation which defines in detail the execution of the system programs.

Nussbaum, E Rebibo, KK Wilhelm, E ; Mitre Corporation, Urban Mass Transportation Administration MTR-6949, UMTA-VA-06-0004-75-4, July 1975, 198 pp; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247754/5ST, DOTL NTIS

21 095260 IMPROVEMENTS OF RAPID TRANSIT SYSTEM GOODNESS. The goodness of a rapid transit system depends on such factors as headway, average commercial speed through the system, capacity per unit train and safety. Improvement of system goodness can be achieved by optimizing each of these parameters. As they are interdependent, their relationships have to be analyzed. One method of improving system goodness is to use a double arrival track at each station. This configuration allows capability for future expansion and provides excellent system flexibility under track outage conditions. Use of this track configuration in downtown areas with optimized train routing strategies can provide maximum utilization of physical facilities and rolling stock, and provide the public with more transportation per dollar of cost. This paper discusses the relationship of the above factors and the advantages of using double arrival tracks at stations.

Kalra, P (Bechtel Corporation) Oswald, R *High Speed Ground Transportation Journal* Vol. 8 No. 3, 1974, pp 185-193, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

21 095722 COMPILATION OF TIME TABLES, OPERATING SCHEDULES AND DUTY ROSTERS BY HEURISTIC PROCESS WITH THE AID OF EDP. The objective of this development was relieving scheduling offices of a periodic, expensive manual process, simultaneously optimizing criteria by complete integration of all related transport and operating requirements and restrictions and of legal and collective wage agreement regulations. The goals were minimizing of deadheading of equipment, minimizing of the crew costs and other means of reducing operating expenses. The eventual goals will be graphical production of timetables and the optimization of connections between different routes.

Kregeloh, H Netzband, I Mojsilovic, M *Union Internationale des Transports Publics, Revue* Vol. 24 Jan. 1975, pp 81-86, 3 Fig., 3 Ref.; ORDER FROM: Union Internationale des Transports Publics, Avenue de l'Uruguay 19, B-1050 Brussels, Belgium Repr. PC

21 097283 LEVEL-OF-SERVICE CONCEPT FOR EVALUATING PUBLIC TRANSPORT. A system of evaluating service variables common to all public transport modes is proposed so that an existing system may be managed or improved and a new system may be built on the basis of its ability to fulfill a desired level of service. The variables discussed are those directly perceived by the user regardless of mode: overall trip speed and en route delay and comfort factors associated with the vehicle including density, acceleration, jerk, temperature, air flow, and noise. Improving one or more of these measurable variables bears an associated cost and design requirement. Since better service is desirable in certain situations while average service is sufficient in others, levels of service A through F are adopted for each variable. In the proposed system, level of service is determined by the use of a weighted average of rankings assigned to individual factors. Within tolerable limits, 40 percent of the overall ranking should be based on speed and delay and 60 percent on comfort factors. When an individual comfort variable becomes intolerable, the entire ride is at service level F. Application of the

procedure results in reasonable comparisons of both systems and individual trips within a system.

Botzow, H (Port Authority of New York and New Jersey) *Transportation Research Record* No. 519, 1974, pp 73-84, 5 Tab., 13 Ref.; Prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

21 097676 THE INTERACTIVE GRAPHIC TRANSIT DESIGN SYSTEM: A BRIEF NON-TECHNICAL OVERVIEW OF ITS STRUCTURE AND OPERATION. The purpose of this paper is to present a brief summary of the structure and operation of a man-computer system for designing a bus transit system for many origin-to one destination travel patterns in an urban region. In its manual mode, the planner is asked to make eight decisions concerning park-ride lots, the type and frequency of the bus service and the pricing of the complete journey. A modal split model then determines the percentage of people taking the modes, walk bus, drive bus and drive. Visual displays enable the planner to evaluate the economic and socio-economic performance of his system. The system can also pre-set some of the eight decision variables in order to limit the number of combinatorial options available to the planner. The system will soon be applied to the problem of designing and evaluating a bus transit service to the campus of the University of Washington, its first test in a real-world setting. /TRRL/

Schneider, JB Gehner, CD (Washington University, Seattle) *Logistics and Transportation Review* Vol. 10 No. 1, 1974, pp 41-53, 2 Fig., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212143)

21 097868 VEHICLE IDENTIFICATION IN PUBLIC TRANSPORT [Voertuigidentificatie in Het Openbaar Vervoer]. This article is meant to prompt local and regional public transport to adopt a uniform attitude towards a standard coding. To that purpose a number of possible forms of organisation are juxtaposed and the consequences for the standard coding as well as the effects on the organisation are compared. For the time being a form of organisation for each transport area is preferred to one for each control area. However, the proposed standard coding provides for both forms of organisation. Attention is also paid to the equipment needed. The article gives a practical key to the organisation per transport area. /TRRL/ [Dutch]

Corzilius, DH *Verkeerskunde* Vol. 26 No. 2, Feb. 1975, pp 86-89, 5 Fig.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 212602)

21 098580 IMPROVING URBAN MOBILITY THROUGH BETTER TRANSPORTATION MANAGEMENT. Pressure is building in America to "do something" to improve urban mobility. Many treatments designed to relieve these combined pressures rely on the development and demonstration of new systems technology which usually requires long lead times and high capital costs. However, there are low-cost options available to use now which can significantly improve urban mobility, can be implemented quickly, and also offer environmental and energy conservation benefits. Some of these techniques concentrate on improving the people-moving efficiency of the

existing road systems through more effective management; some at improving transit operations. Others concentrate on improved utilization of the automobile through ride-sharing programs. Still other techniques attempt to reduce the demand for motor vehicle transportation services and facilities. The technique or combination of techniques used depends on the needs and resources available in the specific area, but each can be a positive response to the complex issues involved in urban transportation today. This publication illustrates what is being done and what can further be done to improve urban mobility.

Reichart, KB; Federal Highway Administration FHWA-PL-77-004, 30 pp; Available NTIS, PB-260539/2ST.; ORDER FROM: NTIS

21 099240 EVALUATING PUBLIC TRANSPORTATION FOR EFFECTIVE DECISION-MAKING. This paper views evaluation criteria in the transportation planning process from the operator's perspective. It is concluded that evaluation criteria for goals objectives, and responsibilities must be designed to permit innovation in organization structure, facilities, operating procedures and practices, and service promotion, merchandising, and marketing. A table is presented showing evaluation criteria from the operator's perspective. It is organized according to the following three major areas of concern: organization, facilities, and operations.

Hill, NE (San Antonio Transit System) *Transportation Research Board Special Reports* No. 155, 1975, p 29, 1 Tab., 1 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

21 099245 WORKSHOP 4: THE OPERATOR'S ROLE. The purpose of Workshop 4, which viewed the evaluation of urban public transportation from the operator's perspective, was to examine the following 5 basic subject areas: the elderly and the handicapped, manpower, hardware and equipment, financial, and marketing and management. This report of the proceedings of Workshop 4 identified the following research projects as being necessary for an adequate evaluation of urban public transportation: (1) planning and design of mass transportation services to meet mobility needs of the elderly and handicapped; (2) study of the merits and problems of combining some transit, school transportation, and goods movement with transit vehicles; (3) evaluation of the purchase of new transit vehicles via the consideration of new-vehicle quality as measured through vehicle maintenance costs; (4) effectiveness of Federal and/or State operating subsidies for urban public transportation; (5) development of effective marketing disciplines for promotion of use of club buses, subscription bus service, special charter group trips, etc.; (6) effect of car pool promotions on transit; (7) evaluation of fare packaging procedures as a tool for inducing transit ridership and reducing the cost associated with the sale and collection of tickets; (8) use of retired and part-time personnel as transit employees; and (9) human resource and development needs for expanding transit services.

Schnell, JB (American Public Transit Association) *Transportation Research Board Special Reports* No. 155, 1975, pp 45-46; ORDER FROM: TRB Publications Off, Orig. PC

21 099301 ROLE AND EFFECTIVENESS OF CONTRACT MANAGEMENT IN THE TRANSIT INDUSTRY. During the past decade, there has been a growing trend toward public acquisition of failing private transit companies. Many cities recognized however, that they do not have city personnel with the expertise, knowledge, or experience to run the newly acquired systems. Public entities which are responsible for the transit operations of publicly owned transit systems often must be created and take the form of transit authorities, commissions or boards. Many public entities have turned to transit management companies to run the daily operations of their systems. A study of the three major contract management companies and 26 properties managed by them has been conducted. The purpose of the study was to: 1.) survey the three major transit management companies in terms of ownership and history, present size and operating scale, management philosophies and corporate perspective on transit management; 2.) survey the organizational structures of various transit systems operated by contract management, the decision making process and the organization effectiveness. Results and conclusions obtained from this research could be summarized in the following: 1) contract management companies perform a justifiable role in the current state of development in the transit industry; 2) there are three basic types of organization structures utilized by publicly owned-contract managed transit systems. Each of these types tends to have typical characteristics relative to the decision making process within the organization; 3) transit systems associated with each of the major transit management companies tend to have individual characteristics which reflect each company's own operating philosophies and perspective. At the end a number of recommendations have been made relative to contract management and future research.

Bakr, MM Robey, D Miller, TS (United States Marine Corps); Marquette University No Date, 51 pp, 2 Fig., 5 Tab., 13 Ref., 1 App.; Prepared as part of a program of Research and Training in Urban Transportation at Marquette University sponsored by the Urban Mass Transportation Administration.

21 099496 BUS PRIORITY STRATEGIES AND TRAFFIC SIMULATION. Simulation of corridor traffic (SCOT), a recently developed computer model that simulates traffic flow within a specified traffic system, has been used to predict the effect on bus service and general traffic performance of implementing candidate bus priority strategies. Numerical values of standard traffic performance measures were determined from computation of network vehicle trajectories. SCOT was calibrated to current peak-hour traffic conditions within an urban street grid representative of the central business district of Minneapolis. Data from city agencies were used in conjunction with field experiments to verify SCOT simulations. Various bus priority strategies designed to increase bus speeds by providing bus-only lanes were evaluated. The significant elements in bus travel time were shown to be frequency of station stops and red light signals. Further studies planned include identifying optimum bus station locations, developing bus progressive traffic signal timings, and evaluating various bus preemption of traffic signal strategies.

Demonstration projects are under consideration to evaluate the simulation technique as a transit operations tool.

Muzyka, A (Transportation Systems Center) *Transportation Research Board Special Reports* No. 153, 1975, pp 39-49, 2 Fig., 2 Tab., 6 Ref.; Presented at the 7th Summer Mtg. of TRB in cooperation with Florida DOT, Jacksonville, Fla., Aug. 5-7, 1974.; ORDER FROM: TRB Publications Off, Repr. PC

21 125197 BINARY STATION CHOICE MODELS FOR A RAIL RAPID TRANSIT LINE. Using two independent data sets, alternative binary station choice models were successfully calibrated and tested. The regression and probit models are based on a two stage decision process: first the commuter selects his mode of travel, and then, given the use of rapid transit, he chooses a station. The station choice models focus on the second stage of the decision process. The models estimate the relative frequency a station will be selected by commuters from a census block group, given a modal choice of rapid transit. This proportion is a function of the trip cost difference between that station and the next least cost station. /TRRL/

Desfor, G (York University, Canada) *Transportation Research* Vol. 9 No. 1, Feb. 1975, pp 31-41, 3 Fig., 5 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213119); ORDER FROM: ESL, Repr. PC, Microfilm

21 125452 COMMON BUS LINES. In large cities operating an important public mass transit network, we are faced with the problem of "common bus lines:" some routes share common sections and the passenger must select the buses he will probably use. While most computer packages code the section as a unique link and disregard the precise assignment of passengers on the distinct routes, we give a solution to this operational assignment based on the "perceived" travel time. Formulated as an optimization problem within a probabilistic context, the optimal subset of routes "to be selected" is obtained. A more detailed treatment on uniform and exponential cases for the time of the first vehicle to arrive on a route concludes the paper. /Author/

Chriqui, C Robillard, P *Transportation Science* Vol. 9 No. 2, May 1975, pp 115-121

21 125535 PASSENGER TRANSPORT OPERATIONS. RECOMMENDATIONS ON A STANDARD FINANCIAL STATEMENT AND A ROUTE COSTING SYSTEM. As part of their duties under the local government act 1972, the new county councils will have an overall responsibility for transportation, planning and their co-ordination. The new authorities will be expected to draw up transport policies and programmes for submission to the department of the environment. In order to do this they will need to know details of cost and revenue information for a wide variety of patterns and levels of bus operation. At present the various classifications of operators who provide public road transport vary widely in their accountability and information practices, and this paper gives recommendations for A standard financial statement and a route costing system. The layout of the standard financial statement is given and detailed notes are provided. The prime basis of the route costing

system is time, although specific items are costed solely on a mileage basis. Appendices are given showing suggested cost allocations, layout, recommendations for allocating revenue to services and peak vehicle allocations. /TRRL/

Chartered Institute of Public Finance & Accounting Apr. 1974, 49 pp, 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 213005)

21 125562 TRAFFIC MANAGEMENT. BUS PRIORITY SCHEMES (PAPERS E11, E12, E14, E15, E16, E17, E18). The theme: "bus priority schemes" contains the following papers: bus priorities and traffic management, richbell, le; evaluating a network of bus segregation schemes, lane, r and hodgkinson, dh; cost benefit analysis of bus lanes, cracknell, ja and beatson, je; the re-admission of buses to pedestrian streets—a bus demonstration in gateshead murray, ra and ennor, pd; oxford street experiment: environmental improvement, turner, ed; accidents in contra-flow bus lanes, madelin, kb; the effects of bus priority schemes in bus operation, oliver, am and freedman, jd. For the covering abstract of the proceedings, see IRRD abstract no. 212285. /TRRL/

Planning and Transport Res and Computation Co Ltd Conf Paper No Date, p 71, Figs., Tabs., Refs.; Presented at the Seminar on Traffic Management.; ACKNOWLEDGMENT: TRRL (IRRD 212292)

21 126086 OPTIMIZATION OF PUBLIC TRANSPORT SYSTEMS [Optimalisering av Openbaar Vervoerssystemen]. Little attention has been paid to the optimization of public transport systems having fixed routes and fixed schedules and with or without a specific infrastructure. Optimization in this case concerns traffic-dependent quantities, e.g. number of travellers, traveller-kilometrage, costs and revenues. A very important factor in optimizing a public transport system is the strong relation between transport demand and transport facilities (accessibility, speed, frequency). At present only partial solutions are available; the most relevant of these are described. In the long term the research by this author is aimed at solving this problem as far as possible. First, research is proposed on the interrelation of supply and demand by elaborating a particular method yielding partial solutions. For this purpose a computer program is being developed. /TRRL/ [Dutch]

Edelman, WF (Delft University of Technology, Netherlands); Colloquium Vervoersplanologisch Speurwerk Conf Paper 1974, 7 pp, 2 Fig., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-213408)

21 127729 THE IMPACT OF TECHNOLOGY ON INTERNAL ORGANIZATION OF THE URBAN PASSENGER TRANSPORTATION ENTERPRISE. This paper introduces methodology, data analysis and results relating to work organization characteristics in three areas—taxi-cab companies, bus operations and rail rapid transit. Technology as an independent variable is quantitatively scaled according to vehicle loading capacity, service controllability and capital intensiveness. The model proposes two objective measures—Time Span of Discretion (TSD) and Discretionary Resource Rate (DRR) at various hierarchical levels, along with their product—the Position Power (PP). The organizational structures of the various urban transportation enterprises are appraised on this basis.

Wirth, I Crossman, ERFW (California University, Berkeley); Cross (Richard B) Company Vol. 16 No. 1, 1975, pp 157-164; This paper is from the Proceedings of the 16th Annual Joint Meeting of the Canadian Transportation Research Forum and the Transportation Research Forum, 3-5 November 1975, Toronto, Canada. Complete Volume \$20.00.; ORDER FROM: Vietsch (Grant C), 181 East Lake Shore Drive, Chicago, Illinois, 60611

21 127900 PROPOSED O.R. WORK ON RAIL TABLING. This note proposes an initial feasibility study into the production of timetable "standards" as part of the possible application of O.R. Techniques to assist railway timetable compilation. If successful this will be followed by joint O.R./D.P. Assessment and extension to joining of standards. /TRRL/

Weston, JG; London Transport Executive Tech. Note #88, Aug. 1974, 3 pp; ACKNOWLEDGMENT: TRRL (IRRD 215030); ORDER FROM: London Transport Executive, Transad House, Leicester Square Station, London, England Repr. PC

21 127901 PUBLIC TRANSPORTATION LINE POSITIONS AND HEADWAYS FOR MINIMUM USER AND SYSTEM COST IN A RADIAL CASE. In this paper, a model of a transit system is built in polar coordinates with radial transit lines in order to find the line positions and headways which minimize user (travel time) and transit agency (operating) costs in response to A general population density function. It is found that the optimum line location is related to the population density and the circumferential access. The optimum headway is found to be that which causes user waiting time cost to equal the operating cost. The simplification of a population density function varying only radially is introduced. A method for determining the optimum number of lines is developed. This number depends upon the ratio of the access cost to the sum of the waiting and operating costs. It is proven that, for optimality, lines should be located in the centers of corridors of uniform width and have equal headways. A fleet size constraint is also introduced for the simplified case. It is proven that for optimality, the fleet is divided equally between lines. (A) /TRRL/

Byrne, BF (West Virginia University) *Transportation Research* Vol. 9 No. 2/3, July 1975, pp 97-1023, 3 Fig., 3 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 215059); ORDER FROM: ESL, Repr. PC, Microfilm

21 128744 FEEDER BUS SERVICE FOR COMMUTER RAIL. A demand model for feeder bus ridership is developed (input variables: location of rail users, income of users, transit fare, level of transit service and walk time to bus route), and a cost-effectiveness framework is used to compare alternative systems. The main measure of effectiveness was the number of commuter rail users who would use the feeder bus service, and the cost was taken as the long run marginal cost, or the total average cost. Application of the methodology to a study area which included three commuter rail stations showed that all feeder bus systems would operate at a loss. Bus routes with loops in residential areas and direct service to the stations had the best ridership.

Shortreed, JH (Waterloo University, Canada) Ireland, JA (York, Municipality of, Ontario)

Canadian Journal of Civil Engineering Vol. 2 No. 4, Dec. 1975, pp 530-539, 10 Fig., 1 Tab., 3 Ref.

21 129295 THE OVERALL JOURNEY TIME AS COMPARED WITH TRAVELLING TIME IN LOCAL PUBLIC TRANSPORT [Die fahrzitatequivalente Reisezeit im oeffentlichen Personennahverkehr]. The journey time is composed of different elements, to which different weighting factors should be applied, so as to which different weighting factors should be applied, so as to give them a value corresponding to the passenger's psychological attitude to each different aspect of the journey. The author analyses weighting factors for walking time, waiting time, and time spent catching connections. He then illustrates with examples the influence of the weighting factor of these times and of frequency of the service on the overall journey.

Walther, K *Verkehr und Technik* Vol. 28 No. 7, July 1975, pp 271-275, 1 Tab., 19 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Schmidt (Erich) Verlag, Herforder Strasse 10, 4800 Bielefeld, West Germany Repr. PC

21 129346 BUS CAPACITY ANALYSIS. This paper provides an initial input for updating the section on bus capacity in the Highway Capacity Manual and identifies parameters, principles, and procedures for estimating the capacity of bus facilities and systems. It reviews available data on bus capacities, suggests design assumptions for bus system planning and analysis, and outlines further research needs. The studies demonstrate that (a) the critical element governing system capacity is the bus station platform or bus stop rather than the busway; (b) at stations, capacity is determined by the number of door channels on the bus and fare collection practices; and (c) bus capacity should be viewed in terms of people transported rather than buses moved per hour.

Hoey, WF Levinson, HS (Smith (Wilbur) and Associates) Vuchic, VR, Discussor Day, FB, Discussor *Transportation Research Record* No. 546, 1975, pp 30-43, 1 Fig., 8 Tab., 16 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

21 129347 FRAMEWORK OF ROUTE SELECTION IN BUS NETWORK DESIGN. The purpose of this study is to establish a framework of route selection in bus network design, based on the proposed functional description and evaluation system. In the proposed framework, the network is classified into residential, activity, and transfer nodes. Routes connecting the transfer nodes serve as the regional system, and other routes constitute the local systems. The evaluation system designed is capable of reflecting both the connectivity of transfer nodes and the accessibility of the residential and activity nodes. To establish the priority of route selection, several attributes were tested against transit use at the neighborhood level. The level of transit service was the sole dominant factor in the traveler's determination of mode choice. Furthermore, the employment activity nodes were significantly correlated with route performance. If the work trips and route performance are given prior consideration, employment serves as a good index during the process of network development. If the provision of accesses to other activities is taken into consideration, employment can also serve as

a good indication by connecting those activity nodes to the other elements of the network. This framework will be especially useful when it is integrated in a heuristic algorithm for optimization of network design. A case study was carried out to demonstrate the use of this framework in four stages of bus network development in the Denver area.

de Hsu, J (Illinois Institute of Technology) Surti, VH (Colorado University, Denver) *Transportation Research Record* No. 546, 1975, pp 44-57, 4 Fig., 6 Tab., 21 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

21 129809 ROUTE LAYOUT PHILOSOPHY AND SERVICE COORDINATION PARTICULARLY FOR LIGHT RAIL TRANSIT. Peak-period and all-day service in public transportation are discussed with emphasis on light rail transit. Peak-period service treats each line as a separate entity operating from residential neighborhoods directly to the central business district. This type of service is typified by the American metro-mode motor-bus concept. Each route in an all-day service interacts with every other route enabling regionwide mobility. This integrated approach is found throughout Europe and is also well developed in a few U.S. and Canadian cities. Traditional network arrangements, such as radial and grid setups, and more recent concepts, such as the timed transfer focal point, are considered. Detailed aspects of service integration including schedules, passenger facilities, information, and fares are reviewed. That a widespread disinclination in North America to implement integrated systems exists because of limited funds and management disinterest is noted. The organizational structure successfully adopted in Europe to bring about service integration is described.

Sullivan, BE (British Columbia Department of Municipal Affairs) *Transportation Research Board Special Reports* No. 161, 1975, pp 26-36, 1 Fig., 1 Tab., 20 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

21 129969 SIMULATION OF URBAN RAILWAY TRANSPORT WITH COLOR GRAPHIC DISPLAY IN CONVERSATIONAL MODE [Utilisation d'une console de visualisation quadrichrome en mode conversationnel pour l'étude de la regulation d'un reseau ferre urbain]. General evolution of urban rapid transit is leading to a reduced headway between trains in order to increase the transport capacity during peak hours. Any traffic disturbance becomes rapidly more and more important and it is difficult to maintain the theoretical maximum capacity. A conversational mode system, consisting of a 4 color graphic display connected with a computer enables consultant engineers to simulate traffic. The display gives a space-time, or speed-space diagram and the operator can modify it, using light pen, function keys and keyboard. Introduction of a disturbance in traffic flow may result in different kinds of diagram, according to the selected corrective strategy. Automatic regulation may be tested on this system, and later applied on real-time system. [French]

Quonten, R *Traffic Control and Transportation Systems* Conf Paper 1974, pp 519-527, 2 Fig.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 215934); ORDER FROM: North-Holland Publishing Company, 335 Jan van Galenstraat, Amsterdam, Netherlands Repr. PC

21 131801 MORE CONVENIENT CHANGING AT PLACES WITH A CONCENTRATION OF BUS STOPS [Geriefellijker overstappen op een busseplein met halteconcentratie]. One of the measures which public transport companies can take to improve their product lies in the field of provisions for changing. This article deals with a system that has been developed with the purpose of reducing the inconvenience of changing at big stations with much bus movement and a large concentration of stops. It also pays attention to the arrival and departure platforms as well as the buffer space, the working out of the chance that the buses that arrive will outnumber the platforms is based on the method of elementary probability calculation. In the case of busy stations the application of formulae from the stochastic theory of processes is more suitable. /TRRL/ [Dutch]

Grondelle, WJ (Nederlandse Spoorwegen Utrecht) Polder, W (Centrum voor Vervoersplanner Utrecht) *Verkeerskunde* Vol. 26 No. 10, Oct. 1975, pp 525-529, 3 Fig., 1 Tab., 8 Phot.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV46014E), TRRL (IRRD-216272); ORDER FROM: PB8100

21 132237 A COMPUTER PROGRAM FOR THE ANALYSIS OF WAITING TIME SURVEY DATA. This paper describes a computer program developed at the Traffic and Transport Survey division, PWD, Hong Kong. It begins with a brief review of methods used in the study of delays experienced by pedestrians at the kerbside, waiting times of bus passengers at a bus stop or those of vehicles at a vehicular ferry concourse. The tedious data analysis work has prompted the development of a computer program which, in addition to simplifying data analysis, helps to extract as much information as possible from the survey data. The input data include the numbers of bus passengers waiting at the commencement and the end of the survey, the numbers of passengers arriving or departing (by bus or otherwise) in subsequent specified short intervals. Assuming a proper queue formation, the computer evaluates the statistical distribution of passenger waiting times and presents the information in a histogram in bar chart form. (A) /TRRL/

Nip, KF (Public Works Department, Hong Kong) *Highway Engineer* Vol. 22 No. 10, Oct. 1975, pp 22-24, 2 Fig., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 216075)

21 133104 SCHEDULE CONTROL AND MANAGEMENT INFORMATION SYSTEM STUDY. The report describes a study performed for the Chicago Transit Authority (CTA) to develop recommendations and development plans for a Schedule Control and Management Information System. According to the authors, this system would be a further improvement upon and extension of the Automatic Vehicle/Bus Monitoring (AVM) System which was installed

by CTA in 1970 and was the first of its kind in the U.S. Sections 1, 2, and 4 of the report constitute the equivalent of an executive summary. Section 1 presents an overview of the system, giving the purpose, background data, and scope of the study. Section 2 gives system requirements, functional information flow, and a brief system description. Section 4 details the implementation plan with a breakout of functions and task objectives including a discussion of schedules and personnel organization and responsibilities, and a detailed discussion of potential benefits. Section 3 comprises a comprehensive system description by subsystem including bus control, communications, communications processing, main processing, operations control center, route control, street displays, customer information system, and radio maintenance.

International Business Machines Corporation, Urban Mass Transportation Administration, Chicago Transit Authority, (UMTA-IT-09-0040) Final Rpt. UMTA-IT-09-0040-74-1, Nov. 1974, 557 pp; Prepared in cooperation with Chicago Transit Authority, Ill.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-250986/7ST

21 134062 INTEGER PROGRAMMING FORMULATION FOR DERIVING MINIMUM DISPATCH INTERVALS ON A GUIDEWAY ACCOMMODATING THROUGH AND LOCAL PUBLIC TRANSPORTATION SERVICES. Vehicles are dispatched at regular intervals from station zero to station j. Vehicles 1,3, ... Stop at all stations along the guideway while vehicles 2,4,... Proceed directly to station j. Stations accommodating local vehicles are off-line to enable through vehicles to pass the stations without delay. A mixed integer programming model is formulated with an objective of minimizing the time interval between dispatches of vehicles having identical operating patterns. The major constraints provide lower bounds on the headway between successive vehicles at the merge points just downstream from the off-line stations. (A) /TRRL/

Bergmann, DR (General Motors Corporation) *Transportation Planning and Technology* Vol. 3 No. 1, 1975, pp 27-30, 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217381); ORDER FROM: ESL

21 134683 INTERACTIVE GRAPHICS SYSTEM FOR TRANSIT ROUTE OPTIMIZATION. A person-computer interactive graphics system for optimizing the routing structure on an urban transit network is presented. The system allows a user to design bus, streetcar, and subway routes on a display scope and to specify route frequencies and types of vehicles. The computer predicts the effects of the routing structure by assigning potential transit trips to the network and it displays the route loadings along with statistics on travel times, rolling stock use, and operating costs. After evaluation, the user can partially or totally modify his or her designs and thereby move toward routing schemes that come closest to planning objectives. The system is based on a multipath transit assignment model that is a further development of R. B. Dial's stochastic assignment algorithm. The model is implemented on a CDC 7326 series computer with a display scope, and it has been tested by being applied to the Lausanne, Switzerland,

public transit system. A second implementation of the model has been realized on a small computer environment and is being used productively for optimizing the 24-route tramway and bus network of Basel, Switzerland. The methodology and some results of these applications are described.

Rapp, MH; Mattenberger, P; Piguet, S; Robert-Grandpierre, A. *Transportation Research Record* No. 559, 1976, pp 73-88, 16 Fig., 1 Tab., 9 Ref.; ORDER FROM: TRB Publications Off

21 137057 DATA MANAGEMENT METHODS FOR URBAN MASS TRANSPORTATION SYSTEMS. The report describes a computer based Data Management and Retrieval System for the Urban Mass Transportation Industry. The System is designed to aid the transportation planner, engineer, and manager in solving recurring problems associated with (1) collection; (2) categorization and synthesis; (3) storage and (4) retrieval of urban mass transportation information. The system is designed to be used by personnel without formal computer training with the everyday vocabulary associated with many classes of rapid transit operation, evaluation, and studies. The features and use of an example system is described for rail rapid transit noise abatement studies. The example system combines (1) physical data describing the system and (2) measured noise levels as an aid in evaluating cost effective acoustic treatments for lowering rail rapid transit noise.

Priemer, R; Silver, ML; Illinois University, Chicago, Urban Mass Transportation Administration, (UMTA-IL-11-0007) Res. Rpt. UMTA-IL-11-0007-75-1, Sept. 1975, 77 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254798/2ST, DOTL NTIS

21 137349 DEVELOPMENT AND OPERATIONAL VALIDATION OF A TRANSIT BUS SIMULATION. A computer simulation incorporating the significant operational factors and transit bus characteristics has been developed to compute power, fuel consumption, and emissions over an arbitrarily prescribed mission profile. Factors considered include roadway grade, air density, aerodynamic drag, bus center-of-gravity location, front and rear tire inflation pressures, acceleration, weight, and torque converter characteristics. A portable instrumentation package was designed, constructed, and installed on a bus. Operational tests were conducted for a variety of velocity-time profiles for three gross weights. Continuous data recorded included engine speed, torque-converter output shaft speed, fuel flow, electrical load, wind speed and direction, and atmospheric data. Typical mission profiles for an urban transit bus were established by shadowing buses on two most typical routes. The results of the experimental program and mission profile analysis have been used to validate the computer simulation previously developed and to allow the determination of the relative importance of operational and design features on the fuel economy and emission characteristics of a transit bus operating on a realistic mission profile.

Fairchild, JE; Stephens, LW; Williams, T; Simmons, GAJ; Texas University, Arlington, Urban Mass Transportation Administration, (UMTA-TX-11-0001) UMTA-TX-11-0001-75-2, Nov. 1975, 99 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254891/5ST

21 137378 A PRELIMINARY SYSTEMS DESIGN FOR A MULTI-PURPOSE TRANSIT PLANNING AND MANAGEMENT INFORMATION SYSTEM. The report presents a preliminary systems design for a multi-purpose transit planning and management information system. It conceptualizes two such information systems: one for the automation of transit schedule data for the production of scheduling related reports, and the other for the automation of transit schedule data and street network data for a general transit information system. While the former system is designed to produce the types of reports currently manually produced and in use by the transit industry, the latter system is intended to provide an automated data base for the planning and marketing of transit services. The purpose of the report is to provide transit properties and others with an efficient file structure for organizing schedule data for the production of various types of output based on the concept of random access search.

Friedman, TW; Washington University, Seattle, Urban Mass Transportation Administration Res. Rpt. RR-76-1, UMTA-WA-11-0005-76-1, Mar. 1976, 102 pp; Contract FWPCA-WA-11-0005; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255178/6ST

21 137964 TECHNICAL APPROACHES IN CO-ORDINATING PUBLIC TRANSPORT. The author describes his work in Cleveland, Ohio which was concerned with quantifying the level of public transport service and personal mobility. The criteria chosen for calculations on the level of service are coverage, linkage, frequency and speed. Category analysis is carried out calculating public transport opportunities and accessibilities on four different types of trips. This shows up weaknesses in some areas such as inaccessibility for shopping. Given a desired level of public transport investment it can be seen how to allocate improvements. Some useful results are obtained from the study. The discussion which followed is included. /TRRL/

McBrayer, DB (Voorhees (Alan M) and Associates, Incorporated) Ennor, PD; Newcastle-Upon-Tyne University, England Monograph 1974, pp 91-106, 4 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-219546)

21 138131 LABOR IN THE TRANSIT INDUSTRY. This examination of employment and compensation trends, labor/management relations, government involvement and employee productivity, found that management (which comprises 15 percent of the workforce) receives inadequate attention, and that labor compensation comprises approximately 65 percent of the industry's operating costs. It urges that Congress should expand Urban Mass Transportation Administration funding of management related programs to remedy the situation regarding recruitment and training of management personnel. Transit union activity related to compensation should be closely monitored by UMTA. The implications of Section 13(C) of the Urban Mass Transportation Act of 1964 are covered and the role and impact of paratransit service is considered. Labor productivity is examined and it is noted that while neither system size nor ownership have a significant effect on labor productivity, work rules and compensation patterns exert a major influence on productivity.

Lieb, RC (Northeastern University); Department of Transportation DOT/TPI/10-77/02, May 1976, 102 pp, 9 Tab., Refs., 5 App.; ACKNOWLEDGMENT: NTIS, Monthly Catalog of US Government Publications, GPO (TD 1.2:L 11/2); ORDER FROM: NTIS, GPO; PB-265235/2ST, DOTL NTIS, S/N-050-000-00119-9

21 138981 A MATHEMATICAL PROGRAMMING MODEL FOR OPTIMAL SCHEDULING OF BUSES DEPARTURES UNDER DETERMINISTIC CONDITIONS. The article formulates a mathematical model of a general public transportation network and suggests an optimization procedure to schedule the buses' departure times. It is assumed, as a reasonable approximation, that the network operates under known deterministic conditions; namely, the lines' routes, the stations' locations, the numbers of passengers and the traffic intensity are supposed to be given. In this general framework, however, no further restrictions are imposed. The proposed performance index of the system is the average waiting time of passengers, and it has to be minimized by a proper choice of the decision variables-i.e. The buses' departure times-without violating the constraints of prescribed numbers of buses and drivers. For the sake of lucidity the model is first developed under the assumption that the loading as well as the unloading times of passengers are zero. Afterwards the consequences of the relaxation of this supposition are investigated. (A) /TRRL/

Friedman, M *Transportation Research* Vol. 10 No. 2, Apr. 1976, pp 83-90, 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220244)

21 139353 URBAN TRANSIT OPERATIONS: MANAGEMENT INFORMATION SYSTEMS AND COMPUTER APPLICATIONS. This selected, annotated bibliography which covers publications between 1970 and September 1975, places emphasis on information which may be of use to the transit operator. The 203 citations here relate to management information systems, scheduling, bus transit demand service bus transit priority operation, communications and control (bus transit, rapid transit taxicabs, urban transit), fare collection, traveler information, maintenance and security. An author index and geographic index are included, as well as addresses of periodicals and publishers.

Henry, MK; Northwestern University, Evanston Bibliog. 1975, 36 pp, 203 Ref.; Sponsored by an UMTA Grant.

21 141283 TRANSIT SYSTEM CIRCULATION SIMULATOR: A PRACTICAL DESIGN TOOL. This paper presents a transit circulation simulation model to be used heuristically for evaluating and choosing from alternative designs. The simulator measures changes in the performance of a trial transit system that result from variations in the design parameters. These include location of transit nodes, demand flows, vehicle capacity and speed, location of routes, and number of vehicles per route. The model output includes system, route, and vehicle performance characteristics, number of passengers served, and their average in-system travel and wait times. A monitoring capacity provides information, at any time interval, for the number and location of

passengers waiting for service, delivered, or en route. The time interval scanning technique is also used to trace the movement of vehicles through the transit system and to provide insight for the next trial scheme. The simulator is demonstrated through the analysis of a new transit system for a university activity center.

Page, JH (Virginia Department of Highways and Transportation) Demetsky, MJ (Virginia University) Morris, D (Virginia Highway & Transportation Research Council) *Transportation Research Record Conf Paper No. 582, 1976, pp 28-38, 7 Fig., 6 Tab., 9 Ref.*; Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

21 142175 SHORTEST ROUTE AND AREA DISTRIBUTION, TWO TRAFFIC PLANNING PROGRAMS [Kortaste vaeg och foerdelning paa omraaden, tva trafikplaneringsprogram]. This study is performed within the project Optkolt (optimization of public transportation in urban areas, IRRD no 601276). Two traffic planning programs are presented concerning shortest route determination and area traffic distribution in terms of descriptive text and flow charts. References are given to the corresponding computer programs available at the Department of Mathematics at Linkoeping University. /TRRL/ [Swedish]

Johnsson, H ; Linkoeping University, Sweden Rpt. LIH-MAT-EX-74-2, 16 pp, 5 Fig., 3 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN34025E), TRRL (IRRD-220909)

21 142317 METHODS TO SIMPLIFY NETWORK REPRESENTATION IN TRANSPORTATION PLANNING. The problem of Network Aggregation is defined as the simplification of the number of nodes and links in a transportation network. The objective of a network aggregation technique is to reproduce the level-of-service attributes (such as travel time) between any two points using a spider network as a proxy for the detailed. The aggregation procedure categorizes links into functional groups such as access, egress, line-haul, bypass and intra zonal circulation--which is a convenient classification in terms of transportation analysis. The technique presented has several distinguishing advantages. First, certain invariance properties are maintained--for example the total trip miles of travel is the same whether measured in the aggregate or detailed networks. Second, the method is systematic, rather than judgemental, which means the inaccuracies introduced as a result of network aggregation can be measured in a scientific way.

Chan, Y (Pennsylvania State University, University Park) *Transportation Research Vol. 10 No. 3, June 1976, pp 179-191, 15 Ref.*; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

21 142367 STAGGERED WORK HOURS IN MANHATTAN. In April 1970, about 50,000 persons from 45 private firms and government agencies in the downtown area began a new program of staggered work hours designed to determine if a break from the 9 to 5 schedule would relieve transportation congestion. By September 1972, more than 70,000 persons from 116 firms and public agencies had shifted to a new schedule from 8:30 to 4:30 and some from 9:30 to 5:30. Analysis of this operation indicates that

people like the new schedule, congestion at the peak hours has been relieved, and transportation operations have improved their services. Project sponsors met with commuter rail and transit system operators to suggest certain schedule and service changes. Elevator operations in main lobbies of office buildings have also been improved. Productivity changes are also noted: supervisors reported gains under the new hours; and the punctuality of employees increased.

Port Authority of New York and New Jersey July 1976, 10 pp., Figs.

21 142727 A QUANTITATIVE MODEL FOR NUISANCE [Een kwantitatief model voor hinder]. The utility of a transportation system, such as a road structure or a public transport system, is affected greatly by the nuisance caused by the operation of the system. In this paper an attempt is made to quantify the nuisance. A model is suggested which describes the relation between the nuisance experienced and its origin. The model has been applied to several types of nuisance, namely the influence of the number of transfers and the walking distance on the appraisal of public transport, the influence of the noise level on the nuisance experienced and the influence of traffic density on the mean speed. (a) /TRRL/ [Dutch]

Vans, HB (Verkeersakademie, Netherlands) ; Colloquium Verkeersplanologisch Spuurwerk Analytic 1976, pp 141-154, 7 Fig., 11 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV55009E), TRRL (IRRD 221561)

21 142959 PEAK-HOUR TRANSIT ROUTING. Transit routes radiating from the CBD are typical of most city bus operations. This type of routing has existed since the late 1920's with major changes primarily in the form of longer and more routes as the city grows. The major innovations away from this trend, the demand responsive systems, have met with varying degrees of success and in general have two undesirable characteristics, high cost and low ridership. The research reported here describes an alternative which incorporates both the advantages of the fixed route system and some of the advantages of demand responsive systems. The concept requires a residential clustering of employees who work at or near a single location. In this regard the six largest employers in Cedar Rapids, Iowa were analyzed. The 10 largest employee residence zones of each firm (99 total metropolitan area zones) accounted for 37.5%-52.7% of the total number of employees of each firm. The firms analyzed were dissimilar in location (CBD to fringe), and in employee characteristics (white to blue collar employees).

Peterson, SD (Howard, Needles, Tammen and Bergendoff) Wilson, EM (Wyoming University) *ASCE Journal of Transportation Engineering Vol. 102 No. TE4, Nov. 1976, pp 847-856, 3 Fig., 3 Tab., 10 Ref., 1 App.*

21 143038 A COMPUTERIZED BUS TRANSIT MANAGEMENT INFORMATION SYSTEM USING CREDIT CARD FARE COLLECTION DATA. This research indicates that development of a bus transit management information system that uses data from a bus credit card fare collection system is feasible from

a hardware and software standpoint. An assessment of the data available from the credit card system shows that valuable and timely ridership and revenue information, which would not be readily available otherwise, can be provided to assist in management decisions regarding changes in service. To match the large amount of available information to the transit manager's needs, a two level form of presentation is proposed with daily indicators for monitoring transit system performance and detailed reports available on demand.

DiCesare, F Sullo, G ; Rensselaer Polytechnic Institute, Urban Mass Transportation Administration, (UMTA-NY-11-0001) Final Rpt. UMTA-NY-11-0001-76-1, Apr. 1976, 104 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255982/1ST

21 144348 OPERATING STRATEGIES FOR BUS TRANSIT IN EDMONTON. This paper discusses the functions of public transit and what parameters determine the operating strategy to be followed. The physical considerations are then taken into account, both in relation to land use, inter-connectivity and the levels of service that are desired; keeping in mind what can be accomplished within budget constraints. The system of timed transfers as used in Edmonton is then discussed and how this system is being developed in stages and what impact the system has on patronage.

Bakker, JJ Palmer, MF ; Roads and Transportation Association of Canada Proceeding 1976, pp 197-204, 9 Fig., 5 Ref.; This paper was published as part of the Proceedings of the 1975 Annual Conference held in Calgary.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

21 145179 ROUTE SELECTION IS CRITICAL FACTOR IN DESIGN OF RAPID TRANSIT SYSTEMS. This paper examines and compares the Washington METRO System and the BART System with respect to route selection, station location, and service to the metropolitan area. The Washington METRO, less restricted by geographical and political constraints, is a more flexible system and offers a more flexible service. BART is a commuter rail system that complements the local transit systems, while METRO will become the backbone of an integrated regional transit system.

Seamon, JH *Transportation Research News No. 65, July 1976, pp 15-17*; ORDER FROM: TRB Publications Off

21 146437 A MATHEMATICAL MODEL FOR THE OPTIMUM UTILISATION OF BUS ROUTE NETWORKS, AS APPLIED TO LINKOEPING [En matematisk modell foer optimal trafikering av busslinjernaet tillampad paa linkoeping]. This report, which refers to the project OPTKOLT (computerised optimisation methods for the allocation of public service buses in urban areas), describes a network model, formulated as a mathematical programming problem, the object of which is to find frequencies for the bus lines and the number of travellers between areas, broken down by mode (by bus and on foot) and by road, in such a way that the total generalised journey time is minimised without the capacity of the buses being exceeded. Input data are a given bus network and a certain number and types of buses, as well as the number of trips to

and from each area. The model is intended for use in planning situations in the medium term, and is useful for testing alternative networks. It has the advantages that it takes into account capacity restrictions, and that it does not employ a given trip matrix but allows the matrix to adapt to the supply of transport. The model has been applied to the bus network in Linköping with good results. /TRRL/ [Swedish]

Scheele, S ; Linköping University, Sweden
Monograph Rpt. LITH-MAT-R-76-6, 1976, 122 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN38003E), TRRL (IRRD 222420)

21 146438 ALGORITHM AND COMPUTER PROGRAM FOR THE OPTIMUM UTILISATION OF A BUS ROUTE NETWORK [Algorithm och dataprogram för optimal trafikering av busslinjenät]. This report, which refers to the project OPTKOLT, gives details of the algorithm used for the solution of the network problem described in the previous report, (see IRRD abstract no. 222420). This algorithm also includes an algorithm for the solution of the combined distribution and road choice problem, which can also be used for car traffic. /TRRL/ [Swedish]

Scheele, S ; Linköping University, Sweden
Monograph Rpt. LITH-MAT-R-76-7, 1976, 79 pp, 5 Fig., 12 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN38004E), TRRL (IRRD 222421)

21 146512 NORTHEAST CORRIDOR IMPROVEMENT PROGRAM. TASK 1: MANAGEMENT SURVEY SUMMARY REPORT. The summary report presents an overview of the organizational structure and construction management function of several, largely transportation oriented, construction projects. The nine organizations surveyed were: (1) Alyeska Pipeline Service Company, (2) Bay Area Rapid Transit District, (3) Chicago Transit Authority/Chicago Urban Transportation District, (4) Dallas-Fort Worth Regional Airport, (5) Federal Highway Administration/New York State Department of Transportation, (6) Metropolitan Atlanta Rapid Transit Authority, (7) Massachusetts Bay Transportation Authority (8) Naval Facilities Engineering Command/Trident Project, and (9) Washington Metropolitan Area Transit Authority. The data reported focuses on six major topics for each organization. They are: (1) project and organization background and overview, (2) funding and budgeting considerations, (3) project management and project monitoring, (4) construction project management, including cost and schedule controls, (5) management information systems, and (6) institutional considerations.

Gracallesi, A Albin, PA DiLuzio, RG ; Dynatrend, Incorporated, Federal Railroad Administration Final Rpt. NEC-PAA-75-194, FRA/NECPO-76/1, Dec. 1975, 155 pp; Also available in set of 3 reports PC-E09, PB-259983-SET; Contract DOT-FR-56007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259984/3ST, DOTL NTIS

21 147295 THE OPERATION AND MANAGEMENT OF THE SHIRLEY HIGHWAY EXPRESS BUS-ON-FREEWAY DEMONSTRATION PROJECT. In September 1970, UMTA approved a demonstration grant to the

Northern Virginia Transportation Commission to design and implement transit service on an 11 mile exclusive busway from suburban Virginia to downtown Washington, D.C. The grant also called for development of fringe parking lots to serve the exclusive lanes. The success of the project both in terms of ridership and fare box revenues has been widely recognized in the transit industry. This document reports on the project from the viewpoint of the project sponsor. Thus, the report contains information which in all probability could not be obtained from other sources and which would not ordinarily be reported in any technical evaluation of the project. Also included in the report are some of the marketing and merchandising activities that contributed to the public's awareness and acceptance of the express lane concept.

Northern Virginia Transportation Commission, Smith and Locke Associates, Incorporated, Urban Mass Transportation Administration Final Rpt UMTA-IT-06-0024-76-1, Sept. 1976, 113 pp

Prepared in cooperation with Smith and Locke Associates, Inc., Washington, D.C.; Contract DOT-IT-06-0024; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-260540/OST

21 147483 THE MODELLING OF PLATOONING TENDENCIES IN PUBLIC TRANSPORT. This article sets out the causes of vehicle platooning in a public transport system which operates without a fixed schedule. It demonstrates that the traditional model is inadequate in such cases. An alternative model based on a Markov chain is presented and both models compared with a simulation. It is shown that simulation must be adopted once near-even spacing of the vehicles is lost. (a) /TRRL/

Heap, RC (Warwick University, England)
Thomas, TH (Warwick University, England)
Traffic Engineering and Control Analytic Vol. 17 No. 819, Aug. 1976, pp 360-363, 4 Fig., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 222259)

21 147674 THE CONTROL AND ROUTING OF VEHICLES. The paper discusses the various forms of control systems at present applied to some existing form of road or rail transport. Control strategies for new systems such as never-stop railways, moving pavements and driverless vehicles on reserved track are examined. Active and passive forms of guidance are reviewed, expressions are derived for safe headway and the safety factor in asynchronous control. The merits of synchronous and asynchronous control are compared. Switches, merges and crossing points, the components of intersections are discussed from the control point of view. The problems of station design are examined. The author concludes that only in safety, and in the avoidance of congestion, is an automatic system likely at present to out-perform a system with drivers, and there is no evidence to date confirming the possibility of commercial operation at short headways of say 3 seconds. /TRRL/

Thomas, TH ; Warwick University, England
Analytic Working Paper 14, Mar. 1973, 21 pp, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 22148)

21 147858 ON ESTIMATING EFFECTIVE FREQUENCIES AND AVERAGE WAITING TIMES FOR INDIRECT CONNECTIONS. This paper is concerned with the problem of

estimating two important service properties of transportation systems in which a traveler may have to use more than one vehicle to complete his journey, such as in urban public transport or intercity air, bus or rail systems. The service properties are waiting time for connections and effective frequency of service from origin to destination. These two service characteristics are among those five-cost, travel time in the vehicle, waiting, access time, and departure frequency-typically found to be most important in transportation planning models for estimating system usage. Despite their importance, there exist no methods for estimating waiting time and frequency which are compatible with the information available in transportation planning studies. In this paper theoretical models for estimating these are developed and then tested with actual data. They are found to be quite accurate in terms of quality of fit to the empirical data. Their use in urban and intercity transportation planning contexts is described, along with the data required, which consists simply of the number of vehicle trips on each of the links and for each of the time periods of interest. /Author/TRRL/

Sen, AK (Illinois University, Urbana) Morlok, EK (Pennsylvania University, Philadelphia)
Transportation Planning and Technology Vol. 3 N 1976, pp 175-83, 1 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-223276); ORDER FROM: ESL

21 148091 PUBLIC TRANSPORT ASSIGNMENT CALCULATIONS WITH THE TRANSCOM SUITE. This consideration of the important features of Transcom describes the techniques for the computerized version of a network as well as the assignment calculations (as an example of the utilisation of the computerized version). The transit network information structure framework is described and the details are discussed of its principal concepts: zone, centroid, link, node, section and lines. The details are given of the assignment method which involves a minimum travel time tree where the travel time between 2 nodes is defined by an impedance function. The methods presented here have been implemented in the Montreal Urban Community Transportation Commission network which consists of 3 metro lines and 115 bus lines with 600 nodes in the network.

Chapleau, R Chriqui, C (Montreal University, Canada) ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 76-88, 5 Fig., 12 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

21 148123 OPERATING STRATEGIES FOR BUS TRANSIT. The purpose of this paper is to outline several different operating strategies that are available for bus operations. These include fixed route, variable routes, Fixed/dynamic route and dynamic route operating strategies which are all discussed briefly. Other aspects of operating strategies are included such as service planning, demand and cost. /RTAC/

Blurton, MA (Canada Systems Group) ; Roads and Transportation Association of Canada Proceeding Sept. 1975, pp 23-42, 5 Fig.; This paper was presented at the Annual Conference held in Calgary, 1975.; ACKNOWLEDGMENT:

Roads and Transportation Association of Canada

21 148293 DEVELOPMENT OF A MODEL FOR ANALYSIS OF THE COST EFFECTIVENESS OF ALTERNATIVE TRANSIT SYSTEMS. A theory has been developed for preliminary analysis of transit alternatives by which estimations of average performance, power use, and cost effectiveness of all types of transit alternatives (scheduled, demand-responsive, automated, manually driven) may be computed for given and varying population distributions and travel behavior. Computation on a digital computer for a specific set of input parameters is very rapid, therefore extensive parametric analysis of each alternative is possible with respect to variations in over 70 geometric, kinematic, dynamic, service and economic variables. A new method of application of mode-split theory is used, and the computation technique correctly accounts for all modes of access to and egress from transit stations or stops without use of ad hoc assumptions.

Anderson, JE (Minnesota University, Minneapolis); Colorado University, Denver Conf Paper Vol. 1, Paper 9, 1975, 42 pp, 12 Ref.; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

21 149507 NEXT STEPS IN URBAN TRANSIT. The need for understanding Personal Rapid Transit (PRT) is noted, the associated environmental and financial problems are reviewed, and the use of data processing to improve both management and control fleet operations are discussed. The use of automatic train operation and program machines at intersections, the command subsystem and the safety subsystem of the Victoria subway line in London are described. The storage of an entire weeks time table on plastic tape, and human communication is also described. Transit planners now contemplate demand-responsive systems for urban trips of under 15 miles. The Group Rapid Transit (GRT) in which driverless vehicles run apart from regular street traffic on guideways are reviewed, and comments are made on the relatively simple Airtrans at Dallas-Fort Worth Airport and the sophisticated system in Morgantown. Details are given of the asynchronous (vehicle follower) or synchronous (spot follower) command and control used by both the PRT and GRT. The technical prospects of advanced transit technology are discussed and the observation is made that although such prospects are high, political prospects are low.

Carroll, H (International Business Machines Corporation) *Datamation* Vol. 22 No. 2, Feb. 1976, pp 86-94, 2 Fig., 2 Phot.

21 149733 PREPARING DUTY ROSTERS FOR BUS ROUTES BY COMPUTER [L'habillage par ordinateur des horaires des lignes d'auto-bus]. The authors recall that the rational running of a bus route requires a series of closely linked operations. If it is assumed that the route is known in detail, the first step is to set up an efficient system for the collection of data to learn

about demand and traffic conditions at various times of the day and at various points along the route. It is then necessary to anticipate (1 to 3 months before use) the operating schedule for the route. This being an allocation of resources in equipment and staff according to the tasks, it is composed of: first of all the graphic timetable or vehicle schedule for the buses; having established the frequency of the service to satisfy demand, one must set out, for each bus, the time of departure from the depot, the time of arrival at the terminus and the return to the depot; secondly the duty roster must be compiled, that is the shifts or duties complying with the statutory working conditions. It is during the following stage, with the establishment of staff schedules, that staff are allocated by name to the various shifts previously defined, after inserting the work days and rest days over a given period. Details are given of the studies carried out so that the user may avail himself of tools which enable him to improve the services offered and ensure better adaptation of the means available to the work to be done. /TRRL/ [French]

Heurgon, E Hervillard, R *UITP Revue Analytic* Vol. 24 No. 1, 1975, pp 27-42, 3 Fig., 11 Ref.; ACKNOWLEDGMENT: Road Safety Study and Research Fund, Belgium (FESR25070E), Central Laboratory of Bridges & Highways, France, TRRL (IRRD 103554)

21 152138 A COMPARISON OF SEVERAL TECHNIQUES FOR SIMULATING BUS ROUTES. This report outlines the basis of simulation models of bus routes and the ways in which they may be used. It then compares several such models and the ways in which they have been used to represent various aspects of routes. It is found that although the models have many similarities, there are important differences, particularly concerning the movements of passengers, and it is often not clear which method of representation is preferable. Few models seem to have been validated to any great extent, and this has prevented a detailed assessment being made of the realism of the models. Suggestions are made about the features of the bus route which should be considered for representation in a model. (A) /TRRL/

Jenkins, IA; Newcastle-Upon-Tyne University, England, (0306-3402) Monograph Torg Paper 14, Jan. 1976, 36 pp, 5 Fig., 1 Tab., 35 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220725); ORDER FROM: 7605342

21 152352 JOURNEY TIME AND OCCUPANCY CHARACTERISTICS OF THE HELSINKI METROPOLITAN PUBLIC TRANSPORT SYSTEM. This study which provides a method by which the Helsinki Metropolitan Public Transport System can be divided into homogeneous categories, also calculates the journey time and occupancy characteristics of these categories, and finds how journey time and occupancy characteristics depend on the characteristics of routes, the relationships between different journey time characteristics, and the dependence of journey time on occupancy. The study also compares different journey times with each other and different vehicles types with each other. The Helsinki public transportation system can be divided into 6 vehicle-route combinations which include 295 routes of the metropolitan total of 302 routes. District differences were found

between routes of different types, whereas the differences between vehicles were generally small. Models are presented which can be used for different stages of planning.

Himanen, V; Helsinki University of Technology, Finland Thesis Research Paper No 55, 1975, 189 pp, 35 Fig., 46 Tab., 9 App.

21 152913 MINIMUM FLEET SIZE MODELS FOR TRANSPORTATION SYSTEMS. There is an increasing interest in using computers for scheduling both fleet and crews of transportation systems. Programs that accomplish this have to be for a large part heuristic, however for some aspects an optimization approach is feasible and may improve the results. Moreover, the heuristic programs may benefit from theoretical studies that increase our knowledge of the processes involved. The purpose of this paper is to present a general fleet scheduling model together with a survey of applications to various modes of transportation. It will be shown that a general fleetsize formula for transportation systems, that expresses the transportation capacity needed in terms of vehicle departure and arrival patterns, can be applied to various situations: suburban railways, buses and airlines. In each of these models the passenger origin-destination statistics are assumed to be given, the vehicle arrivals and departures during the scheduling period (normally a day) constitute the variables. Basically these are dispatching models. Generally, there is room for another objective, apart from the fleet-size, as the number of schedules with minimum fleetsize is normally large. This approach leads to mathematical programming models for suburban railway and airline systems, which are applicable to practical situations, as is illustrated by computational results. The bus dispatching model leads to a theoretical model for optimal bus departure rates, as a function of the time of day; the model provides some clues concerning the construction of bus timetables. /TRRL/

Salzborn, FJM (Adelaide University, Australia) Buckley, DJ; Elsevier Scientific Publishing Company, (444195327) Proceeding 1974, pp 607-623, 5 Ref.; Transportation and Traffic Theory. Proceedings of the Sixth International Symposium on Transportation and Traffic Theory. University of New South Wales, Sydney, Australia, August 26-28, 1974.; ACKNOWLEDGMENT: TRRL (IRRD 224480)

21 152966 PATTERNS AND PROSPECTS; A RESOURCE BOOK FOR PREPARING TRANSPORTATION PROPOSALS. This compendium of papers dealing with the major components of a typical regional transportation system covers five specific areas: existing modes and their operational characteristics; paratransit; new technology; transportation system management; and transportation policies. Auto, bus, commuter railroad, rapid transit, taxicab, freight system, airport system, dial-a-bus, jitney, pooling, and school bus system are described. New technologies in auto, monorail, automated guideway transit gravity-vacuum transit, air-cushion vehicles as well as other fields are covered. System management elements such as reserved bus, transit security, guideway aesthetics and transit marketing are reviewed and comments are made on fare structure, auto restrictions, taxes, and other policy elements. The papers which state the

applications of all elements, also give specific examples as well as the advantages, disadvantages and issues surrounding each element.

Chicago Area Transportation Study, Chicago Department of Development and Planning, Northeastern Illinois Planning Commission, Northwestern Indiana Regional Planning Commission Sept. 1976, 174 pp, Refs.

21 154857 THE LEGAL FRAMEWORK FOR COLLECTIVE BARGAINING IN THE URBAN TRANSIT INDUSTRY. This report is part of a general study of labor relations in urban transit financed by the Urban Mass Transportation Administration (UMTA). The general study will be submitted to UMTA as four separate reports. The purpose of the study is to analyze labor relation trends in municipal bus systems, to identify the determinants of wage rates and labor costs, and to examine the impact of governmental assistance programs on collective negotiations. This report analyzes the legal framework of collective bargaining in local transit within the private-public transition period of transit systems.

Stern, JL Miller, RU Rubinfeld, SA Olson, CA Heshizer, BP ; Wisconsin University, Madison, Urban Mass Transportation Administration, (UMTA-WI-11-0004) Final Rpt. UMTA-WI-11-0004-77-1, No Date, 196 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266110/6ST, DOTL NTIS

21 154858 FACTORS INFLUENCING THE ADOPTION OF MANAGEMENT INNOVATIONS IN THE CTA. The process of management innovation in one transit property, the Chicago Transit Authority (CTA), is examined. The purpose of the study is to identify those factors of greatest relevance to innovation in organizations and to describe the extent to which those factors have helped the CTA to innovate successfully. Specifically, the research effort is designed to assess the environmental, organizational, linking, and attitudinal factors related to the recent adoption by the CTA of two management innovations: (1) Bus Utilization System, and (2) Microfiche viewers in the Travel Information Center. Both innovations significantly affect decision processes and have present and potential advantages for transit management. Data were collected from institutions and from structured interviews and questionnaires administered to persons closely involved with the development and use of the two innovations. (Data collection tools are contained in the Appendix.) Results show that the organization structure of the CTA had a positive influence on the adoption of both innovations.

Robey, D Bakr, MM ; Marquette University, Urban Mass Transportation Administration UMTA-WI-11-0002-77-1, 114 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266154/4ST, DOTL NTIS

21 155402 A SYSTEMS APPROACH OF OPTIMAL BUS NETWORK DESIGN [Research rept.]. This report reflects the view that one possible way to improve planning efficiency is to provide the planner with better coordination with decision-makers and with a systematic framework for the bus network design. The purpose of this research is to present a new approach for bus network design. The proposed framework is

comprised of four sub-models: attitude model, network generating model, prediction model, and evaluation model. This proposed framework is implemented on a macro-modeling basis. That is, a systems approach of bus network design in which a city is first modeled and bus routes are then fitted into this urban network of nodes and links. This macro-modeling approach is contrary to the street by street modeling of bus routes. Development priorities for various type of bus routes are derived from the socioeconomic characteristics of nodes along the route. In this report, sample applications of this new approach to bus network design are presented using both theoretical viewpoints and empirical analyses. An example of applying the proposed methodology to the Denver area is given to illustrate the operational characteristics of the framework. This study concludes that the proposed approach is a workable one and will be a help to planners in improving the efficiency of transit planning.

Hsu, J Surti, VH ; Colorado Univ., Denver. Center for Urban, Transportation Studies. **Illinois Inst. of Tech., Chicago. *Urban Mass Transportation Administration., Washington, D.C., (UMTA-WI-11-0002) RR-19, UMTA-WI-11-0002-77-2, Sept. 1975, 107p; Prepared in cooperation with Illinois Inst. of Tech., Chicago.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266661/8ST

21 156208 IMPROVEMENT OF AN UNDERGROUND'S TRANSPORT CAPACITY WITH TWO DIFFERENT OBJECTIVES. The paper deals with optimization studies that looked into minimizing run time as train frequency increases, (this minimizes the number of trains necessary to run the service); and making the best use of the given theoretical transport capacity by looking for all servicing trains with balanced load. The studies were part of an investigation into connecting the Paris subway system with a suburban subway. They were carried out using new hierarchic simulation methods.

Castel, C (CERT/DERA, Toulouse, France) Gaillet, A Cervoni, M Hennebert, M ; International Federation of Automatic Control Proceeding 1976, pp 277-282; Proceedings of the INFAC/IFIP/IFORS International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI (EIX770400439); ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

21 156209 TRAFFIC CONTROL POLICIES FOR AN UNDERGROUND SYSTEM. On underground railway lines with low exploitation interval, when disturbances occur, the number of trains and stations involved increases rapidly in proportion to the size of the incident. The paper discusses a method for controlling the results of an incident by reabsorbing and distributing these disturbances in the entire traffic system. To do this, the regulation demands a new schedule for all trains and stations affected by the incident by acting upon the stop times and speeds controlled by the automatic train control.

Mampey, R (CERT, Toulouse, France) Paulignan, JF ; International Federation of Automatic Control Proceeding 1976, pp 283-293; Proceedings of the INFAC/IFIP/IFORS International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976.;

ACKNOWLEDGMENT: EI (EIX770400440); ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

21 156317 ANALYSIS OF TRANSIT OPERATIONS: FARE/FREQUENCY TRADEOFFS. The paper discusses modeling of transit operations on a route-by-route basis. In particular, explicit relationships between ridership, revenue, fare and frequency are sought. Functional forms for two models--demand and cost--are assumed. The forms--constant elasticity demand and linear cost--are simple enough to allow analytical solutions yet sufficiently rich to portray most of the essential tradeoffs. The models are not system aggregate but are intended to model a given route at a given time of day. The implications of these assumptions are shown on the "frequency-fare" plane. This plane is shown to be divided into two areas, one of excess capacity and one of excess demand.

Lion, PM (Princeton University) Obermann, RM International Federation of Automatic Control Proceeding 1976, pp 73-80; Presented at the INFAC/IFIP/IFORS International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI (EIX770400450); ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

21 156323 CONTROL IN TRANSPORTATION SYSTEMS, PROCEEDINGS OF THE IFAC/IFIP (INTERNATIONAL FOUNDATION FOR INFORMATION PROCESSING-/IFORS (INTERNATIONAL FEDERATION OF OPERATIONAL RESEARCH SOCIETIES) INTERNATIONAL SYMPOSIUM 3RD, 1976. The Proceedings contain 42 papers presented at the Symposium. General topics covered in the technical sessions include highway system access and control, bus operations, rail/tracked systems, urban taxi-transit/public transportation systems, mathematics of traffic control, urban commuter and automated transit, transportation, land use and environment, urban network control systems, and optimization in urban transportation. The papers discuss various aspects of these topics, from theoretical, experimental, and practical application viewpoints. Selected papers are indexed separately.

International Federation of Automatic Control Proceeding 1976, 382 pp; Presented at the IFAC/IFIP/IFORS International Symposium, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

21 156384 ELECTRONIC SYSTEM TO ASSIST THE MANAGEMENT OF BUS OPERATIONS. A public bus network is assigned two objectives: assure a good cover of the urban spread and offer sufficiently high quality service to capture permanently an important number of travelers. These two objectives can only be attained at the expense of a fundamental change in the methods and techniques of public transport. It is in this perspective that efforts are currently directed to development of electronic assistance in the management of bus networks. This development is a natural complement of other recent developments in public information,

in material comfort, in commercial techniques, in network restructuring and in productivity.

Frey, H ; International Federation of Automatic Control Proceeding 1976, pp 61-65; Proceedings of the International Federation of Automobile Control/International foundation for Information Process/International Federation of Oper Research Society; International Symposium: Control in TransporZation Systems, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI (EIX770400448); ORDER FROM: ESL

21 157171 A TSM TRAFFIC MANAGEMENT GUIDE FOR TRANSIT. Transportation System Management (TSM) attempts to balance improvements between highway & transit facilities to foster increased efficiencies in operations. Federal guidelines state that TSM, in addition to making efficient use of existing transportation resources for short-range needs of urbanized areas, should also identify traffic engineering, public transportation regulations, pricing, management, operational and other improvements to the existing urban transportation system. The author notes that if the TSM program is to have a lasting effect, it must be coordinated among all the transportation elements and be maintained by an agency with input from transit operators and traffic engineers. Working with the lead agency, the transit authority and traffic engineering agency will be responsible for evaluation of regional traffic as well as transit improvements. The author concludes with an analysis of the following task evaluations: An examination of existing route characteristics; the identification of areas of significant traffic impence; an analysis of alternative transit improvements; and, the development of a staged implementation plan for recommended improvements.

McCrosson, DF (Harrisburg Capitol Area Transit) *Transportation Engineering* May 1977, pp 47-48, 1 Fig.

21 157184 CONCENTRATE ON THAT BOTTOM LINE. This paper which notes that streamlining a transit agency must involve a close consideration of contracts, cash management, and customers, discusses control deficits, contracts, and cash, as well as paying customers. The first step toward controlling transit deficits is the recognition that transit management has a variety of tools to influence the bottom line which indicates how much one could lose. Transit agencies owe to their sponsors a realistic set of service, fare and efficiency options so that transit needs could be rationally weighed against other public funding priorities. The need for innovation in the labor contract is noted. One promising concept is a productivity allowance to share with employees a portion of the revenue increase due to new ridership. A commonality of purpose based on mutual survival should be stressed at the bargaining table. Public liability and property damage insurance, employee health insurance, shopping for fuel and oil, professional services and administrative costs, pensions, and marketing costs are also discussed. Comments are made on cash management, and the four phases of the Urban Mass Transportation Administration's operating grant cycle are reviewed. Comments are also made on the gaining of paying customers.

Scheiner, JI *Government Executive* Vol. 9 No. 4, Apr. 1977, pp 22-24

21 157209 TRANSIT DELAY REDUCTION PROJECT, PHASE I. Operating problems experience by transit buses in Seattle were analyzed and feasible improvements were developed. An express and one local bus service was studied to evaluate alternative routes and to identify problem locations. By analyzing available origin and destination data, it was determined that the number of CBD passengers would justify eleven more express buses during the peak period. The selection of the best express bus corridor was dependent on the fastest and best transit route within the CBD. Operating problems of the local bus service within the corridor were studied to identify the location which will provide the most reduction in transit delay. Several sources of information which identified the location of transit bus delay problems were studied and analyzed for potential traffic engineering solutions. Recommended improvement projects were prioritized and preliminary cost estimates were prepared.

Seattle Engineering Department July 1976, 28 pp, 5 Tab., 1 App.; The preparation of this report was financed in part through a Coordinated Support Program: Mass Transportation Technical Studies Grant.

21 157257 IMPROVING TRANSIT UTILIZATION THROUGH PULSE-SCHEDULING. Pulse-scheduling or coordinated transfer service is a technique for providing convenient service and thus increasing ridership without requiring undue operational expenditures or major changes in existing facilities. This is a special form of fixed-route operation which minimizes time loss due to transferring and thereby maximizes service convenience. In pulse-scheduled operation all buses in a given network begin service at the same time and place, circulate on their respective routes and return to the starting or terminal point simultaneously. Such a service permits successive cycles of operation and maximizes coordination among services offered. A typical example of pulse-scheduling is presented. Steps to be taken in the establishment of a pulse-scheduled service are listed. Pulse-scheduling appears to be a viable alternative to costly dial-a-ride service to many communities which cannot offer direct point-to-point service and are willing to accept coordinated transfers. Coordinated transferring would have great potential in: small communities, emerging suburban communities, urban subsystems, route deviation service, and point deviation service.

Polin, L Cherwony, W (Simpson and Curtin Incorporated) *Transit Journal* Vol. 3 No. 2, 1977, pp 53-60, 2 Fig., 1 Tab.

21 159474 PROGRESS IN COMPUTER AIDED RAIL TIME TABLE COMPILATION. The report reviews the railway timetable compilation process and describes areas where computerisation can assist timetable development. It describes a program developed to compile a railway timetable and suggests ways in which further development should proceed. /TRRL/

Weston, G Wren, M Dexter, K Packer, J ; London Transport Executive Monog Rpt. Op. Res. Memo M318, 1976, 16 pp, 8 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-225552); ORDER FROM: London Transport Executive, Planning Research Division, Transad House, Leicester Square, London WC2, England; 7704069

21 159479 VEHICLE MANAGEMENT POLICIES FOR AUTOMATED TRANSPORTATION SYSTEMS. A new approach to the problem of managing vehicles within a personalized automated transportation system is outlined. Two alternative vehicle management strategies are suggested; each is potentially applicable to either scheduled or demand responsive systems possessing large numbers of vehicles, topologically complicated guideway networks and capacitated stations. The proposed strategies take station capacity constraints into account by guaranteeing that under normal operating conditions (i.e., no emergencies) no vehicle is ever prevented from entering its destination station because of the unavailability of a berth.

Kiselewich, SJ (Yale University) Tong, YM Morse, AS ; International Federation of Automatic Control Conf Paper 1976, pp 223-227, 12 Ref.; Presented at the INFAC/IFIP/IFORS International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976. Also available from ESL.; ACKNOWLEDGMENT: EI (EIX770400463); ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

21 159482 QUEUEING THEORY APPROACH TO RAILWAY CAPACITY IN URBAN COMMUTER RAILWAYS. The method proposed is a mixture of stochastic and diffusion type mathematical approximations to describe the queue length, delay and relaxation times found in the operation of the section. It is the perturbations in the times between trains and in the station stop times that give rise to queuing and the delays on the trains. The traffic intensity and a queue growth factor are key parameters in determining the practical capacity which is related to the deterministic or basic capacity, a concept derived entirely from the signaling characteristics of the station layout.

Rice, P (University College, London) ; International Federation of Automatic Control Conf Paper 1976, pp 267-276; Presented at the INFAC/IFIP/IFORS International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976. Also available from ESL.; ACKNOWLEDGMENT: EI (EIX770400438); ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

21 159785 PASSENGER RESISTANCE TO A RURAL BUS-BUS INTERCHANGE. Passenger resistance to the use of a rural bus-bus interchange facility in west Yorkshire has been investigated. When alternate through and transfer journeys were offered at hourly intervals a high proportion of travellers delayed or advanced their desired journey time to avoid the transfer. In the case of the transfer journeys the resistance which travellers displayed to using the interchange facility increased with trip length. For inter-urban trips, when through and transfer journeys were offered simultaneously by different routes, virtually all travellers took the through journey in spite of the fact that there was virtually no difference in journey time or fare. /Author/TRRL/

Tebb, RGP ; Transport and Road Research Laboratory Monograph TRRL SR 269, 1977, 18 pp, 4 Fig., 7 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225839), NTIS;

ORDER FROM: NTIS; PB-276521/2ST

21 159817 FACTORS AFFECTING THE OPERATION OF URBAN BUS ROUTES. This report presents the findings of an investigation into the operation of urban bus routes. The operation is studied in terms of the times taken by passengers and buses in different stages of their journeys. The report consists of three main parts. In the first part the subject area is introduced, the terms are defined, a framework for assessment is proposed, and a description of the survey techniques is given. The second part contains results in terms of times associated with bus stops, with moving between stops, and with timing points and terminals. The ways in which these affect the route as a whole are discussed, and comment is made on the use of simulation techniques. The third main part draws together the findings of the earlier parts and points out the implications for the operator, the traffic engineer, and the passenger. The work is developed at three levels, by way of theoretical considerations, by descriptions and comments on methods for survey and analysis, and by presentations of results. Many of the results were obtained in one large city in the United Kingdom, but results from elsewhere in the country and from a smaller number of cities in other parts of the world are given to examine the generality of the findings. Many of the findings relate to the variations in the components of journey times and emphasise the importance of these variations for the reliability of the route.(a) /TRRL/

Chapman, RA Gault, HE Jenkins, LA ; Newcastle-Upon-Tyne University, England, (0306-3402) Monograph TORG Work Paper 23, Dec. 1976, 103 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-225598)

21 159827 ELECTRONIC SYSTEM OF OPERATION USED FOR THE BUS NETWORK IN BESANCON [Système électronique de gestion du réseau d'autobus de besancon]. In the town of Besancon, pilot town as regards the solving of traffic and town planning problems, an electronic system of bus network operation has been set up. The aim of the system is to ensure the optimum traffic control of all vehicles over the whole network with a view to improving the cost effectiveness of the measures and to offering a level of service such that a larger part of the public will patronise public transport services. /TRRL/ [French]

Lorillon, P ; Transport Economic Circulation Analytic July 1975, pp 14-16, 2 Phot.; ACKNOWLEDGMENT: Institute of Transport Research, Central Laboratory of Bridges & Highways, France, TRRL (IRRD-105008)

21 163157 SPREADING THE LOAD (OR HOW TO EXTEND THE PEAK HOUR WITHOUT REALLY TRYING!). A package of proposals is discussed which should result in a reduction in peak hour traffic and the problems of public transport without the need for new construction or large expenditure. It is suggested that car commuters could be persuaded to accept staggered or flexible working hours, an individual work programme, and a four-day working week spread over five or six days with increased daily hours. Other methods suggested include preferential routes and town-centre parking charges for cars with three or more occupants. A fare

surcharge could be levied on passengers arriving or leaving the centre at peak periods. Opening times of central car parks could be restricted to off-peak periods. The author discusses the sequence of introduction of the measures, giving examples of how this can be achieved. /TRRL/ Ball, RR (West Midlands County Council, England) *Institution of Municipal Engineers, Journal of Analytic* Vol. 104 No. 3, Mar. 1977, pp 40-41, 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 226166)

21 163162 SCHEDULING FOR DEPLETED SERVICES. Two mathematical models, one analytic and the other relying on computer simulation, were used to investigate the effects of cancelled buses on passenger waiting times, and also the improvements which could be brought about by rescheduling. Two rescheduling strategies were evaluated by the analytic model, the first to provide equal headways for available buses in a schedule changing daily, while the second provided a reserve pool of buses to replace cancelled buses in a new service scheduled at a lower frequency. The simulation model was used to represent two real bus services. It is estimated that in situations where services are consistently running behind complement, rescheduling could produce savings in passenger waiting time amounting to some 20000 hours per year for each bus missing from the original service. /TRRL/

Bly, PH Jackson, RL ; Newcastle-Upon-Tyne University, England Proceeding 1975, pp 54-64, 3 Fig., 4 Tab., 5 Ref.; Proceedings of the Operating Public Transportation Symposium; ACKNOWLEDGMENT: TRRL (IRRD 225701)

21 163834 A MATHEMATICAL PROGRAMMING ALGORITHM FOR OPTIMAL BUS FREQUENCIES. Assume that we are given a network of streets on which certain bus lines have been set up. Let the total number of buses be given. Assume furthermore that the total demand for travel from certain origins as well as the total demand for travel to certain destinations is given. The requirement is to determine the complete travel pattern and decide which bus frequencies to use on the various lines. The problem is formulated as a non-linear programming problem. The model takes into account capacity constraints on the buses and the distribution of trips between different zones is influenced by the frequencies on the bus lines. The model also takes into account modal split between bus riding and walking. The model is intended for medium to long range planning. An iterative algorithm to solve this problem is developed. The algorithm is shown to converge to stationary points. As a part of the algorithm, an algorithm for the combined distribution-assignment problem in traffic planning is developed. The model has been used on the bus network in the town of Linköping (80000 inhabitants). /TRRL/

Scheele, S ; Linköping University, Sweden Monograph No. 12, 1977, 215 pp., Figs., 8 Tab., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-226779)

21 163929 TRANSFER OPTIMIZATION IN AN INTERACTIVE GRAPHIC SYSTEM FOR TRANSIT PLANNING. This paper describes a coordinated four-stage interactive

graphic process for operational transit planning. Stage 1 deals with route, headway, and vehicle-type optimization; stage 2 attempts to optimize transfer delays; stage 3 designs runs so that the service resulting from the previous stages can be operationalized; and stage 4 provides computer assistance in making manpower assignments. The network optimization procedure of stage 1 has been previously reported on, and the latter two stages are currently under development. This paper deals principally with the transfer optimization tool of stage 2. The operational tool to optimize transfer delays involves the automated-iterative modification of terminal departure times. An interactive graphic computer approach is used to increase the transparency of the tool to the planner. The analysis takes into account the calculation of expected waiting times for transfers between transit lines with different headways and the interdependence of terminal departure times. Within the interactive graphic optimization process, the user can request computer-generated and computer-drawn charts of transfer movements and delays, time-distance diagrams of individual routes, and computer-produced transfer statistics at individual stops as well as the entire system. The process has been applied to the Basel Transit System in Switzerland, which serves a population of 500,000. In comparison with the existing hand-generated timetable, the optimized timetable reduces the total transfer delays by approximately 20 percent with no increase in operating costs. /Author/

Rapp, MH (Rapp (W and J) Company, Switzerland) Gehner, CD (Washington University, Seattle) *Transportation Research Record* No. 619, 1976, pp 27-33, 8 Fig., 1 Tab., 9 Ref.; This article appeared in *Transportation Research Record* No. 619, Innovations in Transportation System Planning.; ORDER FROM: TRB Publications Off

21 165926 STUDY OF STAGGERED WORK HOURS FOR THE CENTRAL EMPLOYMENT AREA IN WASHINGTON, D.C. This study was conducted to provide information on the probable impact of a staggered work hours program on transit capabilities, vehicle fuel consumption, traffic congestion and air quality in Washington, D.C. Underutilized bus capacity is identified as being available just before and after the peak intervals. A staggered program, along with proper incentives would make better use of available capacity and encourage new transit patronage, thus relieving the urban environmental and energy problem. The optimum impact of a staggered hours program on the transportation system would be achieved by inducing a change in work travel from automobile to transit. To achieve this, measures would be necessary to make transit travel more attractive relative to the automobile. The most noticeable effects in Washington, D. C. would be those related to traffic congestion. Key factors crucial to the success of the plans are discussed and evaluated including staggered work-hour-strategies, employee participation, and bus transit coordination. Based on studies of alternative techniques for implementing a staggered work hours plan, a final program was recommended. Incremental shift of starting times would be adopted for the central employment area; working hours of a quarter of the jobs in the area would be rescheduled; The plan would be initi-

ated in two stages, first the government employees and secondly the private sector; high level program endorsement is essential, particularly by the Executive branch; metro bus service should be increased by about 9 percent during the extended peak-periods; finally, a coordinated effort should be made to divert workers from their cars, continue bus priority treatments, and maintain fares at or near the present level.

Smith (Wilbur) and Associates Proj IT-09-0033-32, Sept. 1975, 97 pp, 21 Fig., 8 Tab., 3 App.; The preparation of this report has been financed in part by the urban Mass Transportation Administration, DOT.

21 167350 SAN DIEGO BUS TRANSIT STUDY [Data file]. The San Diego bus transit study data base comprises 16 files of data describing (on a monthly basis) the operations of the San Diego Transit Corporation bus system from January 1972 through April 1975. Many of the data items are available for individual bus routes. The major categories of data include: (1) Revenues and patronage, by type of fare and by type of ticket, for all routes and for the system as a whole; (2) supply data (vehicle miles, vehicle hours, and one-way trips operated) for all routes and for the system as a whole; (3) details of service quality, derived from the published schedules, for 32 routes; (4) systemwide operating costs, in total and disaggregated into 16 categories; (5) route descriptive data (length, bus stops, etc.) for 32 routes; and (6) other variables relevant to inter-route and inter-month variations in demand.

Kemp, MA Goodman, KM King, H ; Urban Inst., Washington, D.C.*Urban Mass, Transportation Administration, Washington, D.C., Office of Service and Methods Demonstration. NTIS/DF-77/006, Apr. 1975, mag tape; Sponsored in part by Urban Mass Transportation Administration, Washington, D.C. Office of Service and Methods Demonstration.(CP T02) Source tape is in ASCII/Binary character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products, if you have questions. Price includes documentation, PB-272 754.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272753/5ST

21 167351 THE SAN DIEGO TRANSIT STUDY DATA BASE: TAPE-USERS' GUIDE. This document is a brief technical manual for users of a magnetic tape-based data set assembled by The Urban Institute Transportation Studies Program. The data characterize the operation of the San Diego Transit Corporation bus system for the time period 1/72 through 4/75. These data have been used for a study of bus transit demand and supply and are being made available for other analysts who wish to use them.

Kemp, MA ; Urban Inst., Washington, D.C.*Urban Mass, Transportation Administration, Washington, D.C., Office of Service and Methods Demonstration., (UMTA-DC-52-0002) -4, , nNTI Working Paper-5066-5, UMTA-DC-52-0002-77-2, Sept. 1977, 111p; For data file on magnetic tape, see PB-272 753.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272754/3ST

21 167524 A FLEET-SIZE MODEL FOR INTER-CITY SERVICES. This report describes an extension to the fleet-size model which was described in TRRL report Ir607. The model relates fleet-size, which has an important effect on system costs, to the number of departures per day on an inter-city transport service, taking into account in a simple but realistic way the constraints under which a transport operator must plan his timetable. In the first part of the report, the mathematical formulation of the extension to the model is derived. In the second, the extended model is used to predict the number of trains required to run various services on a major railway network, and it is shown that the model gives good agreement with actual practice. This report is a supplement to Ir607 (appendix 4) and should be read in conjunction with it.

Walmsley, DA ; Transport and Road Research Laboratory Monograph TRRL Suppl Rpt 308, 1977, 9 pp, 1 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-228151), NTIS; ORDER FROM: ESL, NTIS; PB-277107/9ST

21 167587 EFFECT OF AUTOMATIC VEHICLE MONITORING ERROR ON TRANSIT SCHEDULE ADHERENCE MONITORING. The timing accuracy required to support transit company use of an automatic vehicle monitoring system has been analyzed for the function of monitoring schedule adherence. Schedule deviation data from existing bus lines of the Southern California Rapid Transit District (a potential monitoring system user) were combined in a Monte Carlo analysis in which error distributions were chosen to limit the expected error behavior. Curves were obtained relating the percentage of false alarms and missed detections for each case. The monitoring system can be expected to perform satisfactorily with timing errors that meet a 95th percentile accuracy of plus or minus 15 s. However, allowance of an internal safety margin will be required to avoid an excessive number of false alarms. The size of the safety margin will depend on the actual error distribution. /Author/ Bruce, P Ludwick, JS Swetnam, GF, Jr (Mitre Corporation) *Transportation Research Record* No. 626, 1977, pp 1-6, 7 Fig., 3 Ref.; From *Transportation Research Record* No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

21 168067 BUS TRANSIT ROUTE DEMAND MODEL (ABRIDGMENT). This paper describes a model that will predict the effects of fare changes, route relocations, and headway changes on either an existing or a proposed bus route. The model should be applicable on a single-route basis so that systemwide models would not be required every time a new route extension was being considered. The model is based on the fact that transit ridership is related directly to the existence of both population and employment within good access times of the route. The model has been calibrated twice, once for Austin, Texas, and once for Kitchner-Waterloo, Ontario. The calibration results were found to be similar in both cases. The author concludes that the calibration results thus far have been promising for the two cities studied. The transferability of coefficients from one city to another is not directly possible. The model, in controlling for differences in automobile ownership, population, access to route, headways, shows considerable promise in comparing the

performance of different routes and systems, and when sufficient route data have been gathered to allow for a more confident estimate of the parameters, it should be very useful for the planning, design, and operation of urban bus routes.

Shortreed, JH (Waterloo University, Canada) *Transportation Research Record* No. 625, 1977, pp 31-33, 1 Fig., 5 Tab., 4 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

21 169300 UTILIZING GEOGRAPHIC BASEFILES FOR TRANSPORTATION ANALYSES: A NETWORK BASEFILE SYSTEM. The existence of geographic base files (GBF) for most large urban areas offers a significant resource for the network models required for many transportation studies. The thrust of the Network Basefile System (NETBASIS) development, underway at the University of Washington since 1974, is to build upon the existing GBF data resource (which has been operational for the city of Seattle for many years) and to provide a general purpose transportation network data base together with the required data manipulation and display software. The purpose of this paper is to present a status report on the NETBASIS development as of June 1977.

Gehner, CD ; Washington University, Seattle, Urban Mass Transportation Administration Res Rpt. UMTA-WA-11-0005-78-1, RR-77-3, June 1977, 46 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275586/6ST

21 173416 THE VARIABLE-PATH SYSTEM: A SOLUTION FOR OPTIMISING SURFACE TRANSPORT SERVICES FROM THE OPERATING STANDPOINT [Variable Linienführung. Eine Massnahme zur betrieblichen Optimierung des Leistungsangebotes im Oberflächenverkehr]. The modulation of an initially-rigid schedule is seen as a means of containing the problem of traffic drops in passenger suburban transport. In order to improve profitability, vehicle efficiency should be increased, possibly through the introduction of flexible working hours, modification of shop closing hours and staggered school hours. In addition, the article proposes the phased adoption of a "variable-path system", and explains its principles and features in detail. [German]

Prusa, W *Nahverkehrspraxis* Vol. 25 No. 9, 1977, pp 373-374, 1 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Arnold Verlag, Siegburg Strasse 5, 4600 Dortmund, West Germany

21 174165 THE TIMED TRANSFER FOCAL POINT: A REFINEMENT IN PUBLIC TRANSPORT SERVICE DESIGN. This paper describes the network design technique called the "timed transfer focal point" approach. This design method is employed to provide region-wide travel in low density suburban areas which have insufficient demand levels to support an untimed grid of routes. Some recent research into factors influencing consumers' decisions to use a transit service have identified the ability to make trips to a wide variety of destinations within the metropolitan area as a prime consideration. Transit planners can implement three kinds of service

feature that cater to this desire: (a) a "crosstown" route; (b) the use of a grid layout of transit routes rather than a radial network; and (c) more recently the "timed transfer focal point" approach, which has been used in three Canadian cities with success. There are two essential elements in a "timed transfer focal point" network: (a) the layout of transit lines such that they focus on community centres or some other geographically significant point; and (b) the arrangement of timed intervals on a route such that buses, streetcars, or other transport arriving at any given focal point do so at the same time, facilitating transfer movements. A transit system laid out in this fashion enables the person to travel in a reasonably direct manner from and to any place in the metropolitan area. /TRRL/

Sullivan, BE ; Bureau of Transit Services
Monograph Oct. 1976, 22 pp, 3 Fig., 12 Ref.;
ACKNOWLEDGMENT: TRRL (IRRD-230989)

21 174644 A SURVEY ON THE STATE OF RESEARCH IN AUTOMATED SCHEDULING FOR URBAN PASSENGER TRANSPORTATION. This paper was prepared for Project 3, Management Systems for Urban Passenger Transportation, of the U.S.-U.S.S.R. Program for Scientific and Technical Cooperation on the Management of Large Cities. It includes a general description of three applications of the use of computers in urban mass transportation scheduling: (1) Urban Transportation Planning System (UTPS), a computerized aid for transportation planners; (2) the Run Cutting and Scheduling (RUCUS) package that assists operation scheduling departments in developing vehicle schedules and driver work assignments from a given set of trip schedules; (3) real-time control systems for demand-responsive transportation (Dial-A-Ride).

Rebibo, K Bennington, G ; Mitre Corporation,
National Science Foundation M72-27, Mar.
1977, 49 pp; Grant NSF-MCS74-08921-A02;
ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS;
PB-274587/5ST

21 175038 BUS SERVICE PLANNING [Transportation research record]. Contents: Effect of automatic vehicle monitoring error on transit schedule adherence monitoring; Transit performance in the I-35W urban corridor demonstration project; Transportation planning for the 1980 Winter Olympic Games; An aggregate supply model for urban bus transit; Orlando changes direction—from beltway to busway; Increasing the people-moving capability of Shirley Highway; Modal-choice analysis of an exclusive bus and car-pool lane; Simulation of a bus-priority lane; Evaluation of bus-priority strategies on Northwest Seventh Avenue in Miami; Where express buses work; Planning and designing bus-transit garages.

Bruce, P Ludwick, JSJ Swetnam, GFJ Cherwony,
W Polin, L ; Transportation Research Board,
Washington, D.C. TRB/TRR-626, 1977, 49p;
Library of Congress Catalog Card no. 77-20009;
ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS;
PB-274536/2ST

21 176571 RAM: A NORMATIVE TOOL FOR TRANSIT ROUTE PLANNING. This work deals with the development of a Route Allocation Model (RAM), a practical methodology to assist the transit planner in the development of transit

needs. RAM is a computerized transit route design tool which will sequentially allocate bus (or other) routes to an area under study. The model is multi-purpose in that it may be utilized for standard transit route planning or for transit route planning under a scenario of special interest. These scenarios may include such items as limited auto-environment planning, school bus planning, standard Transportation Systems Management Element applications, and the updating of currently outdated transit routes to reflect present day transportation needs. This document discusses such items as: the nature of the general transit routing problem; a disutility function; a definition of the network and the RAM approach. There are charts that illustrate the differences between the conventional approach of route planning and the RAM approach to transit route planning. The scope includes a case study application of the RAM methodology in Queens County, New York City. Results obtained for this case study are presented as well as recommendations for further research. The RAM methodology is developed within this text and complemented by the appendices of computer outputs which illustrate components of the methodology. The appendix material is not included herein, but it is available on request from the Transportation Research and Training Center, Polytechnic Institute of New York. /UMTA/

Golstein, L McShane, W ; Polytechnic Institute of
New York, (NY-11-0009) UMTA-NY-
11-0009-77-2, Sept. 1977, 187 pp; Sponsored by
DOT, Urban Mass Transportation Administration;
ACKNOWLEDGMENT: UMTA; ORDER
FROM: NTIS; PB-275213

21 177128 SIMPLIFIED PROCEDURES FOR PRELIMINARY EVALUATION OF PUBLIC TRANSPORTATION ALTERNATIVES. A simplified approach is proposed to quickly evaluate at a gross level various alternatives for providing public transportation services. The alternatives, ranging from very simplified bus-oriented systems to high-speed rail facilities operating on dedicated rights-of-way, are reviewed in terms of meeting specified criteria for public transportation services. The sketch-planning procedure reviews and evaluates alternatives without substantial outlays in time or resources. Computer capabilities are not required. At this level of analysis, sketch planning enables the planner to differentiate between alternatives that have merit and those that should not be given a more detailed analysis. The data required for sketch planning come from two sources—the socioeconomic and demographic variables enumerated in census reports and origin-and-destination data available from metropolitan area transportation studies. Criteria for evaluation should be established for each area under study to provide for differences among urban areas. The planning procedures proposed here are generally more applicable to medium-sized and small urban areas.

Heathington, KW (Tennessee University, Knoxville)
Brogan, JD (Michigan State University,
East Lansing) *Transportation Research Record*
No. 638, 1977, pp 1-7, 4 Fig., 16 Ref.; This article
appeared in *Transportation Research Record* No.
638, Transportation Planning Techniques for
Small Communities.; ORDER FROM: TRB Publications
Off

21 177165 ZONE THEORY OF SUBURBAN RAIL TRANSIT OPERATIONS: REVISITED. Zone theory discussed deals primarily with the scheduling of trains. In combination the zone train schedules and zone fares affect most aspects of railroad operations and planning, including crew schedules and the use of railroad equipment, track, and manpower. The zonal concept of train operations applies to highly patronized suburban transit systems operated over the multitracked route of a heavy-duty main-line railroad. The basic theory has been tested and found to produce improvements.

Eisele, DO (Long Island Railroad) *Traffic Quarterly* Vol. 32 No. 1, Jan. 1978, pp 5-22, 5
Ref.; ACKNOWLEDGMENT: EI; ORDER FROM:
ESL

21 177185 DEVELOPING INTEGRATED URBAN TRANSPORTATION CONTROL SYSTEMS. This paper discusses urban transportation control practices in North America and European cities as guides to developing more integrated urban transportation control systems in our cities. Strategic control functions, tactical control functions, field control functions, information flow, improvement and development potential are highlighted.

Catton, FD (IBI Group) Irwin, NA ; Institute of
Electrical and Electronics Engineers Conf Paper
n 77CH1246-8-IA, 1977, pp 946-952; Conf Rec
IAS 12th Annual Meeting, Los Angeles, California,
October 2-6, 1977.; ACKNOWLEDGMENT: EI;
ORDER FROM: IEEE

21 177336 INTERACTIVE GRAPHIC TRANSIT PLANNING SYSTEM BASED ON INDIVIDUALS. With recent developments in disaggregated demand models and advances in low cost computer graphic systems, it is now reasonable to contemplate integrating these innovations together in an interactive graphic transit route design system. The authors outline the goals for such a system and propose a means for implementing those goals. The result is an analytical system which is more effective and economically efficient for transit planners to use than previous interactive systems while also having the capability to solve problems of a larger size, for cities up to one million population. Finally, the authors have developed an operational example of such a system to demonstrate the feasibility of the proposed approach.

Moellering, H (Ohio State University) Gauthier,
HL Osleeb, JP *Urban Systems* Vol. 2 No. 2-3,
1977, pp 93-103, 16 Ref.; ACKNOWLEDGMENT: EI;
ORDER FROM: ESL

21 178744 PASSENGER UTILIZATION OF LOCAL VS EXPRESS TRAINS FOR A NEW YORK CITY SUBWAY LINE: A CASE STUDY. A survey of over 5000 passengers on the IRT #1 line was conducted in New York City in order to examine passenger attitudes, perceptions and, most importantly, travel mode preferences (local vs express). Passengers were asked whether they prefer faster or more comfortable trains. It was found that they were evenly divided in their preference between faster trains and more comfortable ones, regardless of the distance travelled. However, it was found that significant numbers of passengers opted to transfer to crowded express trains, with little or no savings in travel time, while parallel local trains ran much less crowded.

Passengers were asked to estimate their travel time and the results were compared to measured travel times. Passengers consistently over-estimated their travel time and correlated their use of express trains with faster service. A major conclusion of this study is that the overall quality of service on the #1 line may be improved by inducing passengers to stay on local trains when travelling even moderate distances. This will promote a better passenger load distribution between the local and express and provide all passengers with a more comfortable level of service with no significant increase in travel time. /Author/

Wiener, R (Colorado University, Boulder) Lidor, G (City College of New York) *Transportation Research Record* No. 662, 1978, pp 8-16, 5 Fig., 4 Tab., 2 Ref.; This article appeared in the *Transportation Research Record* No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

21 178749 CONTRACT MANAGEMENT IN THE TRANSIT INDUSTRY. During the past decade, there has been a growing trend toward public acquisition of failing private transit companies. Many government agencies and public entities have turned to transit management companies to run the daily operations of their systems. The transit management companies offer a range of services which include assistance in a number of functional areas in transit management. The purpose of the study was to examine the organizational structure, the decision making process and certain attributes of the organization performance for transit systems operated under contract management. The study has focused on 26 transit properties managed by three major contract management companies. The study showed that management companies mesh into three basic types of local organization structures. Each of these types possesses certain characteristics. Each management company was also found to be more associated with a certain type of property and local organization. The organization, often, reflected the company's own operating philosophy and perspective on transit management. Results of the study could also be used to look at the merits of contract management in situations similar to those experienced by the transit industry. /Author/

Bakr, MM (Wisconsin University, Parkside) Robey, D (Florida International University) Miller, TS (United States Marine Corps) *Transportation Research Record* No. 662, 1978, pp 34-41, 2 Tab., 11 Ref.; This article appeared in the *Transportation Research Record* No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

21 178916 THE SIGNIFICANCE OF STATION STOP TIMES IN URBAN RAPID TRANSIT SYSTEMS [Die Bedeutung der Haltezeit im Stadtschnellbahnbetrieb]. Station stop times in urban rapid transit systems can be divided into operating and traffic components. Their proper dimensioning calls for comprehensive analytic and synthetic studies of time and sequence for the method of train dispatching used, likewise extensive traffic surveys to provide information on the entry and exit situation at the stations. Also to be considered are the constructional features of both vehicle and platform, a

knowledge of which allows passenger exchange times to be determined. In order to avoid changes in timetable frequency during the day's working, the station stop times at rush hours provide a basis for arranging the timetable. The author illustrates his views with a calculated example. [German]

Dirmeier, W *Eisenbahningenieur* May 1978, 5 pp, 3 Fig., 5 Ref.; ORDER FROM: Dr Arthur Tetzlaff-Verlag, Niddastrasse 64, Frankfurt am Main, West Germany

21 179089 MANAGING TRANSPORTATION DEMAND BY ALTERNATIVE WORK SCHEDULE TECHNIQUES. The management of urban transportation demand involves a number of techniques to reduce congestion by altering peak demand patterns. This paper discusses several transportation system management elements and focuses on alternative work schedule techniques such as staggered and flexible work hours and the shortened workweek. Alternative work schedules are deemed to be the most promising approach to managing transportation demand since such techniques are usually highly cost effective, are popularly received, entail non-transportation societal benefits, and can be implemented quickly. The effectiveness and state of practice of various alternative work schedule techniques are discussed, and a recommended approach for studying, implementing, and evaluating such techniques is presented. Brief case studies are given of programs in urban areas. /Author/

Selinger, CS (Port Authority of New York and New Jersey) *Transportation Research Board Special Report* No. 172, 1977, pp 67-74, 1 Ref.; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

21 180631 THE ECONOMIC COST IMPACT OF THE LABOR PROTECTION PROVISIONS OF SECTION 13(C) OF THE URBAN MASS TRANSPORTATION ACT OF 1964. PART TWO: APPENDICES: SUMMARIES OF THE 13(C) EXPERIENCE IN THE THIRTEEN TRANSIT SYSTEMS INTERVIEWED FOR THE STUDY [Final rept]. This study identifies, describes, and attempts to estimate kinds of costs (with particular focus on costs imposed on management) that might occur as a result of Section 13(C). The first part of the study used a mail questionnaire to estimate the frequency and size of all 13(C) cash payments made to transit employees during the years 1964-1975. The second part of the study consisted of an evaluation of the probable size and extent of (1) increased wage and fringe benefit costs in take-over situations, (2) redundant worker costs, (3) uncertainty added to the planning process, (4) costs of delays in signing 13(C) agreements and (5) negotiation, arbitration, litigation, and record keeping costs. Information for this part of the study was obtained by conducting personal interviews with management and labor officials of 13 transit systems. (Portions of this document are not fully legible)

Siskind, FB Stromsdorfer, EW ;

Assistant Secretary for Policy, Evaluation, and Research (Labor), Washington, D.C. 1/B ASPER/INH/OFT-78/000, May 1978, 275p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-280072/OST

21 180660 COMPARISON OF THE PERFORMANCE OF THREE ALGORITHMS FOR USE IN AN AUTOMATED TRANSIT INFORMATION SYSTEM (ATIS). This paper compares the performance of three algorithms for computing trip itineraries for use in an automated transit information system. One of the approaches (TIMEXD) is based on a time-expanded network. The other two both compute paths in a bipartite route/stop network; one algorithm (LABCOR) is based on the label-correcting approach and the other (LABSET) on the label-setting approach. The transit networks upon which the performance comparison is based are of two types: a grid network with specified, possibly non-uniform, distances between streets, and a spider web type of network. TIMEXD is fastest on all the larger networks, but it requires most computer storage and outputs paths with more transfers. LABCOR is the slowest, but is guaranteed to produce the best routing, since it always outputs an optimal path with fewest transfers. Computation time estimates extrapolated to large transit networks indicate times of 1.5 to 2.5 seconds per itinerary for TIMEXD and LABSET respectively, well within the acceptable range for such networks.

Gilsinn, JF Leyendecker, EL Shier, DR ; National Bureau of Standards, Urban Mass Transportation Administration, (NBS-2050402) Final Rpt. NBSIR-78-1426, Mar. 1978, 164 pp; Sponsored in part by Urban Mass Transportation Administration, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279066/5ST

21 182081 SEPTA MANAGEMENT STUDY. In 1964, State Act 450 created the Southeastern Pennsylvania Transportation Authority (SEPTA) with a mission to provide or arrange for the provision of effective and efficient public transportation services in the five-county Pennsylvania portion of the Philadelphia metropolitan area. The SEPTA Management Study was commissioned by SEPTA's funding governments to evaluate how well this mission was being performed in consideration of the agency's budget constraints, and to make specific improvement recommendations. The study uses a series of diagnostics (peer group comparison, case studies, flow charts, and organizational analysis) to identify areas where SEPTA performance appeared unusual. Serious deficiencies are identified in nine functional areas (Cash Handling, ConRail Purchase-of-Service Agreement, Surface Transit Operations Planning, Vehicle Utilization, Surface Transit Maintenance, Capital Project Management, and Regional Fare Integration) and seven additional improvement areas. A key question raised in this study relates to the roles of the SEPTA Board and SEPTA's funding agencies. Specific actions, including organizational changes, are recommended which will yield near-term benefits.

Southeastern Pennsylvania Transportation Authority, Booz-Allen and Hamilton, Incorporated, Price Waterhouse and Company, Urban Mass Transportation Administration, Delaware Valley

Regional Planning Commission, (UMTA-PA-09-0039) Final Rpt. UMTA-PA-09-0039-78-1, May 1978, 72 pp; Prepared by Booz-Allen and Hamilton, Inc., Philadelphia, PA., and Price Waterhouse and Co., Philadelphia, PA. Sponsored in part by Delaware Valley Regional Planning Commission, Philadelphia, Pa.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285010/5ST, DOTL NTIS

21 182460 NATIONAL VALIDATION OF A TEST BATTERY FOR MALE TRANSIT BUS OPERATORS. The major objectives of this research project were to establish valid procedures for the selection of applicants who would have the most potential for successful performance as bus operators in an urban transportation authority, to investigate the validity and equitability of the selection procedure for applicants from all racial groups represented in the study, and to investigate the applicability of the procedure for the five authorities which participated (the Metropolitan Atlanta Rapid Transit Authority, the Massachusetts Bay Transportation Authority, the Chicago Transit Authority, the Cleveland Transit System, and the Alameda-Contra Costa Transit District). The validity of the procedure for female drivers was not investigated because of the small number employed when the study was initiated. Therefore, the study was implemented for White, Black and Spanish-surnamed males. However, a follow-up study is presently underway to validate the test battery for female operators. Both concurrent and predictive performance-criterion validation models were employed, and within each model both primary and cross-validity coefficients were calculated. The results of the two validation models were essentially similar. Results of the implementation of the selection equation based on the total sample in the current validation model indicate that the test battery rejects approximately the same percentage of applicants from each of the three racial groups. The Appendix shows an agenda for the two-day Workshop conducted by the Industrial Relations Center, and the conclusion of the study is that most companies placed little, if any, emphasis on recruitment of minorities, and also that at present, there is a list of people waiting to be hired, and this surplus makes this validation study more imperative and urgent. /UMTA/

Baehr, ME ; Chicago University, (MA-06-0011) Final Rpt. UMTA-MA06-0011-77-1, June 1976, 367 pp; This report was sponsored by the DOT, Urban Mass Transportation Administration.; Contract DOT-UT-289; ORDER FROM: NTIS; PB-283709/ADS

21 184289 A SET OF PROGRAMS FOR TRAM AND BUS CONTROL [Programmapakket tram-en busbeheersing]. Within the Municipal Department of Traffic and Transportation of Amsterdam a series of compatible computer programs has been developed. The programs can calculate the effect of traffic management schemes and certain traffic management policies. This publication describes the state of the art of public transport programs. These programs will be coordinated with similar programs for non-public-transport traffic. This article gives a brief review of how the programs are to be used. Some examples of trip-time and regularity-measure-

ments of two running projects are given. The results show a considerable improvement in speed or regularity of public transport services, depending on the type of measurement such as the construction of free lanes and priority on traffic light controlled intersections. Improved regularity results in decrease of the average waiting times at the stops. A higher speed results in less in-vehicle-travel-time. /TRRL/ [Dutch]

Middelham, F Moons, C (Gemeente Amsterdam, Afdeling Verkeer En Vervoer) *Verkeerskunde* Vol. 29 No. 4, Apr. 1978, pp 185-189, 12 Fig., 2 Tab., 4 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (IRRD-233204), TRRL

21 189217 LEARNING TO MANAGE TRANSPORT SYSTEMS. The authors suggest that one of the problems confronting planning education in the transport planning field is that of providing students with a reasonably realistic planning experience. The most important consequences of a policy measure are considered to follow only after considerable time, leading to a need for learning aids that would enable students to become involved in a general comprehension of a system, rather than in the detailed information of such a system. The development of gaming-simulation techniques is discussed by reference to business games, in which it was shown that students who took part in such techniques learned more than those who did not, in particular about recognising problems that needed attention. In this article the authors provide a brief description of two games centred on transport systems analysis. The first, jutre—an inter-regional transport game, is concerned with inter-urban transport decision and policy making. It is built around a simplified model of the ground transport system of a relatively isolated developing country, in which there are eight major regions each with a major urban centre and linked by a simple network of roads of varying standards. The second, guts—an urban transport game, is concerned with the exploitation of the properties of a transport system in a circular city with perfect symmetry around its centre. It considers two modes, cars and buses, a network compatible with the symmetry conditions and a flexible set of trip-end parameters. /TRRL/

Ortuzar, JD Willumsen, LG (Leeds University, England) *Traffic Engineering and Control* Vol. 19 No. 5, May 1978, pp 236-239, 4 Fig., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236320)

21 189835 RUCUS: A COMPREHENSIVE STATUS REPORT AND ASSESSMENT. Scheduling is identified as the one area that has perhaps the greatest potential for improving productivity. This article discusses the run cutting and scheduling (RUCUS) package of computer programs which allows schedule makers to improve the efficiency of the scheduling process and, in some cases, reduce the total cost of operating the transit system. Scheduling problems, background and history are covered, as well as the federal perspective, an overall assessment, implementation issues and future developments. The article is based on information from four surveys and site visits to five properties. The site visits included the Tri-County Metropolitan Transportation District of Oregon, Seattle Metro, the Metropolitan Transportation (Minneapolis/St. Paul), the Toronto Transit Commission, and the Mass Transit Administration of Maryland

(Baltimore). The most beneficial components of the package include the runs, data management, and report generation components; the spin-off applications such as computer-oriented timetables and UMTA Section 15 reports can also be valuable.

Hinds, DH (Metropolitan Transit Agency of Miami) *Transit Journal* 1979, pp 17-34, 4 Fig.

21 190320 TRANSIT SYSTEMS THEORY. Written as an engineering textbook, this book attempts to analyse the workings of transit systems, concentrating in particular on automation.

Anderson, JE ; Lexington Books-Teakfield Limited No Date, n.p.; ORDER FROM: Lexington Books-Teakfield Limited, 1 Westmead, Farnborough, Hants GU14 7RU, England

21 191322 HOW TO REDESIGN TRANSIT ROUTES AND SCHEDULES IN RESPONSE TO CHANGING RIDERSHIP TRENDS IN SMALLER SYSTEMS. A method is presented which can be applied to improve route and schedule design and existing level of service. This step-by-step procedure can be utilized by any small or medium sized transit system. In developing a method for analyzing transit route and schedule efficiency related to existing ridership demand, the Bellingham, Washington Transit System was selected for a pilot study. An on-board, line count survey was conducted: observers counted all passengers boarding the bus on all routes during operational hours. The observations were computer tabulated and then analyzed. Based on the analysis, specific recommendations were made. Ridership data from a municipal bus operation in California were obtained to analyze and demonstrate passenger overloading problems related to scheduling efficiency. Part I explains the method of analysis in a step-by-step procedure with facsimiles of the necessary forms. Part II is a Pilot Study report. Part III is a special problem analysis and report.

Derbonne, WLM ; Washington State Department of Transportation, Western Washington University, Bellingham Transit System, (UMTA-WA-09-8003) Final Rpt. Nov. 1978, 211 p.; Prepared in cooperation with Western Washington State College, Bellingham, and Bellingham Transit System, Washington.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289994/6ST

21 193844 ZONE SCHEDULING OF URBAN BUS ROUTES. A method is developed using dynamic programming for determination of optimal division of a bus route into zones, and allocation of buses to those zones. Such zone scheduling strategies are appropriate for bus routes with heavy orientation of riders to a common destination. An illustrative example demonstrates that substantial improvements in service and vehicle productivity are possible with zone schedules, and describes the properties of optimal solutions under varying conditions. A very significant finding is that the optimal zone structure is relatively independent of the number of buses used. It is also significant that the computational requirements for the procedure are quite modest.

Turnquist, MA (Northwestern University, Evanston) *ASCE Journal of Transportation Engi-*

neering Vol. 105 No. 1, Jan. 1979, pp 1-13, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

21 194435 BUS PASSENGERS O-D SURVEYS USING THE SEAT MATRIX METHOD. A new bus passenger origin-destination survey technique involving no questionnaires or interviews is described and tested on a city bus service. The technique is compared with an on-board interview survey. The new method offers savings at both survey and analysis stages, where coding of origins and destinations is greatly simplified. Results consist of stop-to-stop trip matrices for the route.(a) /TRRL/

Davies, P Gribble, JJ (Nottingham University, England) *Traffic Engineering and Control* Vol. 19 No. 12, Dec. 1978, pp 559-561, 4 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 238117)

21 194442 ASSIGNING BUSES TO SCHEDULES IN A METROPOLITAN AREA. The problem of scheduling a fleet of buses to a given set of trips is encountered by large bus companies performing thousands of trips per day. The time-tables for those trips are planned separately and reflect the passengers demand for transportation. These time-tables are inputs for the bus scheduling procedures. The scheduling problem is difficult due to its size and due to many operational constraints which are imposed. A mathematical formulation of the problem is presented and an efficient algorithm is developed. This paper presents results and computational experience that were obtained from implementing the model in a large bus company. /Author/TRRL/

Gavish, B Schweitzer, P (Rochester University) Shlifer, E (Technion - Israel Institute of Technology) *Computers and Operations Research* Vol. 5 No. 2, 1978, pp 129-138, 1 Fig., 2 Tab., 27 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 238366)

21 194529 INTERACTIVE GRAPHICS IN EUROPE: THREE COMPUTER-AIDED TRANSPORTATION TOOLS. This article presents an overview of three interactive graphic transportation planning tools which have been and are being productively applied to planning problems in Europe--NOPTS, ICAM, and TSM. NOPTS has been developed as an aid for day-to-day operational planning in urban public transit. It can assist transit planners to: evaluate the impacts of changes in routing, schedules and vehicle allocations; examine a variety of routing schemes and compare their performance with respect to the objectives of both the transit agency and transit users; identify trade-offs between conflicting objectives; and optimally adjust the transit service to changing demand patterns. TSM--Simulation Program for Urban Transit Operations Objectives--is used for: analysis of movements of transit vehicles and queueing phenomena; estimation of system performance (time delays, vehicle throughput); evaluation of the impacts of alternative designs (geometric design, station layouts); and evaluation of the impacts of alternative operating strategies (line frequencies, signal timing, priority rules). It has been applied to urban public transit systems; to network, sub-network or line segment studies; and to rail transit or rubber-tired transit on exclusive rights of way. ICAM--Interactive Car (Highway) Assignment Model--was developed as a planning tool to assist in the evaluation of

alternative urban/regional highway networks. It consists basically of a multi-path traffic assignment model with which one or more projected origin-destination matrices can be assigned to existing and proposed highway links. It can assist planners to: quantitatively and qualitatively compare alternative highway networks; evaluate alternative highway designs; evaluate signalization and other transport technical solution strategies; adapt existing highways to further demand in an optimal fashion; isolate bottle-necks resulting from changes in the demand of changes in other parts of the highway network; and determine the capacity of the highway network as a function of varying demand patterns.

Rieple, RJ (W&J Rapp AG) Gehner, CD (Washington University, Seattle) *Computer Graphics* Vol. 1 No. 13, Dec. 1978, pp 18-25, 23 Fig.

21 194531 COMPUTER GRAPHICS FOR DEMONSTRATION OF TRANSPORTATION SYSTEM DYNAMICS. Due to the complexities of the many space/time interactions that may take place among the elements of a system, mathematical models are widely used in the planning and design of transportation systems to investigate alternative configurations with regard to performance and to provide a high level of assurance that the system will work efficiently over the anticipated range of passenger loading. Simulation models provide the most detailed and in-depth analyses in that they allow the analyst to incorporate into the model many of the practical details of operation specific to the particular system. The use of computer graphics enhances the visibility of the modeling process by allowing the manager to view the operation of the proposed system and thereby attain a better understanding of system dynamics and the impact of design parameters on system performance. Computer generated films can be produced to summarize and document the rationale behind key system configuration choices. They are also convenient for this purpose due to their ease of storage and distribution and to the ready availability of projectors at most locations. This report includes discussion of several existing applications of computer graphics to various transportation systems--which include airport runways, people movers, traffic situations, and rapid transit terminals.

Joline, ES, President (Aviation Simulations International) *Computer Graphics* Vol. 1 No. 13, Dec. 1978, pp 28-31, 9 Fig., 3 Ref.

21 195876 TRANSPORTATION SYSTEM MANAGEMENT: AN ASSESSMENT OF IMPACTS. Transportation Systems Management (TSM) actions include a wide range of transportation improvements, from basic traffic engineering to a variety of transit improvements, parking strategies, and pricing policies. Under Department of Transportation (DOT) regulations, urban areas with populations greater than 50,000, are required to develop TSM plans that document their strategy for improving air quality, conserving energy, and increasing the efficiency of the overall transportation system. This report summarizes interim results of research designed to quantify the impacts that TSM actions have on the system. Through the research methodology, all TSM actions are divided into four classes according to their impact on transportation supply and travel demand. The classes are: Class

A-Demand Reduced; Class B-Supply Increased; Class C-Demand Reduced and Supply Reduced; and Class D-Demand Reduced and Supply Increased. For each of these classes, computations are performed to determine how a major multi-year program applying these actions would affect the area's vehicle miles traveled and vehicle hours traveled. The results will serve to help local areas in developing appropriate transportation measures for use in local TSM plans as required by DOT regulations and the State Implementation Plans (SIPs), as mandated by the Environmental Protection Agency (EPA) pursuant to the Clean Air Act. This document contains working papers which describe experience with the impacts of some of the major TSM actions. These include impacts of ridesharing, routes and scheduling, Park-and-Ride and express bus, work rescheduling, and auto restricted zones. The Appendix: A Supply-Demand Approach to TSM, explains the development of the methodology that led to the findings in this report. /UMTA/

Wagner, FA Gilbert, K ; Voorhees (Alan M) and Associates, Incorporated, (VA-06-0047) Intrm Rpt. UMTA-VA-06-0047-79-1, Nov. 1978, 118 p.; Sponsored by the Urban Mass Transportation Administration. Prepared for the Urban Mass Transportation Administration and The Federal Highway Administration, in cooperation with the Environmental Protection Agency; Contract VA-06-0047; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-294986/AS

21 197286 DICOS, A TIME-TABLE COORDINATION SYSTEM [DICOS, een dienstregelings coördinatie systeem]. The Netherlands Ministry of Transport, the Amsterdam Public Transport Corporation and the Automatic Traffic Systems section of the Delft Technical University developed means of improving regularity, punctuality and synchronised running of public transport systems. They are being tried on tram line No. 1 in Amsterdam. The article gives the basic philosophy and details of vehicle location and identification methods, hard-and software plus the information system for drivers and passengers. Further reports on this project will follow. [Dutch]

Breur, MWKA *Verkeerskunde* Vol. 30 No. 4, Apr. 1979, pp 171-175, 1 Fig., 4 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-240968), Institute for Road Safety Research; ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands; PB14656

21 239650 THE PERSPECTIVES OF MANAGEMENT INFORMATION TECHNIQUES (INFORMATIQUE) AND OF COMPUTERS IN PUBLIC TRANSPORT OPERATION. THIS REPORT IS THE RESULT OF A QUESTIONNAIRE SENT TO MEMBERS OF THE INTERNATIONAL UNION OF PUBLIC TRANSPORT. MEMBERS WERE INVITED TO INDICATE THE POSITION OF THEIR UNDERTAKINGS CONCERNING DATA PROCESSING APPLICATIONS AND MEANS USED IN 1967 AND 1972, TO DESCRIBE THE PROJECTS THAT ARE TO BE CARRIED OUT BY 1977, AND FINALLY TO INDICATE THE OBJECTIVES AIMED AT, FOR EACH ONE OF THE DEVELOPMENT STAGES OF THE DATA PROCESSING SYS-

TEMS INSIDE THE UNDERTAKINGS. THE FOLLOWING AREAS WERE ANALYZED: PRESENT STATE OF MANAGEMENT DATA PROCESSING AND PROSPECTS FOR THE FUTURE; INTRODUCTION OF DATA PROCESSING IN THE AUTOMATION OF THE OPERATION OF THE RAILWAY SYSTEMS (BOTH METROPOLITAN AND SUBURBAN); INTRODUCTION OF DATA PROCESSING IN THE AUTOMATION OF BUS SERVICE. THE RESULTS ARE PRESENTED IN TABULAR GRAPHICAL FORM AND SHOW THAT PUBLIC TRANSPORT SYSTEMS ARE ENTERING A PERIOD OF INTENSIVE USE OF DATA PROCESSING METHODS.

Faure, R ; Intl Union of Public Transport / Belg/ No. 6, 1973, pp 3-15, 17 Fig, 14 Tab

21 260166 MANAGERIAL RESOURCES AND PERSONNEL PRACTICES IN URBAN MASS TRANSPORTATION. The primary purpose of this project was to identify and evaluate policies, practices and other conditions relating to the supply of managerial personnel in the urban mass transit industry. The study, conducted during 1972-1973, sought to provide information concerning the following: (1) an inventory of management, technical, and supervisory personnel in the industry; (2) a current profile of management and technical personnel; (3) a summary of personnel practices and training methods now being used in the industry; (4) an assessment of manpower demand and supply in the industry by administrative levels; (5) a review of the roles of UMTA, universities and the industry in improving the training of personnel in the transit industry with respect to training methods, course contents, level of support for trainees and related matters. Questionnaires supplemented by personal interviews with transit property officials were used to obtain data. Ten Canadian and thirty-one U.S. transit properties were polled. The survey was designed to permit statistical inferences to be drawn for the industry as a whole. According to the author, little formal organization and planning concerning the development and utilization of human managerial resources were found to exist within the U.S. urban transit industry. Furthermore, according to the author, urgent action is needed to prevent deterioration of the industry's management structure. Data are presented.

Mundy, RA Spychalski, JC ; Pennsylvania State University, University Park, (TTSC 7317) Univ. Res. UMSA-PA-11-0010-73-1, Nov. 1973, 320 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231433/AS

21 264628 AN OPTIMIZATION MODEL FOR DETERMINING HEADWAYS FOR TRANSIT ROUTES. This report concentrates on the problem of headway determination, the first step in the scheduling process of transit service. The objective of the report is to develop a practical procedure for determining optimal headways, recognizing all of the relevant factors. Based on an optimization approach, a chance constrained programming model is developed. The scope of using vehicles of different sizes and operating costs is built into the model which attempts to minimize the total operating cost. The uncertainty associated with demand forecasts is expressed as a chance constraint that specifies the

desired level of reliability with respect to the satisfaction of demand. The model also includes a constraint related to the management policy regarding the minimum service to be provided on a transit route. The deterministic equivalent of the model is solved by linear programming. Its application is demonstrated with an example problem. The authors conclude that the model is simple in concept, practical, and the procedure is applicable to both conventional bus and rapid transit systems. The input data are realistic and usually available or can be obtained without any difficulty. Although this model does not actually schedule vehicles, its results are used in developing headway tables and subsequently vehicle and operator assignments.

Ligaraj, BP Chatterjee, A Sinha, KC ; Marquette University, (WI-11-0002) Univ. Res. UMTA-WI-11-0002-74-3, Aug. 1974, 23 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237233

21 300088 TRANSPORT SYSTEM MANAGEMENT-PROCESS AND APPLICATION. Transport system management (tsm) is a planning and design process for transport system improvements. Its key goal is conservation of economic and social resources, energy, environmental quality and the overall quality of urban life. This is achieved by means of the co-ordination of operating, regulatory and engineering programs. A formalised process for tsm is presented and practical applications illustrated. /TRRL/

Hallam, CE (New South Wales Traffic Authority, Australia) Stapleton, CJ (Stapleton Transportation Planning Proprietary, Ltd) ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 311-327, 2 Fig., 1 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, April 18-20, 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239195), Australian Road Research Board

21 300270 THE APPLICATION OF OPERATIONS RESEARCH TECHNIQUES TO TRANSPORTATION: A CASE STUDY. In this paper, a case study is presented of an operations research analysis of a sub-problem arising in the Adelaide bus system. The study was carried out in 1965 in conjunction with the South Australian Municipal Tramways Trust. This case study illustrates the complexity of public transport problems, the inherent difficulties in formulating mathematical models of them, the necessity to take proper account of employee preferences and finally the significant value of the scientific approach. In using a computer preparation of the roster index, management is seen to be minimizing costs while coping with unusual employee shifts and making due allowance for their preferences. It is one step in the direction of efficiency and good employer-employee relations in public transport. The solution technique demonstrates that operations research methods can cope with complex situations which cannot be resolved by other means, and indeed they have had wide application in transport problems. /TRRL/

Potts, RB (Adelaide University, Australia) ; Academy of Science, Australia, (0 85847 048 9) Conf Paper 1978, pp 100-107, 2 Tab., 1 Ref.; From Transport in Australia; Some Key Issues. Papers Delivered at the Science and Industry

Forum.; ACKNOWLEDGMENT: TRRL (IRRD 239143), Australian Road Research Board

21 302262 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME VII: TRANSIT MANAGEMENT WORKSHOPS. This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Transit Management. Part I deals with management systems developments and includes discussions of transit operations and maintenance management support, automated scheduling of transit services, and development of the skills and techniques required by the transit operating industry. Part II, human resources development, includes discussions of human resources development programs, the national study for the validation of a selection test battery for bus operators, and a report by the AFL-CIO Appalachian Council on their transit employee training project. This volume contains six resource papers which can be found summarized in Volume I of this multi-volume work along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants. These proceedings (Rpt. Nos. UMTA-DC-06-0157-79-1 thru UMTA-DC-06-0157-79-9) consist of nine separately titled volumes, namely: Volume I: Proceedings of General Sessions and Summarized Reports of Workshops; Volume II: Bus and Paratransit Technology Workshops; Volume III: AGT and Advanced Systems Workshops; Volume IV: Service and Methods Demonstration Workshops; Volume V: UMTA Special Technology Programs Workshops; Volume VI: Rail and Construction Technology; Volume VII: Transit Management Workshops; Volume VIII: Access for Elderly and Handicapped Persons Workshops; and Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association, Urban Mass Transportation Administration, (DC-06-0157) UMTA-DC-06-0157-79-7, Nov. 1978, 122 p.; This report is a sequel to reports: Proceedings of the UMTA/APTA R&D Priorities Conference, February 1978 (PB 255-898); and Proceedings of the Second R&D Priorities Conference, December 1976 (PB 266-158); Contract DOT-UT-70026; ORDER FROM: NTIS; PB-300992

21 303856 TYNE AND WEAR PUBLIC TRANSPORT IMPACT STUDY: STUDY DEFINITION REPORT. This report defines the content and method of a study of the effects of the introduction of the Tyne and Wear Metro and the reorganisation of bus services to complement the Metro and provide an integrated public transport system. The aim of the study is to identify and quantify the effects of changes in the public transport system on travel behaviour, activities and land use in the area concerned. The results of the study are intended to assist Central Government in future decisions on policy towards the public transport, the Tyne and Wear County Council in transport and land use planning and expenditure decisions within the County, the Tyne and Wear PTE with operating and marketing aspects of the system, the District Councils within the County when considering land use

planning and development decisions, and transport planners for local authorities elsewhere in the UK by providing information on the effects of improvements to public transport. The statistical reliability of the study is discussed: overall, it is hoped to detect changes in major factors (such as public transport trip rate) of 10 per cent with a confidence of at least 90 per cent.

Transport and Road Research Laboratory Suppl Rpt. No. 478, 1979, 21 p., 5 Fig.; Prepared in cooperation with the Tyne and Wear County Council.; ACKNOWLEDGMENT: British Railways; ORDER FROM: TRRL

21 303944 SEPTA MANAGEMENT STUDY: PROCESS AND RESULTS. A management study of Philadelphia's Southeastern Pennsylvania Transportation Authority (SEPTA) was completed in May 1978. The study process was designed to quickly focus investigative effort on apparent problem areas by means of a series of diagnostic techniques, including interviews, peer-group analysis, flowcharting, and organizational analysis. The in-depth studies that relied on independent data collection were specially designed to test hypotheses. The study revealed that among the areas where SEPTA performance was strong were rapid-transit crew scheduling, grant applications, employee absenteeism, and short-term investment management. The study identified nine priority areas for improvement: (a) cash handling, (b) Consolidated Rail Corporation's purchase-of-service agreement, (c) surface transit operations planning, (d) vehicle use, (e) surface transit maintenance, (f) capital project management, (g) pension management, (h) quality of transit service, and (i) regional fare integration. Funding agencies should expect large transit agencies to have at least a few serious problems that should be identified and studied by the agency. The number and phasing of improvement activities must be feasible for the transit agency to accomplish.

Scheiner, JI (Pennsylvania Department of Transportation) *Transportation Research Record* No. 719, 1979, pp 1-6, 1 Fig., 1 Tab., 7 Ref.; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

21 303952 ASSISTING SMALL TRANSIT OPERATORS IN CALIFORNIA (ABRIDGMENT). The paper describes the process and presents the results of ten workshops recently conducted by the California Department of Transportation (Caltrans) with transit operators throughout the state. The purpose of the workshops was to identify the needs of small transit operators, to determine the existing expertise of transit operators and others associated with transit (universities, consultants, etc.), and to discuss the role Caltrans should play in a transit management assistance program. The most frequently mentioned needs were summarized: accounting systems; grantmanship; marketing; management, planning, and technical assistance; scheduling and run cutting; information resources and information workshops; insurance; equipment maintenance; vehicle specifications and acquisition; driver training; management and supervision training and diesel mechanic training; ongoing system evaluation; transportation development act information; and methods of assistance. California's first-year transit management

assistance program will consist of six elements that fall into two categories. The first category is statewide management assistance and its elements are: a central transit information center, a bimonthly newsletter, and two three day workshops per year. The second category, local management assistance, is directed toward developing programs on specific topics and its elements are: on-site assistance, marketing presentation, and a driver training program.

Griffin, HW Trimble, RR (California Department of Transportation) *Transportation Research Record* No. 719, 1979, pp 43-45; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

21 305744 HANDBOOK FOR MANAGEMENT PERFORMANCE AUDITS. VOLUME I. A management performance audit is a comprehensive examination and evaluation of a transit system's goals and objectives and the procedures it uses to accomplish these goals and objectives. The audit takes into account the resources with which the system has to work and the constraints under which it must operate. The Handbook introduces decision makers in transit properties, municipalities, Metropolitan Planning Organizations, and State Departments of Transportation to the concepts and techniques involved in management performance audits. The Handbook shares the authors' experience in auditing with other organizations that may conduct audits of transit systems or that train future transit managers, and provides managers of small and medium-sized systems with tools for improving practices and procedures. The Handbook is comprised of two volumes. This volume, Volume I, describes the theory and technique of carrying out a management performance audit. The history and benefits of the audit are introduced; a description of the characteristics of a transit system including its social, political, and economic environment, its governing body, and its internal functions such as maintenance and transportation are addressed; and a discussion of the auditor's procedures from the planning of the audits to preparing the written report is presented.

Smerk, GM Dodge, SA Lee, CM Gunning, JI Babbitt, JH ; Indiana University, Bloomington, Urban Mass Transportation Administration, (UMTA-IN-11-0004) Final Rpt. UMTA-IN-11-0004-79-2, Oct. 1979, 100 p.; See also Volume 2, PB80-117492.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-117484

21 305745 HANDBOOK FOR MANAGEMENT PERFORMANCE AUDITS. VOLUME II. The Handbook introduces decision makers in transit properties, municipalities, Metropolitan Planning Organizations, and State Departments of Transportation to the concepts and techniques involved in management performance audits. Volume II, is a field guide consisting of outlines and questionnaires used in conducting an audit. The outlines and questionnaires are provided for each characteristic of a transit system including its external environment, its governing body, and its internal functions such as maintenance, transportation, accounting, and finance. The outlines give the auditor a guide for collecting data by way of interviewing employees and other

individuals involved with the transit system. The questions provide technical detail that an auditor must collect from each functional area.

Smerk, GM Dodge, SA Lee, CM Humpf, JJ Gunning, JL ; Indiana University, Bloomington, Urban Mass Transportation Administration, (UMTA-IN-11-0004) Final Rpt. UMTA-IN-11-0004-79-1, Oct. 1979, 186 p.; See also Volume 1, PB80-117484.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-117492

21 309523 MANAGING SEPTA STRATEGICALLY. The purpose of this report is to present a way of more effectively managing a public transportation authority, specifically, the Southeastern Pennsylvania Transportation Authority (SEPTA), to enable it to better confront the problems and opportunities it is encountering through an approach which combines management-by-objectives with cost-effectiveness analysis. The approach presented is strategic in both method and scope. Its sweep is region-wide and long term; but it also deals with the local and the immediate. In doing so, it serves as a surrogate for the profit motive of private enterprise. A decision process is described, which involves expressing an organization's functions as discrete projects related to a clearly defined set of objectives, and then comparing the projects through cost-effectiveness analysis. The involvement of management, employees and citizens, along with the effect of responsibility and reward on job performance, is discussed. The environment in which SEPTA must function in the years to come is considered by examining a set of possible alternative regional futures, market share, and the land use-public transportation relationship. An attempt is made to compare the performance of a variety of SEPTA modes serving two different density-defined areas. The report presents a goals structure for SEPTA, consistent with this decision and encompassing the regional concerns identified earlier. Using this goals structure, the study tests various sample projects for cost-effectiveness. Throughout this report, an emphasis is placed on reinforcement—the pooling of resources by SEPTA and other parties to achieve mutual objectives. (FHWA)

Sloan, AR ; Southeastern Pennsylvania Transportation Authority, Urban Mass Transportation Administration, (PA-09-0005) Final Rpt. UMTA-PA-09-0005-79-1, Sept. 1979, 227 p.; Contract PA-09-0005; ORDER FROM: NTIS; PB-80123649

21 309652 POINT OF VIEW: PRIORITY OF PUBLIC TRANSPORT AT JUNCTION TRAFFIC LIGHTS [Point de vue: priorite des transports publics aux feux de carrefour]. After recalling the aims of bus traffic, the author proposes a method of evaluating the results obtained. He suggests that priority equipment should be studied to determine both the objective parameters (journey time, regularity of buses) and the attitudes of users (of public transport and cars). [French]

Giblin, JP *TEC-Transport Environment and Circulation* No. 28, May 1978, pp 27-30, 1 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105644), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM:

21 309670 ACCELERATION OF PUBLIC TRANSPORT WITH PARTICULAR REFERENCE TO METHODS OF SPEEDING UP BUSES [Beschleunigung des Oeffentlichen Verkehrs mit Besonderer Beruecksichtigung von Beschleunigungsmassnahmen fuer Autobusse]. Well known measures for increasing the attractiveness of public transport are described. In addition to measures for speeding up buses to shorten journey times, the importance of coordinating the timetables to achieve minimum time losses when changing is stressed. Further methods of speeding up buses are described in the light of measures carried out in Vienna. In addition to a reduction in the stopping times by the use of automatic equipment when changing passengers, shorter journey times may be achieved by adapting signal switching at stops, changing traffic signals by radio, forbidding stopping at some stops during peak periods, the introduction of bus lanes and the use of bus areas at signal controlled junctions. (TRRL) [German]

Lukas, R.; Wiener Institut fuer Standortberatung WIST Infor 42, Sept. 1978, pp 8-11, 1 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 309022)

21 310365 AN ANALYSIS OF THE HEADWAY DISTRIBUTION OF AN URBAN BUS SERVICE. This paper deals with a quantitative evaluation of headway distribution. The analysis utilises numerical integration and statistical techniques on headway data collected for various bus routes in Evanston, Illinois, a Chicago suburb. An earlier analysis of this study concluded that the bus travel times can best be represented by a beta distribution, the parameters of which can be predicted separately-based on system characteristics for the peak and off-peak periods. This present study accepts the beta distribution hypothesis and suggests a model to predict bus headway behaviour. The parameters r and t of that model may be derived in terms of the length of the bus route under study. The theoretical model is examined and tested against actual headway data. It is concluded that the derived distribution, with the predicted parameters, may be a valid model for the description of actual headway behaviour. (a) (TRRL)

Polus, A (Technion - Israel Institute of Technology) *Traffic Engineering and Control* Vol. 20 No. 8/9, Aug. 1979, pp 419-421, 3 Fig., 1 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243579)

21 310374 A COMPARISON OF BUS OPERATIONS IN CITIES OF DEVELOPED AND DEVELOPING COUNTRIES. This article reviews the demand for public transport in third world cities. Some of the factors affecting demand are examined, comparing them with conditions in the developed world. Special problems facing public transport operators in developing countries and their economic climate are outlined. The low levels of car ownership in most cities of developing countries make it essential that an adequate public transport system exists particularly in urban areas where there is a heavy reliance on buses. The authors analyse trends in bus usage indicating a growing demand for public transport in cities during recent years. However, in many countries, governmental support has been minimal, and in some cases successful bus operators have been penalised by taxation. Although operating costs per kilometre are lower in the UK revenues are also much lower and a larger

demand is associated with a lower level of service. The total numbers of buses available per head in underdeveloped cities is much lower than that in those of Europe and North America. The aims of current research are outlined. (TRRL)

Jacobs, GD Maunder, DAC Fouracre, PR (Transport and Road Research Laboratory) *Traffic Engineering and Control* Vol. 20 No. 6, June 1979, pp 306-310, 4 Fig., 5 Tab., 1 Phot., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244337)

21 310557 TRIP ASSIGNMENT TECHNIQUES CURRENT IN THE UK. The paper summarises the main results of a survey carried out in April 1978 concerning the assignment methods used by local authorities in the UK for both road and public transport networks. Topics covered include size of the study area and networks, use of computers, objectives and uses of the results, network data and level of detail stored, procedures followed to deal with capacity restraint in road networks, level of accuracy expected and general level of satisfaction with the methods used. A number of areas where improvements might be made to current techniques are suggested. (a) (TRRL)

Lai, FK Van, FKL (Leeds University, England) *Traffic Engineering and Control* Vol. 20 No. 7, July 1979, pp 348-351, 6 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243583)

21 310761 EMPLOYMENT CENTER BUS SERVICE GUIDELINES FOR IMPLEMENTATION. A unique aspect of the Employment Center Bus Service (ECBS) is its ability to schedule the minimum bus fleet necessary to match staggered work shifts with essentially all worker commuting distances in either a "satellite employment center", or a central business district. This brochure summarizes an earlier study and includes some recent developments. An effort to develop techniques for applying the ECBS concept to various urban areas, (based on information obtained from a cross-section of the nations' operators and major employers) is also described. The ECBS scheduling methodology is illustrated by applying it to three typical work shift/commuter distance scenarios: one bus-tow shifts, two buses-three shifts, and two buses-four shifts. ECBS is amenable to the inclusion of several other features that appeal to the auto-oriented traveller. The fares could be proportional to trip length and competitive with auto operating costs. The ECBS is amenable to several fare payment plans that are convenient for the passengers and economical to implement and operate. The paper examines the urban transit void filled by ECBS and the benefits of the service. Guidelines on implementation are also provided.

Urban Mass Transportation Administration Mar. 1978, 24 p., Figs., Tabs., Photos.; ORDER FROM: GPO; 050-000-00142-3

21 311169 SIMPLIFIED MODELING OF TRANSIT CORRIDORS. A sketch planning model overcoming several drawbacks of the traditional models is developed. This model partitions the urban area into a corridor, in which a transport alternative is introduced, and the complementary part of the urban area. Prediction of travel demand is made separately for the corridor and its complement. Demand for trips

outside the corridor is estimated by aggregate methods, while travel demand in the corridor is estimated by a disaggregated model. A sample of 150-300 households is drawn from the corridor zones, and the model is applied to each observation, estimating its travel demand. The household socio-economic and level of service variables are computed or approximated on a disaggregated level. Total demand is estimated by factoring up the demand for each observation by the sampling rate. The trips are assigned to a highly abstracted network until equilibrium between assignment and mode split is reached.

Landau, U (Technion - Israel Institute of Technology) Fedorowicz, Y *ASCE Journal of Transportation Engineering* Vol. 106 No. 1, Jan. 1980, pp 71-84, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

21 311210 TRANSIT SERVICE STANDARDS, ROUTING, AND SCHEDULING. The governments of Eugene, Springfield, and Lane County, Oregon, recently adopted a multimodal transportation plan that has forecasts to the year 2000. Serving this area is the Lane Transit District. The board of this district recently developed short-range objectives for fixed-route service designed to interface with the year 2000 plan. These objectives include a goal of a ratio of fare-box revenue to operating cost of 25 percent by 1982. Lane Transit District offers three types of service: urban fixed route, nonurban fixed route, and urban dial-a-bus. The service standards considered most important to the development program include coverage, travel time, availability, and accessibility. Route and schedule adjustments originate from public and employee suggestions, which are considered as part of a periodic route-and-schedule review. Surveys and passenger-opinion data are collected regarding any proposed changes. Schedule changes are made three times a year, route changes are made annually. Routes and schedules are adjusted as necessary to achieve long-and short-range goals. The transportation plan for the Eugene-Springfield area calls for implementation of a bus rapid transit system supported by local buses. A key element of the plan is the construction of 10 major and 10 minor transit stations throughout the metropolitan area. (Author)

Rynerson, D (Lane Transit District, Oregon) *Transportation Research Board Special Report* No. 187, 1980, pp 21-24, 2 Tab.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

21 311323 MIDTOWN MANHATTAN CIRCULATION AND SURFACE TRANSIT STUDY-MIDTOWN CIRCULATION DEMONSTRATION AND EVALUATION PROGRAM. The Midtown Circulation and Surface Transit Study was initiated in order to reduce congestion, and thereby improve air quality; improve pedestrian and vehicular safety; improve surface transit service; and enhance the urban environment in midtown Manhattan. The objective of the study is to develop and demonstrate low-capital, surface transit and other circulation improvements--in addition to the various techniques currently employed in pursuit of solutions

to problems of congestion and the intense competition for street space—in midtown. The objective of this report (Interim Technical Report Number 3, "Midtown Circulation—Demonstration and Evaluation Program) is twofold: to report the findings of the early action demonstration program; and to develop and initiate additional demonstration projects and to recommend a program for the monitoring and evaluation of these projects. The demonstration projects generally involved such things as bus route changes, turn prohibitions at selected intersections contra-flow lane and priority and exclusive bus lanes. These usually resulted in increases in bus and vehicle speeds and a corresponding reduction in traffic congestion.

Edwards and Kelcey June 1979, 63 p., 14 Fig., 11 Tab.

21 313141 TRANSIT NETWORK ANALYSIS: INET. This report is a collection of five independently developed documents concerning the transit system analysis program INET (Integrated Transit Network). The five documents are titled: INET Tutorial, a technical introduction to INET functions and mechanics; INET Lecture Guide, a set of over 50 graphics suitable for overhead projection, along with an explanatory text for each; INET Coding Hints, some guidance on preparation of INET input from actual transit plans or operations; INET Case Study, a small, complete example of the use of INET with the Alexandria, Virginia, bus system; and INET Operating Instructions, the instructions for operation of the INET computer program. INET, a new computer program which is an integral part of UTPS (Urban Transportation Planning System), has been developed to aid planners in the analysis of urban transit systems. INET makes transit network coding quick and easy by exploiting data already available for highway networks. It maintains consistency between transit and highway levels of service, and it helps bridge the gap between transit planning and operations. Experience with actual highway and transit data has shown that INET performs with speed and accuracy even better than expected. INET is a substantial improvement over previous transit network programs and greatly facilitates transit systems analysis.

Dial, RB Rutherford, GS Quillian, L; Rutherford (GS) and Associates, Urban Mass Transportation Administration Final Rpt. UMTA-UPM-20-79-3, July 1979, 360 p.; Contract DOT-OST-78-048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-141807

21 313196 PUBLIC TRANSIT RISK MANAGEMENT: A HANDBOOK FOR PUBLIC TRANSIT EXECUTIVES. Transit is seen by insurers as a risk with high loss potential. Since people are transported in large numbers, a single accident may yield many claims. One solution to this insurance situation that has been employed by transit system operators is to assume some of the risk of potential loss themselves. The handbook introduces risk management to transit professionals and outlines the elements of the risk management concept and process.

Ryland, VW; James (Fred S) and Company of Virginia, Inc, Urban Mass Transportation Administration, (UMTA-IT-06-0173) UMTA-IT-06-0173-79-1, Dec. 1978, 75 p.; Contract DOT-UT-70002; ACKNOWLEDGMENT:

NTIS; ORDER FROM: NTIS; PB80-145287

21 314086 PROTOTYPE PLANNING STUDY, PORTLAND (OREGON). TRANSPORTATION SYSTEMS MANAGEMENT (TSM) [Final rept.]. Transportation System Management (TSM) is a concept that calls for the planning, programming, and implementation of low-capital, short-range improvements designed to increase the efficiency of existing transportation systems. TSM may also serve the goals of energy conservation, environmental protection, and urban revitalization. This report is one of five special studies of the TSM Planning Prototype Studies Program. The program was designed to demonstrate the capabilities of local agencies to undertake TSM planning in a systematic problem oriented manner. This report documents the project in Portland and is designed to provide a summary of the procedures utilized in Portland to systematically develop a regionwide program for TSM delineated on a small area basis. The TSM process includes a statement of goals and objectives, evaluation of existing conditions, a set of proposed action and justification for inclusion of those actions in the area's Transportation Improvement Program.

Spanovich, G; Metropolitan Service District, Urban Mass Transportation Administration Final Rpt. UMTA-IT-09-0068-79-1, Nov. 1979, 114p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181951

21 314706 BOTTLETHWAITE: A BUS NETWORK DESIGN EXERCISE. 1. THE PROBLEM. The exercise, developed for use in the training of bus system designers as part of the National Bus Company's market analysis project (map), is concerned with the design of an off-peak urban network. The problem, to maximize a demand related measure, using a fixed quantity of resources, is given in the article. Some solutions and their implications are to be discussed in the April 1980 issue of "Traffic Engineering and Control". The hypothetical town—Bottlethwaite, has six main roads radiating from its centre and a series of 12 estates between the main roads linked by a circular ring road. The potential trips from each estate to the town centre and the radial roads is given in a matrix. The object of the exercise is to design a regular-headway pattern of service, using 10 buses, for maximum patronage. The method of scoring is explained and details are given of the restraints imposed upon the designer such as the effects of passengers walking to the nearest radial route. (TRRL)

MacBriar, ID (National Bus Company) *Traffic Engineering and Control* Vol. 21 No. 2, Jan. 1980, pp 28-29, 2 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 245603)

21 315056 MEASURES OF EFFECTIVENESS FOR MULTIMODAL URBAN TRAFFIC MANAGEMENT: VOLUME 2—DEVELOPMENT AND EVALUATION OF TSM STRATEGIES. This three-phase study has developed measures of effectiveness (MOE'S) for Transportation Systems Management (TSM) strategies. In Phase I, hierarchical schemes of TSM strategies and tactics and comprehensive goals and objectives were developed. MOE's were then identified which could measure the degree of attainment of each related objective through the

implementation of a given tactic. Data sources, field measurement procedures and modelling techniques were then identified for measuring or estimating each MOE. In Phase II four case studies were conducted to test and illustrate the methodology and to demonstrate the effectiveness of a variety of TSM strategies. In Phase III sampling and data collection procedures for some of the most commonly used MOE's were developed. Also, manual and computer modelling procedures for modal split and network analysis were studied and recommendations on their applicability to TSM analyses were developed. This volume has been written as a stand-alone guide for practicing engineers and planners who are engaged in the development and evaluation of urban area TSM plans. The guide provides a consistent framework for TSM strategy development, recommends measures of effectiveness for TSM strategy evaluation and identifies and demonstrates manual and computer techniques for TSM analysis. (FHWA)

Abrams, CM DiRenzo, JF; JHK and Associates, Peat, Marwick, Mitchell and Company, Federal Highway Administration Final Rpt. FHWA-RD-79-113, Dec. 1979, 193 p.; SPONSORING AGENCY: RESPONSIBLE INDIVIDUAL: Rosen, DA (HRS-31); Contract DOT-FH-11-90246; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-198682

21 315190 A SOLUTION METHOD FOR THE BUS ALLOCATION PROBLEM. The problem of allocating a given number of buses to a set of routes in order to minimize passengers waiting time is studied and a solution method is discussed. An extension of the problem where in-vehicle time is also taken into account is derived and it is shown that the suggested method can also be used to solve the extended problem. A small numerical example is also given. (TRRL)

Grega, W Joernsten, KO; Linköping University, Sweden, (0348-2960) Monograph Lith-Mat-R-79-43, 1979, 29p, 3 Fig., 6 Tab., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246657), National Swedish Road & Traffic Research Institute

21 315405 ALTERNATIVE WORK SCHEDULES. Organizational productivity should increase significantly with the 4 day/40 hour week strategy. Start up and shut down times could be reduced by 20%; and with equipment operating 50 hours per week instead of the traditional 40, capital costs may be also reduced. With the staggered hours—a fixed eight hour/day schedule within a range of starting times—and flextime—a variable time eight hour work day within a range of starting times—strategies, transit scheduling would be more difficult because of inability to predict workers' commuting times. Flextime may not work for production line situations, and it creates a problem in monitoring employees. Chapter Two lists contacts for information about alternative work schedule programs, and it lists several current programs. Chapter Three contains an annotated bibliography of alternative work schedule programs.

Public Technology, Incorporated, Department of Transportation Feb. 1978, 21 p, 1 Fig.

21 316254 METHODOLOGY FOR GENERATION OF OPTIMAL SCHEDULES FOR AN UNDERGROUND RAILWAY SYSTEM. A methodology is developed for the automatic

generation of optimal schedules for the North-South line of the METRO of Sao Paulo, Brazil. An analytical model was created to represent the system behavior: train and passenger movements. Based on the model characteristics, the goal-coordination method, due to Las don and Tamura, was utilized to produce the optimal reference schedule, by considering comfort levels for passengers, the number of trains in the line and the performance of trains. The optimal schedule for the morning peak period was generated and a great improvement over the current strategy was obtained.

Cury, JE Gomide, FAC Mendes, MJ; Institute of Electrical and Electronics Engineers Conf Paper IEEE 79CH1486-OCS, 1979, pp 897-902, 8 Ref.

Proceedings IEEE Conference on Decision Control Incl Symposium Adaptation Processes 18th, Fort Lauderdale, Florida, December 12-14, 1979; Volume 2.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE

21 316477 MONITORING AND SURVEILLANCE-SERVICE STANDARDS. This report documents a program developed by the Transit Authority of Northern Kentucky for the collection and analysis of operating data. A series of performance standards for existing and proposed new route service has been identified. Standards have also been developed for other aspects of TANK's operations. Data collection procedures have been delineated for the purpose of providing the raw statistics to be evaluated. The complete collection and analysis program is designed to help TANK meet its primary goal of "providing the best public transportation service possible within the limits of its financial resources." This program will be reviewed on a periodic basis as part of TANK's Management by Objectives Program. The dynamic environment in which transit systems operate today demand that inappropriate or outmoded performance measures cannot be tolerated. (Author)

Transit Authority of Northern Kentucky, Urban Mass Transportation Administration Final Rpt. UMTA-IT-09-0080, Mar. 1980, v.p., Tabs., 1 App.; Grant IT-09-0080; ORDER FROM: NTIS

21 317191 THE UNIVERSITY OF OTTAWA RUN-CUTTING PROGRAM [BENKELMAN-VERFAHREN UND PROOF-ROLLING...]. This report describes the runcut computer program developed at the University of Ottawa (Computer Science Department) for solving the run-cutting problem that exists in the urban transit industry. Runcut exists as three program modules and a description of the role and general organization of each of these is provided. Particular attention is given to the data structures used to manage the raw data and the runs which are created. The main run-cutting operation is carried out on a line-by-line basis; however the task of the final phase is to create multi-piece runs from the pieces of unassigned work that remain from the main procedure. Also included in the report are sample results generated by runcut from data provided by OC Transpo. (TRRL) deformation measurements that the "proof rolling" technique should be used only under limited conditions. In general, on the basis of a range of specimens, the above test of the relations between the testing techniques and the contract is recommended. [DEUTSCH]

Haas, H *BAUWIRTSCHAFT* Monograph NTP1943, Feb. 1979, 45p, 11 Fig., 3 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247238), Roads and Transportation Association of Canada; ORDER FROM: DOK 25331

21 319190 TRANSIT SYSTEM MANAGEMENT ELEMENT FOR SOUTHEASTERN CONNECTICUT. This report contains summary data and information on the status of transit in the Southeastern Connecticut area and makes certain recommendations for modifications utilizing low cost techniques to improve operating effectiveness, the primary objective of the Transit System Management Element process. The body of the report is divided into two sections. The first section deals with specific developments and accomplishments that occurred during Fiscal Year 1979-1980 as a result of Metropolitan Planning Organization efforts to help the Southeast Area Transit implement the transit plan. The second section is somewhat more technical and less descriptive in nature. It deals with very specific detail changes that have been made to the proposed transit system in order to increase its efficiency.

Southeastern Connecticut Regional Planning Agency, Urban Mass Transportation Administration June 1980, 116p; Contract CT-09-0015; ORDER FROM: Southeastern Connecticut Regional Planning Agency, 139 Boswell Avenue, Norwich, Connecticut, 06360

21 319324 VEHICLE INSURANCE STUDY. The objectives of this report are to present vehicle insurance/self-insurance programs of the 19 urban transit systems in Wisconsin and to provide recommendations for improvement of these programs, giving particular attention to group findings. The following are the principal recommendations derived from the findings of this study: transit vehicle insurance should be placed separately from other municipal insurance, where presently combined; responsibility for transit vehicle insurance procurement should be shifted to the transit manager, or the transit manager, or the transit manager must work closely with the city department responsible for insurance purchasing; the competition method should be used when obtaining competitive insurance bids, and insurers of transit systems should be subjected to price competition no more frequently than every three years; safety and training programs and internal claim reporting procedures should be documented in writing; transit management should streamline internal reporting procedures by forwarding to insurers each item of accident information as it becomes available; statements of transit system vehicle losses should be obtained from insurers quarterly during the coverage term and updated annually thereafter; transit systems should emphasize their emphasize their favorable loss records to insurers bidding vehicle insurance programs. Transit systems except Madison and Milwaukee should consider deductibles or should purchase liability coverage limits of no less than \$5 million, and should pursue a joint purchase program.

Wisconsin Department of Transportation UMTA-WI-09-8004, May 1980, v.p., Apps.

21 319334 DIAGNOSTIC TOOLS IN TRANSIT MANAGEMENT. Historically, transit management had to rely on a technique known as

peer-group comparison to identify strengths and weaknesses in the performance of their system. In this technique, performance indicators for the system under study are compared with the average performance of systems that have similar characteristics. This method, though useful, is deficient in that it does not totally reflect the differences in operating characteristics or environment among transit properties. This paper presents a diagnostic tool for comparing performance among transit systems by suggesting a method to eliminate deficiencies in the traditional approach. The paper suggests that combined uncontrolled and controlled comparisons be used to identify relative strengths and weaknesses in performance. The uncontrolled comparison is the traditional approach in which system performance is compared with average performance of the peer systems. The controlled comparison is performed by comparing that actual performance with the expected performance. The expected performance is calculated from models that can be developed from the experience of the peer systems. This paper presents a case study in which uncontrolled and controlled comparison concepts were used to identify strengths and weaknesses of 11 bus depots in the New York City Transit Authority. The paper presents 10 transportation and maintenance performance indicator models that were used to calculate the expected depot performance. The models were developed through stepwise multiple regression analysis of the New York City Transit Authority's actual operating statistics for fiscal year 1977. The paper also discusses how the uncontrolled and controlled comparisons were subsequently used to set priorities among depots for remedial action. The application of the performance comparison technique discussed in this paper to smaller systems would require comparison of the system's performance with that of other similar transit properties. (Author)

Mundle, SR Cherwony, W *Transportation Research Record* No. 746, 1980, pp 13-19, 8 Fig., 1 Tab., 1 Ref.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

21 319336 EVALUATING POTENTIAL EFFECTIVENESS OF HEADWAY CONTROL STRATEGIES FOR TRANSIT SYSTEMS. Holding strategies for control of headways between transit vehicles are often considered as a means of improving the reliability of transit service. This paper describes simple tests that can be used to identify situations for which control is potentially attractive. These tests depend only on a simple measure of headway variability and the proportion of total passengers who will be delayed as a result of the holding strategy. Thus, this analysis provides transit operators with a simple screening model to evaluate potential effectiveness of controls. (Author)

Turnquist, MA Blume, SW *Transportation Research Record* No. 746, 1980, pp 25-29, 3 Fig., 8 Ref.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

21 319339 SYSTEMATIC PROCEDURE FOR ANALYSIS OF BUS GARAGE LOCATIONS. The overhead costs of transit operations represent one area in which economies can be achieved. For

a large system the costs of putting buses on routes and pulling them off (pull-on and pull-off) and driver relief can be substantial: up to 10 percent of the operating budget for the system studied. These costs are directly related to the route structure and the location and capacity of bus garages. This paper describes a procedure that uses generally available planning data in the analysis of the pull-on and pull-off and relief costs for alternative garage programs. Factors studied include the number of facilities, their location, their capacity, and the routes served from each garage. It is shown that the location of garages in relation to day-base routes is a determinant of relief costs and that the difference in operating costs for alternative programs can approach \$1 million per year. (Author)

Spielberg, F Golenberg, M *Transportation Research Record* No. 746, 1980, pp 39-42, 2 Fig., 1 Tab.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

21 319342 OPERATIONAL IMPROVEMENTS IN A TWO-CITY BUS TRANSIT CORRIDOR (ABIDGMENT). The Albany-Schenectady, New York, bus service corridor is the most heavily used corridor in the Capital District Transportation Authority's service area. The continuing decentralization of activities from the two cores out along the corridor and the increase in service demand has created the need for operational analysis of services to increase their effectiveness. The resultant study emphasized near-term operational improvements that could be implemented within fairly fixed operational support funding. A study of this nature deals with many situations that are site-specific. Of general interest will be the methodology of data collection and analysis and some of the detailed dynamics of a long, relatively high-density bus transit corridor that must consider interactions between line-haul and local services and between transit and the many factors that contribute to route delay. Of 14 problem areas originally enumerated in the study, general analytical conclusions on 7 are given. The corridor demonstrates that many of the operational inefficiencies for which separate right-of-way modes might be proposed manifest themselves at demand levels well below levels at which implementation of such modes is usually considered. (Author)

Nelson, GG *Transportation Research Record* No. 746, 1980, pp 52-55, 2 Fig., 1 Tab.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

21 319344 HIERARCHICAL PROCEDURES FOR DETERMINING VEHICLE AND CREW REQUIREMENTS FOR MASS TRANSIT SYSTEMS. This paper presents procedures for determining vehicle and crew requirements for mass transit systems. Some of these procedures are very fast computationally but only give lower bounds, upper bounds, or estimates of resource requirements. Other procedures are slower computationally but give actual crew and vehicle schedules. Depending on the type of analysis being performed (long-range planning, short-range planning, or operational planning), all of these procedures play a useful role in the design and analysis of proposed mass transit

systems. The paper has two sections: (a) the first discusses techniques for determining vehicle requirements and (b) the second discusses techniques for determining crew requirements. Within each section are a set of procedures that range from the very simple to the complex, along with comments on their usefulness and shortcomings. (Author)

Bodin, LD Dial, RB *Transportation Research Record* No. 746, 1980, pp 58-64, 3 Tab., 7 Ref.

This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

21 319364 TRANSPORTATION SYSTEM MANAGEMENT: OBSERVATIONS AND COMMENTS ON FUTURE DIRECTIONS.

The author notes that the TSM concept seems to have become thoroughly institutionalized in the transportation planning process. He attributes this to its compatibility with a set of values and concerns that have emerged in the U.S. in recent years: the emerging conservation ethic, the growing fiscal conservatism, a new emphasis on reusing the old rather than throwing it away, and a newfound awareness that the age of cheap, unlimited energy is over. Typical TSM activities—small-scale, incremental actions whose effects are confined to communities or neighborhoods—seem more suitable for local initiative and implementation and thus raise doubts in the author's mind of the importance of TSM at the regional level. The need is stressed for taking greater account of role of the private sector in TSM implementation. Many TSM initiatives (e.g. flexible working hours, vanpools, off-street parking management, pedestrian malls) are significantly dependent on the initiative, support and good will of private enterprise. Attention is called to such less galmourous TSM actions being introduced at the local level as residential parking programs, traffic diversion, commuter parking bans and street closings. Finally, the author calls for the use of TSM in rail planning (e.g. the joint use of rail facilities by freight and commuter services, i.e. tracking sharing).

Orski, CK (German Marshall Fund) *Transportation Research Board Special Report* No. 190, 1980, pp 10-11; This paper appeared in Transportation Research Board Special Report No. 190: Transportation System Management in 1980.

21 319418 TRANSPORTATION SYSTEMS MANAGEMENT ELEMENT. Transportation Systems Management (TSM) denotes a process designed to increase the efficiency of existing transportation facilities and resources by implementing low-capital measures which reduce the need for major capital improvements. In addition to fiscal economy, the TSM process insures that meaningful steps can be taken toward attaining broader local and national goals—energy conservation, environmental improvements, equity for transit dependents and urban preservation. In this fifth update of the TSM Element, greater emphasis is placed on: (1) developing a method for prioritizing projects; (2) developing monitoring and evaluation techniques to ascertain the effectiveness of implemented projects; (3) establishing a transportation technical committee to more completely involve local and state agencies in the total TSM program. (Author)

Hayes, SJE ; East-West Gateway Coordinating Council, Urban Mass Transportation Adminis-

tration, (327.0) EWG-SH-0402.10.0, Mar. 1980, 75p, 2 Fig., 1 Tab., 1 App.; ORDER FROM: East-West Gateway Coordinating Council, 112 North Fourth Street, Suite 1200, St Louis, Missouri, 63102

21 319643 IS PART-TIME LABOR A CURE FOR TRANSIT DEFICITS? This article examines the potential savings from part-time labor and concludes that part-time labor cannot make a substantial reduction in the size of the transit deficit. Also discussed are the factors responsible for producing transit deficits. It is concluded that broad social forces outside the control of the transit industry are the major factors.

Lave, CA (California University, Irvine) *Traffic Quarterly* Vol. 34 No. 1, Jan. 1980, pp 61-74, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

21 322245 BUS ROUTE AND SCHEDULE PLANNING GUIDELINES. Bus transit service planning in most urban areas is largely an outgrowth of historic and geographic circumstances. Planning should reflect the specific needs and operating requirements of each urban area. Relevant planning factors include: past operating practices and procedures; the current operating authority and system extent; revenue requirements (i.e., reliance on fares); land-use, population density, ad employment features; street patterns; and the availability of off-street rail transit. These factors, singly and in combination, influence the pattern of bus services and the opportunities for change and expansion. The best possible service should be provided to the greatest number of people within the governing economic constraints. Planning must balance the amount and type of services provided with the net costs of providing the service. This trade-off underlies all service planning decisions. Bus services should be carefully related to existing and potential markets and concentrated in heavy travel corridors with the greatest service frequency and route coverage in the approaches to the city center. Route structure should be clear and understandable, and service duplication should be avoided. Changes in transit service must be coordinated with planning and traffic agencies to expedite bus flow and to assure that streets in nearby developing suburban areas are able to accommodate buses. These changes in service should minimize disruption of existing riding patterns. The greatest opportunities for major modifications to services or routes accompany (a) expansion of transit services from urban and regional carriers into integrated systems and (b) provision of new service to growing suburban areas. However, the alteration in service patterns usually represent small-scale, fine-grained adjustments. Such adjustments reflect changes in actual ridership due to population growth or decline; provision of service to new employment centers, schools, or residential areas; ability to operate on new streets or expressways; and "restructured" or reduced service to bring costs and revenues in better balance. In almost every case, the amount of financial support beyond fare-box revenues influences the amount and type of service. (Author)

NCHRP *Synthesis of Highway Practice* No. 69, Apr. 1980, 99p, 44 Fig., 23 Tab., 55 Ref., Apps. ORDER FROM: TRB Publications Off

21 322263 SYNCHRONIZED TRANSIT SYSTEMS: THE CHALLENGE OF THE 1980S. The way in which a transit system can be redesigned to better fit the polycentric city is described. A transit system which serves several high density destinations will be better utilized and supported and more economical to operate than one which serves only one major destination. Such a service should be structured around a set of strategically located major interchange points and would consist of good local service to a few centers of activity (including downtown), good express bus service between centers, and good internal circulation service in a few high density centers. The synchronized transit system (STS) concept is structured around a small number of transit centers and provides synchronized service at most or all of these centers. The synchronization of schedules at the transit centers makes transfers easy and quick. The design of an STS should begin with the identification and classification of the most promising set of locations for the transit centers. The next step is the defining of the transit service to be provided to and between each center. Ideally, the routing and scheduling of the transit service should change to fit the travel patterns at different times of the day or week. The dual route/schedule concept (two sets of fixed routes with one set serving major employment centers during peak periods and the other serving nonwork activity centers) is discussed. Actual experience with the application of STS concepts in Canada and the U.S. is discussed, and the problems encountered are noted. It is observed that the STS concept appears to be the transit solution to meeting the American City in the 1980's and 1990's.

Schneider, JB (American Public Transit Association) Smith, SP (Washington University, Seattle) *Transit Journal* Vol. 6 No. 2, 1980, p 39; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

21 322562 OPERATIONAL TECHNOLOGY IN PUBLIC RAIL-BOUND TRANSPORT [Betriebsleittechnik im Schienengebundenen Nahverkehr]. Operational technology as part of safety and railway automation process plays an important role in public transport. First, the area

of management operation technology is divided from the areas of signalling technology and train control technology. The basis of the structure of an urban railway network, the role of the three functional planes "areas", "line" and "control centre" are laid down. For the carrying out of these roles, a hierarchical system is proposed for the computer and is explained by means of an example of an actual system in use. [German]

Sperl, H *Internationales Verkehrswesen* Vol. 31 No. 3, May 1979, pp 172-175, 6 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 311462), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

21 322984 DEVELOPMENT AND TESTING OF AN INTERACTIVE TRANSIT STATION SIMULATION MODEL. USS is a transit station simulation computer program developed for the Urban Mass Transportation Administration. The program is intended as a design and evaluation tool for transit planners and engineers, to assist in developing alternative configurations for rapid transit stations. In its final version, USS will become a part of UMTA's Urban Transportation Planning System (UTPS), a series of related computer programs which permit planners to simulate and model both supply and demand characteristics of urban transportation systems.

Lutin, JM (Princeton University) ; American Federation of Info Processing Soc Press 1979, pp 936-941, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: American Federation of Info Processing Soc Press, 210 Summit Avenue, Montvale, New Jersey, 07645

21 323358 THE HONG KONG MASS MOVEMENTS MIRACLE. The author reviews the administrative organisation concerned with the construction of the Hong Kong mass transit railway (MTR). The 26 km of railway under construction consists of 16 km of modified initial system already opened and the 10 km Tsuen Wan extension to be in operation by the end of 1982. Costs of the project and sources of finance are discussed. It is emphasised that the success of the project so far in opening on time and within the budget is due to the continuity of management

planning. Although revenue for the project is partially protected by property development, this might be equalled by increasing operating costs. A successful outcome of the MTR is of importance not only to Hong Kong but also to other urban areas of the world contemplating similar systems.

Ridley, T (Halcrow Fox and Associates) *Transport* Vol. 1 No. 3, July 1980, pp 19-22, 1 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 249625); ORDER FROM: City Press Limited, Fairfax House, Colchester, Essex, England

21 324469 MANAGING PEAK PERIOD TRANSIT DEMAND IN LOS ANGELES. This paper discusses cost and fare structure analysis at the Southern California Rapid Transit District, where in-depth studies of cost and fares have recently been performed. It has been found that off-peak fares tended to subsidize peak-hour service, particularly the express buses using the freeway. To compensate for this, a surcharge is added to the peak hour fare, while the express service utilizes a graduated fare system. A flat fare is retained for local service. The worst single inefficiency of the peak is having to run buses in two directions for travel in one direction. This imbalance has been eased somewhat by the increasing suburbanization of employment. Where reverse commutes are possible, ridership has grown spontaneously. Where the imbalance persists, load-shedding (i.e. actually encouraging car-or vanpool to relieve bus overcrowding) is recommended. Where peak occur at different times on different lines, some efficiency is gained through interlining. Other possibilities being explored include more sophisticated data collection and analysis, better means of tying costs and revenues to units of service provided, use of part-time drivers, automatic passenger counting and vehicle monitoring, and increasing computerization of scheduling process.

Woodhull, J (Southern California Rapid Transit District) ; Urban Mass Transportation Administration May 1980, pp 57-63, 1 Ref.; From Panel Sessions of the Urban Mass Transportation Administration University Research Conference, May 6-7, 1980.

22 051405 DEVELOPMENT OF A FLEET MAINTENANCE POLICY. The preventive maintenance program may be defined by the period between maintenance actions, the time the vehicle is removed from service for preventive maintenance work, and the cost of the periodic preventive maintenance. Total maintenance cost is the sum of the cost of parts, labor, and material used for scheduled preventive maintenance; and the costs of parts, labor, and material used for unscheduled repairs of vehicles that break down between scheduled maintenance actions. Level of service is more difficult to define quantitatively, and is discussed in detail.

Kuhn, K Berger, C (Sperry Rand Corporation); American Society of Mechanical Engineers Paper 73-ICT-69, Sept. 1973, 8 pp, 10 Fig; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

22 093359 SIMS IMPLEMENTATION HANDBOOK. SERVICE, INVENTORY AND MAINTENANCE SYSTEM. The Service, Inventory, and Maintenance System (SIMS) has been developed to aid urban bus transit properties in managing their servicing and maintenance activities. This automated information system is currently operational and consists of three components: the Service/Unit Change System, Inventory System, and Repair Cost System. General descriptions of the system's data requirements and the reports it produces have been published, and detailed software documentation is available for each of the three components. This handbook furnishes guidance to management in planning the implementation of the SIMS components at individual properties, by outlining such steps as data base generation, training, and acquisition of data processing services.

Scott, RL; Mitre Corporation, Urban Mass Transportation Administration, (VA-06-0004) MTR-6798, UMTA-VA-06-0004-75-1, Dec. 1974, 93 pp; See also report dated Oct 73, PB-241495.; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245610/1ST

22 095224 ORGANIZATION OF A TRAINING CENTER FOR MAINTENANCE PERSONNEL. TABEC (Technical And Behavioral Education Center) was created in 1974 as a centralized training facility for Chicago Transit Authority maintenance personnel. The primary function at TABEC is to provide the training needed to enable maintenance personnel to efficiently and safely maintain all of CTA's equipment. Training includes both classroom and "on-the-job" instruction. This paper discusses the courses of job training that are handled at TABEC.

Bolech, J (Chicago Transit Authority); American Society of Mechanical Engineers 75-RT-6, Apr. 1975, 4 pp; Contributed by the Rail Transportation Division of The American Society of Mechanical Engineers for presentation at the IEEE-ASME Joint Railroad Conference, San Francisco, California, April 15-17, 1975; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr. PC, Microfilm

22 095988 IMPLICATIONS OF THE RELATIONSHIP BETWEEN INVESTMENT AND MAINTENANCE. While a transport operator must be certain that his investment and operating plans will fit his community's needs, there are other basic considerations. Data is analyzed from a survey of some 20 railway and 40 single-deck bus operators. A reduction in required maintenance can be achieved by higher investment in design and quality of construction. The number of maintenance employees per vehicle appears to be a more crucial factor than fleet size. There is some evidence that, with the right choice of a maintenance method to minimize overheads, a bus life of less than 12 years has been shown to provide a balanced service performance at a most economical level of overall cost.

Glendinning, JG McKay, G; International Union of Public Transport Report 5A, 1975, 21 pp Presented at the 41st International Congress of the International Union of Public Transport.

22 097469 SIMS OVERVIEW. SERVICE, INVENTORY, AND MAINTENANCE SYSTEM. UMTA's Transit Operations and Management (TOMS) project includes the development of a maintenance management information system for use by the urban mass transportation industry in the maintenance of bus fleets. The Service, Inventory, and Maintenance System (SIMS) has been developed to operate as a software package at computer service bureaus or on computers operated by transit properties. SIMS consists of a package of computer programs written on ANSI COBOL language and currently operates on an IBM 360/50 or larger computer. Practical design has been enhanced by experience from field tests at the Dallas Transit System (DTS) of Dallas, Texas and Alameda-Contra Costa Transit District (ACTD) of Oakland, California. The system has been operating daily at both DTS and ACTD on a demonstration basis. This report provides an overview of the system using illustrations of the reports produced by SIMS. Information displayed on the reports allows management to plan repair actions, avoid road calls and control expenses. The Service module helps to identify consumption of oil and coolant. Transit property stock room supplies are monitored through the use of the SIMS Inventory module. The Maintenance (Repair Cost) module provides repair costs data for individual buses and divisions, segregating costs into subassemblies, inspections, accidents, and vandalism repairs, and provides information about total maintenance labor utilization. Appendices contain computer requirements and glossary.

Thurlow, VS; Mitre Corporation, (M73-218) UMTA-VA-06-0004-73-5, Oct. 1973, 56pp; This report was sponsored by the Urban Mass Transportation Administration, Department of Transportation.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB241-495/AS

22 099300 ELECTRONIC DATA PROCESSING AS AN AUXILIARY IN RELIABILITY AND PREVENTIVE MAINTENANCE STUDIES OF PUBLIC TRANSPORT VEHICLES. Studies reveal a tendency for transport undertakings to use procedures of the kind used by manufacturing industries for the organization of work on periodical maintenance and overhaul

operations. Completely new ground, however, has to be broken in this context as regards procedures and rates of production. The general concepts which form the basis of already existing systems must be adapted to the specific needs of transportation undertakings. The maintenance of vehicles comprises 3 operations (maintenance, overhauling, and repair) organization of the undertaking must be divided into 5 labor units and 3 managerial units. The programming and initiation of maintenance and overhaul work is discussed, and the technical and managerial control of maintenance and overhaul operation is detailed. Accident repairs and spare parts record are also discussed. The results and analysis of results of 86 replies to a questionnaire survey are presented.

Sasso, S (Azienda Tramvie e Autosiloviedi Napoli, Italy); International Union of Public Transport 6, 1975, 14 pp, 2 Fig., 1 App.; Presented at the 41st International Conference of the International Union of Public Transport, Nice, France, 1975.

22 132992 SERVICE, INVENTORY AND MAINTENANCE SYSTEM COMPUTER SYSTEM DESCRIPTION. VOLUME III: REPAIR COST SYSTEM. The Service, Inventory and Maintenance System (SIMS) is a computer-based information system designed to assist urban transit systems in the management of their bus service, maintenance and inventory operations. SIMS comprises three interrelated program modules: The Service/Unit-Change, Repair Cost and Inventory modules. This report describes the overall structure, inputs, reports, files and data processing functions of the SIMS Repair Cost system. /UMTA/

Thurlow, VS Ravenscroft, EI Wilhelm, EB Brown, GM Kim, CG Munch, EP Robinson, ES Sumitomo Light Metals Industries Limited, (DOTTSC-UMTA-7530.III) Final Rpt. UMTA-VA-06-0004-75-8, Dec. 1975, 238 pp; Contract DOT-UT-10005; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249060

22 132993 SERVICE, INVENTORY AND MAINTENANCE SYSTEM COMPUTER SYSTEM DESCRIPTION. VOLUME II: INVENTORY SYSTEM. The Service, Inventory and Maintenance System (SIMS) is a computer-based information system designed to assist urban transit systems in the management of their bus service, maintenance and inventory operations. SIMS comprises three interrelated program modules: The Service/Unit-Change, Repair Cost and Inventory Modules. This report describes the overall structure, inputs, reports, files and data processing functions of the SIMS Inventory system. Related reports are "Volume I: Service/Unit-Change System" and "Volume III: Repair Cost System." /UMTA/

Thurlow, VS Ravenscroft, EI Wilhelm, EB Brown, GM Kim, CG Munch, EP Robinson, ES Mitre Corporation, (DOTTSC-UMTA-7530.II) Final Rpt. UMTA-VA-06-0004-75-7, Dec. 1975, 623 pp; Contract DOT-UT-10005; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249059

22 132994 SERVICE, INVENTORY AND MAINTENANCE SYSTEM COMPUTER SYSTEM DESCRIPTION. VOLUME I: SERVICE/UNIT-CHANGE SYSTEM. The Service, Inventory and Maintenance System (SIMS) is a computer-based information system designed to assist urban transit systems in the management of their bus service, maintenance and inventory operations. SIMS comprises three interrelated program modules: the Service/Unit-Change, Repair Cost and Inventory Modules. This report describes the overall structure, inputs, files and data processing functions of the SIMS Service/Unit-Change system. Related reports are "Volume II: Inventory System" and "Volume III: Repair Cost Systems." /UMTA/

Thurlow, VS Ravenscraft, EI Wilhelm, EB Brown, GM Kim, CG Munch, EP Robinson, ES Mitre Corporation, (DOTTSC-UMTA-75-30.1) Final Rpt. UMTA-VA-06-0004-75-6, Dec. 1975, 571 pp; Set of 3 volumes available through NTIS, PB-249057, \$28.00.; Contract DOT-UT-10005; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249058

22 137373 LIFE CYCLE COSTING FOR CURRENT ROHR AND AM GENERAL BUSES AND GENERAL MOTORS RTS-II BUS. UMTA is considering the use of the life cycle costing concept in the procurement procedures for intracity buses. These relevant factors have been identified as the bus price, maintenance costs (including preventive maintenance), fuel costs, and tire costs. Evaluation of practices of bus operators and manufacturers indicates that they are in a position to agree mutually upon an evaluation process dependent upon: (1) maintenance cost data, (2) design-related maintenance elements, (3) fuel and tire costs, (4) useful life of a bus for evaluation purposes, and (5) initial bus purchase price. Inasmuch as the follow-on costs considered in the evaluation of bus bids exceed the cost of the bus itself, the life cycle costing approach highlights the follow-on costs. Of paramount importance is the flexibility to introduce design improvements that can result in savings during the life of the bus.

Kain, HR Marks, GJ Staszak, LA ; Advanced Management Systems, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0039-76-1, July 1976, 46 pp; Contract DOT-UT-60066; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-255091/1ST

22 149723 ELECTRONIC DATA PROCESSING AS AN AID TO FEASIBILITY STUDIES AND INVESTIGATION INTO THE PREVENTIVE MAINTENANCE OF PUBLIC TRANSPORT VEHICLES [Le traitement électronique des données commé auxiliaire en vue des études de fiabilité et de l'entretien préventif des véhicules de transport public]. The author stresses the importance of using computers in the planning of vehicle maintenance-electronic methods could be used to investigate damages and investigate their mathematical statistical distribution, and causes of breakdowns. Based on the computer data, a maintenance policy could be established with a view to reaching minimum maintenance costs. /TRRL/ [French]

Sasso, MS ; International Union of Public Transport Proceeding No. 6, May 1975, 14 pp, 2 Fig. 4e congrés internationale de l'UITP, Nice, 1975; ACKNOWLEDGMENT: Road Safety Study

and Research Fund, Belgium (FESR25083E), Central Laboratory of Bridges & Highways, France, TRRL (IRRD 103567)

22 152721 SCHEDULING OF TRANSIT BUS MAINTENANCE. The study of current practice in bus maintenance has revealed that preventive maintenance schedules are initially based upon past experience, and are reviewed and adjusted according to the feedback regarding the cost of maintenance and the reliability of performance of a bus fleet. Maintenance management would normally institute changes in the maintenance periods and in the procedures followed, in an attempt to shift the system towards a better balance between the cost of maintenance and the reliability of service. The method proposed in this research takes a formal approach towards the determination of bus maintenance schedules. A cost function which takes into account the sum of the cost of periodical preventive maintenance and the cost of failures and unscheduled repairs has been developed. A computer method is used to derive the least-cost maintenance schedule, and an example is given to demonstrate the use of the method.

Bakr, MM (Marquette University) Kretschmer, SL *ASCE Journal of Transportation Engineering* Vol. 103 No. 1, Jan. 1977, pp 173-181, 4 Ref.; ACKNOWLEDGMENT: EI (EIX770200007); ORDER FROM: ESL

22 197441 USER'S GUIDE FOR THE INTERACTIVE SCHEDULING PROGRAM: PRELIMINARY CALENDAR VERSION. The Office of Transportation Management of the Urban Mass Transportation Administration (UMTA), in conjunction with the Transportation Systems Center (TSC), designed and developed the Interactive Scheduling Program (ISP) to assist rail-transit operators in the scheduling of preventive maintenance. The ISP was first applied to the scheduling of warranty inspections for the new Light-Rail Vehicles (LRV's) acquired by the Massachusetts Bay Transportation Authority (MBTA). The warranty for these vehicles covers a 2-year period, and requires scheduled inspections every 45 days. While the ISP is designed for the LRV's, its scope could easily be broadened to aid any property with equipment whose maintenance is conducted on a calendar basis. This document describes the user's guide for the preliminary calendar version of an ISP. A computerized scheduling system is described that is designed to operate on a real-time or on-line basis. By utilizing a set of program commands, the user is allowed to enter and extract data relative to vehicle warranty scheduling. A scheduling algorithm was developed for this program which incorporates a variable work window whose purpose is to minimize fluctuations in the daily workload. This minimization results in less required manpower and overtime, therefore resulting in a reduced maintenance cost. The program operates on a five consecutive year span for the years between 1976 and 2000.

Downey, PJ ; Transportation Systems Center, Urban Mass Transportation Administration Handbook DOT-TSC-UMTA-77-43, UMTA-MA-06-0074-78-1, Aug. 1978, 30 p.; Contract DOT-MA-06-0074; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295021/OST, DOTL NTIS

22 198651 AN INFORMAL STUDY OF TRANSIT BUS TIRE PROCUREMENT AND RECYCLING IN MICHIGAN. The tire procurement practices of several Michigan public transit agencies are examined. Cost comparisons between tire purchasing costs and tire leasing costs are performed. It appears that Michigan public transit agencies can save significant amounts of money by purchasing their bus tires rather than leasing them. Tire recycling methods are reviewed. The use of recapped bus tires appears to be the most cost effective and energy efficient method of recycling used transit bus tires. Cost comparisons of tire use cost for all-new and recapped bus tires offer significant operating cost savings to those Michigan public transit agencies not using them now.

Dries, JL ; Highway Safety Research Institute, State Highway Commission UM-HSRI-78-35, Aug. 1978, 35 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296059/9ST

22 239476 THE URBAN MASS TRANSIT GRME (MAINTENANCE)-TECHNICAL REPORT PHASE IR: INSTRUCTIONS FOR PARTICIPANTS THE URBAN MASS TRANSIT GAME (MAINTENANCE)-TECHNICAL REPORT PHASE IB: ADMINISTRATIVE MANUEL. THE URBAN MASS TRANSIT GAME (MAINTENANCE) IS A COMPUTER-BASED SIMULATION EXERCISE OR MANAGEMENT GAME THAT IS FOCUSED UPON THE MAINTENANCE FUNCTION OF A MUNICIPAL BUS COMPANY. THE GAME PARTICIPANT IS REQUIRED TO MANAGE THIS DEPARTMENT-TO DIRECT A WORK FORCE TOWARDS THE COMPLETION OF A DAILY SCHEDULE OF WORK REQUIREMENTS. A UNIQUE FEATURE OF THE GAME IS THE INCLUSION OF DISTINCT PEOPLE-A WORK FORCE OF MECHANICS THAT ASSUMES SEPARATE AND DIVERSE IDENTITIES. THE PHASE IA REPORT INCLUDES A BRIEF IDENTITIES. THE PHASE IA REPORT INCLUDES A BRIEF GENERALLY, AND THEN TO THEIR APPLICATION IN THE MASS TRANSIT INDUSTRY. SPECIFIC INSTRUCTIONS TO GAME PARTICIPANTS AS WELL AS SOME AUXILIARY CASE PROBLEMS ARE CONTAINED. IN PHASE IB ADDITIONAL PROGRAM DOCUMENTATION AS WELL AS THE SPECIFIC FORTRAN COMPUTER PROGRAM IS INCLUDED. RESULTS OF A PILOT TEST CONDUCTED WITH THE NEW YORK CITY TRANSIT AUTHORITY ARE PRESENTED. IN OPERATION, THE GAME REQUIRES A 25-DAY SIMULATION PERIOD AND A COMPUTER SYSTEM WITH FORTRAN IV COMPILER CAPACITY. /UMTA/ Virginia Polytechnic Institute ; ACKNOWLEDGMENT: UMTA

22 260165 EVALUATION OF BUS MAINTENANCE PROCEDURES THROUGH SYSTEMS ANALYSIS: A CASE STUDY. Every transit company is faced with the maintenance operations of buses. Each bus in the garage is a loss of revenue. In order for the transit system to operate efficiently, maintenance procedures must be such that buses receive proper maintenance and repairs with minimum loss of time. The main

purpose of this study is to provide an analytical basis for a bus maintenance shop. Bus maintenance procedure is primarily based on the mileage of the buses and the life mileages of major parts on each bus. This procedure becomes complicated as the variety of bus types increases as well as when number of parts grows. To make formal analysis possible a generalized model was constructed. This model consisted of submodels of the inspection shop, the repair shop and a cost minimization submodel. The validity of the models was established through comparison between observed data and that produced by the model. Information made available by the Denver Metro Transit Company (DMT), which is owned and operated by the City and County of Denver, was used as the observed data base. Queuing theory plays a key role in the analysis of the inspection shop and repair shop. The relationship among the

various factors was examined and it was found that most of the characteristics of each part were determined by curve fitting to the life mileage curve, which can be determined by curve fitting to the actual data. The model, according to the authors, provides much insight into a maintenance shop. Figures, tables and references are furnished.

Surti, VH de Hsu, J ; Colorado University, Denver, (CO-11-0001) Univ. Res UMTA-CO-11-0001:73-5, Sept. 1973, 37 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231325/AS

22 303942 MAINTENANCE PLANNING FOR SMALL TRANSIT SYSTEMS (ABRIDGMENT). This paper discusses a study of maintenance operations for small transit systems. The study, conducted in 1976, focuses attention on

two systems in Wisconsin--the Bell Urban System (BUS), which serves the Racine area, and the Sheboygan Transit System, which serves the city of Sheboygan and some of the surrounding communities. The study deals with the current maintenance facilities and procedures, as well as with expected future needs. A review of available maintenance reporting and planning systems such as the Service, Inventory, and Maintenance Systems (SIMS) and BUS reveals that such systems could not be supported efficiently in small transit systems.

Bakar, MM (Wisconsin University, Milwaukee) Glueckstein, H, Jr (Weyerhaeuser Company) *Transportation Research Record* No. 718, 1979, pp 45-46, 1 Fig., 4 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

23 054616 EDUCATION IN TRANSPORTATION SYSTEMS PLANNING. The past few years witnessed profound changes in the basic manner in which transportation services are viewed, developed and operated. The passage of the Federal-Aid Highway Act of 1968, the National Environmental Policy Act of 1969, and the Federal-Aid Highway Act of 1970, the expansion of programs in urban mass transit, and a rising level of concern on the part of the public have all led to a new set of rules and directions for those actively engaged in the provision of transportation services. These changes have led to protection of parklands, TOPICS studies, environmental impact statements, noise and air pollution studies, relocation assistance programs, capital grants for mass transit, citizen participation panels, joint use projects, demonstration projects for innovative transportation systems, and so on. These changes are having substantial impacts on transportation education programs at many universities, and have already created a need to incorporate a broader array of subjects into the curriculum.

Highway Research Record No. 462, 40 pp ORDER FROM: TRB, Repr PC

23 080215 MASS TRANSIT TRAINING NEEDS. VOLUME I. EXECUTIVE SUMMARY. The report is the first of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This study includes a detailed analysis of the training requirements; a discussion of the availability of training programs to meet the needs of the industry; an outline of supplementary material needed to bring training programs up to an acceptable standard; and proposals for programs to upgrade the standard of training as it currently exists. Specifically, this volume summarizes the results of an inquiry into industry needs for standardized programs regarding training of (1) bus operators, (2) bus operator instructors, (3) bus mechanics, (4) bus mechanic instructors, and (5) rapid transit rail car repairmen. Following a description of programs currently in use at transit properties, the general contents of the respective standardized programs are outlined, the role of the Federal government in funding is examined, alternative methods of delivering programs are discussed, and costs of development and demonstration are estimated.

Thrasher, EJ Wood, P ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0004) Tech. Rpt. MTR-6681-Vol-1, May 1974, 42 pp; Paper copy also available in set of 5 reports as PB-235 999-SET, PC\$17.00.; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS (PB-236000/6SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236000/6SL, DOTL NTIS

23 080216 MASS TRANSIT TRAINING NEEDS. VOLUME II. HISTORY AND METHODOLOGY. The report is the second volume of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This volume describes the history and methodology of the program. Statistics relating to transit industry training are derived.

Thrasher, EJ Wood, P ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0004) Tech. Rpt.

MTR-6681-Vol-2, June 1974, 104 pp; Paper copy also available in set of 5 reports as PB-235 999-SET, PC\$17.00.; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS (PB-236001/4SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236001/4SL, DOTL NTIS

23 080217 MASS TRANSIT TRAINING NEEDS. VOLUME V. RAILCAR REPAIRMAN TRAINING NEEDS. The report is the fifth of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. This volume is devoted to the railcar repairman. About half of the training is generalized enough to allow a standardized training course to be developed. An outline of such a course, and sources of training material which would be included are presented. One conclusion is that because of the financial difficulties of the mass transit industry, it is recommended that implementation be delayed until funds become available to cover the costs of training.

Wood, P ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0004) Tech. Rpt. MTR-6681-Vol-5, Aug. 1974, 53 pp; Paper copy also available in set of 5 reports as PB-235 999-SET, PC\$17.00.; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS (PB-236004/8SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236004/8SL, DOTL NTIS

23 080228 MASS TRANSIT TRAINING NEEDS. VOLUME IV. BUS MECHANIC TRAINING PROGRAM. BUS MECHANIC INSTRUCTOR TRAINING PROGRAM. The report is the fourth of a five-volume series summarizing the findings, conclusions, and recommendations of a study of urban mass transit training needs. The training of mechanics and mechanic instructors is described in this volume. An outline of a general training program containing ten independent modules is presented, together with sources of material for use in the course. One conclusion reached is that because of the financial difficulties of the mass transit industry, it is recommended that implementation be delayed until funds become available to cover the cost of training.

Thrasher, EJ Wood, P ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0004) Tech. Rpt. MTR-6681-Vol-4, Aug. 1974, 117 pp; Paper copy also available in set of 5 reports as PB-235 999-SET, PC\$17.00.; Contract DOT-UT-10005; ACKNOWLEDGMENT: NTIS (PB-236003/0SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236003/0SL

23 083155 PROFESSIONAL EDUCATION IN URBAN PUBLIC TRANSPORTATION. A description is given of a 6 week program for practicing professionals, by which they may update knowledge and skills. Part 1 consists of graduate level lectures and assignments, a series of seminars planned and conducted by the participants, and several tours of local transit facilities. Part 2 consists of a lecture-study tour of major North American and European cities. The strong endorsement of the lecture-study tour segment by participants supports the view that practical field study is an essential element of such a program.

Two devices which have appeared helpful in defining the application of fundamental areas to specific problem situations are the case study and the seminar.

Hoel, LA Romualdi, JP Roszner, ES (Carnegie-Mellon University) *Transportation Research Board Special Reports* Conf Paper No. 150, 1974, pp 35-36; Presented at a conference conducted by the Transportation Research Board Sept. 7-8, 1973, at the University of Pennsylvania, Philadelphia, and cosponsored by the Transportation Studies Center, University of Pennsylvania, in cooperation with the 1907 Foundation.; ORDER FROM: TRB Publications Off, Repr. PC

23 098930 UNION WAGE RATES OF TRANSIT EMPLOYEES. A significant part of the union wage gains of 11.5 percent for local transit employees, resulted from contract stipulated cost-of-living adjustments based on changes in the national or local consumer Price Indexes. The average July 1973-1974 wage increase for operators of surface cars and buses was 11.3 percent compared with 12.8 percent for those on elevated and subway lines. Union wage rates for local transit operating employees averaged \$5.62 an hour on July 1, 1974. Slightly more than 33 percent of all operating employees earned at least \$6.00 an hour compared with fewer than one percent of the workers a year earlier. In three of the 6 cities reporting both types of workers, average wage rates were the same. In the remaining three cities, elevated and subway equipment operators averaged 8 to 16 cents an hour less than workers on surface cars and buses. The average wage for all operating employees was highest in the Middle Atlantic. Regionally, percentage increases in wage rates over the year ending July 1, 1974 were the largest in the midwest and southeast. An average wage rate of \$6.03 was recorded for workers in cities of 1 million inhabitants or more. Union contracts in all but three of the cities surveyed provided for wage rate progressions on the basis of length of service. Contract provisions for employer financed health, welfare, and pension plans applied to nearly all of the workers covered in the survey.

Rieg, MK *Monthly Labor Review* July 1975, 2 pp, 1 Fig., 1 Tab.

23 136986 THE EFFECTS OF THE 1972 TRENTON, NEW JERSEY BUS STRIKE ON THE MODAL CHOICE OF THE COMMUTERS. The drivers of the Transport of New Jersey (TNJ) Bus Company declared a strike against their employer in 1972 for seventy-five days, leaving about 350,000 daily riders with the problem for finding alternate modes of transportation. The objectives of this report are to establish 'what happened' in modal use during the strike-related periods and to attempt to identify how location and passenger characteristics may or may not affect such strike-related modal use changes.

Bata, AF ; Northwestern University, Evanston, Urban Mass Transportation Administration, (UMTA-IL-11-0005) MA Thesis UMTA-IL-11-0005-74-2, June 1974, 120 pp; Grant DOT-UT-495; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-253411/3ST

23 138153 EVALUATING THE RELEVANCE OF SPECIALIZED UNIVERSITY COURSES IN PUBLIC TRANSPORTATION (ABRIDGMENT). As the transit industry begins to attract more university graduates, it becomes important to examine the relation between university transportation course offerings and the transit industry's job requirements. From an evaluation of university transportation courses and programs can come information concerning the direction such programs must take to provide the most effective employees. Twelve public transit properties and five state departments of transportation were contacted by telephone and mail surveys to identify organizational needs and problem areas. Faculty members were contacted at several universities, and business, transportation, and civil engineering programs were reviewed. Recent university graduates employed in public transit activities were surveyed by a questionnaire regarding the relevance of their transportation education to their jobs. The results of the research show that, for most public transit industry jobs, universities are providing graduates with the proper training and capabilities. Also found was a strong demand for additional short courses and seminars that would enable industry personnel to keep abreast of the newest methods, techniques, and topics of interest to the industry. The data generated should be useful to universities and federal and state agencies in evaluating their position with respect to public transit education.

Larson, TD Liquori, PA Pashek, RD (Pennsylvania Transportation Institute) *Transportation Research Record* No. 563, 1976, pp 89-91; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

23 143223 ADVANCED MECHANICAL TRAINING PROGRAM [Final rept]. The Advanced Mechanical Training Program (AMTP) was a joint effort of the Southern California Rapid Transit District's Personnel Department and Maintenance and Equipment Department. Administrative aspects of the program including scheduling of classes, candidate selection, overall coordination and program evaluation were the responsibility of the Personnel Department. The Maintenance and Equipment Department assumed technical responsibility for instructor selection, subject matter development, selection of textbooks and training materials, etc. The Mechanical Training Coordinator, who also directs the District's successful Utility A to Mechanic Training Program, coordinated classroom training.

Southern California Rapid Transit District, Los Angeles.*Urban Mass Transportation Administration,, Washington, D.C., (UMTA-CA-06-0065) UMTA-CA-06-0065-75-1, Sept. 1975, 291p; See also PB-256 780.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256781/6ST

23 153143 PUBLIC TRANSPORTATION EMPLOYEE COLLECTIVE BARGAINING. The rapid increase of collective bargaining strength of public transportation employees was explored at a conference session presided over by Charles T. Edson, New Jersey Department of Transportation. This paper contains summaries of presentations by Joseph Adler, American Federation of State, County and Municipal Employees, AFL-CIO; James F. Kelley, Massachusetts De-

partment of Public Works; William P. Hobgood, Federal Mediation and Conciliation Service; and Alfred L. Miller, Federal Highway Administration. The paper also contains an edited transcription of the question and answer session.

Transportation Research Record No. 598, 1976, pp 14-16ORDER FROM: TRB Publications Off

23 155430 THE EFFECTS OF LABOR STRIKES ON BUS TRANSIT USE. Strikes have become a major concern in the effort to reverse the long-term deterioration of public transportation services in this country. This study addresses the effects of strike-induced transit shutdowns on the short and long-run demand for mass transportation services. To shed light on the problem of post-strike passenger diversion, a nation-wide analysis of transit strike impacts is presented. The findings herein should prove useful to transportation planners and transit management. This study reviews the present day labor-management relationship and the collective bargaining process in the urban transit industry. Several case studies of urban transit strikes are also examined with the intent to establish the effects of the strike on the public and on its future travel patterns.

Brachman, ME Sinha, KC Pustay, MW ; Purdue University, Urban Mass Transportation Administration, (UMTA-IN-11-0001) Final Rpt. UMTA-IN-11-0001-77-1, Dec. 1976, 149 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267077/6ST

23 156122 ESTABLISHING CONTRACTUAL RELATIONSHIPS FOR DEMAND-RESPONSIVE TRANSPORTATION SERVICES. As interest in demand-responsive transportation systems has grown, increased attention has focused on making use of the experience and resources of the private sector in providing these services. Recent experiences have shown that establishing satisfactory relationships between public agencies that want to foster these services and private operations may be difficult because of the different constraints and objectives that characterize the public and private sectors. An important part of such relationships is the contract that binds the two parties. The authors review recent contracting experiences; identify the goals, objectives, and constraints that characterize each sector; and suggest a contract framework that seeks to reconcile potentially conflicting objectives of the two sectors. /Author/

Alschuler, DM Flusberg, M (Multisystems, Incorporated) *Transportation Research Record* No. 608, 1976, pp 107-112, 12 Ref.; ORDER FROM: TRB Publications Off

23 158054 A SELECTED BIBLIOGRAPHY AND REFERENCE DOCUMENT IN URBAN PUBLIC TRANSPORTATION. This document was prepared as part of an initial task in the development of a Federal Highway Administration/Urban Mass Transportation Administration sponsored training course in Public Transportation. The materials included in this document have been selected for their use in association with the training course and as such are not meant to be a comprehensive listing in any particular subject area. The abstracts which make up this bibliography have their origins in four sources: (1) Fletcher, William S., & Sid Davis, Urban Trans-

portation Information Handbook, Atlanta University, School of Business Administration, Atlanta, October 1975; (2) Oram, Richard L., Transportation System Management: Bibliography of Technical Reports: UMTA, Office of Policy and Program Development, Washington, D.C., May 1976; (3) Author(s), Editor(s), and Compiler(s) of the individual documents utilized here (where written as abstracts); and (4) Richard Presby, of JHK & Associates, the compiler of this work.

JHK and Associates Bibliog. UMTA-DC-06-0114-77-1, July 1976, 91 pp; Sponsored by DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-266252

23 167853 STUDY OF UNIONS, MANAGEMENT RIGHTS, AND THE PUBLIC INTEREST IN MASS TRANSIT. Results of the collective bargaining process are of central interest in the fields of industrial relations and mass transit. This research reports on an empirically based study of labor-management relations in a nine-state Southeastern area. Through an analysis of labor agreements on a provision-by-provision basis utilizing a list of 249 variables and in-depth, on-site interviews of both union and management representatives, this research provides the reader a better understanding of the dimensions of collective bargaining in mass transit. By identifying the significant parameters in negotiations, determining the collective bargaining environment, and quantitatively evaluating the involvement of organized labor in the bargaining relationship, the research provides a basis for examination of the underlying complexities of labor-management relationships. This report presents, along with a description and analysis of the collective bargaining environment in the Southeast for mass transit, the formulation and operationalization of a model of collective bargaining outcomes. Significant issues such as the nature of bargaining, employee protection provisions, wage determination, impasse resolutions, and technological change are discussed. An examination of the public interest and union influences is developed and a model to measure union involvement or power is formulated and analyzed. /Author/

Jennings, KM Smith, JA Traynham, EC ; University of North Florida Final Rpt. Jan. 1977, 276 pp, Tabs., Refs., 5 App.; Sponsored by the Department of Transportation, Office of University Research.; Contract DOT-OS-50116; ORDER FROM: NTIS

23 172047 LABOR RELATIONS IN URBAN TRANSIT. This study focuses on labor-management relations in the urban mass transit industry from 1960-1975, a period during which most of the major transit systems changed from private to public ownership and began receiving substantial funding from government. A major objective of this study was to evaluate how collective bargaining outcomes--transit wages, labor cost, and work rules--changed with the advent of public ownership and public subsidies. Two chapters of this study examine the development of Amalgamated Transit Union (ATU) policies and how they affect practices in the urban transit industry. The political, legal, and economic factors shaping the collective bargaining relationship are explored. Special attention is directed toward such factors

as; 1) the labor protection clause, Section 13 (c), of the Urban Mass Transportation Act, and 2) the reliance on "interest" arbitration for the settlement of the terms of new contracts during the past seventy years. Data on wage and selected fringe benefit changes in the 1960-75 period are reviewed. Because this is an exploratory study which relies in part on secondary data, conclusions, of necessity, are tentative. The findings herein are based on several data collection and analysis techniques. Chapter X is based on data primarily for APTA's TRANSIT OPERATING REPORTS; and Chapters V and VI reflect information from ATU publications and interviews with the national leadership of that union. The other chapters consist of personal interviews with union/management spokesmen of 25 transit systems in the U.S. /Author/

Stern, JL Stern, JL Miller, RU Olson, CA Heshizer, BP ; Wisconsin University, Madison, (WI-11-0004) Final Rpt. UMTA-WI-11-0004-77-2, Aug. 1977, 326 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB-274059/5ST, DOTL NTIS

23 172063 A STUDY OF MINORITY BUSINESS PARTICIPATION IN THE URBAN MASS TRANSPORTATION INDUSTRY VOLUME I--ANALYSIS OF MINORITY BUSINESS PARTICIPATION. UMTA's Office of Civil Rights (UCR) commissioned this 3-volumed study to establish a data base on the current level of Minority Business Enterprises (MBE) participation in the planning, development, and implementation of transit systems and to recommend changes in enforcement strategies in order to substantially increase MBE participation. The purpose of this report, Volume I, was to examine the participation by and opportunities for MBE in the urban mass transportation industry. A national survey was conducted and the UMTA Minority Business Enterprise Information Sheet (Appendix A) was developed and distributed to twenty-one transit properties selected by UCR (Table 1). The survey revealed that participation by minority businesses in the urban mass transit industry is minimal. This study examined transit properties' procurement activities from 1974-76, affirmative action plans, and UMTA documents. The study recommends that UCR which monitors transit property minority business programs establish more stringent requirements of grantees, require proposed annual and quarterly transit property reports, institute a priority monitoring system, and take measures to more closely link the minority business program with the UMTA grant funding system. /Author/

One America, Incorporated Final Rpt. UMTA-DC-06-0146-77-1, July 1977, 122 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration. Volumes 1, 2 and 3 available from NTIS as a set, PB-274772/A21. Volume 4, Minority Business Capabilities Data bank is computerized and is available from UMTA's Office of Civil Rights upon written request.; Contract DOT-UT-60079T; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-274773/1ST

23 172064 A STUDY OF MINORITY BUSINESS PARTICIPATION IN THE URBAN MASS TRANSPORTATION INDUSTRY VOLUME II--DEVELOPING SUCCESSFUL MINORITY BUSINESS ENTERPRISE PROGRAMS FOR PUBLIC TRANSIT PROPERTIES: A MANUAL. UMTA's Office of Civil Rights (UCR) commissioned this 3-volumed study to establish a data base on the current level of Minority Business Enterprises (MBE) participation in the planning, development, and implementation of transit systems and to recommend changes in enforcement strategies in order to substantially increase MBE participation. This manual, Volume II, provides guidelines for mass transit properties on developing an effective MBE program. Information and recommendations are provided on the use of transit planning and programming tools in planning the MBE program, goal setting mechanisms, MBE subcontract requirements of prime contractors, communications procedures, staffing needs, and recordkeeping and monitoring methods. This Manual reflects UMTA's Office of Civil Rights' requirements for transit property grantees. These requirements were instituted to implement the Revised Title VI Order issued in 1977. The Appendices contain: Annual Report Form, Quarterly Report Form, Sample Bid Work Sheet, List of MBE Liaison Officers, National Trade and Professional Associations, and Minority Contractors and Technical Assistance Organizations. /Author/

One America, Incorporated Final Rpt. UMTA-DC-06-0146-77-2, July 1977, 68 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration. Volumes 1, 2 and 3 are available from NTIS AS A SET PB-274772/A21. Volume 4, Minority Business Capabilities, Data bank is computerized and is available from UMTA's Office of Civil Rights upon written request.; Contract DOT-UT-60079T; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-274774/9ST

23 172065 A STUDY OF MINORITY BUSINESS PARTICIPATION IN THE URBAN MASS TRANSPORTATION INDUSTRY VOLUME III--PUBLIC TRANSIT CONTRACTING OPPORTUNITIES FOR MINORITY BUSINESS ENTERPRISES: A MANUAL. UMTA's Office of Civil Rights (UCR) commissioned this 3-volumed study to establish a data base on the current level of Minority Business Enterprises (MBE) participation in the planning, development, and implementation of transit systems and to recommend changes in enforcement strategies in order to substantially increase MBE participation. This Manual, volume III, provides information on procurement programs, the Title VI Regulations, the contracting procedures utilized by various transit properties, and the names and addresses of MBE Liaison Officers by region. This Manual also contains suggestions for doing business with transit properties relative to the transit/marketing contracting process. A study of MBE procurement activities with 21 transit properties indicated a need to develop this manual. This Manual reflects those elements MBE's need to successfully obtain business from transit properties. The ADDENDA herein contains: Definition of Transit Terms; Selected Active UMTA Grants by Amount and Purpose; Selected MBE Contract

Awards; List of MBE Liaison Officers; List of Commonly Procured Items; MBE Marketing Check List; National Trade and Professional Associations List; and Minority Contractors and Technical Assistance Organizations. /Author/ One America, Incorporated Final Rpt. UMTA-DC-06-0146-77-3, July 1977, 70 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration. Volumes 1, 2, and 3 are available from NTIS as a set, PB-274772/A21. Volume 4 Minority Business Capabilities, Data bank is computerized and is available from UMTA's Office of Civil Rights upon written request.; Contract DOT-UT-600079T; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-274775/6ST

23 172152 PSE IS IN TRANSIT IN PHILADELPHIA. A project is described which employs 400 formerly unemployed persons to improve the appearance and cleanliness of South-eastern Pennsylvania Transportation Authority's (SEPTA) vehicles, stations, and depots. Since resources have been concentrated largely on keeping its vehicles rolling, uninviting conditions aboard public conveyances have contributed to a steady loss of SEPTA's riders. The project aims to make the SEPTA system presentable and to draw more people. The workers are paid through a \$4.7 million Comprehensive Employment and Training Act (CETA) title VI grant. The Authority's Rolling Stock and Shops Department in charge of vehicle maintenance, employ part of the SEPTA/CETA participants.

Belsky, A (Department of Labor) *Worklife* Vol. 2 No. 11, Nov. 1977, pp 15-18, 7 Fig.

23 176509 SUMMARY VIEWPOINT OF ISSUES OF LABOR RELATIONS IN URBAN PUBLIC TRANSPORTATION. Discussions of issues in labor relations focussed on a range of subjects in the context of the decision-making process by which wages, hours and conditions of employment are determined. The importance of data relating to wages and to employment and operating costs is recognized, and the Urban Mass Transportation Administrations Financial Accounting and Reporting Element (FARE) system to compile nationally uniform data on operating costs is noted. The acceptance of the number of vehicle kilometers operated as a measure of productivity was urged. The issue of nationwide consistency on the legal status of collective bargaining was raised; labor supported this approach, and management generally opposed it. Paratransit was discussed. Labor indicated early enthusiasm for dial-a-ride but has become skeptical as paratransit has expanded particularly in regard to employee protection. The political impact of public transit bargaining is discussed and comments are made on the implementation of statutory requirements of section 13c.

Prouty, K (Department of Transportation) *Transportation Research Board Special Report* No. 181, 1978, pp 140-141; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and

HUMAN RESOURCES MANAGEMENT

Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

23 176510 LABOR COSTS AND COLLECTIVE BARGAINING IN URBAN MASS TRANSIT: PROBLEMS OF DEFINITION, MEASUREMENT, AND RESOLUTION WITH DISCUSSION. This paper which discusses issues associated with labor costs in the urban transit industry, reports some preliminary results of current research in labor relations and discusses alternatives aimed, on the one hand, at improving both the validity and the accessibility of cost data and, on the other hand, at reducing the gap between operating expenses and revenue. An approach for modifying the bargaining approaches of transit labor and management is also suggested. The research project reported here consisted of 4 parts: the legal framework for collective bargaining in urban transit, including the role of 13c; an analysis of the Amalgamated Transit Union (ATU); the effects of bargaining of the transition from private to public ownership, the impact of subsidies, and the use of arbitration in settling interest disputes; and an examination of the determinants of wage rates and labor costs through cross-sectional and longitudinal statistical analysis. The measurement, determination and control of labor costs in transit are considered, and the inadequacy of current labor costs data is noted. Urban mass transit as a public-sector industry is discussed, as well as employment security and productivity committees.

Miller, RU Olson, CA Stern, JL (Wisconsin University, Madison) *Transportation Research Board Special Report* No. 181, 1978, pp 141-147, 1 Tab., 9 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

23 176511 GROWTH OF PRODUCTIVITY AND LABOR RELATIONS IN URBAN MASS TRANSIT WITH DISCUSSION. Numerous potential opportunities to improve the productivity of urban mass transit can be identified. Many of these possibilities involve relatively small departures from standard industry practices and thus might be relatively quickly implemented. These more readily adopted changes include the use of more express services and bus-priority techniques, deployment of some buses larger and smaller than the standard model, negotiation of changes in split-shift work rules, adoption of computerized scheduling, and tailoring of fares, service quality, and schedules to conform better to transit's distinct markets. Other opportunities for productivity growth are clearly possibilities for implementation only in the more distant future, if at all, since they alter more fundamental and traditional procedures used in the industry. Although these opportuni-

ties will take much more time and effort to implement, they may ultimately prove more worthwhile because they address some of the more basic causes of transit's productivity problems. Probably the most important among these long-term possibilities is to find some productive off-peak tasks for employees who are needed as drivers in the peak hours only. A second important long-term change is to discontinue transit service in markets in which it is least competitive with the automobile. The industry's record of decline or relatively slow growth in productivity can not be sustained for long, since the cost of transit would increase in relation to the cost of other goods and services. Failure to implement innovations that improve productivity, like the ones suggested here, will result in some combination of rapid growth in the industry's deficits (and its dependence on public subsidies) and the slow but sure pricing of transit services out of the market. /Author/

Gomez-Ibanez, JA Meyer, JR (Harvard University) *Transportation Research Board Special Report* No. 181, 1978, pp 147-156, 14 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

23 176512 COLLECTIVE BARGAINING AS A PROBLEM-SOLVING PROCEDURE IN URBAN TRANSIT WITH DISCUSSION. The paper focuses on the areas of changes in collective bargaining in transit that could contribute to a better labor-management relationship. The findings from several studies are reviewed, and a series of questions which will stimulate discussion is raised. The parties and their objectives in collective bargaining are discussed, and the critical issues are explored. One study of collective bargaining in the Southeast found decentralization in publicly owned agencies, i.e., mass transit employees concerns are negotiated and included in a labor agreement that is separate from that of other municipal employees. Comments are made on such aspects as the power to make policy decisions, and on the differences between private and public systems. The Southeast study showed that the shift from private to public ownership had little impact on the collective bargaining process, and that the budget-making process exerted no influence on collective bargaining. It was also found that most of the mass transit properties appear to be relatively unaffected by state or federal labor laws. Institutional and economic issues are discussed. Comments are made on the resolution of impasses in industrial disputes.

Smith, JA, Jr (University of North Florida) *Transportation Research Board Special Report* No. 181, 1978, pp 157-162, 1 Fig., 1 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by

Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

23 176514 POLITICS OF COLLECTIVE BARGAINING WITH DISCUSSION. The question of whether the collective bargaining procedures that have developed in the private sector fit the public sector is considered. The collective bargaining process is seen to consist of bargaining, lobbying, electioneering, exhorting and politicking (bleeping). In the transportation field, the process developed more and more toward the type of collective bargaining that exists in the private sector. As the bargaining or bleeping process develops, there is inevitable movement toward larger units or units that are more influenced by what occurs in other units. Also, the depth of the decision making process increases with the increasing number of political jurisdictions in the cities. The question of who is the decision maker is considered. The dominant factors in making collective bargaining work in the public sector are problems of decision making by the employer and the question of fare.

Kheel, T (Battle, Fowler, Lidstone, Jaffin, Pierce & Kheel) *Transportation Research Board Special Report* No. 181, 1978, pp 167-168; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

23 176515 EMPLOYEE PROTECTION: PERCEPTIONS OF SECTION 13C. An attempt is made to explain the factors behind section 13c. Section 13c represents labor's request for recognition that the transit worker had some legitimate interests and certain rights that had been damaged in the process of transition from private to public employment before 1964. In recognizing the need for fair and equitable treatment of labor, Congress recognized that the transit workers have rights that must be considered by the federal government and that they should be protected. The basic thrust against section 13c seems to be based on the fact that the movement to the public sector has focused a much broader dispute about the structure for wage determination in state and local public employment in general. There is also a great deal of opposition to collective bargaining from local governments. It is still an open question whether the U.S. Department of Transportation feels the need for section 13c protection in the area of operating assistance. There are legitimate differences of opinion as to the structure and application of section 13c.

Putnam, E (Amalgamated Transit Union) *Transportation Research Board Special Report* No. 181, 1978, pp 168-169; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on

Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

23 178814 PARATRANSIT LABOR ISSUES. All paratransit services are labor intensive, second only to conventional taxis among transportation modes. As such, the manner in which the service is provided, the role of the labor force, and, in particular, the compensation afforded to drivers, have significant impact on the cost of system operation. This report looks into paratransit labor costs as they relate to type of service, union affiliation, management strategies, and characteristics of the system location. Labor costs are analyzed in terms of wage scales, benefits, incentive payments, work rules, scheduling practices, and job definitions. The Transit labor costs are analyzed separately from paratransit labor costs, and the relationship between the two is explored. Interwoven into this discussion of paratransit labor costs is a study of the cost impact of Section 13(c) of the Urban Mass Transportation Act. (This statute protects the employment conditions of transit employees against any adverse effects that may arise out of Federal transit assistance.) This report concludes that real growth in paratransit over the coming years could effect the establishment of dual union wage standards for paratransit and conventional operators. Although the future of paratransit in small rural communities appears secure, the uncertainty and the high labor costs found in the larger cities make its future there more tentative. Greater cooperation is recommended between all levels of government, transit managers, and transit labor unions to further the development of paratransit labor standards and of integrated paratransit services. /UMTA/

Brandon, C ; Harvard University, (DOT-TSC-UMTA-78-11) Final Rpt. UMTA-MA-06-0054-78-1, Feb. 1978, 82 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration, and under Contract to the Transportation Systems Center.; Contract DOT-TSC-11968; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-280206

23 180633 THE ECONOMIC COST IMPACT OF THE LABOR PROTECTION PROVISIONS OF SECTION 13(C) OF THE URBAN MASS TRANSPORTATION ACT OF 1964. PART ONE: EXECUTIVE SUMMARY, DESCRIPTION OF STUDY METHODOLOGY, ANALYSIS AND CONCLUSIONS [Final rept]. This study identifies, describes, and attempts to estimate kinds of costs (with particular focus on costs imposed on management) that might occur as a result of Section 13(C). The first part of the study used a mail questionnaire to estimate the frequency and size of all 13(C) cash payments made to transit employees during the years 1964-1975. The second part of the study consisted of an evaluation of the probable size and extent of (1) increased wage and fringe benefit costs in takeover situations, (2) redundant worker costs, (3) uncertainty added to the planning

process, (4) costs of delays in signing 13(C) agreements and (5) negotiation, arbitration, litigation, and record keeping costs. Information for this part of the study was obtained by conducting personal interviews with management and labor officials of 13 transit systems.

Siskind, FB Stromsdorfer, EW ; Assistant Secretary for Policy, Evaluation, and, Research (Labor), Washington, D.C. 1/A
ASPER/INH/OFT-78/000, May 1978, 155p;
ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279918/7ST

23 183628 CIRCULAR NO 76-42 DATED 9TH MARCH 1976 RELATING TO THE CONTROL OF WORKING CONDITIONS IN PUBLIC AND PRIVATE ROAD TRANSPORT FIRMS [Circulaire n. 76-42 du 9 Mars 1976 relative au controle des conditions du travail dans les transports routiers publics et privés]. This circular defines the conditions in which road transport workers must be working. There are two kinds of control: on the road and within the firm. This circular gives details of control devices and documents and the mechanical aspects of control, and the standards to be fulfilled. A chapter deals with equipment used in other countries. An appendix gives tabulated data on: (1) equipping vehicles with tachographs, (2) documents to be produced during in-situ controls by drivers of vehicles with a mechanical device, (3) list of main offences, (4) model of a sheet recording and analysing chronotachograph discs. /TRRL/ [French]

Bulletin Officiel du Ministere de l'Equipe-ment Monograph No. 287, July 1976, 40 p, Tabs. ACKNOWLEDGMENT: TRRL (IRRD-105271), Institute of Transport Research, Central Laboratory of Bridges & Highways, France

23 189960 LABOR-MANAGEMENT RELATIONS IN URBAN MASS TRANSIT: AN ANNOTATED BIBLIOGRAPHY. This bibliography contains approximately sixty citations of descriptive case studies. It is restricted to important research in union-management relations in urban mass transit as opposed to the entire transportation industry. It focuses on strike or conflict situations and contains several references concerning collective bargaining.

Hunt, C Long, L Perry, J ; California University, Irvine, California University, Irvine ITS-I-WP-76-1, Nov. 1976, 26 p.; ACKNOWLEDGMENT: California University, Irvine; ORDER FROM: California University, Irvine, Institute of Transportation Studies, Irvine, California, 92717

23 190516 TRAINING PROGRAM FOR OPERATION OF EMERGENCY VEHICLES. The purpose of the contract was to train emergency-service personnel in the operation of Emergency Vehicles (EVs). The course requires five days to administer and includes both classroom and in-vehicle training. Classes can accommodate students from any one or a combination of the following emergency services: law enforcement; fire services; rescue; or, ambulance/EMS. The in-vehicle exercises work with emergency sedans, vans, or large fire apparatus. The report: (a) describes the functional analysis performed to derive the description of the tasks performed in EV operation; (b) describes the training analysis process used to delineate the training requirements, objectives, and course content; (c) dis-

cusses the Pilot Test and Revision process; and (d) presents conclusions and recommendations for improving the course. The major conclusion is that the flexibility of having one package for all services and vehicle types may not justify the added administrative burdens and the instructional compromises that were necessary to get the flexibility. The authors recommend that NHTSA consider re-packaging the program as separate courses for each Emergency Service.

Schumacher, SP Schumacher, JB ; INNOVATRIX, Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-669, 1336-9-78-FR, Sept. 1978, 78 p.; Contract DOT-HS-6-01336; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288906/1ST

23 193533 IMPACT OF THE TRANSIT STRIKE IN KNOXVILLE, TENNESSEE. The six-week strike from February 14, 1977 to March 28, 1977 of the Knoxville Transit Corporation (KTC) stranded 7,000 to 8,000 daily riders of regular bus routes and 600 daily riders of the express bus service. It provided an interesting and practical opportunity to assess the impact of a temporary interruption of public transportation service in a city of approximately 200,000 population. Small sample surveys were performed both during and after the strike; the surveys focused on specific target groups that were expected to be most severely affected by the strike. The study revealed that many discretionary trips of elderly and economically disadvantaged transit users were suppressed during the strike. However, few cases of severe hardships were reported and it was found that most individuals were able to satisfy their essential travel needs with the help of relatives, friends and social service agencies. Many of the downtown merchants who cater to transit dependents lost substantial business and some were forced to temporarily lay off sales personnel. The transit system itself felt the adverse and continuing impact from the strike. The decline in ridership on the regular routes was estimated to be in the range of 7.2 to 16 percent and in the case of the express buses, the ridership dropped by approximately 15 percent. The adverse impact of the strike on the downtown parking situation was noticeable. However, the general traffic situation was not affected appreciably. On an overall basis, it appears that all parties involved with public transportation--the city, labor union, transit users and downtown merchants--would have been better off by averting the strike. /Author/

Wegmann, FJ Chatterjee, A Parnell, S (City of Knoxville) Welch, GL (Metropolitan Atlanta Rapid Transit Authority); Tennessee University, Knoxville TC 017-78, Dec. 1978, 34 p., 3 Tab., 1 Ref.; ACKNOWLEDGMENT: Tennessee University, Knoxville

23 195580 TRENDS IN CALIFORNIA TRANSIT LABOR CONTRACT SETTLEMENTS. This report reviews trends in transit labor contract settlements nationwide and documents transit operator wage rate increases in California between 1970 and 1976 in comparison to the consumers price index (CPI) increases. It concludes that operator wage rates in California follow national trends and are increasing faster than CPI. It documents the findings resulting

from a literature review pertaining to the transit labor contract settlement process, trends in transit wage rates, and possible government roles in the process. Details of these findings and references to the author's publications are included in the Annotated Bibliography in Appendix D. The report recommends that all involved parties should note the serious upward trend in transit wage rate increases in relation to the CPI and the implication this has on future public financial assistance. It further recommends that the California Department of Transportation should continue its present limited monitoring role until there is a clearer legislative mandate for active labor contract settlement process. /UMTA/

Rae, JW Grob, MA ; California Department of Transportation, (CA-09-8001) Final Rpt. UMTA-CA-09-8001-79-2, Feb. 1978, 52 p.; The appendixes herein are as follows: A-California Transit Operator Wage Survey; B-CPI Data; C-Indexing Data; and D-Annotated Bibliography.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS

23 196889 COMPILATION OF INTERVIEWS REGARDING WORKING AND SPARE TIME CONDITIONS OF PUBLIC TRANSPORT PERSONNEL [Sammanstaellning av Intervjuer Roerande Lokaltrafikanstalldas Arbets-och Fritidsfoerhaallanden]. This report is based upon some 50 interviews with drivers, union and management representatives of two public transport companies in the Stockholm area. The interviews are a part of a study to investigate the working conditions for employees of public transport companies in large and medium sized cities. The results of the interviews are dealt with under the following headings: ranking of environmental factors contributing to comfort or discomfort at work; work hour disposition; running time and contact with the public; comradeship; physical working environment; work-leisure relationship. /TRRL/ [Swedish]

Gardell, B Aronsson, G Ryden-Lodi, B ; Stockholm University, Sweden, (0039-2146) Monograph Rapport NR 10, 1977, 37 p., 20 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 240718), National Swedish Road & Traffic Research Institute

23 198995 HUMAN RESOURCE DEVELOPMENT STUDY OF THE SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY. An interdisciplinary research team of the Human Resources Center comprehensively investigated the existing and projected human resource development needs of the Southeastern Pennsylvania Transportation Authority (SEPTA). The objectives were to: (1) assist in determining the human resources development organizational needs of SEPTA; (2) identify the objectives to be met through human resource development training; (3) determine the organizational resources and constraints to meet identified needs; (4) develop alternatives to accomplish human resource training objectives; (5) develop a plan to implement a human resource development system; and (6) structure a human resource development evaluation model. The recommendations of the study are discussed and analyzed in the report.

Wharton School, Urban Mass Transportation Administration, (UMTA-IT-09-0073) Final Rpt. UMTA-IT-09-0073-79-2, May 1979, 128 p.

See also PB-298161.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298405/2ST

23 263363 MASS TRANSIT TRAINING NEEDS--VOLUME III. BUS OPERATOR TRAINING PROGRAM, BUS OPERATOR INSTRUCTOR TRAINING PROGRAM. This is the third of a five-volume series summarizing the finding, conclusions, and recommendations of a study of urban mass transit training needs. This study includes a detailed analysis of the training requirements; a discussion of the availability of training programs to meet the needs of the industry; an outline of supplementary material needed to bring training programs up to an acceptable standard; and proposals for programs to upgrade the standard of training as it currently exists. This volume is devoted to bus operators and bus operator instructors. A recommended standardized course for bus operators is presented, together with sources of suitable training materials. One significant conclusion reached is that it is considered that existing sources of training are adequate to meet the needs of operator instructors. /UMTA/

Thrasher, EJ ; Mitre Corporation, (MTR-6681) UMTA-VA-06-0004-74-3, July 1974, 182 pp; Contract DOT-UT-10005; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236002

23 263766 TRANSIT INDUSTRY EDUCATIONAL INTERESTS. In order to facilitate communications between transit industry and academic institutions, a questionnaire was distributed to representatives of the transit industry in order to define the types of educational background and broad areas of program emphasis felt to be most desirable. As preparation to enter the transit industry, the majority of transit operators felt a four-year college education was suitable. Stress was placed on having the educational background span a broad interdisciplinary mix with emphasis in program areas such as management, business administration, public policy, economics and engineering. The present nature of involvement between educational institutions and transit operations centers on research and providing continuing education through part-time studies, seminars, and short courses.

Wegmann, FJ Beimbom, EA *ASCE Journal of Professional Activities* Vol. 100 No. E14, Proc. Paper 10863, Oct. 1974, pp 313-324

23 267026 U.S. AND CANADIAN URBAN MASS TRANSPORTATION SYSTEMS. The purpose of this study was to investigate U.S. and Canadian transit systems on a comparative basis. It was proposed that this investigation be confined to the study of three conceptual variables of organizational structure and personnel profiles, personnel process, and marketing strategies. The basic objective of the study was to provide knowledge that would be of use in establishing and implementing policies concerning the basis or rationale for investment in the development of U.S. transit personnel and the marketing of transit services. A major problem of those wishing to recommend investment in the development of human resources is the demonstration of tangible results. It is the authors belief that internal development of U.S. transit personnel and their policies is the most expedient route to revitalizing public transit in U.S. cities. The quality of individuals who serve in transit's managerial, technical, and supervisory positions

is a leading (if not single-most important) determinant of the extent to which mass transit will be improved. A bibliography is included. Among the appendices are the transit interview format, transit employee questionnaire, marketing practices in transit industry, and personnel process and marketing strategy worksheets.

Mundy, RA ; Pennsylvania Trans and Traffic Safety Center UMTA-PA-0010-74-2, Jan. 1974, 156 pp; ACKNOWLEDGMENT: UMTA (PA-11-0010); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-23290/AS

23 272053 PLANNING, RESEARCH, EDUCATION AND TRAINING, AND LEGISLATION (EDUCATION AND TRAINING SEMINAR). The educational and training needs of the public transportation industry are determined by first identifying the components of the industry and then examining in detail the specific needs of each component. The types of skill required are classified into management or operating (dispatchers, bus drivers). The demand for education to meet the needs of consultants and the urban or regional planning agencies has been provided by Universities. There are many University level programs which assist the professional in identifying data on which to base analysis and plan development. A distinction is made between demand and need for trained managers. It is estimated that transit companies need approximately 100 college-trained managers per year during the next 15 to 20 years. If the needs of various levels of government for such men are included, the number would be 200 per year. High school counselors and math and science teachers must be educated so that they may inform sophomores and juniors about opportunities in public transportation. A 4-year bachelor's program in either an engineering or business college within a university could provide the education for potential managers. Many universities have interdisciplinary degree programs where an educational program may be planned which involves persons in more than one college. A need exists for the development within the university or public transportation course content material such as course outlines, bibliographies, texts, case studies and audio-visual materials. Suggestions have been made for development of this material in cooperation with the transit companies, and for a clearinghouse for curriculum materials. The question of financial support for students is also discussed. During the on-the-job training periods, the student should be rotated from one department to another. The need is expressed for better communication and interaction between persons who are involved in providing public transportation and the faculty of the university teaching public transportation. Recommendations are presented.

Grecco, WL (Tennessee University, Knoxville) Satterly, GT, Jr (Purdue University) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 119-123; Appeared in Issues in Public Transportation, proceeding of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

23 272054 PLANNING, RESEARCH, EDUCATION AND TRAINING, AND LEGISLATION (LEGISLATION SEMINAR). This seminar which examined the question of what

should be done in the legislative area to aid in the solution of problems in public transportation, focused on the broadest scope of legislation. The seminar considered legislation to be synonymous with implementation. General problems encountered in this area are reviewed. The accountability of public transit agencies in their expanding of public funds is discussed. The specifics of reporting to grant-making agencies at the state and federal levels are within the realm of administrators' decision. However, administrators should take care not to overstep their jurisdictions. The size of the region at which the transit agency should exist was also discussed. The making up of deficits incurred by transit operations is reviewed. One proposal was that local communities make up the entire deficit incurred in providing transit service used by their residents. An improvement over existing property tax deficit funding methods that is consistent with the concept would be to separate the funding of deficits for local and regional service. The reliance for regional transit subsidies on local property taxes, the problem of "mobility", investment criteria and priorities, and the provision of federal transportation funds to urban areas are other aspects covered. There was no role for legislation in setting fixed operating standards. With respect to other actions of supplying transit service, the role of legislation was limited and indirect and for the most part concerned with funding. Federal legislation should take the lead in setting objectives and priorities in research, development and demonstration of new public transportation services and technology. The role played by legislation is the marketing of transit, was seen to be limited. Other ways in which legislation could influence transportation are outlined. They relate to the granting of passes to certain groups such as welfare recipients, improvement of the quality of transport, automobile restriction, and land use controls.

Brand, D (Harvard University) Haines, R (Purdue University) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 123-127; Appeared in *Issues in Public Transportation*, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

23 272055 PLANNING, RESEARCH, EDUCATION AND TRAINING, AND LEGISLATION (PLANNING SEMINAR). The seminar which addressed the question of what should be done in the area of planning to aid in the solution of problems in public transportation, focused on the different requirements that long-range and short-range transportation planning imposed on the planning process. Long-range planning, which should provide guidance to short-range planning and associated activity, is characterized by its comprehensiveness, particularly with respect to modal considerations, and by its concern for the relation of large-scale investment decisions to a broad array of social, environmental, and urban development goals. Specific problems common to both long and short-range planning are identified as the lack of planners' responsiveness of involvement in long-range policy making, the absence of qualified personnel, the inability to predict the land use development impact, and the lack of planning techniques permitting design of

desirable systems for the future. Issues specifically related to short-range planning are listed. Recommendations to meet the problems are presented. Manuals of the National Committee on Urban Transportation must be revised. The criteria presented here should be expanded to include social concerns, levels-of-service definitions and standards, and system continuity concepts. The manner in which this may be done is outlined. The recommendation is made that a workshop be held to assess the state-of-the-art in transit system sketch-planning techniques and to suggest ways of improvement. Lines of communication should be established between planners and consultants working with sophisticated techniques, and transit operators using pragmatic approaches. The need is indicated for better data particularly origin-destination data at the proper level of disaggregation in sufficient amounts and at reasonable costs. It is recommended that alternative techniques be explored for the collection of suitable origin-destination data. A general need exists for the improved dissemination of the results of research and planning studies in an accessible and understandable form.

Wegmann, FJ (Wisconsin University, Madison) Shuldiner, P (Massachusetts University, Amherst) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 114-117

Appeared in *Issues in Public Transportation*, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

23 300693 SECTION 13C: SOME CONCERNS AND CONSIDERATIONS. ABRIDGMENT. Protective provisions that must be included in Section 13c are noted and attention is focused on two areas of concern: paratransit and rural transportation. The provisions must include the preservation of rights, privileges and benefits under existing collective bargaining agreements or otherwise; continuation of collective bargaining rights; protection against a worsening of employment positions; assurances of employment to employees of acquired mass transportation systems and priority reemployment of employees terminated or laid off; and paid training or retraining programs.

Franks, LA (Department of Labor) *Transportation Research Record* No. 696, 1978, pp 24-25, 1 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

23 301961 MEASUREMENT AND MANAGEMENT OF PERFORMANCE OF MAN-MACHINE SYSTEM. An apparatus has been developed to measure and record sudden acceleration (over .3 g), sudden deceleration (over .4 G) and sharp cornering (over .3 g) in order to evaluate driving fluency. The apparatus was installed on six taxicabs for the test. Driving behavior of drivers in each of the taxicabs was recorded for a distance of more than 10000 kilometers. From the test results it was found possible to grade the fluency of driving as well as to point out to individual drivers unsafe driving practices based on the data obtained. One particular driver to whom a feedback of his own unsafe driving habits was given showed a marked improvement in his driving performance. Discussion was made on the utilization of these data into daily management of drivers. /Author/TRRL/

Funatsu, T (Kyushu University, Japan) *IATSS Research* Vol. 2 1978, pp 74-85, 9 Fig., 1 Tab., 1 Phot., 6 Ref.; ACKNOWLEDGMENT: TRRL (241387)

23 303291 A SURVEY OF THE USE OF PART-TIME EMPLOYEES IN TRANSIT. The purpose of this study was to obtain data to determine the nature and extent of transit industry use of part-time labor. The data indicate that the use of part-time labor is widespread and is more likely to be found in public systems and in those systems not covered by collective bargaining agreements. There has been a significant increase in the number of public systems using part-time labor over the past five years. Further, there are strong indications that this matter will be a major bargaining issue for most transit properties during the next round of contract negotiations. It would seem that the most likely candidates for new part-time agreements are the larger systems which are subject to collective bargaining agreements. While these systems tend to be troubled by the most significant peak-hour problems, they have tended to be least successful in establishing part-time agreements. This could foreshadow an extremely interesting round of transit industry contract talks. (Authors)

Lieb, RC Wiseman, F (Northeastern University) *Transit Journal* Vol. 5 No. 2, 1979, pp 3-8, 3 Tab.

23 303945 IMPACT OF THE 1977 TRANSIT STRIKE IN KNOXVILLE. The six-week strike from February 14 to March 28, 1977, of the Knoxville Transit Corporation (KTC) stranded 7000-8000 daily riders of regular bus routes and 600 daily riders of the express bus service. It also provided an opportunity to assess the impact of a temporary interruption of public transportation service on a city of 200,000 people. Small sample surveys performed during and after the strike focused on those groups expected to be most severely affected. The study revealed that, although many discretionary tips of elderly and economically disadvantaged transit users were not taken, few cases of severe hardship were reported. Most individuals were able to satisfy their needs with the help of relatives, friends, and social service agencies. Many of the downtown merchants lost substantial business, and some were forced to temporarily lay off sales personnel. The transit system itself felt the most adverse and continuing impact from the strike. The decline in ridership on the regular routes was estimated to range from 7.2 to 16 percent; for express buses the ridership dropped by approximately 15 percent. The adverse impact on downtown parking was noticeable, but general traffic was not affected appreciably. Overall, everyone involved with public transportation--the city, labor union, transit users, and downtown merchants--would have been better off by averting the strike.

Wegmann, FJ Chatterjee, A (Tennessee University, Knoxville) Parnell, S (Knoxville Department of Traffic Engineering) Welch, GL (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 719, 1979, pp 6-13, 1 Ref.

This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

23 305821 MANAGING SEPTA (SOUTH-EASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY) STRATEGICALLY. A decision process is described, which involves expressing an organization's functions as discrete projects related to a clearly defined set of objectives, and then comparing the projects through cost-effectiveness analysis. The involvement of management, employees and citizens, along with the effect of responsibility and reward on job performance, is discussed. The environment in which SEPTA must function in the years to come is considered by examining a set of possible alternative regional futures, market share, and the land use-public transportation relationship. An attempt is made to compare the performance of a variety of SEPTA modes serving two different density-defined areas. The report presents a goals structure for SEPTA consistent with this decision and encompassing the regional concerns identified earlier. Using this goals structure, the study tests various sample projects for cost-effectiveness. Throughout the report, an emphasis is placed on reinforcement—the pooling of resources by SEPTA and other parties to achieve mutual objectives.

Sloan, AR ; Office of Science and Technology, Urban Mass Transportation Administration, (UMTA-PA-09-0005) Final Rpt. UMTA-PA-09-0005-79-1, Sept. 1979, 227 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-123649

23 308520 BUS OPERATOR ABSENTEEISM: SOME CAUSES AND CURES. In an effort to develop ways of reducing the rate of absenteeism, this study assessed the scope and dimensions of the problem, constructed a profile of the so-called problem operators, identified major causes of absenteeism, and developed some absenteeism reduction strategies based on these findings. Because of its many contributing factors, no single solution can effectively deal with all facets of absenteeism. The solutions presented here range from being easy to implement to those requiring major labor contract revisions. An effective absence reduction program requires a coordinated and comprehensive effort aimed at the probable causes of excessive absenteeism. At the Southern California Rapid Transit District an attempt is being made to develop a program for monitoring and controlling absenteeism, highlighting the disruption and expense of the problem, involving first-line supervisors in identifying solutions, and evaluating major operational and work-rule changes.

Leahy, A Sprague, C Schlegel, L (Southern California Rapid Transit District) *Transit Journal* Vol. 5 No. 4, 1979, pp 29-38; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

23 309069 FOLLOW-UP STUDY AND ADAPTATION OF THE THEORETICAL EXAMINATION OF THE HEAVY VEHICLE DRIVING TEST (LORRIES AND PUBLIC TRANSPORT VEHICLES) [Suivi et adaptation de l'épreuve théorique poids lourds et transports en commun]. The aim of the investigation described was to set up a series of specific questions for the theoretical examination which is part of the driving test for heavy vehicles, extra-heavy vehicles, and public transport vehicles, following the principles used for the audio-visual examina-

tion of the theoretical part of the driving test for type b vehicles (private cars). (TRRL) [French]

Chatenet, F Simonnet, M Chevalier, M ; National Road Safety Organization, France Monograph Feb. 1978, 200 p., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 105692), Institute of Transport Research, Central Laboratory of Bridges & Highways, France

23 310464 SICK-LEAVE AND PATTERNS OF DISEASE OF TRAFFIC PERSONNEL AT GREATER STOCKHOLM TRANSPORT COMPANY [Sjukfrånvaro och sjukdomsmönster hos trafikpersonal vid storstockholms lokaltrafik]. The aim of this report is to present how working conditions can contribute to disease for the group of full-time working public transport personnel. The report is based on investigations of the company's statistics concerning sick-leave during 1974. The parameters in the statistics are sex, age, category of personnel, who's classification of disease on 16 kinds of disease. The results show that the office staff are more healthy than the traffic personnel and that men are more healthy than women. The size of the differences vary for different groups of disease. Concerning diseases that are caused by the physical environment like inflammations in ears or eyes, the traffic personnel are more exposed than the office staff. (TRRL) [Swedish]

Aronsson, G Gardell, B ; Stockholm University, Sweden Monograph No. 1976-9, Dec. 1976, 28 p., 21 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 243192), National Swedish Road & Traffic Research Institute

23 313258 NORTHEAST LABOR-MANAGEMENT CONFERENCE ON ISSUES IN URBAN TRANSIT HELD AT HARRISON CONFERENCE CENTER, GLEN COVE, NEW YORK ON APRIL 18-20, 1979. The report summarizes the four topics that were discussed at the conference and that were originally selected by an advisory committee consisting of union and management, namely: (1) new UMTA programs; (2) paratransit; (3) shop floor labor-management relations; and (4) part-time employment. For each topic a summary is provided for the problems cited by the participants, the recommendations for solving these problems, and specific suggestions for UMTA policy and program development.

Stern, JL Rubinfeld, S Dennis, B ; Wisconsin University, Madison, Urban Mass Transportation Administration, (UMTA-WI-11-0006) Summary Rpt. UMTA-WI-11-0006-80-1, Sept. 1979, 38p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-155526

23 316659 THE TRANSPORTATION MANAGER: AN EVOLVING CONCEPT. Solutions to the new transportation needs of the United States require the development of problem-solving skills, which augment the historical role of the highway engineer and highway planner. This new role, the transportation manager, is the direct result of several factors in our environment and, more particularly, in our transportation systems. For example, although vehicle kilometers of travel are projected to increase by 39 percent by 1985, resistance to new highway construction is increasing, and mass transit is severely limited in its ability to serve peak-hour commuter needs by

using expensive vehicles and full-time labor. As a result, the focus of transportation activities is shifting to improved management techniques. The new transportation needs will require individuals who have a different perspective and approach than that of the traditional engineer or planner. The new management emphasis will address more day-to-day decision making and have the opportunity to initiate low-cost, incremental changes to systems that are reversible on short notice. Cost/benefit analyses of detailed planning efforts associated with such incremental efforts reveal that the transportation manager will consume less resources in examining the data and undertaking corrective action. The paper will trace the development of public involvement in transportation to demonstrate the evolving needs of transportation and the orientation toward the professional urban transportation manager. (Author)

Davis, FW, Jr Cummingham, LF (Tennessee University, Knoxville) *Transportation Research Record* No. 735, 1979, pp 7-12, 1 Fig., 8 Ref.; This paper appeared in Transportation Research Record No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

23 319398 TRAINING AN EDUCATION IN TRANSPORTATION: FUTURED DIRECTIONS. The dramatic changes in the environment in which transportation professionals operate in the United States and the impact of these changes on transportation education and training are examined. Within a decade, the definition of the urban transportation "problem" has been expanded from one focused solely on congestion to one that includes at the very least the relationship between transportation and the following factors: energy, air quality, equity, safety, congestion, land use, noise, and more efficient use of scarce resources. These new problem definitions and the skills necessary to deal with them effectively have added to the responsibilities of transportation educators and represent forces of change in U.S. educational programs. Actions that could be taken to prepare for the future professional needs of the transportation sector are recommended. (Author)

Hoel, LA Meyer, MD *Transportation Research Record* No. 748, 1980, pp 15-21, 21 Ref.; This paper appeared in TRB Research Record No. 748, New Directions in Transportation Education.; ORDER FROM: TRB Publications Off

23 319437 HUMAN RELATIONS TRAINING MANUAL FOR TRANSIT PERSONNEL. This manual was developed for the trained professional familiar with human relations training. Suggested uses for this manual are to review all included material and pick those instruments best suited to one's particular needs as a trainer. It is very important for any transit operation to have employees who are sensitive to and cognizant of the needs of the people served. Probably the most important people for seeing that meaningful public relations person. Their demeanor toward the passenger in any given situation will have a definite impact on the image which the transit company projects to the community as a whole. Consequently, good public relations are contingent upon the extent to personnel who are directly involved with the public. Good human relations and attitudes are as important to transit person-

nel as is operating the equipment. Attitudes come from within an individual and are very difficult to change. In order to change a person's attitudes, one must change his feelings and thoughts. New or changed attitudes can never be forced upon an individual; any attempt to force attitude changes can result in totally opposite results. This manual is made up of learning and training devices to teach individuals how to change their attitudes. Small group dynamics will be the training device most effective with these materials. Groups should never be smaller than five or larger than ten, excluding the leader. If a group is too small, there may be no extroverts in the group to break the ice. If a group is too large, only a few of the members will get involved and the rest may just occupy space. The ideal group has six or seven members plus a leader. Groups should be picked at random so that they include a variety of ages, experiences, and problems. The greater the vari-

ety, the better the chance of success. Remember that group members will learn from themselves and each other and not from the leader. The goals and objectives for this training program are to teach transit personnel how to develop effective and meaningful interpersonal communication skills; to develop skills in facilitative responding to others through small group dynamic; to develop effective listening skills; and to develop the abilities to engage in honest self-disclosures without fear of hurting others or themselves. (Author)

Martin (AW) Associates of Virginia Incorporated
June 1980, 159p, Figs., 1 Tab., Apps.

23 319850 DRIVER TRAINING AND OPERATING CHARACTERISTICS OF TRANSPORTATION SYSTEMS FOR THE ELDERLY AND HANDICAPPED. This research focused upon two problem areas in the

operation of transportation systems for the elderly and handicapped. The two areas were the training of vehicle operators and the analysis of operating data. The examination of these problem areas was designed to answer the following questions: What types of training should be provided to a vehicle operator in a system designed to transport the elderly and handicapped? What are the characteristics of operating data generated by systems can this data be utilized by system management? (A)

Thomas, DD (Texas University, Austin) *Dissertation Abstracts International, Part A* Vol. 39 No. 11, May 1979, 213p; ACKNOWLEDGMENT; ORDER FROM: University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan, 48103; FAD 7911041

24 050059 INTERMEDIATE LEVELS OF TRANSIT SERVICE WHICH ARE COST-LIAR: TRAINS ON RAILS OR BUSES ON BUSWAYS? Trains-on-rails are cost-equivalent to buses-on-busways where the newly installed urban transportation system's capacity is 12,000 passengers per hour per direction. New transit facilities, utilizing existing railroad air-rights, require capital improvements of 7.5 (busway) to 12 (train-on-rail) M \$/mile and cost to operate from 1.2 (bus) to 0.4 (train) cents per seat-mile, using 1970 data.

Hoffman, GA ; Daniel, Mann, Johnson and Mendenall/Kaiser Engs 73-ICT-26, Sept. 1973

Presented at the Intersociety Conference on Transportation, September 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

24 050328 LINDENWOLD: THE COMMUTER LINE THAT MAKES A PROFIT. AP reported that the line in 1972 took in \$6 million, or some \$700,000 more than it spent; that ridership jumped from 6 million in 1969, when operations began, to 9.5 million in 1971 and to 11 million in 1972; that patronage is continuing to climb and that 40% of its passengers are former auto commuters.

Jannsen, O *Passenger Train Journal* 1973, p 15, 1 Phot; ORDER FROM: Passenger Train Journal, 29 East Borad Street, Hopewell, New Jersey, Repr PC

24 050366 BOSTON PLANS \$1 BILLION IMPROVEMENTS OVER 5 YEARS. Mass transit is important in Boston. The Massachusetts Bay Transportation Authority carries 150 million passengers annually (1972) on its rapid transit, street cars, trolley buses, and diesel buses. The commuter railroads, the Boston and Maine and the Penn Central, carry 7.5 million annually. These services are subsidized by the MBTA which makes up the net operating costs. Unfortunately, over the past seven years, commuter rail ridership has gradually declined. MBTA's overall ridership experienced a similar trend; however, it is now increasing. Continued improvements in service and equipment plus line extensions are expected to further increase ridership.

Myers, ET *Modern Railroads* Vol. 28 No. 10, Oct. 1973, pp 73-74; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

24 050631 INFRASTRUCTURE IMPROVEMENT AND EXTENSION [RENOVATION ET EXTENSION DE L'INFRASTRUCTURE]. The author explains the whole range of measures intended to modernize and extend the infrastructure which have become necessary because of the age of a large proportion of the installations, generally largely dimensioned when they were built, and because of the enormous and constant development of passenger traffic. He provides details of the steps taken to improve technically the infrastructure (new and Modernized electrification, trebling or quadrupling of lines, signaling, traffic control, intermediate termini, etc.); the improvement of installations, especially stations, in respect of safety, capacity, convenience and comfort. He then deals with new infrastructure planned in Paris (interconnections, under-

ground stations, Orsay-Invalides junction line, etc.) and the suburbs (services to new towns, airports, etc.). [French]

Legrand, M, Director of Equipment *Revue Generale des Chemins de Fer* Apr. 1973, pp 218-221, 2 Fig; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

24 050632 A PROPOSED SNCF/RATP INNOVATION: THE INTERCONNECTION [UNE POSITION NOVATRICE S.N.C.F.-R.A.T.P: L'INTERCONNEXION]. The authors explain in this article how a standard structure gauge interconnection for rail traffic relations across Paris has been planned using as a basis an improved "Metro" underground railway and the construction of standard structure gauge lines in Paris and the Paris area: East-West Region Express Railway (RER) and a direct North-South connection via the Sceaux Line extended towards the North. This interconnection would mean in fact that parts of the lines would be used by both SNCF and RATP trains which would make traffic more flexible and enable certain SNCF trains to cross Paris, thereby overcoming the inconvenience for passengers of the present dead-end termini stations. They consider from various aspects the first interconnection planned on which work has already begun, namely the Paris-Lyon station and Paris-Nord station junction line via Chatelet through new tunnels, the first of which forms part of the East-West RER line from Paris-Lyon station to Chatelet, the second still being in the planning stage. [French]

Giraudet, P, General Manager (Paris Transport Authority) Stein, M, Assistant General Manager *Revue Generale des Chemins de Fer* Apr. 1973, pp 213-217, 4 Fig; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

24 050743 LOW COST URBAN TRANSPORTATION ALTERNATIVES: A STUDY OF WAYS TO INCREASE THE EFFECTIVENESS OF EXISTING TRANSPORTATION FACILITIES. VOLUME I. RESULTS OF A SURVEY AND ANALYSIS OF TWENTY-ONE LOW COST TECHNIQUES. Volume I of this study details the findings of a survey and analysis of twenty-one low cost techniques designed to increase the effective processing capacity of fixed capital transportation facilities. Techniques were rated with particular attention to their potential processing efficiencies (volume increases or time reductions in moving people via existing transportation facilities). In addition, the evaluation considered various cost parameters, impacts on the disadvantaged, environmental and transportation safety factors, technical and institutional viability, and the expected response from travelers.

Dupree, JH Pratt, RH ; Pratt (RH) Associates, Incorporated Jan. 1973, 299 pp; Contract DOT-OS-20034; ACKNOWLEDGMENT: NTIS (PB-223197/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223197/5

24 051417 ECONOMY OF SCALE FOR MASS TRANSIT SYSTEM. Mathematical models are developed for trips versus transit network length. It is shown that the number of trips captured per unit length of network is a

highly nonlinear phenomenon, occurring because of four major factors. These factors are: interzonal travel, modal split, nonuniformity in trip generation, and future growth factors. Sensitivity analysis is presented to understand the impact of various controllable and noncontrollable factors economies of scale.

Mittal, RK (Union College, Schenectady) Arora, SR (Minnesota University, Minneapolis); American Society of Mechanical Engineers Paper 73-ICT-93, Sept. 1973, 12 pp, 8 Fig, 9 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

24 052106 MINIMUM COST LOCATIONS FOR PARALLEL PUBLIC TRANSIT LINES. Passengers are to be carried to a rapid transit line by feeder transit lines perpendicular to the rapid transit line. How should the feeder lines be located and how should their schedules respond to a passenger arrival pattern that varies with location and time? These questions are answered for a system with a simple cost structure by using continuous functions to approximate the behavior of the system, then minimizing the cost by the methods of elementary calculus.

Hurdle, VF (California University, Berkeley) *Transportation Science* Vol. 7 No. 4, Nov. 1973, pp 340-350, 1 Fig, 4 Ref; Grant NSF GP 24617; ACKNOWLEDGMENT: Transportation Science; ORDER FROM: ESL, Repr PC, Microfilm

24 053730 ANY POLICY AIMING TO PROMOTE PUBLIC TRANSPORT, TO BE EFFICIENT HAS TO BE BASED ON IMPORTANT IMPROVEMENTS OF THE QUALITY OF SERVICE. The economic planning has placed the accent on the importance of the macro-economy in order to deal with the vast counter balance between the aggregates of the national finance.

Frybourg, M (Institute of Transport Research) *Rail International* No. 1, Jan. 1973, 11 pp, Figs, Tabs; ORDER FROM: ESL, Repr PC, Microfilm

24 071845 A REVIEW OF REPORTS RELATING TO THE EFFECT OF FARE AND SERVICE CHANGES IN METROPOLITAN PUBLIC TRANSPORTATION SYSTEMS. The report reviews articles and reports developed in the past ten years relating to demand elasticities for public ground intra-city transportation. It is designed to provide policy makers with a quick overview of the literature. Some major headings are: (1) an increase in fares will decrease patronage, but will result in a net increase in revenues; (2) the effect of fare increases differs depending on circumstances; (3) the relationships probably operate in the same manner with fare decreases, but in the opposite direction; (4) increased frequency will increase patronage, but no clear pattern has been found to suggest a method of numerical prediction; (5) it is difficult to judge the relative impact of each when improvements occur simultaneously; and (6) the attributes of speed, comfort, convenience, and wide choice of destination are as important as fare in attracting persons.

Holland, DK ; Saint Louis University, Federal Highway Administration Final Rpt. June 1974,

26p; ACKNOWLEDGMENT: NTIS (PB-234069/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234069/3, DOTL NTIS

24 072468 LABOR COSTS AND PRODUCTIVITY FOR THE LINDENWOLD RAPID RAIL LINE AND THE SHIRLEY HIGHWAY RAPID BUS DEMONSTRATION PROJECT: SOME PRELIMINARY FINDINGS. An argument favoring a rail system rather than bus transit is that the rail mode will be less labor intensive. Since labor costs constitute the largest component of transit operating costs, the more capital intensive mode should be more productive and slow the increase of unit labor costs. This idea seems to be borne out by some of the results from the bus service in the Washington, D.C., suburbs and the rapid transit service in the Philadelphia, Pa., suburbs. Authors observe that much remains to be learned about the relative efficiency with which the modes provide passenger transportation service. They point to the need for a refined data base, better definition of transit output, and more exact identification of the capital input.

Berg, JT Miller, S Fleischman, E (Federal Highway Administration) *Transportation Journal* Vol. 14 No. 1, Sept. 1974, pp 46-50, 1 Tab., Refs.; ORDER FROM: XUM, Repr. PC

24 072759 TRANSPORTATION AND THE PROSPECTS FOR IMPROVED EFFICIENCY. This publication contains a collection of papers from an NAE Symposium. Several of the papers are related to rail rapid transit systems and to commuter railroad operations. Specific papers deal with planning for transportation in Dallas, Chicago, and San Francisco.

National Academy of Engineering 1973, 270 pp, Figs., Tabs., Phots.; A Symposium sponsored by the National Science Foundation, Department of Housing and Urban Development, Department of Transportation and the National Academy of Engineering at its Eighth Autumn Meeting October 12 and 13, 1972.; ORDER FROM: National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr. PC

24 080259 DEVELOPMENT OF EXPERIMENTAL DESIGN METHODOLOGY FOR EVALUATING MASS TRANSIT DEMONSTRATIONS: AN APPLICATION TO THE SEATTLE EXPRESS BUS SERVICE DEMONSTRATION PROJECT. VOLUME 1. EXECUTIVE SUMMARY, MAIN REPORT. UMTA has been actively involved in the process of funding full-scale demonstration projects in select metropolitan areas throughout the country. These demonstrations are carried out for the purpose of research, testing and evaluation of transit concepts with potential nationwide implications. One major objective to be accomplished is the development of a systematic and effective means of evaluation which will enable UMTA to determine not only the effectiveness of the specific projects, but also the extent of applicability to other areas. The effort sought to accomplish this objective through three steps. The basic approach of the study was development of an experimental design, in Seattle, WA, where an express bus service demonstration project was initiated in 1970.

Northwestern University, Evanston, Urban Mass Transportation Administration, (UMTA-IL-06-0021) Sept. 1973, 96 pp; See also PB-235

510.; ACKNOWLEDGMENT: NTIS (PB-235509/7); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235509/7

24 080260 DEVELOPMENT OF EXPERIMENTAL DESIGN METHODOLOGY FOR EVALUATING MASS TRANSIT DEMONSTRATIONS. AN APPLICATION TO THE SEATTLE EXPRESS BUS SERVICE DEMONSTRATION PROJECT. VOLUME 2. APPENDICES. A major objective of the UMTA demonstration projects is to develop a systematic and effective means of evaluation which will enable determination not only of effectiveness of specific projects but also the extent of applicability to other areas in the country. Volume two contains the appendices to the Volume I main report. Materials are given on ridership on Blue Streak Routes, origin and destination surveys, Magnitude of vehicles using expressway facilities, methods of counting bus passengers, and issues arising from the study.

Northwestern University, Evanston, (UMTA-IL-06-0021) Sept. 1973, 100 pp; See also PB-235 509.; ACKNOWLEDGMENT: NTIS (PB-235510/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235510/5

24 083827 EFFECTS OF A SERVICE INTERRUPTION ON BUS RIDERSHIP LEVELS IN A MIDDLE-SIZED COMMUNITY. A stochastic model of bus passenger ridership is applied to the problem of determining the effect of a service interruption on ridership levels in a middle-sized community. The work indicates that, despite the captive clientele of transit and the relatively short duration of the service discontinuance (63 days), large reductions (13.5-17.9 percent) in ridership resulted. These results suggest that government agencies should take an active role in preserving stable and reliable transit service if large future subsidies are to be avoided. The work indicates that the building of stochastic models of transit demand would aid in planning future transit services.

Harmatuck, DJ *Transportation Research* Vol. 9 No. 1, Feb. 1975, pp 43-54

24 095202 OPTIMUM ECONOMIC PERFORMANCE FOR A RAILWAY SYSTEM. Comprised of several short papers--The PTE point of view, by A.M. Munro; Selection of train performance characteristics for suburban railways, by A. Hawes; London Transport Railway economics, by D.K. Ware and F.G. Ruddy; and Design considerations for rapid transit, by A.M. Lyall and N.W. Colling.

Munro, AM ; Institution of Mechanical Engineers Nov. 1974, 23 pp, 24 Fig.; Paper presented to the Institution of Mechanical Engineers Railway Division, November 11, 1974.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: ESL, Repr. PC, Microfilm

24 095252 SYSTEM OPTIMIZATION WITH DIFFERING DEMANDS FOR SERVICE. For a given objective function which can be used for a system serving a single demand point, this paper defines a technique by which that objective function can be used to define an aggregate objective function for optimizing a system which is required to serve several different demand

points. The objective function is defined for conditions under which demand is inelastic and all costs incurred by a group of users representing a single demand point must be paid by that group of users. The second condition is the same as the first, but with elastic demand. For the third condition, the problem of cross-subsidization among various users of the system is considered. The demand is considered to be elastic. Examples of the use of the technique for a commuter railroad are presented. In the examples, the objective function is the user cost where the cost includes fare, travel time, and the cost of inconvenience due to lack of service frequency.

Eberle, WR (Purdue University) *High Speed Ground Transportation Journal* Vol. 9 No. 1, 1975, pp 407-416, 4 Ref.; ACKNOWLEDGMENT: EL; ORDER FROM: ESL, Repr. PC, Microfilm

24 097284 APPLICATION OF GUIDELINES FOR IMPROVING TRANSIT SERVICE AND OPERATING EFFICIENCY. Considerable public funds are being allocated for transit operations, and a method is needed to ensure improved quality of transit service and increased efficiency of operations. Operating guidelines and standards developed in Pennsylvania specify elements of service, such as speed, reliability, capacity, and comfort, that must be provided under different conditions. Transit agencies are also required to improve public information, undertake marketing, and collect technical, operating, and financial data and submit them to the state transportation department on a regular basis. The department uses the data to evaluate operations of each agency and bases distribution of funds among the applicants on their compliance with the guidelines. The department also provides all applicants with professional assistance for improvement of operations.

Vuchic, V (Pennsylvania University, Philadelphia) Tennyson, EL Underwood, WC (Pennsylvania Department of Transportation) *Transportation Research Record* No. 519, 1974, pp 66-72, 1 Fig., 8 Ref.; Prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

24 099237 EFFECTIVE TRANSIT POLICY-MAKING AT THE LOCAL LEVEL. This paper reviews the role of Transit Authority Boards in the urban transportation planning process. The Transit Authority Board is seen as having two major responsibilities: (1) it serves as the focal point of citizen input to the urban public transportation planning process; and (2) it is responsible for seeing that an adequate level of public transportation service is provided to the community. The various steps involved in making policy decisions in order to fulfill these responsibilities are discussed. It is emphasized that care must be taken to develop means of evaluating various combinations of public transportation instead of simply developing measures to justify current activities and vested interests. The Knoxville Transit Authority's efforts to solve the problems they have encountered are cited as an example of the need for evaluation measures that will help determine whether an adequate level of transportation service is being provided to the community and whether the service is being provided in the most effective way.

Davis, FW, Jr (Tennessee University, Knoxville) *Transportation Research Board Special Reports* No. 155, 1975, pp 9-13, 3 Fig., 1 Tab.; ORDER FROM: TRB Publications Off, Orig. PC

24 126196 A METHOD FOR STANDARD DESCRIPTION OF PUBLIC TRANSPORT SYSTEMS [Metod foer Standardbeskrivning av Kollektiva Transportsystem]. The standard of a transport system, its ability to satisfy a certain travel requirement, is defined by a multitude of factors. The principal components chosen in the report are accessibility, safety and convenience. Preferences between different factors vary depending on age, etc. Transport standard is a complex concept and the quality of a system is dependent on a large number of factors. Factors can be set out systematically or analysed graphically. Different evaluation methods are used in comparing transport systems. In choosing analytical methods, a balance must be struck between accuracy and ease of handling. Attempts have been made to set transport standards into a broader framework by making the transport apparatus an integral part of society. Travel is an expression of people's need to participate in different activities; recent surveys showed that a well-functioning transport apparatus must satisfy greatly varying travel needs. A model is presented for public travel standard; in a study at Lund, the model was applied and found in good agreement with intuitive assessments of the public transport system. /TRRL/ [Swedish]

Friberg, G Holmberg, B ; Nordic Institute for Studies in Urban & Reg Plannng R&D Rept. NR2, 1974, 114 pp, Figs., 6 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-213463); ORDER FROM: Nordic Institute for Studies in Urban & Reg Plannng, Skeppsholmen, S-111 49 Stockholm, Sweden Repr. PC

24 127867 CHARTING THE LIMITS OF UNMANNED OPERATION. Introduction of full automation of rapid transit does require a radical change of views in which there can be no shrinking from technical, operating and legal challenges. Today's automation technology does allow rapid transit systems to be run with very few employees. Use of trains without operators and stations without attendants does not jeopardize safety, but in some cases improves it. Attractiveness of service can be improved at little expense. The author has described his efforts over 20 years in technical direction of efforts at automating West Germany's Hamburg transit system.

Tappert, H (Hamburger Hochbahn AG) *Railway Gazette International* Vol. 131 No. 10, Oct. 1975, pp 373-377, 8 Ref.; ORDER FROM: ESL, Repr. PC, Microfilm

24 129454 THE BUS IN CANADA. This issue of Transit Canada presents a look at a couple of concepts which can improve the performance of the transit bus and generally improve the performance of any transit system. One section is also devoted to a review of past and present manufacturers of transit vehicles. /RTAC/

Transit Canada Vol. 11 No. 4, July 1975, 24 pp, Photos. ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada Repr. PC

24 129819 OPERATING AND MAINTENANCE COSTS OF LIGHT RAIL TRANSIT. This paper explains the costs of operating light rail lines, and it explains how light rail can be more economical than other modes under certain conditions. Using 3 recent studies of proposed light rail lines as examples, the paper shows that new lines can be economically constructed and operated with a potential ridership of as little as 20,000 daily passengers. The self-service fare systems used on European light rail lines is explained, and an opinion is given recommending that such a system could be implemented on new light rail lines built in the United States. Relatively fixed maintenance costs, high passenger-to-operator ratios, and multiple-unit capabilities make traffic increases on light rail lines much more economical to accommodate than on bus lines. The paper details how light rail lines have high passenger carrying capabilities (as much as 20,000 passengers/h) yet need relatively low passenger loads (only 20,000 passengers/day) to economically justify implementation and still have sufficient revenue to cover all operating costs. Also discussed are the ease of implementation, the versatility of the mode, and passenger acceptance and preference.

DeGraw, R (Southeastern Pennsylvania Transportation Authority) *Transportation Research Board Special Reports* No. 161, 1975, pp 122-125, 4 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

24 130784 MEASURING TRANSPORTATION SYSTEM PERFORMANCE. Quantitative measures of several aspects of urban transportation system performance which are difficult to incorporate in a cost-benefit analysis are presented. Two major types of evaluations are presented, those based on linked trip data between origin-destination zone pairs and those based on traffic volumes on individual links of the transportation network. Several miscellaneous evaluation procedures are considered, as are the problems of presenting evaluation data in an effective manner. /ASCE/

Mongan, TR (Sydney Area Transportation Study, Australia) Nielsen, NJ (De Leuw, Cather of Australia Proprietary Limited) Forbmy, JR (Monarto Development Commission, Australia) *ASCE Journal of Transportation Engineering* Proceeding Vol. 101 No. TE3, ASCE # 11483, Aug. 1975, pp 437-454, 1 Fig., 5 Ref., 2 App.

24 131065 LEVELS OF SERVICE PROVIDED BY URBAN TRANSPORTATION SYSTEMS. A level of service measure has been developed which has expanded beyond the traditional bounds that concentrate on dollar values and which recognizes that the level of service is a qualitative measure. The process involves 6 basic procedures. (1) Development of a concise but comprehensive goal related to urban transportation systems. (2) The goal may be defined by a series of concise and inclusive objectives. (3) Each objective may be defined by one or more performance measures. (4) Ranking and

weighting procedures are suggested which would allow relative weights to be assigned to each objective and performance measure. (5) The utility concept is introduced which permits quantitative comparison of individual values of a single performance measure. (6) An evaluation is developed which facilitates the determination of the level of service of any one system or system element.

Traffic Engineering Vol. 46 No. 1, Jan. 1976, pp 30-35, 4 Fig., 6 Ref. Informational Report by ITE Technical Council Committee 64-1.

24 133170 PROGRAM TAXISTATS: A COMPUTERIZED SYSTEM FOR PROCESSING AND ANALYZING TAXICAB COMPANY STATISTICS. This report presents the results of a study designed to develop software for reporting taxicab company statistics. It provides a general description of the data processing and report generation systems and discusses certain problems and issues associated with the sample design and implementation of the system. Topics addressed in the chapter on system description are: data collection and preliminary file preparation; final file preparation; printing of final reports; schedule problems; and industrywide reports. Appendices contain sample input forms for program taxistats, sample printouts of tables generated by the taxistats program, and examples of industrywide analysis.

International Taxicab Association, Urban Mass Transportation Administration, Wells Research Company, (UMTA-IL-06-0029) UMTA-IL-06-0029-75-1, June 1975, 62 pp; Prepared by Wells Research Co., Silver Spring, Md.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-250997/4ST

24 133313 EVALUATION GUIDELINES FOR SERVICE AND METHODS DEMONSTRATION PROJECTS. The document consists of evaluation guidelines for planning, implementing, and reporting the findings of the evaluation of Service and Methods Demonstration (SMD) projects sponsored by the Urban Mass Transportation Administration (UMTA). The objective of these guidelines is to foster consistency of evaluation philosophy and techniques, and comparability of results so as to improve the output of the UMTA demonstration program. In addition to describing procedures for developing and executing the evaluation of SMD projects, this document contains background information the SMD Program, a general discussion of the demonstration evaluation process, and appendixes on survey techniques and statistical methodology. Although these guidelines were prepared specifically for use in evaluating SMD projects, their potential applicability covers the evaluation of any type of transit innovation.

Heaton, C McCall, C Waksman, R ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-8, UMTAMA-06-0049-76-16, Feb. 1976, 187 pp; Prepared in cooperation with CACI, Inc., Los Angeles, Calif.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251891/8ST

24 134301 A SUGGESTED MODEL FOR ESTIMATING THE PRACTICAL PERFORMANCE OF TRANSIT SYSTEMS. The model suggested is developed as an exploratory tool for estimating the practical performance of transit

systems of both existing and new technologies. A constant jerk-rate type of equation is shown to give excellent agreement with existing New South Wales suburban railway rolling stock. By development of the envelope, use of this equation may be extended to examine the effects of reduced station dwell, increased initial acceleration and increased maximum speed etc. It is shown that for initial accelerations above 5 km/h/s very little benefit is likely to accrue on suburban systems, but major benefits are likely to stem from increasing station separation, skip-stop scheduling and reduced station dwell, all of which are feasible with existing technology systems. The method is shown to be particularly useful in the estimation of journey speed, journey time and station-to-station time when coding transit networks for modal-split analysis. (A). /TRRL/

Brain, R. *Australian Road Research Board Conference Proc* Vol. 7 No. 2, 1975, pp 414-424, 5 Fig., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218039); ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont 3133, South Victoria, Australia

24 134331 SYMPOSIUM ON THE COSTING OF BUS OPERATIONS. The following papers were presented at this symposium: The Need for a Realistic Costing Method, Smith, LH; A Method of Bus Operations Costing Developed by NBC, Taylor, HW; The RTM Method of Bus Operations Costing Developed for the Bradford Bus Study, Parker, GB and Blackledge, DA; A Method of Bus Route Costing Developed by Arthur Anderson and Company, McClenahan, JW and Kaye, DR; Some Recent Developments in Route Costing Techniques used in London Transport, Wagon, DJ and Baggaley, DA; Bus Costing Methods: A Critique, Beesley, M; Application of Costing Methods, Egerton, MB and Rigby, D; Deficiencies in Present Methods and the Need for Further Work, Bly, PH; and Summing up of the Proceedings, Webster, FV. Discussions of some of the papers are provided. For abstract of paper by Bly, PH see IRRD No. 218057. /TRRL/

Transport and Road Research Laboratory
TRRL SR 180UC, 1975, 18 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 218056); ORDER FROM: TRRL

24 134375 THE DEMAND FOR URBAN BUS TRANSIT. A ROUTE-BY-ROUTE ANALYSIS. In this paper an analysis is made of the demand for bus transport in urban areas, in an attempt to identify those corridors of potential bus patronage which, with suitable price and level of service, can continue to support a bus service with little or no subsidy. To this end, an analysis is made of the demand for bus transport along specific routes, of the sensitivities of that demand to changes in a bus company's policies, of the characteristics of those routes within the system which are being subsidised. The sample developed for this study consists of bus routes in 3 medium sized cities in Connecticut: Hartford, New Haven and Stamford, and uses data over a 10-year period. The technique developed obviates the need for expensive origin-destination survey data which are generally not available for smaller cities. It is concluded that the bus transport demand model developed could be used successfully to isolate potentially profitable routes within

a metropolitan area and to forecast likely changes in ridership resulting from changes in route or neighbourhood characteristics. It is found that fare appears to be a stronger influence on demand than frequency of service. /TRRL/

Schmenger, RW (Harvard University) *Journal of Transport Economics and Policy* Vol. 10 No. 1, Jan. 1976, pp 68-86, 7 Tab., 25 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-218323)

24 134752 FACTORS AFFECTING REALIABILITY OF URBAN BUS SERVICES. Attitudinal surveys have indicated that travel time reliability is an important attribute of urban transportation services affecting choice of mode of travel. Yet there is no generally accepted measure of transport reliability, nor is much known about factors affecting this parameter. This study was conducted to test a particular measure of reliability, the inverse of the standard deviation of point-to-point travel times, using data from bus services in the Chicago area. The selected measure was found to be a useful and easily collected indicator of service reliability. Reliability measured in this form was found to be significantly degraded by increasing route length, increasing intensity of intersection control (particularly traffic signal density), increasing traffic volumes, and, with less certainty, increasing bus passenger loadings. Several strategies for increasing urban transit reliability are suggested.

Sterman, BP (Urban Mass Transportation Administration) Schofer, JL (Northwestern University) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, ASCE #11930, Feb. 1976, pp 147-160, 3 Fig., 3 Tab., 7 Ref., 2 App.

24 136413 RELIABILITY AND AVAILABILITY ASSESSMENT CRITERIA, DATA INPUTS AND ANALYSIS METHODS FOR MASS TRANSIT SYSTEMS. The availability and reliability of a mass transit system is analyzed and assessed, and a fairly complete list of criteria for judging these characteristics of a mass transit system is presented. A discussion is also included of the analysis and data reduction methods involved and an interpretation is given of the resulting numerics noting the particular aspect of reliability or availability addressed by each within the context of previously determined management goals.

Welker, EL (TRW, Incorporated); Institute of Electrical and Electronics Engineers Proc Paper No. 1370, 1976, pp 390-313, 2 Ref.; Presented at the Annual Reliab Maintainability Symp., Las Vegas, Nev., Jan. 20-22, 1976 sponsored by ASME and IEEE.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 137346 TRANSPORTATION SYSTEM AS-SURANCE: TERMINOLOGY, PERFORMANCE INDICES, FAILURE ASSESSMENT AND MAINTENANCE MANAGEMENT. The paper addresses the need for and reports on the development of a methodology for consistent measurement of reliable performance in transportation operations which include intercity rail, urban commuter rail, rapid transit, bus and streetcar, light rail and small people movers. Performance indices and formulae for their computation are developed as a compromise between industry tradition and modern assurance science techniques. Equipment availability, a ge-

neric reference to the reliability, maintainability, and availability of the equipment to transport passengers is discussed as it relates to both service dependability and the cost of the maintenance operation. A comprehensive Failure Assessment and Maintenance Management System (FAMMS) which is directly applicable to transportation properties and which evolved from similar systems used on properties over the past five years is described in detail. The system can be completely computerized and data can either be batch or on-line processed.

Uher, RA; Carnegie-Mellon University, Urban Mass Transportation Administration, (UMTA-PA-11-0013) Res. Rpt. CMUTRI-TP-75-22, UMTA-PA-11-0013-75-1, Aug. 1975, 102 pp; Contract PA-11-0013; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254837/8ST, DOTL NTIS

24 137494 COMPUTING PASSENGER MILES IN LONDON TRANSPORT. This paper briefly describes the methods used by London transport for the calculation of its variety of complex fare scales which are based on passenger miles. London transport has two charging zones for graduated fares, one for journeys in Central London and one for the suburbs, both with a reduced maximum fare in the off peak. There are three types of flat fare routes-Central London red arrow services, certain suburban services, and a small number of minibuses services. More than 16% of passenger journeys are made with system passes of about a dozen varieties, all valid for different periods and for different types of travel. The methods of computing the passenger mileage figures for each main type of fare or payment structure are summarised and discussed under the headings of graduated fare routes, flat fare routes, period tickets purchased "off-bus", and tickets for free travel issued by local authorities. /TRRL/

Baggaley, DA (London Transport Executive) *Journal of Transport Economics and Policy* Vol. 10 No. 1, Jan. 1976, pp 87-89, 1 Ref.; ACKNOWLEDGMENT:

24 139312 BUS RELIABILITY-DEFINITION AND MEASUREMENT. Several studies by other researchers to determine which aspects of a bus service are regarded by users as important are discussed. These usually show that reliability is high on list of people's preferences. Although reliability can be defined in a number of ways, the index of reliability most commonly used has been that of the average waiting time of passengers. This paper takes sixteen possible indices of reliability in three, not wholly distinct, groups: those pertaining to the operator, those of relevance to the passenger, and those which do not presuppose either standpoint. Each index is discussed separately and then compared with other indices to show which ones are different expressions of the same quantity and which can be thought of as fundamental. A selection of representative indices is then used in two ways: analytically, to show how a given change in the operation of a route would be indicated by several indices; empirically, by applying the indices to sets of data to show typical values; and by seeing how various indices have been used in a number of bus studies, mostly carried out in the 1970's. As a conclusion, it is pointed out that a number

of aspects of reliability may be treated by the same action on the part of the operator, but that in any assessment of this action, how much of an improvement is indicated will depend on which index is used. The essence of reliability lies in the principle well established in the bus industry, of keeping to a schedule, published or unpublished, which is usually designed to maintain even headways between buses where the service is at all frequent. /Author/

Chapman, RA ; Newcastle-Upon-Tyne University, England Work Paper No. 18, Mar. 1976, 35 pp, 10 Fig., 4 Tab., 44 Ref.; ORDER FROM: Newcastle-Upon-Tyne University, England, Director of Transport Operations Research Group, Newcastle-Upon-Tyne, Northumberland, England; ISSN 0306-3402

24 139556 GOAL PROGRAMMING APPROACH TO ASSESSING URBAN TRANSIT SYSTEM. Transportation systems often are evaluated to see whether they satisfy a variety of community goals. Of primary concern in this study is the development of a procedure for using the goal-programming technique, a modification and extension of linear programming, to evaluate urban transit systems for meeting the transportation-related goals of a community. These goals are intended to be general enough to permit adaptation of the goal-programming technique for the solution of a wide variety of urban problems. First, constraints are formulated from the inputs from a community; then the output variables are chosen to correlate with basic characteristics of urban transit systems to select a system or group of systems to fulfill the community transportation requirements. A computer program is employed to ease application of the goal programming and allow flexibility for a complex set of equations. A set of sample community goals are assumed to illustrate how the technique is practical in actual applications. /Author/

Yu, JC (Utah University) Hawthorne, RC (Northern Virginia Transportation Commission) *Transportation Research Record* No. 574, 1976, pp 35-47, 1 Tab., 31 Ref.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

24 142270 COST MINIMIZING POSITIONS, LENGTHS AND HEADWAYS FOR PARALLEL PUBLIC TRANSIT LINES HAVING DIFFERENT SPEEDS. A model of a transit system is built to find for parallel lines in a rectangular city the lengths, positions, and headways which minimize user (travel time) and operating costs in response to a general population density function and differing line speeds. It is found that, at some point, low speed lines should be cut off, this point depending upon the relative positions, headways and speeds of adjacent lines. Further, it is found that the optimum position depends upon the tributary population and the changes in operating cost and the change in operating cost due to changes in headway.

Byrne, BF (West Virginia University) *Transportation Research* Vol. 10 No. 3, June 1976, pp 209-214, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 145544 DESIGN FOR A NATIONAL URBAN TRANSPORTATION REPORTING SYSTEM. The report analyzes the contents and uses of a National Urban Transportation Reporting System. The study was performed to assist UMTA in the implementation of Section 15 of the National Mass Transportation Act of 1974. A review of Penn DOT transit reporting system, its implementation and results are presented. A recommended set of data items and indicators is defined and analyzed. Another section of the report contains detailed information on a subgroup of the data items and indicators felt to provide a minimal yet comprehensive base for comparison of transit agencies.

Vuchic, VR ; Pennsylvania University, Philadelphia, Urban Mass Transportation Administration Final Rpt UMTA-PA-11-0002-76-1, 1976, 90 pp; (PC A05/MF A01); ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259002/4ST, DOTL NTIS

24 147497 AIDS FOR THE PLANNING OF PUBLIC TRANSPORT [Hjælpedel foer Planering av Kollektivtrafik]. The travelling public wants a higher standard, i.e. shorter walking distances, waiting and journey times, few changes, comfort on buses and at stops, and low fares. Bus companies want to do their job as economically as possible, while local and national authorities which subsidise unprofitable services must consider quality in relation to cost. While assessment of conditions must be done by man, evaluation of alternatives must be done by computer since, for instance, the number of stop combinations increases with the square of the bus network. An analysis must evaluate travelling standard, traffic loading, productivity and costs. Models for the analysis of public transport are available. /TRRL/ [Swedish]

Andreasson, I (Volvo AB) *Vag-Och Vattenbyggen* Analytic No. 5, 1976, pp 32-33, 2 Fig., 1 Tab.; ACKNOWLEDGMENT:

24 147503 A MACRO ANALYSIS OF VARIABLES INFLUENCING TRANSIT USAGE. The author discusses the measurement of the success of a transit system. The development of the following transit quality indicators is outlined: (1) average system speed; (2) average system frequency; (3) system speed variation along lines; (4) system frequency variation along lines; (5) degree of commuter orientation; (6) degree to which a system concentrates on the central business district; (7) coverage of metropolitan area by the system. Computations using the formulae developed for these indicators were made for transit systems in San Diego, New Orleans, Detroit, Seattle, Toronto and San Francisco, and the results are summarized. These indicate that transit patronage is strongly related to the orientation of the system and to the average system mid-day headway, and somewhat less related to population and system coverage. /TRRL/

Thompson, GL ; British Columbia Bureau of Transit Services Monograph Apr. 1973, 16 pp, 1 Fig., 4 Tab.; ACKNOWLEDGMENT: TRRL IRRD 22225)

24 148257 INCENTIVES IN A METROPOLITAN PUBLIC TRANSPORTATION SYSTEM. Existing public-transportation systems employ out-of-date, inefficient technology. This

situation has not arisen through the lack of improved technology. Rather, it is the result of inherent disincentives which act to force systems in a counter-productive direction. This is an account of a recent study of the finances and operation of the metropolitan-Boston public transportation system (the MBTA). The existing legislation, which has elements in common with that for many other communities around the nation, was found to have widespread disincentives to productivity for all participants. New legislation introducing strong incentives to maximize efficiency at all levels has been drafted and is reviewed here.

Wilson, DG (Massachusetts Institute of Technology) ; American Society of Mechanical Engineers Conf Paper Paper R&L-3, 1976, 7 pp, 16 Ref.; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

24 148261 RAPID TRANSIT SYSTEM DESIGN FOR HIGHER PRODUCTIVITY. The paper discusses ways to increase labor productivity and reduce labor costs. Centralized computer aided monitoring and control systems for trains, passengers, fare collection, electrification equipment, auxiliary equipment, security, yards, maintenance and management information should be provided. Also capability of running trains without operators and operating stations without agents are important. Some of the systems to improve productivity used on the Sao Paulo, Brazil metro or planned are also described.

Kalra, PS (Bechtel Corporation) Nakagawa, T ; American Society of Mechanical Engineers Conf Paper Paper D&O-24, 1976, 5 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

24 148294 INFLUENCE OF THE SIZE AND NUMBER OF VEHICLES ON THE PERFORMANCE AND SERVICE QUALITY OF GROUP RAPID TRANSIT SYSTEMS. The size of vehicles investigated ranges from 4 to 40 seats, the number of vehicles used is between 240 and 8. A demand-activated, fixed-route service was simulated. Parameters, such as waiting time and the passenger's trip velocity are used to characterize the user aspect, and such criteria as load factor of line and vehicles, vehicle kilometers, headway between consecutive vehicles and rate of vehicle stops at stations are employed as measures of the system's operating performance.

Bahm, G (Karlsruhe University, West Germany) Colorado University, Denver Conf Paper Vol. 1, Paper 18, 1975, 20 pp; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

24 148878 EFFICIENCY AND PRODUCTIVITY IN PUBLIC TRANSPORTATION. The difficulties in increasing productivity on the service side of the economy are noted, as well as the slow growth in productivity in the governmental area. Among the various factors, the provision for

retirement after 20 years of service is considered to have retarded the rate of productivity improvement. Other factors include the crisis of worker alienation, and the matter of work practices. The latter has created considerable amounts of non-productive time at very high costs. Management options for attacking the productivity problem includes the increasing of effectiveness of the labor by hiring higher quality employees and increasing skill requirements. Increased use of discipline is another technique, and some union leaders urge management to regulate the work force more aggressively. A new labor contract and a recently negotiated agreement which permits productivity bargaining are outlined. Examples of productivity improvements are described, and the opinion is expressed that productivity bargaining is a viable strategy in many situations.

Yunich, DL (Metropolitan Transportation Authority, New York) *Transit Journal* Vol. 2 N Nov. 1976, pp 33-40, 1 Phot.

24 149620 STATUS OF THE URBAN CORRIDOR DEMONSTRATION PROGRAM: NOVEMBER 1975. This review of the accomplishments of the Urban Corridor Demonstration Program (UCDP) by project type, also compares the similarities and differences of projects in each of the selected cities and documents a preliminary cost-impact evaluation of different improvement techniques. This report also summarizes what has been learned so far about the success or failure of various improvement concepts and discusses the remaining uncertainties. The UCDP projects were subdivided into 3 main groups: improved transit services and facilities, roadway and traffic control improvements, and other projects. Six of the 8 cities implemented some form of new bus service: express buses; expansion of preexisting express bus services; superimposition of new express services; and reorganization of routes and schedules. A variety of roadway and traffic control projects was developed including ones employing innovative preferential bus treatment concepts. A mixture of concepts were also employed in projects which included enforcement of parking regulations on surface streets, progressive parking raes in off-street facilities etc.

Department of Transportation 2 Rpt. No. DOT P 6500., 48 pp, Figs., Tabs.

24 153954 A PROGRAM FOR IMPROVING TRANSIT INDUSTRY MANAGEMENT INFORMATION SYSTEMS. VOLUMES 1-3. The report presents an internal management systems improvement plan for the urban mass transit industry. It is the final report of a series of three reports which develop a transit management information systems improvement program. Volume 1 consists of three sections: Section 1 provides an overview of the transit industry; Section 2 presents a proposed set of systems projects for UMTA sponsorship based on criteria herein; and Section 3 presents a methodology and process for individual transit properties to follow in their systems planning activities.

Simon, ME ; Andersen (Arthur) and Company, Project FARE/Industry Control Board, Wells Research Company, Harmon and Associates, Urban Mass Transportation Administration, (UMTA-IT-06-0094) Final Rpt. UMTA-IT-06-0094-77-5, Sept. 1976, 505 pp; Also available in set of 3 reports PC E09, PB-264523-SET.; Contract DOT-UT-40025; Ac-

KNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264523-SET/ST, DOTL NTIS

24 153980 URBAN MASS TRANSPORTATION INDUSTRY UNIFORM SYSTEM OF ACCOUNTS AND RECORDS AND REPORTING SYSTEM. VOLUME I. GENERAL DESCRIPTION. The purpose of the report is to present and document the detailed features of the uniform system of accounts and records and reporting system required by Section 15 of the Urban Mass Transportation Act of 1964, as amended. This report is presented in four volumes: Volume 1 presents an overview of the systems, and an identification of the analytical potential provided by comparative data generated by the systems.

Andersen (Arthur) and Company, Urban Mass Transportation Administration, (UMTA-IT-06-0094) UMTA-IT-06-0094-77-1, Jan. 1977, 64 pp; Also available in set of 4 reports PC E11, PB-264 876-SET.; Contract DOT-UT-40025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264877/2ST, DOTL NTIS

24 153981 URBAN MASS TRANSPORTATION INDUSTRY UNIFORM SYSTEM OF ACCOUNTS AND RECORDS AND REPORTING SYSTEM. VOLUME II. UNIFORM SYSTEM OF ACCOUNTS AND RECORDS. The purpose of the report is to present and document the detailed features of the uniform system of accounts and records and reporting system required by Section 15 of the Urban Mass Transportation Act of 1964, as amended. Volume 2 contains the definitions for the uniform systems of accounts and records. Modes of transit service subject to this Section 15 system are also defined in this Volume.

Andersen (Arthur) and Company, Urban Mass Transportation Administration, (UMTA-IT-06-0094) UMTA-IT-06-0094-77-2, Jan. 1977, 268 pp; See also Volume 1, PB-264 877. Also available in set of 4 reports PC E11, PB-264 876-SET.; Contract DOT-UT-40025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264878/OST, DOTL NTIS

24 153982 URBAN MASS TRANSPORTATION INDUSTRY UNIFORM SYSTEM OF ACCOUNTS AND RECORDS AND REPORTING SYSTEM. VOLUME III. REPORTING SYSTEM FORMS AND INSTRUCTIONS-REQUIRED. The purpose of the report is to present and document the detailed features of the uniform system of accounts and records and reporting system required by Section 15 of the Urban Mass Transportation Act of 1964, as amended. Volume 3 contains illustrative forms for each of the reports required to be submitted under Section 15 and instructions for completing these forms.

Andersen (Arthur) and Company, Urban Mass Transportation Administration, (UMTA-IT-06-0094) UMTA-IT-06-0094-77-3, Jan. 1977, 60 pp; See also Volume 2, PB-264 878. Also available in set of 4 reports PC E11, PB-264 876-SET.; Contract DOT-UT-40025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264879/8ST, DOTL NTIS

24 153983 URBAN MASS TRANSPORTATION INDUSTRY UNIFORM SYSTEM OF ACCOUNTS AND RECORDS AND REPORTING SYSTEM. VOLUME IV. REPORTING SYSTEM FORMS AND INSTRUCTIONS-VOLUNTARY. The purpose of the report is to present and document the detailed features of the uniform system of accounts and records and reporting system required by Section 15 of the Urban Mass Transportation Act of 1964, as amended. Volume 4 contains illustrative forms and instructions for optional revenue and expense reporting.

Andersen (Arthur) and Company, Urban Mass Transportation Administration, (UMTA-IT-06-0094) UMTA-IT-06-0094-77-4, Jan. 1977, 112 pp; See also Volume 3, PB-264 879. Also available in set of 4 reports PC E11, PB-264 876-SET.; Contract DOT-UT-40025; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264880/6ST, DOTL NTIS

24 155404 TRENDS IN BUS TRANSIT OPERATIONS, 1960-1974. This report analyzes the historical patterns of bus transit operations from 1960 to 1974 using data from 50 bus operations. Because of limitations on the available data, the analyzed data do not represent the universe of bus operations, nor is it a random sample, and therefore do not necessarily represent the industry. However, the trends in this sample may be indicative of the industry trends. The various trends examined in this report are patronage, supply of services, resources employed, revenues, costs, utilization of employees and vehicles, and fuel consumption.

Control Data Corporation, Office of Policy, Plans and International Affairs, Urban Mass Transportation Administration, Wells Research Company Final Rpt. DOT/TPI-mm/14, Jan. 1977, 134 pp Prepared in cooperation with Wells Research Co., Silver Spring, Md.; Contract DOT-OS-60012; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266748/3ST

24 156097 EVALUATION OF PUBLIC TRANSIT SERVICES: THE LEVEL-OF-SERVICE CONCEPT (ABRIDGMENT). There are two key independent combinations of factors that can be directly controlled by transit policy makers: transportation hygiene factors and indicators of the level of service. Of these two, only the LOS indicators can motivate potential riders; transportation hygiene factors can only discourage. The following parameters are used to define transit LOS: a composite of basic accessibility, travel time, reliability, directness of service, frequency of service and passenger density. The operationalism of the concept must be evaluated according to whether it is (a) user oriented, (b) operations oriented, (c) trip or link specific rather than area related, (d) quantifiable by an independent observer, (e) independent of an evaluation of efficiency measures and effects or impacts, and exclusive of any transportation hygiene factors. Conceptual indicators and operational definitions are discussed, alternative conceptual indicators are listed, and aggregation of the indicators is detailed. This modal evaluation methodology appears to provide a useful framework for transit professionals and decision makers to evaluate public transit.

Alter, CH (Maryland-National Capital Park & Planning Comm) *Transportation Research Record* No. 606, 1976, pp 37-40, 1 Fig., 3 Tab., 18 Ref.;

ORDER FROM: TRB Publications Off

24 156098 TRANSIT SERVICE EVALUATION: PRELIMINARY IDENTIFICATION OF VARIABLES CHARACTERIZING LEVEL OF SERVICE. This paper is an introduction to transit service evaluation and its application to medium-sized bus transit systems. The concept of transit evaluation through the measurement of level of service is discussed in terms of usefulness, past work theory, and the presentation of a set of characteristic attributes. The need for performance evaluation, since transit is a public service that does not operate under the profit incentive, is presented. Its usefulness for management, governmental policy formulation, and determination of subsidy levels is discussed. The state of the art and practice, including the Pennsylvania Department of Transportation system, is reviewed. A methodology of transportation system evaluation developed by the Rand Corporation is summarized for its potential application to transit service. A preliminary list of service attributes, with the method of measurement identified, is given. It is concluded that transit service can be quantified and evaluated but that considerable effort is necessary to achieve a comprehensive and equitable system. /Author/

Allen, WG, Jr (Sverdrup and Parcell and Associates, Incorporated) DiCesare, F (Rensselaer Polytechnic Institute) *Transportation Research Record* No. 606, 1976, pp 41-47, 3 Fig., 20 Ref.; ORDER FROM: TRB Publications Off

24 156469 ON MEASURING THE EFFICIENCY OF PUBLIC ENTERPRISES: BUS OPERATING COMPANIES IN THE SAN FRANCISCO BAY AREA. It is important to be able to say whether or not an enterprise in the public sector is efficient and to measure this aspect of its performance. Public enterprises sometimes have legitimate reason to treat efficiency as secondary, but they also may resist efficiency measurement for other reasons. Statistical cost functions containing experience from similar enterprises provide useful yardsticks for public administrators. A purported cost function can be inadequate, however, as is shown in one example. Statistical cost functions allow comparison of bus properties by giving a range within which costs of an efficient property should fall. While random influences cannot be excluded, if observed costs fall outside two standard errors of prediction, there is a good case to say the property is inefficient. The usefulness of the standard error of prediction as a measure of precision is explored. Nationally estimated cost functions were used to investigate the bus operations only of three San Francisco companies. Two were found within sampling error, one was significantly more costly on its motorbus operations than average experience in the nation. A closer look would then be in order by those funding this property. Several years' experience is explored showing changes over time as well as across companies.(a) /TRRL/

Merewitz, L *Transportation (Netherlands) Analytic* Vol. 6 No. 1, Mar. 1977, pp 45-55, 5 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 225977)

24 157176 TRANSIT ROUTE EVALUATION PLANNING PACKAGE (TREPP) USER MANUAL. This manual describe the organization and general information needs for using the TREPP software package for the evaluation of transit service provided by existing or modified fixed route transit networks. This manual is further supplemented by another report depicting the methodology and application of TREPP. Experience in using TREPP shows that the program is efficient when applied to midium size urban areas and small urban areas. This experience also suggests that the program is capable of analyzing larger urban areas with populations of approximately 1-2 million.

Milione, V Dueker, KJ Mattlin, S Coulter, B (Urban Mass Transportation Administration) ; Iowa University 0 Technical Rpt. No. 5, July 1976, 95 pp, 24 Fig., 12 Tab., 6 Ref., 1 App.

24 157190 EVALUATION OF FIXED ROUTE TRANSIT SERVICE PERFORMANCE: THE METHODOLOGY AND APPLICATION OF THE TRANSIT ROUTE EVALUATION PLANNING PACKAGE (TREPP). This manual complements a computerized simulation software package (TREPP) which was developed to organize and generate information needs required in transit planning projects. In this manual, the basis of TREPP analysis is set forth. An articulated impact taxonomy of transit service options based on a systems analysis paradigm is constructed. In addition, the terminology of TREPP analysis is defined, and the problem of transport systems analysis is palaced within the TREPP context. The need for a disaggregate or behavioral based evaluation process is indicated, and the idea of a user-based construct which complements existing planning paradigms is forwarded. The output of TREPP is presented, and an introductory overview of the TREPP algorithm is provided with special emphasis on data requirements. The manual also describes the application of TREPP; the measures generated by TREPP are operationalized in terms of efficiency, effectiveness, adequacy and equity indicators. TREPP's analytical framework begins by defining a study region in terms of (a) the transit network and operating policy, (b) the quantity and distribution of urban activities, and (c) its socio-economic profile. The evaluative framework of TREPP adopts a particular zone within the region. It's transit service is measured and evaluated in terms of the input and output dimesnions of service, and the access of opportunity provided by the interaction of the transit service with the land distribution. Access opportunity is measured in terms of the cummlative number of urban opportunities available within specified impedance intervals.

Siegel, SM Milione, V ; Iowa University Tech Report No. 49, Dec. 1975, 66 pp, 25 Fig., 4 Tab., 32 Ref.

24 157382 ESTIMATING FUTURE COSTS OF OPERATING BUSES. The National Bus Company's system of bus route costing lays down a set of accounting conventions designed to bring order and logic to what would otherwise be diverse costing procedures. It provides a practical method of accounting for past costs and apportioning them to individual routes. It thereby puts on to a uniform footing all cost comparisons between routes that may be necessary for evaluat-

ing performance and substantiating claims for subsidy. However, the system is fundamentally retrospective in its application. Serious doubt must therefore be cast on any claim that it is a method of forecasting future costs. Such forecasts may be valid if all that is involved is financial indexation, as might be used for example to predict cost increases resulting from general inflation. But far more often, and more usefully, forecasts are needed that involve operational changes in the bus service. The NBC system is not appropriate for this kind of forecast because it contains no predictive relationships between operational variables and costs. To fill this gap, LOGORU has developed a model that enables bus operators to calculate the effect on costs of forecast small-scale changes in either financial variables (for example an increase in labour costs relative to capital), or operational variables (for example in the ratio of peak to off-peak buses), or both together. This model, which has been formulated in a computer program, TPTCOSTS, is the subject of this report. Some of the details of the inputs and outputs of the computer program are given in the appendices. For consistency, TPTCOSTS preserves as far as possible the conventions of the NBC costing system. However, it also incorporates some options that permit alternative assumptions to be made about the allocation of cost headings to cost categories, and that enable the cost changes likely to result from policy changes to be readily assessed. The program can also be used in conjunction with the LOGORU public transport analysis suite of computer programs, TRANSEPT, thus providing a powerful aid to the practical planning of bus services.(a) /TRRL/

Daly, AJ ; Local Government Operational Research Unit Monograph Report No. T60, 1976, 15 pp, 1 Fig., 1 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 225100)

24 157950 OPERATING AND MAINTENANCE COSTS FOR RAIL RAPID TRANSIT. The prediction of operating and maintenance costs for rail rapid transit systems is treated from two different approaches. A detailed model for estimating those operating and maintenance costs associated with vehicle operation was developed as part of a procedure to optimize rapid transit car design. The model involves the use of many underlying microscopic variables that must be provided as input data. For the early stages of alternative planning and evaluation, a more macroscopic technique, unit cost modeling, is presented and calibrated. While less precise than the first technique, these models can be used to provide quick "order of magnitude" estimates upon which first-cut comparisons may be reasonably based. The relationship between labor productivity indices and unit costs is also explored, although data did not permit a complete treatment of this area.

Roess, RP (Polytechnic Institute of New York) Huss, MF Sokwicklis, C *ASCE Journal of Transportation Engineering* Vol. 103 No. TE3, Proc. Paper 12942, May 1977, pp 421-439, 7 Ref.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL

24 158107 IMPROVING URBAN MASS TRANSPORTATION PRODUCTIVITY. The purpose of this analysis is to assess the importance of productivity improvement to the transit

industry and to identify opportunities to enhance the industry's productivity record. This report discusses the steady decline in transit ridership during the post-war period and the industry's deficits and growing dependence on public subsidies. The postwar problems of industry are partly attributed to the failure of productivity growth in transit to keep pace with that in other industries. It is suggested that an improved productivity record would probably be necessary, although not sufficient, to reverse the industry's ridership decline and its growing dependence on public subsidies. This report discusses a variety of opportunities to improve transit productivity that are possible by changing current industry practices in such areas as marketing, labor relations, and work rules. These opportunities to improve transit productivity are sorted into three groups, each incorporating a distinct strategy for productivity gain. The first of these strategies is to alleviate the productivity problems associated with the peaking of transit use during weekday rush hours. Discontinuing less productive services is a second strategy for productivity growth that is discussed in this report. The third strategy to improve productivity involves specialization; that is, the tailoring of equipment, fares, and other practices to the peculiar needs of different transit services and situations.

Meyer, JR Gomez-Ibanez, JA ; Harvard University, (MA-11-0026) Final Rpt. UMTA-MA-11-0026-77-1, Feb. 1977, 231 pp; Sponsored by DOT, Mass Transportation Administration.; Contract MA-11-0026; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-266920

24 159326 TRANSIT SYSTEM PRODUCTIVITY. AN INFORMATION BULLETIN OF THE TRANSPORTATION TASK FORCE OF THE URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES. The report includes an overview of issues and problems associated with transit productivity, indicators and techniques for its measurement, institutional perspectives, maintenance, organizational impacts, and purchasing. The report also contains a summary of DOT programs and contacts in this area, as well as an extensive annotated bibliography.

Burke, AC French, BI Pearl, DJ Perry, KA ; Public Technology Incorporated, Department of Transportation Final Rpt. DOT/TST-77-8, Mar. 1977, 36 pp; Prepared for Urban Consortium for Technology Initiatives. Transportation Task Force. See also report dated Oct 76, PB-258 733.; Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268593/1ST, DOTL NTIS

24 163559 A STUDY OF EFFICIENCY INDICATORS OF URBAN PUBLIC TRANSPORTATION SYSTEMS. This report presents the efforts of a research project on efficiency problems of urban public transportation systems (UPTS). Three test regions were selected in an effort to discover, clarify, and understand the efficiency relationships within UPTS. The test regions vary from a small one-mode region to a large multimode region. The UPTS are first divided into three major system components i.e. primary services, support functions, and the network. Then each system is divided by mode, and each component by each distinct function carried within the system component. The inputs to the system are also divided by type, i.e. labor,

capital, and energy, and according to the contributor i.e. the operator, the direct user, the society at large, and the government at all levels. Input units are also traced in terms of many costs (Fiscal Inputs Matrix) and physical units (Physical Inputs Matrix). System outputs are also separated by the receiver and the nature of the outputs. Efficiency analysis is then explored in a hierarchical manner exploring three types of relationships, i.e. system inputs vs. system outputs; component inputs vs. component outputs; and component outputs vs. component outputs. Efficiency indicators are then discussed as to the type of useful service they may offer in various types of efficiency analysis problems. /Author/

Tomazinis, AR ; Pennsylvania University, Philadelphia Final Rpt. DOT-TST-77-47, Jan. 1977, 299 pp, Figs., Tabs., 79 Ref., 9 App.; Sponsored by the Office of the Secretary, Department of Transportation.; Contract DOT-OS-50228; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270940/OST

24 163632 THE TRANSIT SYSTEMS OF SMALL CITIES IN ONTARIO. This report presents a description of the management and operating characteristics of transit systems in the small cities of Ontario. Cities with less than 120,000 in population are considered as small for the purpose of this study. The information for the study was obtained from the system by means of a Management Questionnaire, visits to the systems, and discussions with persons in transit management and operation. Three main divisions of transit management and operation are recognized and described in detail. These are: (1) Systems Management (i.e. covering items such as types of administration, management procedures, management information needs, etc.) (2) Systems Operation (i.e. characteristics of system operation, system operations procedures, and manpower utilization) (3) Finance (i.e. aspects of revenue generation, operating costs and its components, costs and financial records, and operating subsidies are described). Where data were available the range and average of each selected measure of effectiveness for groupings of cities by size are tabulated. Special emphasis has been given to those items where methods of management and operation are weak. Model formulations for some transit measures of effectiveness are also presented. The study should be helpful in gaining an understanding of both small and large city transit systems in the Province of Ontario.

Perera, MH (Ontario Ministry of Transportation & Communic, Can) ; Toronto-York University Joint Program in Transp Research Rept. No 39, Apr. 1977, 91 pp, Figs., Tabs., 8 Ref., 4 App.; This research was supported through the Student Summer Research Grant Program by the University of Toronto/York University Joint Program in Transportation under a grant from the Transportation Development Agency.

24 164254 MEASUREMENT OF WAITING TIMES IN ASSESSMENTS OF OPERATIONAL CHANGES IN BUS SERVICES. This report is intended to indicate some of the difficulties which are likely to be encountered in survey studies of urban bus services, when the objective is to measure the changes in passenger waiting times which are brought about by an operational change. Methods of determining

waiting times that have been used in previous work, and their limitations, are described. The day to day variability of bus operations, which acts as a source of 'random errors' in such work, is illustrated by measurements from surveys carried out by TRRL and London transport. (A) /TRRL/

Coe, GA Jackson, RL ; Transport and Road Research Laboratory Monograph TRRL Report 298, Jan. 1977, 26 pp, 6 Fig., 4 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227493), NTIS; ORDER FROM: NTIS; PB-277031/1ST

24 164398 OBSTACLES TO COMPARATIVE EVALUATION OF TRANSIT PERFORMANCE. The problems encountered and the issues raised in efforts to collect reliable and uniform operating and financial data from transit operators in California are detailed. The data was collected in an attempt to test the usefulness of performance indicators which were specified for criteria for evaluating public transit-performance. The problems discussed include those relating to why the data is not reported, the meaning of the data, and if the data is outdated. It is recommended that data requirements and data reporting channels be simplified. The required data items must be clearly defined and the generation techniques must be specified. It is noted that the area of data requirements, collection, and use, needs the combined and cooperative attention of the transit industry, government, and the research community.

Fielding, GJ Glauthier, RE ; California University, Irvine ITS-I-SP-77-1, Apr. 1977, 10 pp; This paper was prepared for presentation at the National Planning Conference of the American Society of Planning Officials, San Diego, California, April 23-28, 1977. It was sponsored by DOT, Urban Mass Transportation Administration.; Contract CA-11-0014

24 165631 THE OPERATION OF URBAN BUS ROUTES-2. SOURCES OF IRREGULARITY. This is the second in a series of three articles describing factors affecting the operation of urban bus routes. The operation is studied in terms of the times spent by passengers and buses in different stages of their journeys. The first article provided an introduction to the subject area and a framework for assessing route performance. It also described an analysis of factors affecting average bus speeds. This article deals with sources of irregularity in bus route operation and compares the magnitude of the variations of times buses spend in the different stages of their journeys. The effects of the variations on the working of a bus route are assessed and possible reductions are discussed. /Author/TRRL/ [French]

Chapman, RA Gault, HE Jenkins, IA (Newcastle upon Tyne University, England) *Traffic Engineering and Control Analytic* Vol. 18 No. 7/8, July 1977, pp 364-367, 3 Fig., 3 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227770)

24 167588 TRANSIT PERFORMANCE IN THE I-35W URBAN CORRIDOR DEMONSTRATION PROJECT. The I-35W Minneapolis-St. Paul Urban Corridor Demonstration Project was designed to test (a) the effectiveness of expanding express bus route coverage and service frequency and (b) the potential of ramp

metering to produce higher operating speeds. To evaluate expanding bus service and ramp metering of the I-35W project required an extensive data collection and monitoring program throughout the project. The results of this analysis clearly indicate the ability of both express bus service and ramp metering to substantially increase transit use. Further, we concluded that the freeway must have complete access control, both inbound and outbound, for ramp metering to produce high transit operation speeds. In addition, we found that express bus service exhibits a lower unit cost per kilometer than local service and, to the extent that ramp metering increases express bus-operating speeds, ramp metering produces further reductions in transit unit cost. The major conclusion of the I-35W project is that expanded bus service and ramp metering can provide a relatively low-cost technique to increase use of existing freeways and encourage diversion of travelers to environmentally desirable and energy-efficient modes of travel. /Author/

Cherwony, W Polin, L Mundle, S (Simpson and Curtin Incorporated) *Transportation Research Record* No. 626, 1977, pp 6-9, 1 Fig., 1 Tab., 9 Ref.; From Transportation Research Record No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

24 167595 EVALUATION OF BUS-PRIORITY STRATEGIES ON NORTHWEST SEVENTH AVENUE IN MIAMI-ABRIDGMENT. A 3 1/2-year demonstration project was established in Miami in 1973 to develop more efficient people-moving capabilities along a 10 mile corridor. The basic transit concept was to provide fast, peak-period service by express buses. Various combinations of the following three bus priority treatments were evaluated: A reversible express bus lane. A traffic signal preemption system that allowed express-bus drivers to preempt traffic signals to give themselves the green signal. And, a coordinated signal system designed to favor the movement of express buses in the peak-period direction. Effect of bus priority treatments on bus operations, on traffic signal performance, on traffic stream, and on evaluation of the transit service is included. The study concluded, that the project was successful in demonstrating that express buses can be given priority treatment on urban arterial streets and cause little or no adverse effect on the general traffic stream. A park-and-ride express-bus combination that provides a high level of service can attract automobile riders, although such service is expensive for the public to support. The park-and-ride facility was found to be an essential element of the transit service, and a majority of the bus passengers would have been last to the automobile if the facility had not been provided. Lastley, the bus preemption system did not appear to have an adverse effect on traffic signal operations.

Wattleworth, JA Courage, KG Wallace, CE (Florida University, Gainesville) *Transportation Research Record* No. 626, 1977, pp 32-35, 1 Ref. From Transportation Research Record No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

24 169784 TRANSIT PERFORMANCE MEASURES: THEIR SIGNIFICANCE IN LOCAL FUNDING ALLOCATION. Transit performance measures (TPM's) are the values of vari-

ables associated with transit performance, with respect to the vehicle, the service, use of the service, the costs of the service, and the social, economic and environmental impacts of the various elements of the physical systems. Urban transportation issues of interest in this study relate to the subvention of tax monies, whether state or federally collected. The main problem addressed is the development of meaningful TPM's for funding allocation. Other problems deal with difficulties in the use of TPM's, once evolved. This report should interest policy-makers dealing with the subvention of funds to local transit properties. A case study (CalTrans) is presented that provides a pragmatic feedback to the TPM evaluation presented. The report concludes that the utility of TPM's has been overestimated, particularly with regard to their use in allocating funds to individual transit properties.

Drosdat, HA ; Washington University, Seattle, Urban Mass Transportation Administration, (UMTA-WA-11-0005) Thesis UMTA-WA-11-0005-78-2, RR-77-12, June 1977, 196 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276141/9ST, DOTL NTIS

24 170785 BART NEARS THE END OF THE LONG HAUL. Bay Area Rapid Transit is striving for a reliability that will permit full-time operation. Problems are identified as train performance planned beyond physical limits and attempts to innovate in too many areas simultaneously without planning for adequate system performance when inevitable equipment failures occurred. Strengthened maintenance techniques and engineering efforts are improving car availability. Problems with the automatic train control have been compounded by the need to resignal the entire network for lower rates of deceleration than originally designed. The evolution of the automatic train protection system is described.

Herringer, FC (Bay Area Rapid Transit) *Railway Gazette International* Vol. 134 No. 1, Jan. 1978, pp 17-20, 1 Phot.; ACKNOWLEDGMENT: Railway Gazette International; ORDER FROM: ESL

24 172659 DIFFERENCES BETWEEN THE TRUE SERVICE SPEEDS OF THE VARIOUS MODES OF SHORT-DISTANCE PUBLIC TRANSPORT [Differenzen in der Beförderungsgeschwindigkeit öffentlicher Verkehrsmittel]. No Abstract. [German]

Weimer, K *Verkehr und Technik* Vol. 30 No. 10, Oct. 1977, pp 401-405, 2 Tab., 3 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Schmidt (Erich) Verlag, Herforder Strasse 10, 4800 Bielefeld, West Germany

24 174111 MEASURING THE PERFORMANCE OF TRANSIT SYSTEMS. This paper reviews the need for the development of transit performance measures, in the light of recent legislation and public subsidy issues for public transportation in the United States. An evaluation framework is presented, which defines and distinguishes between the efficiency, effectiveness and impact of public transit efforts. The application of this framework in evaluating public transit investments, and the use of the performance measures obtained through the application of this framework, in the allocation of funds among systems is then discussed. Research needs with respect to data collection requirements,

cross-jurisdictional comparability, and the utility of the proposed performance measures for decision-making are finally addressed. /TRRL/

Dajani, JS (Stanford University) Gilbert, G (North Carolina University) *Transportation Planning and Technology* Vol. 4 No. 2, Jan. 1978, pp 97-103, 1 Fig., 1 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-230951); ORDER FROM: ESL

24 176506 THE EVALUATION OF BENEFITS FROM MEASURES TO INCREASE URBAN TRANSPORT EFFICIENCY. This paper closely and comprehensively examines the phenomena of urban transportation improvement and makes estimates of the order of magnitude of the benefits that might reasonably be expected to accrue from the relaxation of economic regulation in the Washington D.C. area. Calculations are made to indicate the effects of: the reduction of the number of private automobiles by 10 percent, due to an increase in car pooling, with a consequent increase in traffic speed due to a reduction in congestion; substitution of subscription bus services for conventional ones, with consequent increases in public transport speeds and a reduction in operating costs; substitution of subscription bus services for 10 percent of private automobile trips, with a consequent increase in traffic speeds due to the reduction in the number of automobiles but a decline in the speed of trips transferred from automobiles to subscription bus services. The calculation of benefits uses a methodology which depends on the finding that both the time and money allocated by groups of trip makers for urban travel tend to be stable and therefore predictable. This methodology was used to study 4 alternatives: shift from automobiles to car pools; replacement of peak-period regular bus services by subscription services; combination of the two former alternatives; and shift from automobiles to subscription buses. The combination benefits to the trip makers and to the providers of the transport are evaluated. It was found that in this area in which 80 percent of travel is by automobile, increased car pooling appears to offer greater promise for improving urban transport conditions than for inducing shifts from automobiles to transit.

Roth, GJ (International Bank for Reconstruction & Developmnt) Zahavi, Y, Transportation Consultant, Bethesda, Maryland *Transportation Research Board Special Report* No. 181, 1978, pp 124-128, 1 Fig., 3 Tab., 7 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

24 176522 CASE STUDY OF NEW YORK CITY TRANSIT SYSTEM: PART 2. In this study of ways in which costs may be reduced, the Metropolitan Transit Authority's management has three criteria for selecting cost saving projects: potential for cost reducing; likelihood of

implementation; time required implementation. The major areas of expenses are being studied, namely, planning activities, capital improvements, bus and rail operations, and the more subjective areas of management and organization. Cost reduction and the control of the rate of cost increase are the key objectives of the study. The improvements proposed should have a minimal negative impact on the quantity of service, and cost savings should not be in the form of deferred expense that make today a problems become tomorrow's crisis.

Doolittle, JT, Jr (Simpson and Curtin, Incorporated) *Transportation Research Board Special Report No. 181, 1978, pp 214-216*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

24 176537 REDUCING TRANSIT COSTS. Although study data indicate that substantial cost reductions can be made in New York, some permanent financing mechanism must be developed to supplement existing, federal, state, and local assistance programs. A list of about 30 areas for potential costs reduction in medium sized transit systems was presented. It is noted that complementary systems to provide for public transportation needs is proving to be a successful cost-saving innovation in some areas.

Smith, JC (New York State Department of Transportation) *Transportation Research Board Special Report No. 181, 1978, p 254*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

24 176552 DEVELOPMENT OF PERFORMANCE INDICATORS FOR TRANSIT. The objective of this research is to establish a rationale for the development of performance indicators for transit; to analyze potential indicators; and to apply a limited set of indicators to data collected from transit properties in the states of California and Washington. The focus herein is on the federal and state levels of government. The procedure is designed to develop and test criteria for the evaluation of performance of transit properties in different locations, of differing size, and with different operational procedures. This report presents the rationale and developmental structure for the evaluation of transit performance through quantitative performance indicators. It specifies efficient and effective transit service as appropriate goals to be encouraged by federal and state governments and identifies three

efficiency and six effectiveness indicators which focus on significant aspects of performance. Using operating and financial data collected from 47 public transit operators in California and 5 operators in Washington, the selected performance indicators are analyzed for comparability of values between different modes of transit, different service area population densities, and different organizational types. The performance indicator values for selected transit properties are individually interpreted to demonstrate the analytic use and limitations of indicators. Potential uses of performance indicators are identified and areas requiring additional research described. The Appendices include: a literature search; a listing of properties; operating and financial data; and a glossary.

Fielding, GJ Glauthier, RE Lave, CA; California University, Irvine, (CA-11-0014) Final Rpt. UMTA-CA-11-0014-78-1, Dec. 1977, 133 pp; Sponsored by DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278678

24 176773 CHOOSING PERFORMANCE INDICATORS FOR SMALL TRANSIT SYSTEMS. Providing adequate system deficit financing for publicly-owned and operated transit systems has been a source of great concern for federal, state and local funding agencies. Marginal increases in tax revenues coupled with increased competition for existing financial resources has forced government agencies to search out the best investment for scarce funds and to insure that the greatest public good may be accomplished at the least cost to the taxpayer. Urban transportation systems, and their mass transit components in particular, have often been regarded as important cornerstones in the economic viability of urbanized areas. The focus of this review, therefore, is on the identification of select performance measures that would provide to the operators of Pennsylvania's small transit system, a simplistic means of measuring the impact of low-capital intensive system improvements as well as highlight existing or emerging operating problems. /Author/

McCrosson, DF (Harrisburg, Pennsylvania Capitol Area Transit) *Transportation Engineering Vol. 48 No. 3, Mar. 1978, pp 26-30, 3 Fig., 3 Tab., 1 Phot., 2 Ref.*

24 177123 DEVELOPMENT AND APPLICATION OF A MODEL TO EVALUATE TRANSPORTATION IMPROVEMENTS IN URBAN CORRIDORS. This paper introduces the linear program model developed at the University of Pennsylvania for evaluating transportation improvements in a high-travel-demand urban corridor. Variables included in the linear program are discussed, and the linear objective function and the constraint equations of the model are outlined. Application to a radial travel corridor in Chicago, Illinois, illustrates the capability of the model; an analysis is made of existing corridor bus service and several corridor capital investments to improve that service. In the analysis of existing bus service, several alternatives to the existing price structure of bus transportation in the corridor were studied; the major result was an evaluation of the shift in mode choice caused by the different pricing schemes and the effects of a change in patronage on bus

operating and capital costs. For the study of alternative capital investments, the corridor model computes the patronage attracted by the improvements and adjusts operating and bus capital costs of bus lines serving the corridor.

Eash, RW Morlok, EK (Pennsylvania University, Philadelphia) *Transportation Research Record No. 639, 1977, pp 14-19, 3 Fig., 3 Tab., 7 Ref.*; This article appeared in Transportation Research Record No. 639, Transportation System Evaluation Techniques.; ORDER FROM: TRB Publications Off

24 178748 PEAK-OFF PEAK REVENUE AND COST ALLOCATION MODEL. This paper develops an approach for allocating bus service operating costs and revenues between peak and off-peak periods. It shows how the economic performance (relative profitability) of peak-period bus service depends on three relative measures--relative peaking, load factors, and schedule efficiency-labor practices. As an example, when the ratio of additional peak buses to base buses is 1.0 and the pay hours per bus hour for the additional buses are double those for the base buses, each bus in the peak would have to carry more than 1.5 times the base period ridership. When this ratio rises to 3, peak buses would have to carry double the passengers carried on each bus in the base period for the peaks to be as profitably. /Author/

Levinson, HS (Smith (Wilbur) and Associates) *Transportation Research Record No. 662, 1978, pp 29-33, 3 Fig., 2 Tab., 3 Ref.*; This article appeared in the Transportation Research Record No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

24 178758 INCENTIVE PROGRAM FOR BUS CARRIERS. One of the most elusive aspects of public assistance to independently operated transit services has been the development of incentives to the operator to provide quality service on a cost-effective basis. To deal with this, the New Jersey Department of Transportation intends to implement an incentive program which will result in monetary rewards or penalties to companies depending on the quality of service provided. This paper presents the essential elements of that program which were developed as part of an overall study to revamp the method that NJDOT follows in providing operating assistance to independent carriers in the state. The incentive system recommended is keyed to three principal areas that are perceived by transit users to be important--1) condition and cleanliness of the bus, 2) courtesy and driving skills exhibited by the bus operator, and 3) on-time performance. For each of these areas, surveillance procedures have been developed and rating forms designed to relate field observations to a numerical scoring system. The scoring system weights each survey element by its estimated relative importance as compared to all other elements. The program calls for each carrier to be rated quarterly in all three areas, and a method is described for translating a company's overall score for a quarter into a monetary reward or penalty. /Author/

Abrams, EM (Simpson and Curtin, Incorporated) McLaughlin, HJ, Jr (Port Authority of New York and New Jersey) *Transportation Research Record No. 663, 1978, pp 47-51, 3 Tab., 1 Ref.*; This article appeared in Transportation Research Record No. 663, Recent Developments in Bus Transportation.;

ORDER FROM: TRB Publications Off

24 179032 FACTORS INFLUENCING TRANSIT PRODUCTIVITY. Data from 66 public and private transit operations in New York State was analyzed for fiscal years, 1974, 1975, 1976 to explore the underlying factors influencing transit productivity over the three year period and to determine why some transit operations perform more or less efficiently than others. Using a statistical tool known as automatic interaction detection (AID), four aggregate measures of transit productivity (passengers/vehicle mile, revenue/vehicle mile, cost/vehicle mile, and revenue/cost), were related to background factors describing: system ownership, service area, service configuration and service types provided. Results show that situational variables, such as city size (population) and the types of service provided markedly affect the relative performance of transit operations, while public or private ownership has a moderate but less important effect. Policy implications are drawn. Additionally, existing or proposed transit services may be compared against the range of values for the four productivity measures, to determine their relative performance with respect to other transit systems providing similar services in similar situational contexts. /Author/

King Q, RL Erlbaum, NS ; New York State Department of Transportation Res. Rpt. 121, Aug. 1977, 20 pp, 4 Fig., 3 Tab., 24 Ref.

24 179041 COST INCREASES, COST DIFFERENCES, AND PRODUCTIVITY OF TRANSIT OPERATIONS IN NEW YORK STATE. Public transit operations in New York State were analyzed to explore transit costs and operational productivity. Three transit systems were examined over time to determine what cost component(s) are causing the rapid increases in operating cost which have occurred in the past seven years. Twelve bus operations were analyzed to explore why some transit operations cost more to operate than others, and if similar transit operations are equally productive. The results showed that employee costs (wage and salary, pension, and other employee-related costs) constitute 70-90% of all operating costs, and that increases in employee costs are almost entirely responsible for past increases in operating cost. Increases in fuel, power, and other non-employee related costs were found to have little effect on operating cost increases. Differences in operating cost per vehicle-mile between operations are accounted for by differences in average vehicle speed, employee average earnings, and in some cases productivity. Cost savings of between 8% to 19% could be obtained by increasing the average vehicle speed of a bus operation by 1 mph. Operating speed is generally not very difficult to produce substantial improvements in operating speed. /Author/

Holthoff, WC Knighton, RG ; New York State Department of Transportation Res. Rpt. 110, Aug. 1976, 31 pp, 16 Fig., 4 Ref.

24 179084 TRAFFIC OPERATION IMPROVEMENTS. Transportation system management applied to traffic engineering operations requires reevaluating basic transportation needs of those who walk, use public transportation, or drive automobiles. Replacing existing control mechanisms is not adequate. New ways must be

devised for optimally sharing limited rights-of-way. Signs, channelization, traffic signals, reversible lanes, and ramp-metering policies are discussed in this paper. /Author/

van Gelder, WG (Seattle Engineering Department) *Transportation Research Board Special Report No. 172, 1977, pp 35-37*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

24 179092 IMPROVING SERVICE QUALITY AND EFFICIENCY THROUGH THE USE OF SERVICE STANDARDS. This paper describes the service policy of the Massachusetts Bay Transportation Authority for surface public transportation and its use in urban transportation system management. The establishment and use of a comprehensive statement of service policy are discussed in the context of TSM objectives. Such a service policy, which contains service goals and objectives, service standards and guidelines, and planning and evaluation procedures, provides the transit manager with a management control framework for monitoring service performance and identifying remedial actions that will improve the quality of service and the efficiency and effectiveness of resource allocation. The paper describes how MBTA uses the control framework embodied in its service policy to identify both general service improvements and some specific TSM service improvements such as reserved bus lanes on arterial streets. The paper concludes by discussing how the MBTA service policy through cooperative planning has begun to make local city and town policy makers more sensitive to transit operations, thereby enhancing the prospects for successful implementation of potentially controversial TSM projects. /Author/

Tober, RJ (Massachusetts Bay Transportation Authority) *Transportation Research Board Special Report No. 172, 1977, pp 86-91, 3 Tab*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

24 182767 ADELAIDE BUS COSTING STUDY; FINAL REPORT. In 1976, R. Travers Morgan were appointed by the South Australian Director-General of Transport to carry out a preliminary investigation of possible improvements to the method of bus costing. Recommendations included a further study covering basic costs, scheduling and marginal costs. This study has provided estimates of both current costs and the extra costs (or savings) associated with any changes in bus and tram operations in Adelaide. It shows variations in costs of operations during different periods of the day, different days of the week and for different routes. It also has developed computer programs to enable regular updat-

ing of basic costs from data routinely collected and manipulated within the State Transport Authority's computerised accounts system. /TRRL/

South Australia Director General of Transport Monograph Jan. 1978, 125 pp, Tabs.; ACKNOWLEDGMENT: TRRL (IRRD-234100), Australian Road Research Board

24 182782 A BUS FOR THE COMMUNITY. The background and operation of the Norfolk village bus, operated as a three-way partnership between the local community, the national bus company and the county council is described. The local village bus committee operates the bus from day to day, staffed by volunteer drivers. The local authority purchased the bus, a 12 seat ford transit, which is maintained by the bus company who also supply professional back-up facilities. Fares collected by the driver are paid to the county council. The bus, which apart from the starting up cost, is self-financing, works both timetabled and excursion duties, including school runs and trips to a local doctor's surgery. Since half the revenue is obtained from excursions, a larger bus would be useful, but this would be awkward in the narrow lanes. The recruiting of drivers could be made easier if the psv licence were not required. Other community bus schemes are summarized, demonstrating that they can provide an invaluable adjunct to the basic network of stage buses and local rail services. /TRRL/

Harris, M *Modern Transport No. 2, 1978, pp 74-79, 2 Fig., 7 Phot.*; ACKNOWLEDGMENT: TRRL (IRRD-233545)

24 184705 OPERATING COST MODEL FOR TRANSIT BASED ON DIRECT SYSTEM CHARACTERISTICS (ABRIDGEMENT). An approach is presented which estimates operating costs based on accurate estimates of the underlying physical characteristics of the system. This approach can be transferred among systems without loss of accuracy and is an extremely fast computational approach. The cost model produces estimates of worker requirements over the day and actual vehicle schedules for the proposed systems. The model separates operating costs of proposed multimodal transportation system into 15 categories. Each category is either a financial accounting and reporting elements (FARE) category, an aggregation of FARE categories, or part of a FARE category. Although costs for many of the categories are based on unit cost, the cost for several cost categories are based on temporal characteristics of the vehicle schedule and crew estimates. These cost categories constitute most of the operating costs for transit systems. Procedures are described for determining the costs of the cost categories. Manpower and vehicle requirements are discussed and the operating cost model is described.

Bodin, L (Maryland University, College Park) Rosenfield, D (Little Arthur D, Incorporated) Kydes, A (Brookhaven National Laboratory) Roark, AL (Roark (AL) and Associates) *Transportation Research Record No. 654, 1977, pp 28-30, 1 Tab., 8 Ref.*; This paper appeared in Transportation Research Record No. 654, Elements in the Transportation Planning and Programming Process in the Public Forum.; ORDER FROM: TRB Publications Off

24 188358 ASSESSMENT AND ALLOCATION OF RELIABILITY AND MAINTAINABILITY PARAMETERS TO MASS TRANSIT OPERATIONS. An attempt is made to show how traditional reliability and maintainability analysis techniques developed by the aerospace industry can be refined and applied to the development of quantitative assurance parameters for rapid transit systems.

Bartholomew, B *Microelectronics and Reliability* Proceeding Vol. 17 No. 1, Jan. 1978, pp 137-142
Can SRE (Soc of Reliab Eng) Reliability Symposium, Fourth Annual, Proceedings Ottawa, Ontario, October 13-14, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 188359 SYSTEM ASSURANCE IN A RAPID TRANSIT SYSTEM. System assurance is a critical issue in the development of new rapid transit systems. This is especially vital when the system is completely automated, i.e. unmanned. An outline of a system, the terminology, plans and methodology used in the development of reliability and maintainability programs for rapid transit systems are discussed.

Ling, AHK (Urban Transportation Development Corporation Ltd) *Pergamon Press* Proceeding Vol. 17 No. 1, Jan. 1978, pp 165-172; Can SRE (Soc of Reliab Eng) Reliability Symposium, Fourth Annual, Proceedings, Ottawa, Ontario, October 13-14, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 188431 TRANSFORMING EXISTING FACILITIES INTO MORE EFFECTIVE TRANSPORTATION SYSTEMS (INTEGRATION OF DEMAND REDUCTION, OPERATIONAL/SERVICE CHANGES AND CAPITAL INVESTMENTS). The paper reviews experience with several types of demand-reducing, operational/service and capital programs, generally noting how they relate to guidelines, discussed in the paper, for getting additional use from existing highway systems. The various programs encompass such concepts as staggered hours/flexible hours, parking charge differentials; contra-flow bus lanes, same-direction bus lanes, one-way tolls, driver information systems, transit information systems, modal interconnectivity; examples of introducing high quality bus rapid transit service into existing corridors under differing right-of-way and institutional constraints.

Goodman, L (Port Authority of New York and New Jersey) ; Institute of Transportation Engineers 1977, pp 160-170; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers and the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 189341 PROCEEDINGS OF THE FIRST NATIONAL CONFERENCE ON TRANSIT PERFORMANCE. The first National Conference on Transit Performance was held in Norfolk, Virginia, September 18-21, 1977. This Conference reflects a major effort aimed at clarifying the issues to transit performance and developing recommendations for actions which could be taken to improve transit performance. Two hundred persons broadly representative of local government, transit management and labor, city and regional planning organizations, educational institutions, transportation consulting firms, and

State and Federal agencies met in Norfolk to exchange ideas on transit performance. This document contains the proceedings of the conference, namely: the addresses, the issue and resource papers, and summaries of the problems and recommendations developed in workshop sessions. Subject papers include: Trends in Transit Performance; Concepts and Indicators; Revenue Policy and Pricing; Service Characteristics; Labor-Management Relations; Internal Management; Transit Performance Indicators; Case Studies of New York City, Southern California Rapid Transit District, and Seattle Metro; and Effects of Fare Changes. This report also contains an annotated bibliography and lists of conferees, members of the planning group, and technical advisors. /UMTA/

Public Technology, Incorporated, (DC-06-0184) Conf Paper UMTA-DC-06-0184-78-1, Jan. 1978, 167 p.; The Norfolk Conference was sponsored by the Urban Mass Transportation Administration, the American Public Transit Association, and Public Technology, Incorporated acting as secretariat for Urban Consortium of Technology Initiatives. Conference Proceedings, September 18-21, 1977.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-291032

24 189833 THE NEED FOR AND USE OF PERFORMANCE INDICATORS IN URBAN TRANSIT. Basic efficiency indicators relate units of cost or work by employees or vehicles to units of service or other types of input. However, it is noted that no one indicator will reveal the relative or absolute performance of a system's management. In order to respond to changing priorities, all levels of government have become aware of the need to develop uniform indicators of transit performance. Such indicators can assist in the establishment and evaluation of public policy with regard to transit. This article reviews the current state of transit performance, and discusses the transit communities role in developing performance indicators.

Stokes, BR (American Public Transit Association) *Transit Journal* 1979, pp 3-10

24 189834 PERFORMANCE INDICATORS: A NECESSARY MANAGEMENT TOOL?. The article notes the need for the measurement and evaluation of transit performance within policy and financial constraints, and discussed the Pennsylvania Department of Transportation's efforts to improve transit service and to increase operating efficiencies in return for the public tax dollars committed for transit. These efforts included: the adoption of operating guidelines that specify elements of service such as speed, reliability, etc.; financial guidelines to compare the financial data of individual properties; a standardized reporting system for operating and financial data; a methodology for determining service changes based upon performance criteria and financial criteria; and a new formula grant allocation methodology. Some of the key data that might be developed and used as part of performance evaluation programs are listed.

Underwood, WC (Pennsylvania Department of Transportation) *Transit Journal* 1979, pp 11-16

24 190926 IMPROVING TRANSIT SYSTEM PERFORMANCE: PROCEEDINGS OF THE SEPTEMBER 1977 NATIONAL CONFERENCE [Conference rept]. The document contains the proceedings of the conference, namely the addresses, the issue and resource papers, and summaries of the problems and recommendations developed in workshop sessions. Subject papers include: Trends in Transit Performance; Concepts and Indicators; Revenue Policy and Pricing; Service Characteristics; Labor-Management Relations; Internal Management; Transit Performance Indicators; Case Studies of New York City, Southern California Rapid Transit District, and Seattle Metro; and Effects of Fare Changes. This report also contains an annotated bibliography and lists of conferees, members of the planning group, and technical advisors.

Public Technology, Inc., Washington, DC. Urban, Consortium for Technology Initiatives. American, Public Transit Association, Washington, DC. Urban, Mass Transportation Administration, Washington, DC., (UMTA-DC-06-0184) UMTA-DC-06-0184-78-1, Jan. 1978, 167p; Proceedings of National Conference on Transit Performance (1st), Held at Norfolk, Virginia on September 18-21, 1977. Sponsored in part by American Public Transit Association, Washington, DC. and Urban Consortium for Technology Initiatives.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291032/1ST

24 193615 TRANSIT SERVICE RELIABILITY. This report presents a comprehensive overview of the subject of transit service reliability and provides a framework for a program of demonstrations and research studies which could be carried out under the Service and Methods Demonstration program. Major subject areas included the impact of service reliability from the operator's perspective, empirical measures of service reliability, causes of service reliability problems, techniques for improving service reliability, and recommendations for further research. Several findings are reported herein, namely: (1) transit service reliability is a significant determinant of traveler mode and departure time choices; (2) service reliability is crucial in influencing the costs of providing transit service; and (3) current evaluation measures are not able to capture the variety of impacts of service reliability on travel behavior and operator costs. Several proposed measures are recommended herein for use in future evaluation studies. Numerous causes of reliability problems are identified, some which appear to be inherent in the specific transit service concept, and others which are more environmental in nature. A review of previous and current analyses reveals inconclusive findings in determining the relative importance and magnitude of each cause. Several strategies are considered to improve service reliability of fixed route and demand responsive transit systems. These strategies are directed at alleviating the initial cause of unreliability or serve as a corrective measure when the reliability problem has already developed. /UMTA/

Abkowitz, M ; Transportation Systems Center, Multisystems, Incorporated, (DOT-TSC-UMTA-78-18) Final Rpt. UMTA-MA-06-0049-78-1, Dec. 1978, 194 p.; Sponsored by the Urban Mass Transportation Administration.; Contract DOT-TSC-1083; ACKNOWLEDGMENT: UMTA, NTIS;

ORDER FROM: NTIS; PB-292152/6ST

24 193971 PERFORMANCE INDICATORS FOR TRANSIT MANAGEMENT. Transit performance can be evaluated through quantitative indicators. As the provision of efficient and effective transit service an appropriate goals to be encouraged by federal and state governments, these goals are used to develop performance indicators. Three efficiency and four effectiveness indicators are described, together with two overall indicators. These nine indicators are analyzed for comparability utilizing operating and financial data collected from public transit agencies in California. Performance indicators selected for this study should not be viewed as final. Twenty-one performance indicators proposed by previous studies were reviewed. Theoretical considerations and unavailability or unreliability of data caused omission of several useful measures like passenger-miles. Circumstances such as improved data, emphasis upon goals other than efficiency and effectiveness, and local conditions might warrant the inclusion of indicators deleted from this research. /Author/TRRL/

Fielding, GJ Glauthier, RE Lave, CA (California University, Irvine) *Transportation (Netherlands)* Vol. 7 No. 4, Dec. 1978, pp 365-379, 4 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237688)

24 195579 METROPOLITAN EVANSVILLE TRANSIT SYSTEM: MANAGEMENT PERFORMANCE AUDIT. This document is the management performance audit of the Metropolitan Evansville Transit System (METS), and it evaluates the transit system in the context of its goals and objectives and its resources and constraints. The scope of this performance evaluation report includes: 1) the resources and constraints of METS internal/external environment; 2) the organization's governing body--the Public Transit Department Board; and 3) the functional areas that define METS activities. This study of METS management of the transit system employs the use of statistical indicators, random samples, and interviews with key personnel to identify areas for detailed analysis. Resulting recommendations aim to assist METS management to improve the effectiveness and efficiency of the system. Among the major recommendations are 1) that METS, Public Transit Department Board, and Evansville Urban Transportation Study's (EUTS) planners should jointly develop goals and objectives, and 2) that METS management and EUTS planners work more closely together. The auditors also recommend that METS install a two-way radio system in the buses and hire a radio dispatcher to improve METS reliability. /UMTA/

Dodge, SA Leffers, DR ; Indiana University, Bloomington, (IN-09-8004) UMTA-IN-09-8004-79-2, Feb. 1979, 119 p.; Prepared in cooperation with Evansville Urban Transportation Study, Indiana and UMTA.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, PB-294958/; PB-294958

24 195969 OPTIMIZING URBAN MASS TRANSIT SYSTEMS: A GENERAL MODEL. This paper describes a model for determining the general dimensions of an optimal mass transit system for an idealized urban area. The model is based on a circular city with a definite center and with density declining uniformly from the center

in all directions according to the negative exponential function. The transit system consists of radial routes that emanate from the center and contain discrete stops. Only trips to or from the center are considered, and travel is assumed to occur only in radial and circumferential directions. The model represents total community costs of the system, defined to include travel time, operating costs, equipment, and construction. A recursive procedure was devised to find a simultaneous minimum with respect to the spacing of routes, number and spacing of stops on each route, and average headway. Numerical analyses were conducted for six hypothetical cities by using varying values for the parameters of the density function. In each case, three types of transit systems were compared: conventional bus service, buses on exclusive lanes, and rail rapid transit. The optimal system in the largest city examined was exclusive bus lanes; in the other five cases, the optimal system was conventional bus service. Other interesting relations that appeared in the results are summarized. /Author/

Black, A (Texas University, Austin) *Transportation Research Record* No. 677, 1978, pp 41-47, 2 Fig., 3 Tab., 11 Ref.; This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

24 196415 TRANSIT ACTIONS--TECHNIQUES FOR IMPROVING PRODUCTIVITY AND PERFORMANCE. This workbook contains actions which can cut the costs of providing transit services or improve system operating efficiency and effectiveness. The included actions represent only a few of the many steps which will have to be taken over the next few years to narrow the growing gap between farebox revenues and operating expenses. Some of the actions are innovative, others, such as the use of part-time labor, and the designation of free-fare zones, have been considered for a long while but are now being tried on a large scale. The 41 actions included here are representative of the 110 actions submitted by 31 agencies. They are included because they required a low capital investment, had short-term payoffs, required minimal staff time, or involved minimal institutional approval. The remaining actions may be clarified or expanded during the Transit Actions Regional Meetings so that they might be included in the final Transit Actions Workbook. This preliminary workbook will be the starting point for five workshops at the regional meetings, covering: service levels, transit financing policies, internal management, labor-management relations, and performance measures. /Author/

Public Technology, Incorporated, Department of Transportation Nov. 1978, 47 p.

24 196416 TRANSIT SYSTEM PRODUCTIVITY. REVISED EDITION. This bulletin explores the subjects of transit productivity measurement and potential for productivity improvement. The following topics are discussed: the concept of productivity; varying institutional perspectives; productivity indicators; labor productivity; service characteristics and pricing; and maintenance, organization, and procurement. /Author/

Public Technology, Incorporated, Department of Transportation July 1978, 47 p., 2 App.; ORDER FROM: DOT

24 196682 BUS SERVICE EVALUATION PROCEDURES: A REVIEW. Over the past few years, rising costs and limited budgets have encouraged transit authorities to evaluate the cost-effectiveness of the services they provide. The Massachusetts Bay Transportation Authority (MBTA) and the Tidewater Transportation District Commission (TTDC) are among many properties interested in updating and improving bus service evaluation programs. These programs include a joint review of the state-of-the-art in bus service evaluation techniques across the country. This information will be used to develop bus service evaluating programs for both the MBTA and the TTDC. This report presents the results of a literature review and survey of 17 transit properties in the United States and Canada regarding the evaluation procedures currently in use. The focus of the study was to identify service performance indicators and criteria used to evaluate bus service on a route-by-route basis. Three types of evaluation indicators: service design measures; operating performance measures; and economic or productivity measures, were identified. The range of standards developed for each indicator are reported. Results are presented separately for transit properties owning less than 400 buses and for those owning more than 400 buses. Detailed appendices provide more complete information on the survey response. These appendices also provide the transit operator and the regional transit planner with a compendium of a wide range of performance measures, descriptions of how they are used and how the needed data is collected, a listing of contact persons in each property, and detailed information on available literature. The conclusions herein show that bus transit operators in the United States and Canada are aware that useful evaluation techniques are currently available, and that most systems recognize the importance of such techniques to ensure a more efficient and effective delivery of service. /UMTA/

Attanucci, JP Jaeger, L Becker, J ; Massachusetts Bay Transportation Authority, Tidewater Transportation District Commission, (MA-09-7001) Intrm Rpt. UMTA-MA-09-7001-79-1, Mar. 1979, 227 p.; Sponsored by the Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-296314/AS

24 197139 REVIEW OF ELECTRONIC DATA PROCESSING REQUIREMENTS AT DART AND DAST. This report is the result of a project to assist the Delaware Transportation Authority in determining the electronic data processing requirements of Delaware Transportation Authority for Regional Transit (DART) and Delaware Transportation Authority for Specialized Transit (DAST). The report provides an overview of the project, and preliminary information requirements for each of the Authorities proposed computer applications systems, cost estimates and an implementation plan. Comments provided by the Authorities have been incorporated into this report. The principal recommendation is, based on the estimated volumes outlined in the report, to use a small business computer, to be located at DART, with a communication line to link the Authorities.

Delaware Transportation Authority, (DE-09-8003) Final Rpt. Mar. 1979, v.p., Figs., Tabs., Apps.; Research performed by Price Waterhouse

and Company.

24 197440 CHARACTERISTICS OF URBAN TRANSPORTATION DEMAND; APPENDIX. To assist the urban transportation planner, the Urban Mass Transportation Administration's Planning Methods and Support Program researches, develops, and distributes planning tools, including the documentation of novel planning studies, new design and forecasting techniques, and germane research results. This report is an example. Its contents clearly present usable planning concepts and constitute a valuable addition to the growing set of computerized and manual techniques comprising the UMTA/FHWA Urban Transportation Planning System (UTPS). This report is an Appendix to CUTD handbook. It offers detailed data on individual cities, roads, routes, stations, etc. These are not in a form that is comparable from place-to-place, but may be of interest from an historical perspective for the urban areas concerned.

Levinson, HS ; Smith (Wilbur) and Associates, Urban Mass Transportation Administration, (UMTA-IT-06-0049) UMTA-IT-06-0049-79-2, Jan. 1979, 213 p.; See also PB-293220, RRIS 25 191689; Bulletin 7902.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294989/9ST

24 197476 A COMPREHENSIVE ANALYSIS OF URBAN BUS TRANSIT EFFICIENCY AND PRODUCTIVITY. PART III. ANALYSIS OF OPTIONS TO IMPROVE URBAN TRANSIT PERFORMANCE. This document is the third part of a study undertaken to analyze options for improving transit performance with particular emphasis upon bus transit systems in small to medium-sized urban areas. A methodology is developed to evaluate the impact of small changes in three operational policy variables, namely: frequency, number of bus stops, and fare along a fixed bus route. Analytical expressions are derived that trace the impact of each variable upon various other system variables leading finally to an assessment of changes in selected measures of efficiency and effectiveness. The application of the methodology is demonstrated with a case study of a selected bus route in a medium-sized Indiana city. The results indicate that significant improvements can be achieved in most of the efficiency and effectiveness measures considered. Finally, the reliability and maintenance aspects of a bus transit system are investigated using repair data from the City of Anderson Transportation System, Indiana. This data is subsequently used in a simulation model using GASP IV to investigate the effect of increasing the number of mechanics and the number of spare buses upon the overall dependability of the transit system.

Sinha, KC Bhandari, AS ; Purdue University, Urban Mass Transportation Administration Final Rpt. UMTA-IN-11-0003-79-4, CE-TRA-78-2, Dec. 1978, 198 p.; See also Part 2, PB-295222. Also available in set of 4 reports, PB-295219-SET.; Grant DOT-UMTA-IN-11-0003; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295223/2ST

24 198194 THE EFFECT OF ORGANIZATION SIZE AND STRUCTURE ON TRANSIT PERFORMANCE AND EMPLOYEE SATISFACTION. The report summarizes the objectives and results of research designed to

assess the relationships between structural, attitudinal, and performance variables in 16 selected California public mass transit (fixed-route bus) systems representing various sizes and organizational types. The structural variables were organizational size, span of control, number of specialties, administrative intensity, formalization, standardization, and centralization. Their relationship was analyzed with attitude variables (job satisfaction and employee commitment) and organizational performance (service efficiency and effectiveness measures and employee withdrawal). Implications for the design of transit organizations are also discussed. The most important result of this analyses is that the impacts of structural variables upon employee attitudes and organizational performance need to be assessed in an interactive framework. Several structural variables, when considered together or as influenced by some moderating variable may have more significant impacts on organizational outcomes than the impact of these same variables considered individually.

Fielding, GJ Porter, LW Spendolini, MJ Todor, WD Dalton, DR ; California University, Irvine, Urban Mass Transportation Administration Final Rpt. UMTA-CA-11-0016-79-1, Dec. 1978, 182 p.; Grant DOT-UMTA-CA-11-0016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296629/9ST

24 198749 THE PRODUCTIVITY AND EFFICIENCY OF INPUTS IN THE PROVISION OF TRANSPORTATION SERVICES OF THE SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY. The project was developed as part of a larger program of research, namely, a study of human resource development in the Southeastern Pennsylvania Transportation Authority. The objectives of this paper are to express some elementary theory (appendix) about productivity, efficiency, and performance standards so that the case study of SEPTA has a basis in accepted theory. Simple concepts are developed which underlie the understanding of the analysis of the SEPTA system. The paper empirically examines the performance of SEPTA vis a vis other transit operations in the United States and Canada (the peer group) on the basis of a number of performance measures. In addition, more complex comparisons are made by statistical techniques. The major insight gleaned from such comparisons is that the simple comparisons, i.e., not controlling for other factors, yield a different view of the system than do the controlled comparisons.

Allen, WB ; Wharton School, Urban Mass Transportation Administration, (UMTA-IT-09-0073) Final Rpt. UMTA-IT-09-0073-79-1, May 1979, 51 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298161/1ST

24 239489 AN INITIAL CHICAGO NORTH SUBURBAN TRANSIT IMPROVEMENT PROGRAM, 1971-1975-VOLUME 1: REPORT AND EXHIBITS. EXISTING MASS TRANSPORTATION SYSTEMS ARE EXAMINED IN DETAIL AND BROKEN DOWN BETWEEN RAIL AND BUS MODES. EXISTING PARKING FACILITIES ARE EVALUATED, AND SPECIFIC RECOMMENDATIONS FOR ADDITIONAL PARKING FACILITIES ARE ADVANCED.

EXISTING BUS SERVICE IS ALSO ANALYZED AT LENGTH WITH REFERENCE TO ROUTES, SCHEDULES, FARE STRUCTURE, EQUIPMENT AND FACILITIES, OPERATING EXPENSES, AND PROJECTED RIDERSHIP TRENDS. AN EVALUATION OF EXPANDED SUBURBAN BUS SERVICE IS PROVIDED WHICH FORECASTS POTENTIAL RIDERSHIP AND IMPACT ON OTHER MODES. A DETAILED SCHEDULE OF PROPOSED SERVICE IMPROVEMENTS ARE PRESENTED: (1) EXPANSION OF COMMUTER PARKING FACILITIES AT RAIL STATIONS; (2) CONSTRUCTION OF A NEW STOP ON THE SKOKIE SWIFT RAPID TRANSIT ROUTE; (3) POSSIBLE PARTICIPATION IN FEDERAL GRANT PROGRAMS TO SUBSIDIZE CAPITAL IMPROVEMENTS FOR THE MILWAUKEE ROAD COMMUTER RAILROAD; (4) WIDELY EXPANDED BUS OPERATIONS DESIGNED TO ULTIMATELY INCREASE RIDERSHIP BY 62% THROUGHOUT THE SUBURBAN AREA; AND (5) COORDINATION OF ALL MASS TRANSIT SERVICES AND FARES BY A SINGLE AGENCY. A DETAILED IMPLEMENTATION PROGRAM COVERS SUCH SPECIFIC AREAS AS FINANCING, CREATION OF A TRANSIT DISTRICT, PROGRAM STAGING, AND IMMEDIATE PROGRAM TASK DESCRIPTIONS. /UMTA/

Pratt, Rh & Bevis Hw May 1971; ACKNOWLEDGMENT: UMTA

24 260152 EVALUATION OF URBAN PUBLIC TRANSPORTATION. Many attempts are now being made to evaluate public transportation. This is brought about by the large public expenditures for mass transit services. The evaluation procedures now employed provide only for a superficial treatment. It is time that clear, concise, quantifiable objectives be defined for public transportation. Unless this quantification can occur, the evaluation process will remain meaningless.

Heathington, KW, Director, Transportation Center (Tennessee University, Knoxville) *ASCE Engineering Issues-J of Prof Activities* Vol. 100 No. EI3, Proc Paper 10662, July 1974, pp 241-249

24 262571 DEVELOPMENT OF EXPERIMENTAL DESIGN METHODOLOGY FOR EVALUATING MASS TRANSIT DEMONSTRATIONS: AN APPLICATION TO THE SEATTLE EXPRESS BUS SERVICE DEMONSTRATION PROJECT VOLUME II-APPENDICES. One major objective of UMTA demonstration projects is to develop a systematic and effective means of evaluation of the projects which will enable determination not only of effectiveness of specific projects but also the extent of applicability to other areas in the country. This report sought to accomplish this objective through 3 steps: (1) determining the feasibility of using experimental design methodology to evaluate transit demonstration projects; (2) utilizing the methodology in assessing the impact of transit innovations; and (3) determining the implications and applications of the demonstration findings to other locales. The setting was established as Seattle, Washington, where an express bus service demonstration project was

initiated in 1970, supported by UMTA R&D funds. This report contains the appendices of the Volume I Main Report. These appendices are: Magnitude of Ridership on Blue Streak Routes, Data from the Origin and Destination Surveys, Magnitude of Vehicles Using Expressway Facilities, Evaluation of Methods for Counting Bus Passengers, and Issues Arising in the Conduct of the Study.

Northwestern University, Evanston UMTA-IL-06-0021-73-2, Sept. 1973, 105 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235510

24 262572 DEVELOPMENT OF EXPERIMENTAL DESIGN METHODOLOGY FOR EVALUATING MASS TRANSIT DEMONSTRATIONS: AN APPLICATION TO THE SEATTLE EXPRESS BUS SERVICE DEMONSTRATION PROJECT VOLUME I-MAIN REPORT. UMTA has been actively involved in the process of funding full-scale demonstration projects in select metropolitan areas throughout the country. These demonstrations are carried out for the purpose of research, testing and evaluation of transit concepts with potential nationwide implications. One major objective to be accomplished is the development of a systematic and effective means of evaluation which will enable UMTA to determine not only the effectiveness of the specific projects, but also the extent of applicability to other areas. This report sought to accomplish this objective through 3 steps: (1) determining the feasibility of using experimental design methodology to evaluate transit demonstration projects; (2) utilizing the methodology in assessing the impact of transit innovations; and (3) determining the implications and applications of the demonstration findings in other locales. The basic approach of the study was development of an experimental design, testing design methodology and evaluation of results. The setting was established in Seattle, Washington, where an express bus service demonstration project was initiated in 1970, supported by UMTA R&D funds. It was concluded, among other things, that the utilization of the methodology is an effective and economical means of evaluating projects on a micro-level where differences in effectiveness and estimates of performance potential can be measured. Tables complement the text. Appendices are in Volume II.

Northwestern University, Evanston, (IL-06-0021) Sept. 1973, 96 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235509

24 264902 PRODUCTIVITY, EFFICIENCY AND QUALITY OF SERVICE OF URBAN TRANSPORTATION SYSTEMS. A comprehensive Societal Productivity Matrix is developed, within the framework of which an all inclusive productivity analysis of an urban transportation system can take place. For efficiency analysis the study finds that the urban transportation system should be divided into three major components, the network, the primary services, and the support functions. Efficiency analysis should be performed for each one separately, and, then, for all three of them together, to specify the contribution of each one towards higher efficiency rates. It is also concluded that for both productivity and efficiency analysis it is imperative that the

work proceed including the points of view of four major actors, i.e., the supplier-operator, the user-consumer, the society at large, and the government at all levels. Issues of quality of service can best be taken care of in this framework as concerns of the user-consumer and society at large which should be achieved efficiently.

Tomazinis, AR ; Pennsylvania University, Philadelphia Rept No TSC-101 (74), Sept. 1974

24 272056 PUBLIC TRANSPORTATION OPERATING STANDARDS. Public transportation operating standards are a body of guidelines concerning the manner in which operators provide service to the public. Most of these guidelines relate to routes, frequency of service, and, to some degree, financing. There is a need for a concerted effort to develop and codify a universal set of standards against which all transit systems can be measured and to provide the means by which data can be secured so that measurements can be made. The standards must be high, specific and quantifiable. Both maximum and minimum standards must be established. The standards must be classifiable into passenger related, regulatory body related, operation, mechanical and route specific classes. The manner of collection of data is discussed. System internal information can be supplied directly by the system, but the external information may be gathered by an independent body under ground rules that ensure similar methods throughout the country. The standards that require public opinion may best be handled by having the general public submit an annual report card on the performance of the system. A table illustrates how standards may be set up. The development of minimum standards will require the initial determination of averages and any program for the development of standards must start with definitions. The general standards currently in the most widespread use are those promulgated by the National Committee on Urban Transportation. Those guidelines relating to routing are examined. Compromises and inadequacies evident in these are noted.

James, DH *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 67-72, 1 Tab., 2 Ref.; Appeared in Issues in Public Transportation, Proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

24 272057 PUBLIC TRANSPORTATION OPERATING STANDARDS. The city of San Antonio is described, the history of its successful transit system is briefly reviewed, and the development is outlined of operating standards that served as a basis for the rendering of the present service and the extension of the service into new developments with new lines. Aerial maps of the city were used to study its geographical and physical layout and plot routes for transit service. A set of minimum standards were then adopted which had to be satisfied before an extension of the bus service is made. This plan, keyed to provide an economic basis for the operation of the system, is set forth here. A decision was also made to establish and maintain, as long as possible, a low basic-fare structure. The application of these criteria to the system has resulted in 59 major extensions and the removal of only 3 such extensions. In establishing the frequency of service, the load factor was not to exceed 150

percent of the seating capacity in peak periods. Emphasis is placed on schedule adherence and operators are checked to the half minute at check points. In planning new service or changes in service, the director of research and schedules and the director of operations share the responsibility. The criteria established in the first year of service has permitted growth of the system and the meeting of all operating costs and other obligations. The low basic fare and zone system have been very meaningful and attractive in maintaining patronage.

Hill, FN (San Antonio Transit System) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 63-67; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

24 272058 PUBLIC TRANSPORTATION OPERATING STANDARDS (INTRODUCTORY REMARKS). Clear statements of transit service operating standards would be helpful both to industry and to government agencies in making judgements on the relative merits of transit operations, and in the measurement and comparison of the performance of individual systems. They could help set performance levels for transit services. Four papers are presented here which present different views of operating standards. The views are presented of a manager of an all-bus transit system in a medium-sized metropolitan area. A private consultant and the manager of a regional transit authority that acquired a privately owned bus company present their views. A multimodal transit operator from a large metropolitan area also presents his views. The reasons are listed why transportation system managers view operating standards with skepticism: (1) the managers are concerned that any service standard that is explicitly adopted will be too rigidly applied; (2) different operation standards apply to different modes and to different-sized metropolitan areas; (3) transit operating standards that are currently being used were determined by the society of another period; (4) the concentrated city of a few years ago is now a suburbanized metropolitan complex.

Echols, JC (Metropolitan Washington Council of Governments) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, p 63
Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

24 272062 PUBLIC TRANSPORTATION OPERATING STANDARDS. Some of the standards employed by the Chicago Transit Authority (CTA) are discussed here. Practically every aspect of transit service is codified with standards, most of them unwritten, but no less effective. A review of such standards serves to emphasize the need for flexibility over rigidity. At operating levels, standards are applied to employee selection, training and performance. Design standards relating to maximum number of passengers per vehicle, and the schedule policy which establishes a range for the selection of service frequencies or the reciprocal, headways are discussed. The maximum service is determined from the allowable crowding standard for

passengers per vehicle, and the base or minimum service is determined from the headway so that the time between trips will meet the policy criteria for the transit system involved. The maximum workable length of a bus route, a standard relating to Chicago, is also discussed. Maximum fleet requirements constitute a common control on service standards, as do the vehicle characteristics: length, width, door width, and seating and standing capacity. The gridiron route pattern and some radial routes ensures that most of the population is within 0.375 mile of more than one CTA service. Policy standards are followed to provide the broadest possible period of service for those who need it at night. Some of the security measures adopted by the CTA (such as the exact fare procedure etc) are outlined. Fare collection, which in a rapid transit system, can involve as much as 16 percent of the operating costs, is reviewed. Standards are essential in planning route changes, extensions or cutbacks. The use of aerial surveys, the problem of the terminal, physical and geometric characteristics of pavements, potential traffic and questionnaire surveys of industries along the route are all aspects to be considered in planning route changes.

Krambles, G (Chicago Transit Authority) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 76-79; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

24 272064 PUBLIC TRANSPORTATION OPERATING STANDARDS. Objectives and standards including threshold service warrants for rapid transit service and the supporting cost data are described here, which were developed for long-range area-wide planning purposes. The objectives were refined by the formulation of a corresponding set of guiding planning principles and a supporting set of specific development standards for each objective. This refinement allowed the objectives to be related to physical development plan proposals and thus used in the processes of plan design, test and evaluation. The purpose of each of the elements (objective, principle, standards and plan) are defined and transportation system development standards (comparative and absolute) are discussed. The four questions considered in the formulation of transit system development objectives and standards are: (1) where should new transit routes be provided? (2) What types of service should be provided for each route? (3) What quality of service should be provided for each route? (4) How much will the service cost? The standards in support of the basic transit system development objective which guided the planning for local transit are set forth. Details are given of the standards which were formulated to aid in the rapid transit plan design, test and evaluation. The derivation is described of rapid transit threshold service warrants which involved two cases. The case concerning the preemption of freeway lanes was analyzed on a rational basis and the case concerning the construction of exclusive facilities was analyzed on an economic basis. The construction, maintenance and operating costs are presented which were used in the development of the threshold service warrant curves for a bus rapid transit system. The rail rapid transit threshold service warrant curves were computed by using

the same basic equations used in computation of the bus rapid transit curves. The cost data used in the development of these curves are detailed.

Weiner, E (Department of Transportation) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 79-92, 5 Fig., 5 Ref.; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

24 272071 PUBLIC TRANSPORTATION PROBLEMS IN URBAN AREAS. It is proposed that public transit be operated on a completely fare-free basis and that costs for providing such transportation be prepaid by the taxpayer. The inability of the transit industry to provide steady jobs paying adequate wages and other conditions of employment is the most serious problems confronted by transit workers. This situation is traced to the industry's worsening economic position. This is a result of the declining productivity of labor and equipment caused by the ever decreasing number of passengers that are carried for each mile or hour of service. Studies reveal that no-fare transit will produce greatly increased ridership. Increased ridership enables transit labor and equipment to become much more productive when measured in terms of number of passengers carried per vehicle-mile and cost per ride. Operating economies and efficiencies and other advantages inherent in such a system are reviewed. The ever-growing number of state and communities already providing public funds in aid of transit are cited as proof that tax support for such a plan is not impossible. The success of a no-fare transit system will work only if it is adequately preplanned, budgeted and managed efficiently and the cost of its operation are collected in regular cost per ride. Operating economies and efficiencies and The no-fare public transit must operate within a definite financial budget not exceeding the anticipated amount of tax funding available. System management should be expected to operate within budget and policy guidelines and to provide only the amounts and kinds of transportation that the local community desires and is willing to finance. A suitable system of incentives and penalties should be devised that should ensure effective management.

Elliot, JM (Amalgamated Transit Union) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 23-29, 2 Ref.; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

24 300012 LOW COST PUBLIC TRANSPORT IMPROVEMENTS. Concern has been expressed about the massive capital investment programmes and deficits of public transport undertakings now being financed by Australian governments and the continued decline in passengers carried. This paper reviews the investment programmes of the undertakings and compares them with other cities abroad. It concludes that investment in Australian public transport systems has not been directed towards significant service improvements that could be expected to attract passengers. Nor have labour-saving devices been developed to the extent abroad. It is argued that better value for money could be

obtained from low cost public transport improvements. However, the limitations placed on management by the strength of the Australian union movement is recognised. /Author/TRRL/

Caldwell, JR (New South Wales Planning & Environment Commission) ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 690-704, 2 Tab.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979; ACKNOWLEDGMENT: TRRL (IRRD 239181), Australian Road Research Board

24 300126 IN SEARCH OF STANDARDS OF SERVICE FOR URBAN PUBLIC TRANSPORT. This paper provides a review of the reasons for the development of standards of service and operation for urban public transport, the kinds of standards that can be struck, how they can be quantified and their impact upon a community. It places public transport services in the context of what a community might expect from them and then presents a reasonably comprehensive explanation and summary of those standards proposed for action, Canberra's bus service. Finally it points out areas where research effort would provide communities with a greater understanding of the roles their public transport services play. /TRRL/

Wardrop, AW (Department of the Capital Territory, Australia) ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 640-662, 3 Tab., Refs.; From the Papers of the Australian Transport Research Forum, Sydney, 18-20 April 1979; ACKNOWLEDGMENT: TRRL (IRRD 239211), Australian Road Research Board

24 300361 EVALUATION OF TRANSIT SERVICE IMPROVEMENTS: MEASURES OF SYSTEM EFFECTIVENESS. This final report encompasses what is perhaps the broadest dimension of transit marketing—analysis of service development. The report suggests that evaluative techniques, specifically twelve evaluation designs, are available to local transit management and city representatives to assess service improvements, based on (1) ridership response; (2) changes in awareness and knowledge of the system; and (3) evaluation of local bus operations. Thus the efficacy of planned and implemented service improvements at the local level can be ascertained. The evaluation design and evaluative studies presented in the report can be utilized by the State Department of Highways and Public Transportation for deriving more comprehensive performance indicators, as a means of assessing system effectiveness for local bus operations, and for comparative appraisals across systems. Unlike other system accounts or approaches for measuring local transit performance which emphasize measures of cost efficiency, this report presents procedures for appraising system effectiveness—to current patrons and the public-at-large.

Guseman, PK Womack, KN ; Texas Transportation Institute, (Res Rpt. 1052-5F) Final Rpt. UMTATX7810525F, Nov. 1978, 89 p., 5 Fig., 17 Tab., Photos., Refs.; Sponsored by State Department of Highways and Public Transportation, in cooperation with Urban Mass Transportation Administration.; Contract Study 2-10-76-1052; ORDER FROM: NTIS

24 300362 PERFORMANCE MEASURES FOR PUBLIC TRANSIT SERVICE. This report which evaluates existing and proposed transit systems identifies definitional, institutional, and technical difficulties associated with developing Transit Performance Measures (TPM's) for use in evaluating public transit service. A survey is made of contemporary evaluation process and their purposes. The procedures used by the Division of Mass Transportation of the California Department of Transportation in developing its list of TPM's and methods for developing performance standards are described. The necessity for linking TPM's to funding strategies is also discussed. The report recommends that further refinement and verification of the research methodology used in this research project is needed. It is pointed out that if public transit service evaluation can be developed effectively, it will greatly enhance the efficiency and effectiveness of public transit service.

Fuller, E ; California Department of Transportation, (DMT-033) Final Rpt. UMTA-CA-09-8001-79-1, Dec. 1978, 115 p., Figs., Tabs., Apps.; Sponsored by Department of Transportation, Urban Mass Transportation Administration; Contract CA-09-8001; ORDER FROM: NTIS; PB-294955/AS

24 300701 COORDINATION, COSTS, AND CONTRACTING FOR TRANSPORTATION SERVICES. Studies of contractual and cooperative agreements among U.S. social-service agencies that provide transportation services have shown that one of the most serious barriers to coordination among agencies is lack of knowledge about transportation costs. In this paper, categories of transportation costs and services developed by the Institute of Public Administration as cost-accounting guidelines for transportation projects are identified and defined. The issue of allocation of data collection responsibilities among the personnel of transportation projects is discussed. Cost accounting and reporting systems developed under Section 15 of the Urban Mass Transportation Act of 1964 (as amended) are related to the Institute of Public Administration guidelines to provide a basis for cost-sharing agreements among transportation agencies. /Author/

Revis, JS (Institute of Public Administration) *Transportation Research Record* No. 696, 1978, pp 46-55, 1 Fig., 4 Tab., 2 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

24 300703 FEDERAL REGIONAL COUNCILS AND THE UNIFORM COST-ACCOUNTING PROJECT. ABRIDGMENT. This paper describes the development of a common cost system that should increase coordination between agencies and providers of transportation. The Federal Regional Council System (the interagency coordinating mechanism) is described. The cost categories of the common cost system include administration, operations, and maintenance. Costs reflect total real costs and include such items as depreciation schedules for capital acquisitions, donated resources, and volunteer time. The four basic units of service selected are (a) total vehicle distance travelled, (b) vehicle distance travelled in revenue service, (c) vehicle hours, (d) one-way passenger

trips. If the system becomes more sophisticated, it may become necessary to go beyond these minimums. Performance measures will relate units of service to costs. The uniform cost-accounting system was tested on two rural transportation projects.

Kemp, JB (Mid-Continent Federal Regional Council) *Transportation Research Record* No. 696, 1978, pp 57-58, 1 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

24 300705 RECORD KEEPING AND EVALUATION. This paper identifies major sources of information, record-keeping issues, and evaluation methodologies. Much is being learned about developing a unified reporting system. Record-keeping needs are addressed in terms of data availability, problems in data collection, and the potential impact of a federal operating subsidy. A systems approach to system evaluation is outlined together with the trade-off or balance sheet evaluation methodology. Service standards are proposed as a means of institutionalizing system evaluation. /Author/

Smith, RL, Jr (Wisconsin University, Madison) *Transportation Research Record* No. 696, 1978, pp 66-68, 1 Fig., 8 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

24 301286 PRODUCTIVITY, EFFICIENCY, AND QUALITY IN URBAN TRANSPORTATION SYSTEMS. No abstract.

Tomazinis, AR (Pennsylvania University, Philadelphia) ; Heath Lexington Books, (0-669-00142-2) 1975, 256 p., Figs., Tabs., Apps.

24 301704 MATHEMATICAL MODELS OF ROAD TRAVEL DISTANCES. Some management science models require estimates of distances between points in a road network based on the point coordinates. This study evaluates the accuracy of a range of reasonable forms for distance estimating functions using samples of urban and rural road distances. The intent is to derive better distance estimating functions for analyzing systems with distance related performance measures. Contrary to a standard assumption, the rectangular distance function is inferior to the simple Euclidean metric in the urban samples. More general functions provide still greater improvement over the rectangular metric. Statistical significance accompanies these conclusions. One of the more general functions appears particularly suited to rural distances.

Love, RF (Wisconsin University, Madison) Morris, JG *Management Science* Vol. 25 No. 2, Feb. 1979, pp 130-139, 9 Ref.; ORDER FROM:

24 302098 COST-EFFECTIVENESS ANALYSIS OF PUBLIC TRANSIT SYSTEMS. This article presents an approach that incorporates a cost/revenue technique of measuring transit performance. It employs effectiveness and efficiency concepts in addressing revenues and costs, and the marginal cost concept, by defining and using fixed and direct costs. The approach may be applied to small-and medium-size transit properties. It also compares the revenue/cost approach with other performance measurement techniques.

Nelson, KE (Knight, (LB) & Associates, Incorporated) Nevel, WC *Traffic Quarterly* Vol. 33

No. 2, Apr. 1979, pp 241-252, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 302259 PUBLIC TRANSPORTATION PLANNING EFFECTIVENESS: CASE STUDIES. Federal Transportation Programs and their planning and reporting requirements are largely oriented to large urban areas. This research examined the effectiveness of federal transportation planning requirements and programs on small urban areas. The research analyzed the impacts of financing procedures and constraints on the transportation systems of small urban areas, examined the effectiveness of public transportation planning, and developed an allocation procedure for state transit assistance programs. A case study methodology was employed to permit greater depth and insight to the planning process than would be possible with comparative data for all urban areas. Three cities in the state of Iowa were selected: Cedar Rapids, Davenport, and Iowa City. The conclusions drawn from the analyses were that: 1) UMTA technical study grants have resulted in realistic short-range transit plans in all three case study cities; 2) UMTA Capital and Operating Assistance has led to the implementation of many of the improvements recommended in the short-range plans; 3) planning to achieve integration of transit services has not been fruitful in the three urban areas; and 4) municipal operation of transit appears to be the most viable and politically responsive method in small urban areas. (UMTA)

Dueker, KJ Barbaresso, JC Stoner, JW ; Iowa University, Urban Mass Transportation Administration, (FR 21) Final Rpt. UMTA-IA-11-0001-79-3, Dec. 1978; Contract IA-11-0001; ORDER FROM: NTIS; PB-300418/AS

24 303021 MEASUREMENT OF THE PERFORMANCE OF BUS SERVICES. A study has been made of methods of assessing the performance of bus services from the passengers' point of view. In the light of the results of surveys of passengers' attitudes to the performance of bus services, reliability was chosen as the attribute most likely to reflect their views. Accordingly, three 'unreliability measures' (um) are examined in detail. These relate to-average waiting time (um awt)-excessively long waits (um ewt/p)-excessively long in-vehicle journey times (um ejt/p). The unreliability measures are designed for use on a route-by-route basis and care has been taken in their definition to ensure that they can be applied to services of both short and long scheduled headways and to journeys of different lengths. Data collected in surveys in Newcastle Upon Tyne and south shields are used to examine the day-by-day variations in the unreliability measures. On the basis of these data, it is concluded that a survey period of 4 weeks is likely to show up services whose passengers wait or ride for about 10 per cent longer than might be considered acceptable. These data were also used to investigate the validity of using 'lost mileage' data to give an indication of the performance of a bus service. Despite evidence of a broad dependence of passenger waiting times on lost mileage, it was found that lost mileage does not provide a good indication of the performance of bus services. With the increasing use of automatic vehicle-location systems and selective vehicle detection equipment for bus priorities, there is scope for introducing

automatic reliability monitoring along the lines proposed in this report. The potential for the use of such equipment for this purpose is discussed. (TRRL)

Gault, HE Doherty, PG ; Newcastle upon Tyne University, England, (0306-3402) Monograph No. 28, Feb. 1979, 29 p., 7 Fig., 9 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242215)

24 303286 TRANSIT PRODUCTIVITY: IMPROVEMENT THROUGH MANAGEMENT TRAINING AND DEVELOPMENT. The Center for Productive Public Management undertook this project in response to an increased concern for mass transit productivity. This final report analyzes transit productivity and discusses the transit management/productivity relationship in detail. It delineates specific transit management problems and discusses the value and validity of management training and development programs as solutions to these problems. More specifically, the report serves as a handbook for the implementation and evaluation of transit management/productivity training programs for both large and small properties. It is written for transit managers, policy makers, and academics as a resource tool and guidebook to an improved understanding and application of productivity principles in transit management. This final report is based on independent research and input from managers of transit properties across the country, as well as on input from transit academics, transit users, elected officials, and attendance at transit performance conferences and seminars. The report concludes that efficient and effective internal transit management, attained through training and development, is the key of improved transit productivity. This report provides appendices titled: Appendix A-Annotated Bibliography: Transit Management/Productivity; and Appendix B-Annotated Bibliography: General Management/Productivity. (UMTA)

Goldberg, J ; City University of New York, Urban Mass Transportation Administration, (NY-11-0019) Final Rpt. UMTA-NY-11-0019-79-1, June 1979, 229 p.; ORDER FROM: NTIS; PB-299369

24 303292 EVALUATING INDIVIDUAL TRANSIT ROUTE PERFORMANCE. This investigation of the use of internal route evaluation techniques by transit properties, includes a discussion of the need for such evaluation schemes and their inherent weaknesses or problems, the development of route evaluation procedures, and the route evaluation techniques presently in use by three public transit properties in California and two transit properties outside of California. The developmental relationship between goals, objectives and performance indicators is emphasized. A major advantage in progressively developed goals, objectives and indicators is that conflict between the various elements is prevented. Clearly stated policy not only eases the problems of management in the public sector but provides for varying degrees of political control and input necessary in such a multi-governmental area such as transit. The utilization of well-defined evaluation processes similarly eases the task of public management administratively as well as politically. Route evaluation schemes provide a means for simplification of data analysis through predetermined performance indicators.

Glauthier, RE (Dave Systems, Incorporated)
Feren, JN (McDonnell Douglas Corporation)
Transit Journal Vol. 5 N 1979, pp 9-26, 6 Fig., 2 Tab.

24 305814 APPLICATION OF TRANSIT PERFORMANCE INDICATORS. Decreasing transit ridership and increasing operating and capital costs have resulted in a situation whereby the Urban Mass Transportation Administration (UMTA) is requiring transit operators to develop comprehensive data reporting schemes. Transit operators are realizing the need for measurement of transit system productivity, efficiency, and effectiveness, in order to make decisions on where to add, modify, or delete service. The research provides an internal route-specific, performance monitoring tool, and aimed at bus transit performance. The research was devised to yield a specific product, which is a comprehensive decision framework for applying transit performance indicators. Two performance indicators were selected for use in the research, namely, passengers per bus mile and passengers per bus hour. These indicators are used primarily because the data are relatively easy to obtain. The application methodology is general, however, in that it can also be used for other route-specific indicators. The decision framework is based upon the statistical decision-making techniques which are used in other fields such as quality control. Two case studies were used in this framework to apply indicators to the measurement of performance of the bus transit systems of the Regional Transportation District of Denver, Colorado, and the Utah Transit Authority of the Salt Lake City, Utah region. Guidelines are given to assist transit operator programs.

Stone, TJ Austin, JA Siegel, RL Taylor-Harris, A
Utah University, Urban Mass Transportation Administration, (UMTA-UT-11-0001) Final Rpt. UTEC-CE-79-117, UMTA-UT-11-0001-79-1, Sept. 1979, 282 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-121569

24 310463 SCALING PERCEPTIONS OF RELIABILITY OF URBAN TRAVEL MODES USING INDSICAL AND FACTOR ANALYSIS METHODS. In several attitudinal investigations, travel modes' reliability was found to be the most important characteristic of the transportation system. This research is concerned with the individual subjective evaluation of different reliability attributes. Two scaling techniques-indsical and factor analysis-were used to investigate travel modes' reliability; these techniques aided in the identification of perceptual performance measures of reliability. The scaling techniques were also evaluated and compared for their usefulness and the reliability performance measures were validated using a preference model. (Author/TRRL)

Prashker, JN (Transportation Research Institute, Israel) *Transportation Research. Part A: General* Vol. 13A No. 3, June 1979, pp 203-212, 3 Fig., 9 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243495)

24 311213 A VITAL PHASE OF TRANSIT EVOLUTION: MANAGEMENT INFORMATION SYSTEMS. Passage of the Urban Mass Transportation Act of 1964 signaled a new era for the transit industry by facilitating the public

acquisition of private operations as well as capital purchases of equipment. In 1974, operating assistance was provided under the National Mass Transportation Act. The increase in federal funding, however, has resulted in significant increases in federal regulations and reporting requirements. This has caused an intensive effort to provide sound system management and internal controls at the local level. To give transit managers the information essential to fully utilize available funds, management information systems have been developed. Successful management information systems are based on, first, the identification of the particular information needs of a transit system and, second, the development of performance criteria from an in-depth statistical analysis of the management provided. Although the management information systems are continually being updated, the performance criteria are still in the formative stages. Yet it is these performance criteria, based on sound management information, that will help transit to become more cost-effective and to provide better service. (Author)

Knautz, DD (McDonald Transit Associates, Incorporated) *Transportation Research Board Special Report* No. 187, 1980, pp 33-35, 1 Tab.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

24 311318 MIDTOWN MANHATTAN CIRCULATION AND SURFACE TRANSIT STUDY. The goal of the Midtown Circulation and Surface Transit Study was "to develop and demonstrate short-range, low-cost surface transit and traffic operational improvements and to formulate these improvement techniques into an overall circulation plan and policies for midtown." The objectives of the project generally included improvements in air quality, surface transit system performance, and the pedestrian environment, and increased efficiency of taxi and truck operations. Towards accomplishing these objectives, the following reports have been prepared: a series of technical memoranda addressing various detailed aspects of midtown circulation and surface transit operations, Midtown Transportation Factbook, Proposed Midtown Circulation and Surface Transit Improvement Program, Midtown Circulation Demonstration and Evaluation Program, and Midtown Circulation Plan. Improvements recommended within these reports encompass transit operations, traffic operations, on-street parking and loading, pedestrian safety, and enforcement within both general policy strategies and specific physical and operational measures. The impacts anticipated as a result of implementing each improvement measure were assessed. (Author)

Edwards and Kelcey Final Rpt. June 1979, 19 p., 2 Fig., 4 Tab.; Prepared for the New York City Department of Transportation and the New York Department of City Planning. Prepared in association with URS/Madigan-Praeger, Incorporated.

24 313627 BUS TRANSIT MONITORING STUDY: DATA REQUIREMENTS AND COLLECTION TECHNIQUES [Interim rept. no. 1]. The purpose of the study is to develop a comprehensive statistically-based data collection manual that will enable transit operators to collect passenger-related data in a cost-effective manner which maximizes the usefulness of the overall data base. This first interim report presents the results of the first two tasks of the study, which were to identify current data collection techniques and data requirements. These two closely related tasks were conducted in parallel through three major activities: (1) a literature review; (2) a review of material collected by the Massachusetts Bay Transportation Authority and the Tidewater Transportation Commission in Norfolk, Virginia in a study for UMTA, focusing on service evaluation techniques; and (3) discussions with forty-one transit properties in the United States and Canada.

Flusberg, M Kruger, JA Curry, J ; Multisystems, Inc., Cambridge, MA. *Urban Mass, Transportation Administration, Washington, DC. UMTA-IT-09-9008-79-1, Apr. 1979, 86p; Prepared in cooperation with ATE Management and Service Co. Inc., Cincinnati, OH.; Contract DOT-UT-09-9008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-161409

24 316496 ARE STANDARDS FOR RURAL PUBLIC TRANSPORT PERFORMANCE MEASURES APPLICABLE? [Is een normeringssysteem voor het voorzieningsniveau van het streekvervoer toepasbaar?]. This report on an extensive literature search discusses standards for efficiency of public transport based on other than financial criteria. Several definitions of the concept of transit performance measures are considered. An overview is given of the transit service standards which were found in theoretical literature. The applications of such standards in several countries, especially in the Netherlands, are summed up and the problems of these applications are analysed. The conclusion is that transport services can indeed be measured, but it is not easy to develop a clear and comprehensible standard. (TRRL) [Dutch]

Vanris, S ; Ministerie van Verkeer en Waterstaat, Netherlands Monograph Jan. 1979, 15 p., 59 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246616), Institute for Road Safety Research

24 316991 ACCESSIBILITY MEASURES USED TO APPRAISE TRANSPORT SYSTEM PERFORMANCE. This article reviews a wide range of approaches to accessibility found in various environmental and urban planning disciplines. It attempts to find a common ground that will provide a basis for the formulation of a general theory or definition of the accessibility concept. The discussion reviews the concept of accessibility as defined in traffic engineering, transportation planning, environmental planning, urban economics, and comprehensive urban planning.

Polus, A (Technion-Israel Institute of Technology) Kumove, M *Traffic Quarterly* Vol. 33 No. 3, July 1979, pp 429-442, 19 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

24 318195 BERKSHIRE REGIONAL TRANSIT AUTHORITY: TRANSPORTATION SYSTEM MANAGEMENT EVALUATION REPORT. Many transit operators have a need for an evaluation system which can measure existing service performance. To assist these operators, UMTA has been funding, through its Section 8 Technical Studies Program, local studies in service evaluations. The purpose of these studies is to evaluate existing transit service and to develop recommendations and plans for service improvements. This document summarizes the local evaluation study of the transit service provided by the Berkshire Regional Transit Authority (BRTA) in Pittsfield, Massachusetts. The purpose of the study was to review and evaluate the current transit services provided by the BRTA and to develop recommendations for service modifications which utilize low cost techniques to improve operating effectiveness. In this study, emphasis is on the three new routes in Pittsfield, the overall fare structure, and the priority locations for bus stop shelters. To collect the necessary information for this evaluation, a loading survey was conducted. This survey provided information on maximum loading, hourly ridership, passenger miles of travel and average trip length by route. The report serves as an excellent example of service evaluation within a small transit system.

Cook, CW ; Berkshire County Planning Commission, Urban Mass Transportation Administration, UMTA-MA-09-0050 (UMTA-MA-09-0050-80-1, Oct. 1979, 145p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-196777

24 319333 DEVELOPMENT AND APPLICATION OF PERFORMANCE MEASURES FOR A MEDIUM-SIZED TRANSIT SYSTEM. This paper summarizes the results of a study of service performance measurement and operating guidelines for the Delaware Authority for Regional Transit (DART) system. This fleet of 100 buses serves the Wilmington metropolitan area and is typical in many respects of many medium-sized bus systems across the country. The project consisted of several elements. First, a brief overview was presented of the historical perspectives on transit performance standards and the current state of the art, specifically noting activities at the state and regional level over the past few years. Next, a preliminary set of transit performance measures and operating guidelines was formulated for local review and comment. To assist in the evaluation of the adequacy of the preliminary performance measures and service standards, the draft standards were used to assess DART's existing operations. This assessment was hampered by a number of data inconsistencies, due primarily to the fact that much of the data required had been collected over a period of several years by using different data collection and analysis procedures. Efforts were made to minimize these inconsistencies and, where this could not be done, recommendations were made for improved data collection procedures to eliminate this problem in future years. As part of the service assessment, order-of-magnitude cost estimates were prepared to define the general range of capital and operating investment that would be required by DART to modify its current services so as to be in greater compliance with the proposed service standards

and operating guidelines. The last step of the project was the preparation of guidelines to assist local agencies in the implementation of the service standards and operating guidelines and the continuous monitoring of DART's performance relative to these standards. This element of the project addressed the manner in which the current infrastructure for transit planning could be improved and described the appropriate level of detail and methodology for the continual evaluation of DART's performance. A discussion was presented of the basic procedures by which to amend or modify the service standards and operating guidelines. (Author)

Allen, WG, Jr Grimm, LG *Transportation Research Record* No. 746, 1980, pp 8-13, 1 Tab., 7 Ref.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

24 319338 USE OF FEDERAL SECTION 15 DATA IN TRANSIT PERFORMANCE EVALUATION: MICHIGAN PROGRAM (ABRIDGMENT). In the first application of its kind, the reporting system of Section 15 of the Urban Mass Transportation Act, as amended, is being used to support the development of a straightforward, routine, and comprehensive transit performance evaluation program in the state of Michigan. The methodology developed for Michigan satisfies the complementary needs to account for public funds invested in transit operation and development and to promote the efficient and effective use of these funds in the delivery of transit services. At the same time, the methodology avoids placing an additional burden of record keeping and reporting on individual transit operators. In the rapidly developing field of transit performance evaluation, these features are essential for state and local funding agencies to consider as part of any plans to develop a continuing evaluation program. In this paper, the Michigan program is described, and the features of the program that have general applicability for other areas concerned with transit performance measurement and evaluation are highlighted. (Author)

Holec, JM, Jr Schwager, DS Fandalian, A *Transportation Research Record* No. 746, 1980, pp 36-38, 2 Fig.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

24 322264 DESIGNING A TRANSIT PERFORMANCE MEASUREMENT SYSTEM. An attempt is made to lay the basis for the development of a framework to guide the design and implementation of performance measurement systems. The three major issues to be considered in designing a transit performance measurement scheme are the intended uses of the measurement system, the relationship of the measurement system to transit system goals, objectives and constraints, and the level of resources and expertise available for the data collection and information processing. A number of potential uses of the performance measurement system are cited. Existing performance measurement systems exhibit a considerable diversity with respect to the number and types of measures being monitored and the nature and extent of utilization of these measures for various purposes. A practical con-

sideration affecting the comprehensiveness and sophistication of a transit performance measurement system is the level of resources and staff expertise available for data collection and data processing. A simple, incremental approach is the soundest course of implementation. The approach would allow transit managers and operating personnel to learn through experience the strengths, limitations, and best applications of the transit performance measurement system.

Heaton, C (Transportation Systems Center) *Transit Journal* Vol. 6 No. 2, 1980, p 49; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

24 322265 PERFORMANCE MEASUREMENT: EXTERNAL AND INTERNAL. In an effort to make the countywide transit system produce the most useful service at the lowest cost to the consumer and taxpayer, the San Mateo County Transit (SamTrans system) district is trying out a new system of evaluating bus services. The program consists of the collection and analysis of key ridership and economic data which measure the performance of each route in the SamTrans system. Five measurable factors (average number of passengers carried daily on each route, passengers per vehicle mile, passengers per scheduled trip, net cost per passenger and percent of operating costs recovered from fares) were identified. The combination of economic and ridership data has enabled SamTrans to reflag the least efficient and least effective service, establish priorities for remedial action, measure and record the impact of route and schedule adjustments, identify and serve growth opportunities essentially with miles and hours salvaged from less productive routes, and achieve productivity by addressing one route or a related group of routes at a time.

Mauro, JT (San Mateo County Transit District) *Transit Journal* Vol. 6 No. 2, 1980, p 57; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

24 324429 SERVICE DEPENDABILITY MODEL FOR AN URBAN RAPID RAIL TRANSIT SYSTEM. A service dependability model is described in terms of passenger perceived probability of delay, from which reliability and maintainability requirements for an urban rapid rail transit system is analytically formulated. A feasible solution is obtained from a set of

3 non-linear equations and historical data and failure management techniques.

Yeh, YC (Canadair Services Limited) ; Sandford Education Press 1978, pp 283-288, 2 Ref.; Large Eng Systems 2, Proceedings of the International Symposium on Large Eng Systems, 2nd, University of Waterloo, Ontario, May 15-16, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: Sandford Education Press, Waterloo, Ontario, Canada

24 326378 DRAWBACKS INHERENT IN CURRENTLY USED MEASURES OF MASS TRANSIT PERFORMANCE. The paper examines weakness and biases inherent in certain measures of urban mass transit performance. The concepts of effectiveness and efficiency in transit are discussed, and the shortcomings of some currently used effectiveness ratios are examined. It is noted that many of the effectiveness measures should more properly be classified as efficiency measures. Weaknesses of certain efficiency measures are also examined. The performance measures examined are cost per passenger, passengers per bus hour, vehicle miles per operator, and cost per vehicle hour.

Barnum, DT Gleason, JM ; Nebraska University, Lincoln, Urban Mass Transportation Administration, (UMTA-NE-11-0002) Spec Rpt. UMTA-NE-11-0002, May 1980, 19p; Prepared in cooperation with Indiana Univ. Northwest, Gary.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-109308

24 326473 BART'S (BAY AREA RAPID TRANSIT'S) FIRST FIVE YEARS: TRANSPORTATION AND TRAVEL IMPACTS. A final report is presented assessing the San Francisco Bay Area Rapid Transit System (BART) on transportation and travel in California. The 71-mile BART began passenger service in 1972. The final section, the transbay link between San Francisco and Oakland, opened in 1974. Ridership has grown to about 140,000 passenger trips per day, 60,000 of them transbay. BART's ridership and impacts have been less than predicted, which reflects the optimism of the predictions and the shortcomings of BART's current service. As intended, BART's most significant improvements in travel times have been for long-distance trips by transit, particularly transbay, to downtown San Francisco. BART carries 21 percent of transbay commuter trips. Area-wide, BART's share of trips for all purposes is between 2 and 3 percent. Total bus ridership has changed

little because the loss of riders from services paralleling BART has been offset by the use of buses to get to and from BART. Impacts on San Francisco-Oakland Bay bridge traffic have been less than expected, because new trips by car have appeared to replace those removed by BART. Implications for planning rail transit elsewhere are drawn.

Sherret, A ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-08, Apr. 1979, 261p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001644. Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118077, DOTL NTIS

24 327516 BUS TRANSIT MANAGEMENT AND PERFORMANCE. The 13 papers in this report deal with the following areas: transit ridership in an intense transit environment: some observations; development and application of performance measures for a medium-sized transit system; diagnostic tools in transit management; portfolio model of resource allocation for the transit firm; evaluating potential effectiveness of headway control strategies for transit systems; what public transportation management should know about possible user reactions, as shown by the example of price sensitivity; use of federal section 15 data in transit performance evaluation: Michigan program (abridgment); systematic procedure for analysis of bus garage locations; initial reactions to a central business district bus transit mall in Honolulu; recent experience with accessible bus services; operational improvements in a two-city bus transit corridor (abridgment); note on bus route extensions (abridgment); and hierarchical procedures for determining vehicle and crew requirements for mass transit systems.

McShane, WP Menaker, P Roess, RP Falcocchio, JC Allen, WGJ ; Transportation Research Board, Washington, DC. TRB/TRR-746, ISBN-0-309-03055-2, 1980, 73p; Library of Congress catalog card no. 80-19208. Also pub. as ISSN-0361-1981. Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-211097

25 047397 AUTOMATIC BARRIERS USED ON THE REGIONAL AND CITY NETWORKS OF THE PARIS UNDERGROUND [LES PEAGES AUTOMATIQUES DU METRO DE PARIS]. The authors describe the ticket issuing machines and explain the checking methods employed, as well as the information processing system for management and data concentration. They discuss the extension of the system to the ordinary city lines to achieve the integrated management of the whole network, as well as the barrier calculators/peripherals links. These investments enable traffic to be analyzed accurately. [French]

Estournet, G Griffe, P *Revue Generale des Chemins de Fer* Vol. 92 Feb. 1973, pp 87-97; ACKNOWLEDGMENT: EI (EI 73 047397); ORDER FROM: ESL, Repr PC, Microfilm

25 047488 AFC CUTS TRAIN AND STATION STAFF COSTS. Automatic fare collection has proved to be the one area where dramatic reductions in operating expenses can be achieved—provided the system works well enough to allow stations to be unmanned. The author takes a look at the current position in North America, and concludes that second-generation equipment now being introduced by established operators will largely overcome reliability problems which plagued the pioneers.

Vigrass, JW *Railway Gazette International* Vol. 129 No. 5, May 1973, 3 pp; ORDER FROM: ESL, Repr PC, Microfilm

25 047880 SOME DATA ON THE EFFECTS OF FREE PUBLIC TRANSPORT. Results indicate that if the existing tube and bus service were free and the existing British Rail service was operated at 25 percent of the present level of fares, the expected proportion of work journeys to central London by car would be about a third of its present level, if commuters reacted in the way indicated by these analyses. Expected British Rail use would be about three-quarters of third more than the present level. The estimates do not take account of feedback effects, which could be substantial.

Goodwin, PB (University College, London) *Transportation Planning and Technology* Vol. 1 No. 3, Jan. 1973, pp 159-174, 11 Ref; ACKNOWLEDGMENT: EI (EI 73 037538); ORDER FROM: ESL, Repr PC, Microfilm

25 048146 PROJECT FARE (FINANCIAL ACCOUNTING AND REPORTING ELEMENTS) TASK III REPORT, URBAN MASS TRANSPORTATION INDUSTRY REPORTING SYSTEM DESIGN. PART II: REPORTING SYSTEM INSTRUCTIONS. The report is the second volume of a four volume study which describes a uniform reporting system for the urban mass transit industry. It contains general system instructions, prescribed accounting standards to be employed for this reporting, and detailed definitions of all reporting categories in the system for transit operations other than commuter rail. Portions of this document are not fully legible.

Harvey, DL Nagel, J Van Lieshout, W; Andersen (Arthur) and Company Intrm Rpt Task 3, June 1973, 41 pp; Prepared in cooperation with Project FARE Industry Control Board and Wells Research Co. Paper copy also available from NTIS \$20.00/set of 4 reports as PB-222

041-SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-222043/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222043/2

25 048148 PROJECT FARE (FINANCIAL ACCOUNTING AND REPORTING ELEMENTS) TASK III REPORT, URBAN MASS TRANSPORTATION INDUSTRY, REPORTING SYSTEM DESIGN. PART IV: COMMUTER RAIL REPORTING. The report is the last volume in a series of four which cover Task III of the four-task Project FARE. It covers the reporting requirements for commuter rail systems. ICC FORM A is included with modifications in order to obtain a complete report of revenues, expenses and nonfinancial operating data pertaining to commuter rail transit service. The purpose of the separation of rail transit from other transit systems is derived from chapter 3 volume I the task summary, which explains why commuter rail systems are subject to a different reporting requirement from that of other transit systems.

Harvey, D Nagel, J Van Lieshout, W; Andersen (Arthur) and Company Intrm Rpt Task 3, June 1973, 34 pp; Prepared in cooperation with Project FARE Industry Control Board and Wells Research Co. Paper copy also available from NTIS \$20.00/set of 4 reports as PB-222 041-SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-222045/7); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222045/7

25 050442 NO SMOKING, NO SPITTING, NO DANCING IN THE AISLES. This article covers some of the problems faced by the Chicago Transit Authority in the operation and funding of the elevated and subway rapid transit system in Chicago. Service levels, fare levels, deficits, and subsidies are discussed.

Blades, J *Chicago Tribune Magazine* Oct. 1973, 4 pp; ORDER FROM: Chicago Tribune Magazine, 435 North Michigan Avenue, Chicago, Illinois, 60611 Repr PC

25 050861 AUTOMATIC FARE COLLECTION IN SURFACE TRANSPORT. This report presents both a discussion and statistics on the various types of automatic fare collection systems in use in Europe.

International Union of Public Transport 34 pp, 6 Tab; 40th International Congress, The Hague 1973; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels, Belgium Repr PC

25 051585 AUTOMATIC FARE COLLECTION, SUPPLEMENTARY REPORT. The report describes the final version of the fare collection equipment, and its operational characteristics through the first nine months of BART revenue service operation, September 1972-May 1973.

Parsons, Brinckerhoff-Tudor-Bechtel, (UMTA-CA-06-0023) Tech Rpt No. 2, June 1973, 47 pp; Report on 'San Francisco Bay Area Rapid Transit District Demonstration Project'. See also PB-189 148.; ACKNOWLEDGMENT: NTIS (PB-226131/1); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226131/1, DOTL NTIS

25 052152 PROJECT FARE TASK IV REPORT, URBAN MASS TRANSPORTATION INDUSTRY FINANCIAL AND OPERATING DATA REPORTING SYSTEM. VOLUME II. REPORTING SYSTEM INSTRUCTIONS. The report contains a description of the uniform reporting system for the urban mass transit industry designed and tested in Project FARE. It is presented in five volumes. Volume II contains general system instructions, prescribed accounting standards to be employed for this reporting and detailed definitions of all reporting categories in the system for transit operations other than commuter rail.

Harvey, DL Nagel, JW Van Lieshout, WT Malachuk, DJ; Andersen (Arthur) and Company Vol. 2 Nov. 1973, 467 pp; Paper copy also available from NTIS \$20.00/set of 5 reports as PB-226 353/SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-226355/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226355/6

25 052153 PROJECT FARE TASK IV REPORT, URBAN MASS TRANSPORTATION INDUSTRY FINANCIAL AND OPERATING DATA REPORTING SYSTEM. VOLUME III. REPORTING SYSTEM FORMS. The report contains a description of the uniform reporting system for the urban mass transit industry designed and tested in Project FARE. It is presented in five volumes. Volume III contains examples of all of the forms used in the system for transit operations other than commuter rail. Each form shows a cross reference to the applicable instructions in Volume II.

Harvey, DL Nagel, JW Van Lieshout, WT Malachuk, DJ; Andersen (Arthur) and Company Vol. 3 Nov. 1973, 132 pp; Paper copy also available from NTIS \$20.00/set of 5 reports as PB-226 353-SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-226356/4); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226356/4

25 054343 HOW MANY PEOPLE PAY THEIR TRAM FARES? Many experimental situations lead to inverse sampling schemes with some random or non-random stopping rule, since at each experiment only a bounded number of observations can be made. This note discusses the problem of estimating the unknown probability in the underlying geometric distribution of such schemes. The author encountered this problem in a very special context, that of estimating the proportion of non-fare-paying passengers in a local transportation system. The methods derived were used on material collected during 1 month by the non-uniformed ticket controllers of the Gothenburg, Sweden, transportation system. Some 3,079 cars and 40,786 passengers were checked; 982 free passengers and 132 stowaways were found, yielding the estimates.

Jagers, P *American Statistical Association, Journal of* Vol. 68 No. 344, Dec. 1973, pp 801-804; ORDER FROM: American Statistical Association, 806 15th Street, NW, Washington, D.C., 20005 Repr PC

25 054450 EVALUATION OF A NO-FARE SYSTEM OF PUBLIC TRANSIT. The paper evaluates the operation of public transit services in Rhode Island on a 'no-fare' basis. The concept of a no-fare operation was selected as meriting further study since it combines aspects of several

problems confronting both the Authority and the state as a whole: declining or stable ridership, costs of operation increasing more rapidly than revenues, congestion of principal arterials in and around central business districts, use of large amounts of land for off-street, non-structural parking within central business districts, and a range of environmental problems associated with increasing use of private automobile transportation.

Rhode Island Statewide Planning Program Tech Rpt RISPP-TP-73-37, Sept. 1973, 30 pp; Sponsored in part by Federal Highway Administration, Providence, R.I.; ACKNOWLEDGMENT: NTIS (PB-227467/8); ORDER FROM: NTIS, Repr PC, Microfiche; PB-227467/8, DOTL NTIS

25 054513 SUBSIDIZATION OF TRANSIT OPERATING COSTS: A CASE STUDY OF METRO. The report discusses the reasons why public assistance to urban transit properties is often very necessary. A financial analysis is made of the Washington Metropolitan Area Transit Authority's (WMATA or METRO) rail system presently under construction. Ways to relieve deficits are identified. A formula is devised to see how the financing of such deficits might be allocated among the 3 major political jurisdictions in the area: the District of Columbia, Virginia and Maryland. The proposed formula is based on service, ridership and population characteristics of each of these areas. The analysis is theoretical and designed to offer local transportation planners thought and tools in case operating deficits arise. Political problems and jurisdictional conflicts are alluded to but not discussed in detail.

Sherman, MM ; Consortium of Universities Final Rpt UTC-03-73, May 1973, 45 pp; ACKNOWLEDGMENT: NTIS (PB-229086/4); ORDER FROM: NTIS, Repr PC, Microfiche; PB-229086/4, DOTL NTIS

25 056835 SOME EVIDENCE OF TRANSIT DEMAND ELASTICITIES. In general, all of the limited evidence available suggests that transit demand is inelastic with respect to money price. Typically, ridership is significantly more sensitive to changes in the level of service (particularly door-to-door journey time) than to changes in fare, although service elasticities also are usually numerically less than unity. In broad terms, short-run direct fare elasticities are characteristically observed to lie within the range of 0.1 to 0.7. A more precise value in a particular instance will depend on a variety of factors in ways which largely support a priori notions. Thus in very large cities, central city areas, at peak hours, and in other circumstances where the prices of alternative modes are high, transit fare elasticities are usually numerically at the lower end of the range.

Kemp, MA (Urban Institute) *Transportation* Vol. 2 No. 1, Apr. 1973, Refs; ACKNOWLEDGMENT: EI (EIX740102483); ORDER FROM: ESL, Repr PC, Microfilm

25 080213 DESIGN AND ANALYSIS OF AN AUTOMATIC CREDIT CARD FARE COLLECTION SYSTEM. The concept of an automatic fare collection system that accepts bank credit cards for payment of fares is examined. The fare collection system is composed of two major

sub-systems. The on-vehicle system includes all fare-related activities conducted inside the vehicle. The off-vehicle system is all fare-related activities that are separated from user transactions in the vehicle, by time and space. There are four areas of interest in the design of the off-vehicle system. The fare structure of the transit system is one determining factor in the system design. The needs of management for data, in addition to that required for computation of user fares, is also an important consideration. The data processing system uses data inputs from the on-vehicle system to generate management reports. Lastly, billing involves the generation of billing information on magnetic computer tapes which are then delivered to the respective banks for customer billing. Various possible configurations of on-vehicle hardware are studied.

Buckley, RF Carlson, RC Jucker, JV ; Stanford University, Urban Mass Transportation Administration, (UMTA-CA-11-0008) Res. Rpt. RR-16, Aug. 1974, 64 pp; ACKNOWLEDGMENT: NTIS (PB-237092/2ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237092/2ST, DOTL NTIS

25 080759 PATRONAGE EFFECTS OF FREE-FARE TRANSIT. Data from the free transit demonstration in the Wilkes-Barre, Pennsylvania area following the recovery from hurricane Agnes in 1972 suggest that the offering of free transit will immediately attract significant numbers of additional patrons, with the percentage patronage increase dependent on the current average fare of the particular transit system. Based on the analysis reported in this article, patronage increases due to free fare, with service and other factors remaining constant, range from 13 percent for a system with 10 cents average fare per boarding passenger to 86 percent for a system with 50 cents average fare. A typical transit system, with an average fare in the 30-to 35-cent range, could expect ridership to immediately increase 50 percent with the institution of free fare.

Scheiner, JI *Traffic Quarterly* Vol. 29 No. 1, Jan. 1975, pp 19-27

25 081502 LOW FARE TRANSIT PLANS GAIN NATIONWIDE TRIALS. Low fare transit is being experimented with as a means of creating a higher demand for public transportation. It can potentially get more people out of their cars, reducing traffic and pollution, help senior citizens and handicapped people, and encourage use of downtown areas. This article reviews various ways of implementing low fare service; total low fare, specific time low fare, specific location low fare and specific group low fare. Systems in urban areas, such as Los Angeles, San Francisco, New York, Baltimore, Boston and Atlanta, utilizing low fares are described and their performance discussed.

Metropolitan Vol. 70 No. 3, June 1974, pp 24-27, 3 Phot., 2 Ref.

25 082824 TRANSIT FARE AND RIDERSHIP: A REVIEW. One of the most frequently mentioned approaches to increase transit ridership is lowered or free transit fares. However, the proportional increase in ridership resulting from a given reduction in fare is estimated to be small. Several statistical studies support the finding that the fare elasticity of transit demand is low, while

simultaneously demonstrating that the sensitivity of transit demand to service improvements is relatively high. There exist few studies which bridge these two findings with cost data to reach a definite conclusion, but the evidence currently available strongly supports the policy of spending transit funds to improve transit service rather than to reduce transit fares. 26 references. /Author/

Difiglio, C ; Highway Users Federation for Safety and Mobility Dec. 1974, 26 pp

25 082825 CASE FOR PREPAID TRANSIT. The foundation of no-fare transit is the financing of public transportation by a specific transportation tax placed on all who draw an income from, or live within the city. A better and even more accurate description than tax is prepayment for transportation services and facilities provided by the city. It is not free transportation. Yearly revenue that is adequate and assured allows for long-term planning and the financing of improvements which will make public transportation more attractive and convenient for passengers and businesses. In response to critics' objections advocates of prepaid transit attest that attracting still more riders by improving service is the primary goal, and not a consequence to be dreaded or avoided. Coupling the top administration more closely to the electoral process might be an appropriate safeguard to prevent the decline of efficiency in management when revenue from fares is no longer juxtaposed with operating costs.

Greenspan, HP *Transit Journal* Vol. 1 No. 1, Feb. 1975, pp 57-63

25 083717 FREE RIDE. The value has been proved of an 18-month experiment providing free bus rides within the large downtown area which covers a 105-block section and includes the city's governmental, financial and retail districts. The system is operated by the municipality of Metropolitan Seattle, a federation of local governments known as Metro responsible for regional environmental problems and mass transit. The City of Seattle paid \$64,000 (the first year) and tax funds to make the free rides possible. Within a few weeks of the project's inauguration the bus riders more than doubled, business increased notably, traffic congestion was eased, and gasoline consumption was reduced. A survey (a year after the service began) revealed that more than half of all downtown employees were using the buses more often. A third of all boardings were for trips within the free-ride zone, and amounted to 12,000 daily trips. More than 1000 workers reported they were now taking a bus rather than their cars to get to the job. Some 2,500 daily auto trips are believed to have been eliminated by the Metro system.

Lamp Vol. 57 No. 1, Mar. 1975, pp 28-29

25 092426 THE EFFECT OF FARE REDUCTIONS ON PUBLIC TRANSIT RIDERSHIP. The study was undertaken to determine the effects of various reduced fare programs on transit ridership. A listing of all reduced fare programs in North America is provided. The concept of fare elasticity was defined and determined for the various programs. Empirical evidence was obtained and analyzed from senior citizen programs. Reduced base fare programs, free fare programs and promotional programs. These programs have

been successful in achieving their particular social and environmental objectives.

Caruolo, JR Roess, RP ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0009) Proj. Rpt. UMTA-NY-11-0009-74-1, May 1974, 89 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244578/1ST

25 092723 TRANSIT IMPROVEMENTS IN ATLANTA-THE EFFECTS OF FARE AND SERVICE CHANGES. Free transit and reduced transit fares have been proposed as a solution to many of the problems of automobile use. Using a sales tax to finance the deficit, Atlanta reduced fares to fifteen cents on its bus system while increasing route coverage and schedule frequency. The study examines the impact of these changes on transit ridership in the Atlanta area. Several longitudinal models of system-wide passenger volumes are developed. Estimates are made of the additional patronage attracted to the system by the fare and service changes.

Kemp, MA ; Urban Institute, National Science Foundation UI-1212-2-1, NSF/RA/S-74-038, 1974, 52p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243408/2ST

25 097405 TRAVELER PREFERENCE FOR FARE ALTERNATIVES AS A TRANSPORTATION PLANNING INPUT. This paper deals with the effect of fare policy and transit service plans on mode-choice behavior. These issues were studied in the context of coordinating a new rail rapid transit service in San Francisco with the existing surface bus system in order to maximize the overall service level. To aid the process of simulating the effects of various bus and rail service plans and joint fare structures under study, a disaggregate model of sub-modal-choice behavior was developed. The model was calibrated with data collected in a field survey of bus patrons. These data were used to estimate the relative influence of fare level and time savings on sub-modal-choice behavior and to forecast the probable extent of rail rapid transit usage by current bus riders. Although the specific questions posed in this study were geographically unique, the underlying technical and policy issues could be applied to other similar situations involving the introduction of a new transportation service or facility.

Day, GS (Stanford University) Schmidt, JW (De Leuw, Cather and Company) *Transportation Research Record* No. 527, 1974, pp 45-58, 4 Fig., 2 Tab., 14 Ref.; This report was prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off

25 098657 SOME OBSERVATIONS ON URBAN TRANSPORT PRICING AND ITS RELATIONSHIP TO COMPREHENSIVE TRANSPORT PLANNING. Principles which have suggested current pricing policies are examined, and the economic analysis of urban transport policy as it has developed to date from the perspective of comprehensive regional planning is reviewed. The proposition is discussed that conditions are more favorable than in the early 1960's for the use of pricing techniques intended to control or induce transport system usage. The argument for, and criticism of marginal cost

pricing are presented. Urban pricing and planning objectives are examined as related to transport system development and user charges, toll bridge policy, transit fares and subsidies, and transportation control. The observation is made that prices are for rationing and that prices for financing are open to question. However, the rationing purpose is considered uncertain. While pricing may perform an important role, the trend in the institutional environment is toward de-emphasizing dependence on prices, at least those toward individual transport programs or operations.

Carll, RR (Metropolitan Transportation Commission) *Transportation Journal* Vol. 19 No. 3, Mar. 1975, pp 18-29, 12 Ref.

25 127466 REPORT TO CONGRESS CONCERNING THE DEMONSTRATION OF FARE-FREE MASS TRANSPORTATION. This report provides information consistent with that required in Sections 204 and 205 of Title II of the National Mass Transportation Assistance Act of 1974. It surveys briefly the current state of knowledge with regard to the benefits and costs of fare-free transit, and describes the essential elements of a demonstration program. Advocates of fare-free transit claim that it would improve the efficiency of the transportation system as a whole, would help transit systems (in particular) operate more efficiently, and would assist certain groups within the population. Others are skeptical about the ability of across-the-board fare subsidies alone to encourage people to forsake private automobiles in favor of public transit. They are also doubtful of the magnitude of potential transit system efficiency gains and the relative effectiveness of low fares in assisting certain population groups. Thus, the overriding objectives of publicly-funded demonstrations of transit fare abolition is to provide definitive answers about the costs and the efficacy of fare cuts in achieving their goals, such as increased ridership. This objective has two important implications. The first concerns the experimental content of a demonstration program. In particular, the programs should not be concerned solely with the feasibility of financing transit through means other than the farebox; they must address a much wider range of concerns, including such questions as: what is the patronage response to fare elimination, how does fare abolition impact on the transportation system as a whole (speed, congestion, emissions, fuel consumption, etc.), what groups of the population benefit from fare-free service and to what degree, and what are the impacts on local employment levels, on retail trade, and on local firms. The second implication is that experiments should be designed so as to test the concept under those circumstances in which it is thought to stand its greatest chance of success.

Urban Mass Transportation Administration July 1975, 30 pp, Tabs., Refs., 2 App.

25 128255 DISTRIBUTIONAL EQUITY AND OPTIMAL PRICING OF URBAN TRANSPORT. A theoretical model is developed for the pricing of urban transport that takes into account the three related problems of rationing, investment and income distribution. Feldstein's technique is used and it is shown that when the distributional aspect of pricing is considered

pricing deviates from marginal cost pricing. It is shown that price also deviates from marginal cost when various "second best" constraints are introduced. Four cases of urban transport, which has two alternative modes, automobile and bus transit, are considered. In the first case marginal cost pricing yields Paretian efficiency, but concern for distributional equity requires price to deviate from marginal cost. The second case introduces a budget constraint. The third case considers a situation where automobile users pay only average cost; in this case a bus subsidy is justified on grounds of efficiency as well as equity. The last case considers the capacity constraint of the highway system.

Abe, MA (Marquette University) *Journal of Transport Economics and Policy* Vol. 9 No. 2, May 1975, pp 178-185, 10 Ref.

25 128958 TRANSPORT PRICING POLICIES AND EFFICIENT URBAN GROWTH. Urban growth is assumed to depend on the balance between advantages of urban employment and the costs of public and private transport. With constant money prices or average cost pricing of buses (free competition), growth is towards a small congested city, with a period of urban decay when congestion and all travel costs are increasing although the city is shrinking. Marginal social cost pricing of both modes removes this dynamic inefficiency and leads to much larger cities with faster transport services. Short-run effects and profitability are found to be poor indicators of the long-run implications of policies. /Author/

Glaister, S (London School of Economics and Political Science) *Journal of Public Economics* Vol. 5 No. 1,2, Jan. 1976, pp 103-117, 2 Fig., 1 Tab., 24 Ref.

25 129518 RED ARROWS-BOARDING TIMES WITH ALTERNATIVE FARE COLLECTION SYSTEMS. The planned introduction of new buses on red arrow routes provides an opportunity to adopt a more standard method of fare collection. Various alternatives are being evaluated for bus management, and as part of this exercise the boarding times are estimated here for each alternative. The sensitivity of boarding times to the "easiness" of the fare, and to change giving is shown. The range in marginal boarding time is from 1.5 to 4.2 seconds per passenger- compared with 2.4 per present red arrows. The corresponding effect on round trip time in the evening peak is from A saving of about 1 1/4 minutes to an increase of nearly 2 1/2 minutes in a total round trip time of 35 to 40 minutes. The results are summarised in the table at the end of the memorandum. (A) /TRRL/

Cohen, NJ Marshall, J ; London Transport Executive R&D Rept. OR Memo M290, May 1974, 4 pp, 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 213632)

25 129598 FARE DEAL. YOUR CHOICE. The aim of this consultation paper is to give information on London transport's rising costs and to ask the general public for comments on the future running of the system. The three alternatives which can secure extra money to maintain and improve existing bus and underground services are listed: (1) fares to go up to meet all increases in costs, (2) rates and fares to go up to meet increases in costs, and (3) fares to be kept steady

and rates alone to go up. A further choice between different ways of structuring fares has also to be made; this applies particularly to buses as there is very little opportunity for further simplification of underground fares. The three alternative fare structures are: flat fare, simplified fares, and graduated fares. /TRRL/

Greater London Council R&D Rept. No. 7168 06 58 8, 1974, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-215041)

25 131702 EXPLODING THE MYTHS OF PREPAID TRANSIT. The legislative framework for prepaid transit is presented, some inaccurate conceptions regarding such transit are clarified, and the potential applications of prepaid transit to solve local transportation problems are discussed. The National Mass Transportation Assistance Act of 1974 provides federal operating assistance for public transportation and sponsors prepaid transit demonstrations. An excerpt from the Act is presented. Demonstrations have shown that prepaid transit is a promising pricing alternative in the urban transportation environment. It may be used as a transportation habit breaker, and could even be part of a long-term plan to minimize operating deficits through reimposition of fares after free service. In conventional rapid transit systems, free transit might find an application as a cost-cutter. During some periods of the week, it sometimes costs more to staff the collection booth than the revenue generated; prepaid transit is better than the 2 alternatives, namely closing the station or provision of normal service. Prepaid transit can also find application as a method of income distribution. The question of long-term operation of a free public transit service, however, should be tried on a demonstration basis. In such a demonstration, the full potential of such transit can only be realized if it is coordinated with extensive service improvements, capital improvement and marketing.

Scheiner, JI (Simpson and Curtin) *Transit Journal* Vol. 2 No. 1, Feb. 1976, pp 57-64, 2 Tab., 10 Ref.

25 132641 THE IMPACT OF FARES-FREE PUBLIC TRANSPORT UPON URBAN LAND USE AND ACTIVITY PATTERNS. This paper investigates the possible changes in the structure of a city arising from the introduction of free public transport. In general, it can be argued that land rents fall as one moves away from the city centre, at a rate corresponding to the extra cost of transport to the centre, while density of development also decreases because more space is available at larger distances from the centre. If travel costs decrease because fares are eliminated, the rent gradient will tend to flatten, and this will eventually lead to a general decrease in density of development, and the further spread of the city. The authors discuss various extensions to this basic principle, taking into account, for example, that travel costs involve time as well as money, so that choice of where to live involves a consideration of how much time, from an available time budget, can be spent on travel. The model uses an expression for generalised cost which is proportional to distance travelled; setting of fares to zero halves this travel cost for public transport passengers. The model, which is of the "gravity" type, has been calibrated for the west midlands conurbation, where a fares-free policy is being consid-

ered, and construction and validation of the model is described briefly. Introduction of zero fares into the model produced an appreciable shift of population from the core of the conurbation to the periphery, with inner Birmingham losing most residents, while central Wolverhampton and Walsall suffered smaller losses, and the outer suburbs making the greatest gains, with a smaller amount of resettlement in the area between the different city centres. On the assumption that zero fares reduce public transport generalised travel costs by 50%, about 10% of those workers who use public transport will be involved in the ensuing relocation (i.e. About 5% of the total population); for a smaller reduction in generalised travel cost the amount of relocation is proportionately smaller.

Batty, M Hall, P Starkie, D ; Reading University, England Monograph Paper No. 26, 1974, 22 pp, 4 Fig., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216295)

25 134023 FARE COLLECTION SYSTEMS: A REVIEW AND PROGNOSIS. Up to the mid 1960's subway fare collection was restricted to the single coin (or token) operated turnstile. About 1965 several major companies with backgrounds in electronics and computer technologies entered the market to develop new types of equipment. In 1909 the Johnson Fare Box Company installed the first patented recording fare boxes. In 1922 the same company developed the automatic fare box which provided visible and audible registration and inspection. The floor-mounted system came with the inception of the exact fare system. The operation of the vacuum revenue processing system is described, as well as the Keene registering fare box. Details are outlined of the Duncan Faretronic Registering Bus Farebox, Cubic Corporation's automatic system, the Abbott Coin Counter, Diamond Manufacturing Inc's fare boxes, and Perey Turnstiles. The collection of statistical ridership data on magnetic tape cassettes while issuing tickets and cancelling coupons is also described. The use of tokens is reviewed.

Metropolitan Vol. 71 No. 6, Nov. 1975, pp 14-28

25 134060 WILL MTR PAY FOR ITSELF? The article discusses the new Hong Kong rapid transit network that is now under construction. The development of the plans for the system are outlined and the network is explained briefly. Comparisons with other rapid transit systems are made with regard to viability. It is suggested that the line will be profitable because of the very high residential densities and ribbon development. The simultaneous development of housing and other property along the route is aimed at further enhancing profitability. The financing of the project and the contracting arrangements are given particular attention. There is a final note concerning the increasing role of the minibus in providing for Hong Kong's travel needs. /TRRL/

Ferguson, H *New Civil Engineer* No. 168, Nov. 1975, pp 38-41, 2 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 217151); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England

25 136974 THE CONSEQUENCES OF TRANSIT FARE AND SERVICE POLICIES: A CLASSIFIED BIBLIOGRAPHY. The bibliography is concerned with the consequences—

specifically the ridership and cost implications—of various policies regarding service and fare levels for urban public transit. Cited publications are classified under separate headings for ease in reference. These are: the demand for transit service; fare and service elasticities of demand; transit operating costs; the economics of transit pricing; public subsidies for transit operations; low-fare and no-fare transit; transit fare structures; transit fare and the distribution of income; transit and the transportation disadvantaged; transit planning, operation and evaluation; marketing transit; and general reference material.

Kemp, MA Rea, RL ; Urban Institute, Urban Mass Transportation Administration, (UMTA-DC-06-0120) Working Paper-505012, UMTA-DC-06-0120-76-3, Apr. 1976, 40 pp; Contract DC-06-0120; ACKNOWLEDGMENT: NTIS, Highway Safety Research Institute (HSRI-36016); ORDER FROM: NTIS; PB-253101/OST, DOTL NTIS

25 137789 FREE PUBLIC TRANSPORT-CAN IT WORK? Arguments for and against free or reduced rate transport policy are put forward. The aim described is to reduce the use of private cars and thus the need for large road investment programmes. An account is given of recent legislation in connection with public transport. The economic factors affecting transport in London are reviewed and figures given include changes in population and car-ownership. The advantages of cheap public transport are discussed including its social desirability and resulting reduction in congestion. Problems include the overall costs, through traffic and integration with other fare-paying services. When other factors are considered, cost is found to be low on the transport-user's list of priorities. It is concluded that a dogmatic approach to cheap fares will not provide an adequate solution to the conurbation transport problem. /TRRL/

Thompson, D *Accountancy* Vol. 86 Nov. 1975, pp 26-30, 4 Fig., 1 Phot., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219357)

25 142363 FAIRTRAN: OPERATION OF A CREDIT-CARD TRANSIT FARE SYSTEM. An Urban Mass Transportation Administration demonstration project has been implemented in the Lower Naugatuck Valley of Connecticut. The purpose of the demonstration was to provide a unified public transport service aimed primarily at the needs of health and social services and their clients. An entirely new fare system was devised to overcome problems in the pricing of multiple, coordinated service modes, to provide for accountability to third-party fare support sources, and to put into practice new ideas on fare equity and pricing. The fare system, FAIRTRAN, involves use of punch-coded credit cards specially issued for the project. Ride data are recorded on magnetic tape cassettes on board the vehicles and are processed remotely at a central computer; rides are billed monthly. An option, Fareshare, allows selective financial support of individual riders in contrast to shotgun subsidies now in practice. The demonstration has shown the system to be workable. Operational changes in hardware and software will be made in a second 3-year demonstration. As yet, fare system costs appear to be several times higher than conventional coin system costs, but benefits of data

collection, elimination of coin handling (and out-of-pocket bias), pricing flexibility, and Fare-share have to be considered on balance. /Author/ Nelson, G (RRC International, Incorporated) *Transportation Research Record* No. 590, 1976, pp 26-30, 3 Fig.; ORDER FROM: TRB Publications Off

25 142958 SYNTHESIZING TAXICAB IMPROVEMENTS. Dade County, Florida has taken major steps to address all components of its public transportation system. This includes a recent study of the administrative and operational aspects of the area's taxicab system--the first project of this type in the country. As part of the study, a submodal split model was developed to quantify the relationship of taxicab ridership to that of all public transportation modes. The model was employed to test operational improvements such as taxicab pooling, advantaged flow taxicab service, central dispatch of all taxicab operators (with and without computer assistance), and various fare reductions. The results indicate possible expansions in 1985 taxicab patronage of between 5% and 10% over that expected without any improvements in the Dade County taxicab system. Significantly, if nothing is done to improve taxicab operations, by 1985, the soon-to-be-developed rapid transit system will limit taxicab service to no growth in its percentage share of the trip market and, in fact, divert a number of longer trips from this latter mode.

Corradino, JC Schimpeler, CC Sexton, BJ (Schimpeler-Corradino Associates) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE4, Nov. 1976, pp 793-804, 2 Fig., 6 Tab., 2 Ref., 1 App.

25 145426 SEASON TICKETS ON REGIONAL PUBLIC TRANSPORT [Laenskort i kollektivtrafiken]. In order that all members of society may have the same access to transport facilities, both local and regional public transport should operate on the basis of subsidized fixed-price monthly season tickets. About 50% of Sweden's population lives in municipalities where this system has been introduced. Season tickets usually cost skr. 50 (skr. 70 in Stockholm County). In order that such a system should work, all local and regional traffic in a county should come under one undertaking, to be made up in variable proportions by the county and the primary municipalities in the county, which will also apportion the deficit in travel costs due to the introduction of the season ticket. These undertakings should be established over a 3-year period; if no agreement is reached by the end of 3 years, they are to be constituted in a stipulated manner. Counties usually constitute a natural traffic area; however, if the population of a municipality must travel to another county, provision can be made for the municipality to come under that county. Guidelines are given on agreements between the bus companies regarding payment of the subsidy. Finance for the system is now being investigated by another commission. /TRRL/ [Swedish]

Kommunikationsdepartementet Sou 1976:43, 1976, 357 pp, Figs., Tabs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN39003E), TRRL (IRRD 222966)

25 148120 D.A.S.H.-WINNEPEG'S FREE DOWNTOWN AREA SHUTTLE. This paper outlines the D.A.S.H. concept of public transit. It

includes discussion of the service its benefits and the cost of operation of the D.A.S.H. service. Public reaction and the degree success fullness are also discussed briefly. /RTAC/

Borland, RL; Roads and Transportation Association of Canada Proceeding Report Number 7, Sept. 1975, pp 3-22, 7 Fig.; This paper was presented at the Annual Conference held in Calgary, 1975.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

25 148724 REDUCED FARE AND FARE-FREE URBAN TRANSIT SERVICES--SOME CASE STUDIES. This paper present case studies of the effects of low-fare and fare-free policies adopted in several American and European cities. There is a general introduction to the concept of travel demand elasticities, and it is pointed out that because the elasticity with respect to fare is usually small, any reduction in fares will lead to loss of gross revenues and small ridership increases. Elasticity with respect to level of service offered is generally higher, and service improvements may have a relatively greater effect on patronage. /GMRL/

Kemp, MA; Urban Institute Paper No. 1212-3, July 1974, 37 pp; ACKNOWLEDGMENT:

25 149010 HIGHER RAIL FARES WILL HIT LONDON JOBS-PLANNERS. The authors develop the arguments put forward by the Standing Conference on London and South East Regional Planning against the green paper suggestion of eliminating rail subsidies in the south east on all but London inner suburban services. It is disputed that the majority of commuters can afford to pay more and suggested that they often commute long distances from areas where they have been able to obtain cheap housing. A detailed discussion is given of the importance of commuter railways to the economic activity of London and the effects that any price rises would have particularly in encouraging the trend of decentralization. /TRRL/

Smith, J (Greater London Council) Copsey, D *Surveyor - Public Authority Technology* Vol. 148 No. 4390, July 1976, pp 19-21, 2 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 223667); ORDER FROM: ESL

25 149059 FARE POLICIES FOR MASS TRANSIT DEFICIT CONTROL: ANALYSIS BY OPTIMIZATION. This paper reports on the analysis of a substantive problem in public policy planning. A dynamic model of demand, supply, cost and revenue relationships in the market for mass transit services in New York City is developed. This behavioral model is then placed in a deterministic optimal control framework to solve for the dynamic sequence of transit fares which optimize several plausible policy objective functions. Among the objective functions used are minimization of operating deficits and fare minimization subject to deficit constraints. The importance of multi-year planning for mass transit pricing policy is clearly established. We also present one way of describing efficient sequences of transit fares in the presence of ignorance of the policy-makers' ultimate objective function. Although the empirical results pertain to New York the analytical techniques seem to have general applicability to other mass transit systems. /Author/ /TRRL/

Garbade, KD (New York University, New York) Soss, NM *Transportation Research Analytic* Vol. 10 No. 4, Aug. 1976, pp 237-247, 6 Tab., 15 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 223669); ORDER FROM: ESL

25 149868 THE EFFECT OF FARES ON BUS PATRONAGE. This report reviews the information available on the elasticity of bus patronage with respect to the fares charged, both in the UK and in other countries. Estimates of overall fares elasticity obtained across individual fares changes, from time-series analysis and from cross-sectional data are all consistent with a typical mean value of -0.3 in a range from -0.1 to -0.6. These values appear to be much the same in the different countries from which the data was obtained, and they have been stable over time. Elasticities at off-peak travel times seem to be about twice those in the peak, short-distance elasticities are larger than those for long journeys, demand from 'non-captive' passengers may be twice as elastic as that from 'captive' passengers, and urban rail travel is found to be only half as elastic as bus travel. (a) /TRRL/

Bly, PH (Transport and Road Research Laboratory); Department of the Environment, England, (03051293) Lab Report 733, 1976, 23 pp, 8 Tab., 43 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 224036)

25 151727 STUDY OF THE TRANSPORTATION PROBLEMS OF THE TRANSPORTATION HANDICAPPED. OFF-PEAK HALF-FARE STUDY INVENTORY REPORT. The study dealt with off-peak half-fare transportation services for the handicapped. This report contains 106 listings of half-fare practices on transit systems, as well as a description of two state-wide programs, in New Jersey and Pennsylvania, that apply to all transit systems participating in such programs. The 196 listings include 163 of the urbanized areas eligible for Section 5 funds and covers a total of 241 transit operators. Of the 196 listings, 153 have been obtained from applications approved by UMTA, and 43 from applications which are still pending.

Grey Advertising Incorporated, Chase Rosen and Wallace Incorporated, Smith and Locke Associates Incorporated, Urban Mass Transportation Administration, (UMTA-NY-06-0054) UMTA-NY-06-0054-77-1, 209 pp; See also PB-263 868. Prepared in cooperation with Chase, Rosen and Wallace, Inc., Alexandria, Va., and Smith and Locke Associates, Inc., Washington, D.C.; Contract DOT-UT-60047; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263867/4ST

25 151728 STUDY OF THE TRANSPORTATION PROBLEMS OF THE TRANSPORTATION HANDICAPPED. OFF-PEAK HALF-FARE STUDY. TEN CASE STUDIES. The report discusses the half-fare programs in Austin, Texas; Chicago, Illinois; Kalamazoo, Michigan; New York City; Commonwealth of Pennsylvania; Roanoke, Virginia; Sacramento, California; San Diego, California; Spokane, Washington; and Oneida-Herkimer counties, New York.

Grey Advertising Incorporated, Chase Rosen and Wallace Incorporated, Smith and Locke Associates Incorporated, Urban Mass Transportation Administration, (UMTA-NY-06-0054) UMTA-NY-06-0054-77-2, Oct. 1976, 134 pp; See

also PB-263 867. Prepared in cooperation with Chase, Rosen and Wallace, Inc., Alexandria, Va., and Smith and Locke Associates, Inc., Washington, D.C.; Contract DOT-UT-60047; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263868/2ST

25 153330 DECLINING PUBLIC TRANSPORT: IS CAR OWNERSHIP TO BLAME? The authors give reasons for their disagreement with the generally held principle; they contend that changes in fare levels have been far more influential and that Department of Transport's fare index underestimates real increases. The relationship between car ownership and the usage of road public transport when compared with the expected change in stage passenger journeys using the D.T.P formula shows that increasing car ownership explains only a relatively small proportion of the decline. Analysis of the national travel surveys indicate that about two thirds of the loss in patronage is due to other factors. The authors claim that the estimated 11 per cent decline in patronage due to the increased fares in real terms amounts to another 30 per cent of the observed decline. The evidence given in the paper suggests that more weight should be given to the effects of price on bus travel as opposed to changes in its quality. /TRRL/

Heggie, IG Bailey, JM (Oxford University, England) *Progress in Planning Analytic* Vol. 149 No. 4413, Jan. 1977, pp 9-11, 2 Fig., 1 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-224579)

25 154043 TRANSIT FARE PREPAYMENT. Fare prepayment encompasses all methods of paying for transit rides other than by cash, namely, tickets, tokens, punch cards, passes, and permits. The purpose of this study is the examination of the overall ridership and revenue impacts of ongoing and completed prepayment programs. The study examines past and current experience with fare prepayment programs and draws conclusions concerning their potential. The major objectives of this study are the following: (1) To survey ongoing and completed transit fare prepayment programs; (2) to identify key features and problems related to prepayment; (3) to measure public response to fare prepayment; (4) to assess advantages and market potential of fare prepayment; (5) to analyze cost-effectiveness of fare prepayment; and (6) to identify the best application of and implementation structures for fare prepayment.

Hershey, WR Forkenbrock, DJ Berla, MJ Miller, BA Dewey, ME ; Huron River Group, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) DOT-TSC-UMTA-76-7, Aug. 1976, 188 pp; Contract DOT-TSC-1056; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265227/9ST

25 156504 A FARE DEAL FOR PASSENGERS. Problems arising from the reorganization of local government regarding public transport are discussed. The main problem is that bus operating territories were not considered and municipal operators are still confined to the boundaries prior to reorganisation. This means that in a district there are often differing fare scales and differing rates of concession. The

article uses the borough of Blackburn as an example, where there are three different fare structures within the borough. The formation and structure of the present transport undertaking, which is within the operating areas of greater Manchester and Ribblesdale (nbc) is described. The undertaking believes in making small but fairly frequent increases in fares. By using this method, passenger resistance within the borough is about half that of many operations in Lancashire. Mention is made of concessions granted to old and disabled people and of the problem of congestion at heavy schools peaks. Traffic congestion problems have been relieved by the redevelopment of the town centre and the introduction of some one-way traffic management schemes. Details are given of the size of the fleet and of the efforts made by the borough transport committee to rationalise fares and coordinate services. /TRRL/

Jewell, M *Coaching Journal and Bus Review Analytic* Vol. 45 No. 4, Feb. 1977, pp 38-40, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-225393)

25 157963 OPTIMAL TRANSIT PRICES UNDER INCREASING RETURNS TO SCALE AND A LOSS CONSTRAINT. The optimal/pricing for transport on different modes uses as examples the Bay Area Rapid Transit and the Alameda-Contra Costa Transit which provide rail transit and bus service, respectively, to a portion of the San Francisco region. The welfare maximization process developed by Bioteux for the French National Railways is followed by a modal choice procedure to estimate marginal and average costs. The cost estimates are used to estimate prices which should be charged by BART and AC Transit.

Train, K (California University, Berkeley) *Journal of Transport Economics and Policy* Vol. 11 No. 2, May 1977, pp 185-194, 1 Fig., 13 Ref.; Research sponsored in part by grants from the National Science Foundation.; ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England

25 158354 USE OF COMPLIMENTARY PASSES TO IMPROVE RIDERSHIP ON BUS TRANSIT SYSTEMS. The research described examines a complimentary pass package distribution in terms of its ability to attract new passengers to urban bus transit lines. Part one of the study examines, by means of a survey of transit operators, any past uses of complimentary pass packages to a random sample in a selected city and determined subsequent pass utilization by various market subgroups. An attitudinal survey of pass recipients' feeling toward various transportation issues is also conducted.

Brogan, JD (Tennessee University, Knoxville) Heathington, KW Satterly, GT, Jr *Transportation Planning and Technology* Vol. 3 No. 2, 1976, pp 103-114, 12 Ref.; ACKNOWLEDGMENT: EI, TRRL (IRRD-220952); ORDER FROM: ESL

25 159599 NO-BARRIER FARE COLLECTION. This paper reviews a study performed by the Metropolitan Atlanta Rapid Transit Authority on the feasibility of a no-barrier fare-collection system and discusses the potential of this self-service concept in the United States. No-barrier fare collection (often referred to as self-service or

automatic) is widely used in Western and Eastern Europe to handle fare-collection requirements. It is not used anywhere in North America, and good information on European experience with it is sparse at best. The assumption that cheating would be rampant in the United States if this concept were employed has unrealistically dominated discussions of it and overwhelmed any rational analysis of its benefits. This study found no large propensity to defraud; it estimated that 3 to 5 percent of daily passengers could be expected to evade fares. This figure is larger than that found in European cities, but can nevertheless easily be handled. The no-barrier fare-collection concept thus appears to have a good potential in the United States, particularly for certain applications. One of these is for integrated bus-rail systems using zone fare structures and another is for light rail systems.

Padron, M Stanger, R (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 614, 1976, pp 21-26, 2 Tab., 4 Ref.; This article appeared in TRB Research Record No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

25 159718 TWO-TIER FARE TARIFFS-A NEW MARKETING CONCEPT IN PUBLIC PASSENGER TRANSPORT? [Zweitellige Fahrpreise--Ein Neues Marketinginstrument im Personennahverkehr?]. In analogy with electricity and telephone users who pay a monthly fee for connection to the system together with a relatively low price per unit used, while the customer who does not pay a connection charge pays more for his consumption, a two-tier fare structure for passengers using public transport has been suggested. Although a long term experiment in a particular town was discontinued after initially favourable reaction from customers, the two-tier tariff is again being discussed. It is now even less likely to be well received by passengers or to offer any advantages for transport undertakings. /TRRL/ [German]

Gutknecht, R *Nahverkehrspraxis Analytic* Vol. 23 No. 5, 1975, pp 197-200, 2 Fig., 3 Ref.; ACKNOWLEDGMENT:

25 163127 FARE ELASTICITIES ON INTER URBAN AND RURAL BUS SERVICES. The principal aim of this study was to establish a series of values for fare elasticity for different types of bus service outside major urban areas. A selection of routes were sampled and surveys are described in the Sheffield-Doncaster area and the Morpeth area. The routes were chosen to include inter-urban, rural and small town services, to determine the short and medium term effects of a fare increase. The study was to examine not only the number of journeys, but also the changes in journey length and purpose. /TRRL/

Heels, P White, PR ; Polytechnic of Central London, England Monograph No. 4, Feb. 1977, 77 pp, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD-226053)

25 163543 USER-SIDE SUBSIDIES FOR SHARED RIDE TAXI SERVICE IN DANVILLE, ILLINOIS: PHASE I. An UMTA Service and Methods Demonstration has been implemented in Danville, Illinois. The purpose of the demonstration is to test the use of a user-side subsidy on a shared ride taxi service for handi-

capped and elderly persons. This report presents time series and survey data analysis on the workability, cost-effectiveness and impacts of the project during Phase I. The demonstration has proven that a user-side subsidy can be workable and cost effective. Project demand has been moderate and costs per passenger trip have proven to be very low. Members of the target group and general public have responded very favorably to the project. UMTA and the Project Staff are now planning an expansion of the demonstration to include a user-side subsidy for all persons on privately operated regularly scheduled fixed route service. /UMTA/

Fitzgerald, PG ; Crain and Associates, (DOT-TCS-UMTA-77-19) UMTA-IL-06-0034-77-1, June 1977, 234 pp, 9 Fig., 33 Tab., 12 App.; Sponsored by DOT, UMTA, Office of Transportation Management and Demonstrations.; DOT-TSC-10 81

ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-292805/95T

25 164023 LOW FARE AND FARE-FREE TRANSIT; SOME RECENT APPLICATIONS BY U.S. TRANSIT SYSTEMS. The purpose of this report is to provide a reference document describing succinct case studies of the experience accrued by more than 40 U.S. transit systems which have introduced fare-free of reduced-fare services of one form or another in recent years. The report is a useful reference document for decision makers contemplating similar pricing policies as well as a preliminary planning guide to the UMTA for the development of demonstration programs to evaluate various transit pricing and service strategies. Many different types of fare reductions were identified. They are classified into five broad divisions: (a) systemwide fare reductions without any restrictions; (b) fare reductions applicable to specific geographical areas only--typically the CBD; (c) fare reductions which are operable only during limited hours--typically the off-peak hours; (d) fare reductions subject to both geographical and time-of-day restrictions; and (e) fare reductions of short duration implemented chiefly for promotional purposes. When viewed from the limited perspective of financial aspects of transit system operations it does not appear that fare reductions alone have had a favorable impact on the overall economic conditions of transit systems.

Goodman, KM Green, MA ; Urban Institute, (UI-5050-54) UMTA-DC-52-0002-77-1, Feb. 1977, 156 pp, 5 Tab., Refs., 1 App.; Prepared for the Department of Transportation, Urban Mass Transportation Administration.; Contract DC-52-0002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271077/05T

25 164289 REDUCED FARES OR INCREASED FREQUENCY? The report comments on the argument for using bus service subsidies to increase vehicle mileage and quality of service rather than reduce fares. This course of action, it is argued, will lead to a larger increase in passenger demand than reducing fares. This conclusion is partly based on a simple model of the bus industry which suggests that a subsidy used to reduce fares by 10% will lead to a 3% increase in passenger demand (either number of journeys or passenger km), whereas if it was used to increase vehicle km by 10% it will lead to a 7% increase in passenger demand. This paper casts

doubt on the simple model used and the parameter estimates, especially the elasticity of passenger demand to vehicle km. /TRRL/

Black, IG ; Warwick University, England Monograph Working Paper 35, Oct. 1976, 10 pp, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 226967)

25 165748 EVALUATION OF REDUCED CARPOOL COMMUTER TOLLS ON THE CONNECTICUT TURNPIKE. This report presents the results of a study to evaluate the effects of reduced commuter tolls on the formation of carpools on the Connecticut Turnpike. The evaluation was conducted by surveying present carpool ticket users and incorporating the results of a previous survey conducted in 1975. It was determined that the economic incentive associated with the present tolls was too small to attract a significant number of carpools. The present toll structure and ticket system has resulted in a significant growth in the use of regular commuter tickets as opposed to carpool tickets. However, the present carpool ticket users perceive a substantial benefit from the plan in light of the fact that the actual economic benefit is small. /FHWA/

Rothenberg, MJ Henry, RD Royer, DE ; JHK and Associates Final Rpt. FHWA-RD-77-30, Mar. 1977, 55 pp; Sponsored by DOT, Federal Highway Administration.; Contract DOT-FH-11-8242; ACKNOWLEDGMENT: Federal Highway Administration, NTIS; ORDER FROM: NTIS; PB-270517/AS

25 165767 MAGIC CARPET EVALUATION STUDY. MAGIC CARPET is the name of the Seattle fare-free CBD bus service that was initiated in a 105 block area of the CBD on September 9, 1973, and it is available 24-hours a day, seven days a week. The fare-free zone was initially proposed as a one year experiment to demonstrate whether or not the concept of free downtown bus service was desirable. The overall objective of Magic Carpet service is to attract auto person trips to the transit bus. This report presents the fare-free zone, Magic Carpet, evaluation project. It consists of a series of surveys aimed at measuring the effectiveness of downtown free buses in achieving the following objectives: 1) Improvement of downtown air quality; 2) Reduction of traffic congestion; 3) Conservation of gasoline; 4) Encouragement of peripheral parking; 5) Increase mobility; 6) Increase midday patronage (transit shopping trips); and 7) Stimulation of retail trade. Surveys in this report indicate that fare-free bus service is responsible for attracting at least \$5,000,000 in retail sales. The number of daily fare-free bus trips counted in June 1974 was 12,258, as opposed to the 4,100 daily bus trips made in the same area in 1973. The findings herein have encouraged the Seattle and Metro Councils to continue this service for at least two more years, at a cost to the City of \$100,000 per year. The Seattle experience emphasizes that downtown transportation systems can be designed and operated to give greater emphasis to within-CBD circulation as opposed to the traditional emphasis, namely, to and from downtown. The data herein should enable other cities to estimate how fare-free service would fit in their communities. /FHWA/

Seattle, City of, Washington, (WA-09-0012) Final Rpt. UMTA-WA-09-0012-77-1, May

1977, 110 pp; Sponsored by the Urban Mass Transportation Administration, DOT.; Contract WA-09-0012; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-271214

25 167863 COSTS OF URBAN AND SUBURBAN PASSENGER TRANSPORTATION MODES. Data from previous studies are used in this study of metropolitan Washington, D.C., which presents conclusions based on a qualitative evaluation of full costs of urban transportation modes, and upon the extensive list of assumptions required to generate them. An estimate is made of the full costs of alternative transportation strategies on a comparable basis, with emphasis primarily on the line haul portion of the system. It is assumed that the important parameters (e.g. travel time) are subject to policy control that is necessary to achieve a satisfactory balance in usage between modes. Intermodal cost comparisons presented here include: long run average costs, peak-period costs, costs under conditions of high vehicle occupancy, and some low-cost marginal alternatives. The financing of urban transportation is discussed with special reference to pricing and subsidies, public versus private costs, participation by nonlocal governments, and probable cost to a typical resident.

Lee, DB, Jr ; Iowa University Working Paper No. 14, Apr. 1975, 55 pp, 4 Fig., 17 Tab., Refs., 4 App.

25 168065 TRANSIT COSTS DURING PEAK AND OFF-PEAK HOURS. This paper discusses the relative costs of providing peak-hour and base transit service in Albany, New York, during a 3-month period between January and March 1976. It concludes that the total cost (operating and capital) per passenger was \$0.480 during the peak period and \$0.746 during the base period. It cautions against the application of these results to other properties because of differences in peak and base service requirements, demand profiles, and union work rules and concludes with a discussion of the implication of the results for transit fares by contrasting an economic viewpoint and a transit-operator viewpoint. /Author/

Reilly, JM (Albany Capital District Transportation Authority) *Transportation Research Record* No. 625, 1977, pp 22-26, 2 Fig., 5 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

25 168070 DIFFERENTIAL TIME-OF-DAY TRANSIT-FARE POLICIES: REVENUE, RIDERSHIP, AND EQUITY. This paper examines the financial, ridership, and equity implications of premium rush-hour fares of seven transit systems in New York State. Using 1973 data and demand equations that establish a relation between fare and ridership calculations are made to estimate changes in ridership and revenue in each of the cities for various peak and off-peak fare combinations. Graphs are plotted for each of the cities to determine the fare combinations that maximize ridership without decreasing revenue more than 5 percent and still improve equity. The results showed that, in all of the cities studied, no differential fare combination increases both revenue and ridership simultaneously. Certain combinations improve equity while increasing either ridership or revenue with a less than 5 percent loss

in the other. In Albany-Schenectady-Troy, Rochester, Syracuse, and Binghamton, combinations that increase passengers at the expense of a less than 5 percent decrease in revenue are attractive because of their flexibility. In New York City and Buffalo, combinations that increase revenue rather than passengers are attractive because no fare combination would increase passengers more than 5 percent without a loss of 15 percent or more in revenue. /Author/

Hartgen, DT Weiss, DL (New York State Department of Transportation) *Transportation Research Record* No. 625, 1977, pp 43-48, 8 Fig., 1 Tab., 2 Ref.; This article appeared in Transportation Research Report No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

25 169081 HINDRANCES TO COORDINATING TRANSPORTATION OF PEOPLE PARTICIPATING IN FEDERALLY FUNDED GRANT PROGRAMS. VOLUME II--CASE STUDIES. GAO studied transportation projects in 12 locations to determine the extent of coordination achieved by each project, the circumstances that made coordination possible, and the hindrances that impeded coordination.

General Accounting Office CED-77-119-Vol-2, Oct. 1977, 177 pp; Volume I in RRIS 25 169082; RRIS Bulletin 7802.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272838/4ST

25 169257 THE SAN DIEGO TRANSIT CORPORATION: THE IMPACTS OF FARE AND SERVICE CHANGES ON RIDERSHIP AND DEFICITS, 1972-1975. This paper is one of a series arising from a study of forty months' operating experience of the San Diego Transit Corporation (SDTC) bus system between 1972 and 1975. It reflects a concern with the increasing deficits of transit operators as well as the diversity contained within a single bus system such as that in San Diego. The principal objectives of this report are: (1) to provide a brief overview description of the bus system and of the data available for analysis; and (2) to present initial estimates of fare and service level elasticities for comparison with the many other estimates in common use among transportation planners, and examines SDTC's financial performance over this period. San Diego's experience of an expanding system at an approximately constant real cost per passenger were very unusual among transit operators in this period. Limited disaggregation of the systemwide data into major groupings of routes shows clearly that the systemwide analysis masks a great deal of heterogeneity within the system.

Goodman, KM Green, MA Beesley, ME; Urban Institute, Urban Mass Transportation Administration, (UMTA-DC-52-0002) UMTA-DC-52-0002-77-2, Working Pap 5066-5-1, May 1977, 46 pp; See also report dated Jun 77, PB-275 010, tape dated Apr 75, PB-272 753 and tape-users' guide dated Sep 77, PB-272 754.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-275009/9ST

25 170792 PRE-PAID FARE COLLECTION. There are various means to collect revenues from users of transportation services. One of the most convenient and cost-effective manner is by pre-collecting revenues. When revenues are pre-collected, there are several benefits to be gained. Quicker boarding and alighting times,

reduced manpower costs to collect and count revenue, increased security and public convenience are several key benefits derived when pre-paid, self-service systems are implemented.

Fischer, BE (Vapor Corporation); American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages. Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

25 172567 THE RELATIONSHIP BETWEEN DEMAND FOR URBAN BUS TRANSPORT IN HOBART AND BUS FARES. The optimum fare structure of a public transport undertaking depends on cost structure of the undertaking and the demand for public transport which the organisation is attempting to satisfy. This study derives from a consideration of these two factors. The first two sections of the study examine the demand characteristics of the market for urban bus travel and the relationship between these characteristics and the price of bus transport. The third section looks at the cost structure of the metropolitan transport trust, and the final two sections examine the various fare structures in common usage and suggest the most appropriate fare structure for Hobart's bus transport system. /Author/TRRL/

Tasmania Transport Commission Monograph 1977, 79 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-229991), Australian Road Research Board

25 175334 TRAVEL PATTERNS OF ELDERLY PEOPLE UNDER A CONCESSIONARY FARES SCHEME. This report investigates the movements of elderly people living on Tyne-side. It is based on four similar travel surveys conducted over a period of 16 months. Initially, old-age pensioners were entitled to a half-fare concession on buses in off-peak hours from Monday to Friday and all day Sunday. The last three surveys were carried out after the concession had been changed to zero-fare and extended to include Saturdays. The work investigates the overall patterns of travel by different modes and for different purposes, in relation to various personal and household characteristics, the effects of changing from a half-fare to a zero-fare concession; and the seasonal differences in travel patterns. It is estimated that the change in concession generated a 34 percent increase in the number of bus trips made. In early summer, 8 percent more trips were made than in early spring, the difference being mainly in recreational trips.

Skelton, NG; Transport and Road Research Lab., Crowthorne, (England). Newcastle-upon-Tyne Univ. (England). 80 TRRL-SUPPLEMENTARY-2, 1977, 40p; Prepared in cooperation with Newcastle-upon-Tyne Univ. (England); ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276755/6ST

25 176484 ELASTICITY OF TRANSIT DEMAND WITH RESPECT TO PRICE: A CASE STUDY IN NORTHERN VIRGINIA. The objectives of this research were to observe and report the elasticity of transit demand with respect to price (fare), to identify and quantify the

impact of a peak-period transit fare increase on automobile use in general and on car pools in particular, to determine whether a peak-period transit fare increase caused any measurable shift in passenger travel from peak to off-peak times, and to compare the point elasticities observed on the Shirley Highway express buses with those observed on traditional bus service in the same metropolitan area, as well as to determine whether elasticities observed for two qualities of transit service were significantly different. In addition, the observed elasticities of transit demand with respect to price will subsequently be compared with elasticities calculated from mode-choice models calibrated within the same environment. The comparison will serve as one validation procedure for the mode-choice models and, it is hoped, will provide useful insights into the question of model transferability. This report presents those preliminary and partial results that are currently available. The forthcoming final report will address the four objectives in greater detail. /Author/

Schofer, RE (National Bureau of Standards) *Transportation Research Board Special Report* No. 181, 1978, pp 40-41, 2 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

25 176488 THE USES AND LIMITS OF BRIDGE PRICING IN THE SAN FRANCISCO BAY AREA. Bridge pricing as a policy alternative and operating tool has only recently become a matter of serious consideration. Previously, travel behaviour was influenced primarily through regulation of available transit, that is, convenient, comfortable, and inexpensive transit was provided to reduce automotive travel, and then transit growth was restrained to maintain a desired balance. Because of increasing transit operating costs, ways of increasing Golden Gate Bridge District revenues become important in early 1975. It is noted that there are two corridors in which bridge pricing can be used as a tool to influence automobile and transit use. Public input on the concept of bridge pricing revealed a high degree of suspicion and the surcharge on single occupant cars was considered discriminatory and unconstitutional. Only through an effective pricing policy can the Golden Gate District financially support a balanced and integrated transportation system. Without an incentive policy, the district cannot as effectively influence automobile and private car or van poolers. It must rely on highly attractive transit systems to control automobile use and balance its systems. The key to moving forward, it is noted, is wide spread public discussion of the potential benefits that a pricing policy can produce when it is properly integrated with an overall transportation strategy.

Kuykendall, JM (Golden Gate Bridge, Highway and Transp District) *Transportation Research Board Special Report* No. 181, 1978, pp 51-52, 1 Tab.; This paper appeared in Transportation

Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

25 176524 COMPLEMENTARY SYSTEMS: INTEGRATING TRANSIT AND PARATRANSIT. Finds that the Knoxville, Tennessee transit deficit was budgeted for \$150,000 but was going to be \$500,000, the city considered a whole range of alternative transportation programs. One approach was to consider urban transportation in general, rather than just the transit operation. By working with several industries around Knoxville, a fairly sophisticated matching program was developed. Van pool, express bus, car pool, regular transit service, taxis, airport limousines were all drawn into the system. Knoxville also developed the brokerage concept. The concept attempts to determine which transportation sources could be contracted for at a reasonable cost. As a result of this program, a fairly large fleet of church buses, vans, and other private vehicles is integrated into the services that transit can offer in the area one of the area's longest employees, TVA which has the largest ongoing private program, is spending about \$125,000 per year to provide transit services to its employees. A new service has also been proposed for the downtown area, i.e., a circulation system which will mesh all the brokered services that are coming into the downtown area. The benefits derived from these programs are discussed. Programs attempted in Sackeon are also outlined and discussed.

Heathington, KW (Tennessee University, Knoxville) *Transportation Research Board Special Report No. 181, 1978, pp 218-220*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

25 176529 CASE STUDIES ON INCREASING TRANSIT REVENUES: BALTIMORE. Baltimore's experiences in attempting to increase revenue in transit operations are discussed. Fares were increased and a new tariff system was proposed that was based on a concentric-ring zone system. The original 30 cent flat fare in the rather irregular zone was raised to a 35 cent off-peak fare and a 40 cent peak fare, with a 10-cent additional fare for each zone. Premium service was also made available. Special 15-cent tokens for senior citizens and handicapped persons were sold at various outlets. Careful fare-box control to assure that fares were collected, and checks are made to on how the driver handles the

fare-box system. Another source of revenue in Baltimore is the charter service and special service.

Addison, WJ (Maryland Mass Transit Administration) *Transportation Research Board Special Report No. 181, 1978, pp 230-231*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

25 176533 CASE STUDIES ON INCREASING TRANSIT REVENUES: CLEVELAND. Cleveland has a multimodal system: both heavy and light rail, a bus system, and paratransit services for the elderly and handicapped—a good portion of the program is contracted out to taxicab operators. The Cleveland Transit System (CTS) become part of the Greater Cleveland Regional Transit Authority (RTA). The years 1974 and 1976 were studied and figures are used to illustrate the percentage of passenger fares accounting for the system's revenue, the trend of average weekday ridership, the monthly passenger revenues, the sales tax receipts, and the comparison of operating revenues in 1974 and 1976.

Yuratovac, DG (Cleveland Regional Transit Authority) *Transportation Research Board Special Report No. 181, 1978, pp 237-238, 5 Fig.*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

25 176581 TRI-MET AUTOMATED FARE BILLING SYSTEM. The fare collection technique studied in this report is that of automated billing, where information on each ride is recorded and a passenger is billed at the end of the month for the ride. The first use and successful operation of an automated billing system was in the Valley Transit District, serving the Naugatuck Valley, Connecticut. Hence, UMTA has decided that a similar system should be implemented in conjunction with a demonstration of special transportation services for the elderly and handicapped in a medium sized city. Portland, Oregon, was the site chosen for this demonstration; the Tri-County Metropolitan Transportation District of Oregon (TRI-MET) is the operating agency. This report describes the TRI-MET Automated Billing System that has been successfully introduced into service in Portland, TRI-MET is using an automated billing system as part of its Special Needs Transportation Project (The Lift) serving the elderly and handicapped. Users of the service are issued an encoded credit-card-sized plastic bus pass. Each

time a passenger rides the bus the card is inserted in an on-board car reader unit which records the code and other appropriate data on a tape cassette. At the end of each day's operation, data on the cassettes are transmitted to a computer center. Itemized billings and statistical reports are produced monthly. The authors state that the TRI-MET Credit Card Fare Collection is a major step forward in the introduction of cashless systems. /UMTA/

Strickland, LR ; Mitre Corporation, (OR-06-0004) UMTA-OR-06-0004-78-1, Dec. 1977, 49 pp; Sponsored by DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-275661

25 178632 MANAGEMENT OBJECTIVES, FARES AND SERVICE LEVELS IN BUS TRANSPORT. The author suggests that there appears to be a widespread assumption that public transport should, in the absence of any specific reasons for subsidy, be operated commercially in some sense. This suggestion, in relation to the task of the bus transport operator is discussed, and consideration is given to the implications of alternative management objectives for public transport in terms of fares, service levels and financial results. The discussion is developed in terms of a grossly simplified model of a bus company, and for the purposes of the discussion the internal efficiency of the operator is not considered. It is assumed that demand in terms of passenger miles is a function of price per passenger mile and the number of bus miles operated, but in a consideration of the cost function differences between routes and the problem of peak demand are ignored. The choice of alternative objectives for nationalised industries to price and output policies is discussed, and alternative commercial criteria subject to a budget constraint examined. A specific numerical example is presented to illustrate the discussion. /TRRL/

Nash, CA (Leeds University, England) *Journal of Transport Economics and Policy* Vol. 12 No. 1, Jan. 1978, pp 70-85, 1 Fig., 4 Tab., 15 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-232818)

25 178759 PEAK-BASE COST ALLOCATION MODELS. During the past several years, most transit agencies have been faced with the problem of rising deficits and limited tax resources to meet operating subsidies. For this reason, renewed emphasis has been placed on examination of the system's financial performance on a route-by-route basis. While route revenues can be determined by surveys and field counts, operating costs are more difficult to ascertain by route. Typically, the cost analysis has been conducted utilizing multivariable cost allocation models in which each expense account in a system is attributed to a particular resource (e.g., vehicle kilometers). This paper presents the cost analysis performed for the Metropolitan Transit Commission (Minneapolis-St. Paul) as part of the monitoring and evaluation program of the I-35W Urban Corridor Demonstration Project which tested the feasibility of express bus service on a metered freeway. The paper calls for the development of cost formulae that are sensitive to peak and base conditions rather than a single system-wide model. Also described in the paper is the development of labor productivity and service

indices which can be used to compute both peak and base unit cost factors. The theoretical derivation of the relationship between the unit cost factors with systemwide costs and the indices, as well as the application of this theoretical concept, are presented. /Author/

Cherwony, W Mundle, SR (Simpson and Curtin, Incorporated) *Transportation Research Record* No. 663, 1978, pp 52-56, 4 Fig., 2 Tab., 4 Ref.; This article appeared in *Transportation Research Record* No. 663, Recent Developments in Bus Transportation.; ORDER FROM: TRB Publications Off

25 178761 COST ANALYSIS OF CURRENT U.S. SURFACE TRANSIT FARE COLLECTION SYSTEMS (ABRIDGMENT). The objective of this analysis is to measure capital and operating costs associated with collecting fares. Six transit systems were visited to obtain data. This discussion addresses two broad categories of cost-direct and indirect. Direct costs are the quantifiable capital and operating costs. Indirect costs, not easy to quantify, are related to system-wide revenue loss, operator involvement in fare-related activities, and impact of fare collection procedure on the system's insurance liabilities. It is concluded that while the transit industry's current fare collection costs are inexpensive relative to total operating costs (less than two percent), its fare collection methods may not be efficient. By requiring exact change in the farebox for each and every ride, the patron must bear the administrative burden of payment, contrary to the dominant trend in private industry toward credit cards and other "convenience" payment forms. It remains to be investigated whether a more convenient fare collection system would generate enough additional revenue to offset higher transit agency fare collection costs.

Scheiner, JI Mundle, SR (Simpson and Curtin, Incorporated) *Transportation Research Record* No. 663, 1978, pp 60-62, 3 Tab., 3 Ref.; This article appeared in *Transportation Research Record* No. 663, Recent Developments in Bus Transportation.; ORDER FROM: TRB Publications Off

25 179023 DEMAND ELASTICITIES OF PER-MILE TRANSIT FARES. Distance-based transit fares are often proposed as a method of generating additional transit revenues while equalizing the costs patrons pay for service. This paper documents efforts undertaken by NYS-DOT's Planning Research Unit to estimate the demand elasticities of pre-mile transit fares. Using a 1975 on-board survey from Albany, N.Y., and the statistical tool, AID, five market partitions are developed which best explain the variation in frequency of bus use. These partitions are based on destination purpose, fare type, and county of residence. Disaggregate linear models are then constructed for each partition, relation frequency of bus use to fare-per-mile. Results show far-per-mile elasticities to be very low, ranging from 0 to -0.41, and showing greater sensitivity by discretionary non-habitual bus users. /Author/

New York State Department of Transportation Res Rpt. 138, Feb. 1978, 29 pp, 3 Fig., 6 Tab., 4 Ref.

25 179047 PREFERENCE ELASTICITIES OF TRANSIT FARE INCREASES AND DECREASES BY DEMOGRAPHIC GROUPS. Using a technique known as trade-off analysis, this paper shows how preference elasticities for transit fare increase and decreases can be estimated for different socioeconomic groups. Data for the analysis is drawn from a NYSDOT-sponsored survey of 1,000 households in the State, conducted in November 1974. Two notable conclusions are drawn: (1) preference elasticities for fare decreases are significantly lower than preference elasticities for fare increases; (2) fare-decrease elasticities vary for different stratifications of the population, while fare-increase elasticities are very nearly the same for all socioeconomic groups. /Author/

Donnelly, EP ; New York State Department of Transportation Res. Rpt. 89, Aug. 1975, 15 pp, 8 Fig., 1 Tab.; This paper was submitted for presentation at the 55th Annual Meeting of the Transportation Research Board, Washington, D.C., January 1976.

25 182600 AN INTEGRATED FARES POLICY FOR TRANSPORT IN LONDON. A common but disputed justification of public transport subsidy is that lower fares will encourage transfer from private vehicles, alleviating the congestion externality. A quantitative method is developed to judge the validity of this "second best pricing" argument and it is applied to the best available evidence on peak and off-peak bus, rail and private car models in Greater London.

Glaister, S Lewis, D *Journal of Public Economics* Vol. 9 No. 3, June 1978, pp 341-355, Refs.; ACKNOWLEDGMENT: Transportation; ORDER FROM: Elsevier North-Holland, Incorporated, 52 Vanderbilt Avenue, New York, New York, 10017

25 183026 EVALUATION: IOWA CITY BUS PASS SYSTEM. In July of 1976, the City Council of Iowa City raised the transit system fare to 25¢ per trip. At the same time the Iowa City Council approved a monthly bus pass system to ameliorate the impact of the increased bus fare. The user pass costs \$8.00 per month and allows for an unlimited number of trips during the month for which the pass is purchased. A survey was conducted to ascertain: who is using the pass, why they are using the pass and pass user opinions concerning the bus pass system. Who might benefit from purchasing the pass, but are not taking advantage of the bus pass system. /GMRL/

Dueker, KJ Rockwell, M ; Iowa University Technical Rpt No. 91, Sept. 1977, 18 pp;

25 183030 FREE TRANSIT FOR SENIOR CITIZENS IN PENNSYLVANIA. On July 1, 1973, the Commonwealth of Pennsylvania initiated a free transit program for senior citizens, representing the first commitment by any state to provide free public transportation for all older persons. With the voluntary cooperation of more than 70 private and public local transit carriers, serving more than 95 percent of all local-transit patronage in the state, the program provided an estimated 49 million free rides at a cost to the state of \$10.8 million during its first year of operation. Funded by the state lottery, these costs are the amounts that the participating transit properties receive for the estimated transit losses

incurred as a result of carrying senior citizens free of charge. The purpose of this article is to describe the results of a research study to assess the impacts of this senior citizens' free-transit program. The results are significant to the commonwealth and to other states that may be considering this means of increasing the mobility of its elderly citizens. /GMRL/

Hoel, LA (Virginia University) Millar, WW (Pennsylvania State University, University Park) Roszner, ES (GAI Consultants) *Traffic Quarterly* Vol. 31 No. 3, July 1977, pp 497-514;

25 183407 THE DIFFERENTIAL EFFECT OF TWO FREE RIDE DISSEMINATION PROCEDURES ON BUS RIDERSHIP. In an attempt to isolate the operating variables that increase transit ridership under conditions of free transit, the following experimental conditions were instituted on a university campus bus system: (1) dissemination of free transit tokens regardless of the subject's bus riding behavior (non-contingent free transit), (2) dissemination of one free token for each bus ride made by the subject (one-for-one contingent free transit), and (3) dissemination of three free transit tokens for each bus ride made by the subject (three-for-one contingent free transit). It was found that the requirement of a response contingency (i.e. a subject must ride to get additional free transit) produced greater transit usage than the dissemination of free transit regardless of the subject's bus riding behavior. Of the two response contingent conditions, the one-for-one contingent free transit condition produced ridership levels greater than the three-for-one contingent free transit condition. Additionally, trading of free transit tokens was highest under the non-contingent free transit condition. /Author/TRRL/

Everett, PB Deslauriers, BC Newsom, TJ Anderson, VB (Pennsylvania State University, University Park) *Transportation Research* Vol. 12 No. 1, Feb. 1978, pp 1-6, 1 Fig., 3 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233925)

25 183484 GUIDELINES TO ZONE FARE SYSTEMS. This is the Transport (Planning and Research) Act 1974 final report NMT 74/20. It examines the present methods of fare system (in Sydney) of public transport (both public and private enterprise) in which more than one mode of transport or breaks within a single mode of transport is involved. It then identifies problems if a single fare was to be charged. Modelling techniques are carried out using a single case not providing attraction from other modes. The model is tested on Sydney data to determine benefits disadvantages, social costs and feasibility of the single fare system. Further modelling was carried out for more complicated cases and again tested. Finally, guidelines were set out for zone fare system by way of models and methods to evaluate possible problems. /TRRL/

New South Wales Traffic Authority, Stapelton Transportation Planning Proprietary Ltd Monograph 1976, n.p., Figs.; ACKNOWLEDGMENT: TRRL (IRRD 234164), Australian Road Research Board

25 184600 TRANSIT PRICE ELASTICITIES IN ST LOUIS. An elasticity analysis of a sample of 65 express and local transit routes in the St.

Louis area, in both Missouri and Illinois, was undertaken to determine the effect of a November 1973 decrease in fares. (The zone system remained unchanged, and there was no change in level of service on the routes selected, so the fare decrease could be isolated as the factor in the any changes in ridership levels.) Two elasticity measures were used: arc elasticity (the ratio of the percentage change in transit utilization to that in price) and shrinkage ratio (the percentage change in ridership resulting from a one percent change in price). Although riders on four routes exhibited elastic behaviour, transit demand as a whole in the Bi-State region was inelastic to the fare reduction, perhaps because substantial ridership from the transit-dependent areas were already being attracted. In contrast to other urban areas, express riders in St. Louis exhibited more sensitivity to fare reduction than local riders. Ridership in Missouri was less responsive than that in Illinois, perhaps because the bus company operates far more service in Missouri and hence had already captured a substantial proportion of the market there. However, express transit demand in Illinois exhibited a composite arc elasticity of -1.0, the threshold between inelastic and elastic demand. (It should be noted, in that instance, that the sample size of four routes was too small to draw reliable conclusion.) The composite arc elasticity for all routes was -0.30, i.e. within the range observed in other cities. However, the conclusion of this study most important to those planning changes in an area's transit service is that ridership elasticity will vary with the type of route.

Mundle, SR (Simpson and Curtin, Incorporated) Weidemann, WE Roesch, SR (Bi-State Development Agency); Institute of Transportation Engineers 1978, pp 42-46, 3 Fig., 2 Tab., 7 Ref.; Paper from the Compendium of Technical Papers, Institute of Transportation Engineers 48th Annual Meeting, August 6-10, 1978, Atlanta, Georgia.; ACKNOWLEDGMENT: Institute of Transportation Engineers; ORDER FROM: Institute of Transportation Engineers, 1815 North Fort Myer Drive, Arlington, Virginia, 22209

25 184664 THE PUBLIC TRANSPORT TICKET EXPERIMENT [Het experiment openbaar vervoerkaart]. The "openbaar vervoerkaart" (public transport ticket) has been used by a number of persons for a trial period of a year. The ticket allowed unrestricted travel by all means of public transport for a low price. The experiment was accompanied by a number of inquiries. From these it has become clear that the ticket appeals especially to people already having relatively high public transport usage. As an effect of the ticket, the mobility of this group (in kilometres) rises sharply. Making the ticket available to the general public would lead to a large increase in the demand for public transport. Railway passenger kilometres would even double. As a result, the public transport deficit would increase by 700 to 900 million guilders a year (decrease of receipts and increase of running costs. /Author/TRRL/ [Dutch]

Baanders, A *Verkeerskunde* Vol. 29 No. 7, July 1978, pp 324-327; ACKNOWLEDGMENT: TRRL (IRRD-234857), Institute for Road Safety Research; ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands; PB 13432

25 185388 SAN DIEGO TRANSIT'S FARE INCREASE IN FISCAL 1976. THE CAUSE AND EFFECT. Changes designed to generate revenue through the farebox are reviewed and a judgement is made on the effectiveness of the proposals and their results in terms of ridership and revenues. The new fare structure was designed to: encourage an 18% increase in senior citizen ridership, essentially maintain the same level of youth riders allowing for a modest increase due to normal growth, reduce the number of regular riders by 13.2%, an average fare of 29 cents, and produce an additional \$2,086,000 revenue. It was found that ridership showed a steady 6% increase throughout the year (even though less than the increases realized in FY 73, 74 and 76). Senior citizen and handicapped riders increased substantially youth ridership also showed a very large increase. Saverpass sales increased 20.7% over last year and Saverpass ridership increased by 22.5%. The Saverpass, the lowering of the age of senior citizens' Goldfare eligibility to 60 and allowing college youths to rider on monthly passes all contributed to a lower than average fare. These factors caused the revenue to fall short of projected totals while ridership was 0.8% above projection. The loss of ridership due to fare increases was projected to occur at an elasticity -0.33. This proved to be correct for the basic fare category, while the positive elasticity for fare reductions proved to be below reality.

Snoble, R (San Diego Transit Corporation) *Transportation Perspectives* Vol. 1 No. 2, Dec. 1976, pp 35-45, 2 Tab.; ACKNOWLEDGMENT: *Transportation Perspectives*

25 186194 PUBLIC TRANSPORTATION FARE POLICY. The factors which affect transit fare policy can be grouped into three categories: institutional, demand, and pricing rationale. Institutional factors include fare trends, types of fares, fare collection techniques, and the role and objectives of the various groups involved in pricing transit. Demand factors are concerned especially with the responsiveness of transit users and potential users to changes in fares, in transit service characteristics, and in the perceived price of urban automobile trips. Pricing rationale or cost factors are concerned particularly with the cost characteristics of the production of transit services. This report identifies the issues with which any fare policy must deal, and presents information that will aid individual transit operators to resolve those issues in their own operations.

Dygart, P Holec, J Hill, D ; Peat, Marwick, Mitchell and Company, Department of Transportation Final Rpt. 289-51864-30-40, DOT/TPI-10/77/19, May 1977, 368 p.; See also PB-287342.; Contract DOT-OS-50134; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287341/2ST, DOTL NTIS

25 186195 PUBLIC TRANSPORTATION FARE POLICY. SUMMARY. The factors which affect transit fare policy can be grouped into three categories: institutional, demand, and pricing rationale. Institutional factors include fare trends, types of fares, fare collection techniques, and the role and objectives of the various groups involved in pricing transit. Demand factors are concerned especially with the responsiveness of transit users and potential users to changes in

fares, in transit service characteristics, and in the perceived price of urban automobile trips. Pricing rationale or cost factors are concerned particularly with the cost characteristics of the production of transit services. This report identifies the issues with which any fare policy must deal, and presents information that will aid individual transit operators to resolve those issues in their own operations.

Dygart, P Holec, J Hill, D ; Peat, Marwick, Mitchell and Company, Department of Transportation Final Rpt. 289-51864-30-40SUMM, DOT/TPI-10/77/20, May 1977, 30 p.; See also PB-287341.; Contract DOT-OS-50134; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287342/OST, DOTL NTIS

25 188324 AUTOMATIC FARE COLLECTION. This short bibliography provides a selective listing of literature relating to automatic fare, or revenue collection in public transport operations. The arrangement of the data is as follows: general transport operations, buses, rail (general, France, Japan, USA), and the United Kingdom. /TRRL

Brodie, M ; Greater London Council, (7168 1011 5) Monograph GLC Res Bibliog 94, Apr. 1978, 10 p., 50 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-236339); ORDER FROM: Greater London Council, County Hall, London SE1 7PB, England

25 189344 TRENTON FREE-FARE DEMONSTRATION PROJECT. The "Trenton Free-Fare Demonstration" is the first large-scale test of free transit in the U.S. The New Jersey Department of Transportation, in cooperation with UMTA, Mercer County, and Mercer County Improvement Authority, is administering an Off-Peak Free-Fare Demonstration Project on the Mercer Metro bus system. The demonstration involves the implementation of a fare-free service on all intra-county routes from 10 am to 2 pm and after 6 pm Monday through Saturday, and all day on Sundays and holidays. The free-fare operation is planned for one year, beginning March 1978. The demonstration is intended as a model for possible use elsewhere across the country as well as for further policy and program development in Mercer County. This document presents a plan for evaluating the impacts of a free-fare off-peak transit demonstration in Mercer County, New Jersey. The evaluation plan describes the demonstration setting, the details of the project, the evaluation issues (travel behavior, transportation supply and costs, secondary effects, and the implementation process), the evaluation strategy, the data collection plan, and the techniques to be used in analyzing the results. The central concern is ridership impact. A list of free-fare references and seven appendixes are included in this report. The appendixes display data collection tools already employed (Appendixes A-E), outline a related research effort of the National Bureau of Standards in which this project's data are to be used (F), and describe the DeLew, Cather evaluating staffing and management approach (G). /UMTA/

Knight, R ; De Lew, Cather and Company, (DOT-TSC-UMTA-78-17) UMTA-NJ-52-0001-78-1, Dec. 1978, 100 p.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration. Under contract to the Transportation Systems Center.; Contract

DOT-TSC-1409; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291455

25 190540 FARE POLICY AND STRUCTURE. The overall objective of this research effort is to relate fare policies and fare structures to passenger demand characteristics as well as to operating expenses and to determine appropriate methods of addressing fare in transit financing. This report presents the findings of a three year research effort. It includes a survey of literature on fare policies and structures throughout the nation. In addition, the report presents the findings of a nation-wide survey of transit properties and deals with fares, ridership, financing, and policy making. Analysis of acquired information show that fare revenues are producing an ever decreasing percentage of operating expenses and, by 1980 will account for less than 40 percent of operating expenses for transit properties nation-wide. The report puts forth arguments for the study of time-varied fares as the most beneficial policy for reducing the financial problems of transit properties while still increasing ridership and also shows that using fare policy/structures to reduce peak vehicles can result in operating cost savings.

Habib, P Linzer, E Jones, C Nason, R Ablamsky, R ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0014) Final Rpt. UMTA-NY-11-0014-78-1, Sept. 1978, 70 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289194/3ST

25 191376 ELASTICITY OF TRANSIT DEMAND WITH RESPECT TO PRICE: A CASE STUDY [Final rept.]. The report describes the methodology and the results of an empirical study of peak-period transit demand elasticity with respect to price (fare). Field observations were structured to capture the reactions of morning (inbound) commuters to a peak-period fare increase introduced on September 1, 1975. The study is limited to bus and automobile travelers on the Shirley Highway and bus passengers on the Lee Highway, both in Northern Virginia. The Shirley buses provide express service on exclusive freeway lanes, whereas the Lee Highway buses provide traditional service on a signalized radial arterial. Various impacts are identified, quantified and compared. Demand for service on the Shirley Highway Express buses is less elastic (-0.274 to -0.218) than that for the traditional Lee Highway bus service (-0.535 to -0.273). There was little evidence of passengers on either service shifting travel outside the peak-periods to avoid higher fares. The fare increase had no effect on auto travel. These results suggest applying different pricing policies to different types of transit service.

Schofer, RE ; National Engineering Lab. (NBS), Washington, DC., Center for Applied Mathematics. *Urban Mass, Transportation Administration, Washington, DC., Office of Service and Methods Demonstration., (NBS-2050404) NBSIR-78-1462, Mar. 1978, 45p; Contract DOT-AT-40018; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292162/5ST

25 193613 TOLLS PRICING STUDY. An attempt is made to present a comprehensive feasibility study and recommendations for peak-hour

charges and the impact that carpooling and commuter discounts have upon congestion. Coefficients of elasticity were derived that would reflect a motorists reaction to any toll charge, peak period or otherwise. Elasticities for automobiles and for commercial vehicles were developed by market group. Also developed was a unique and complex simulation model which, in addition to providing the estimated traffic and revenue resulting from a given toll schedule, also generated estimates of delay time, the various energy and environmental impacts of delay, vehicle miles travelled and other pertinent data. As a means of evaluating toll schedules, specific yardsticks or measures were developed to determine their impact on various factors such as transit patronage, pollution, congestion, energy consumption, etc. The selection and evaluation of candidate toll schedules are also covered. The major conclusions drawn from the study and the recommendations made are given. Details are also given of the study method (including the computer program, the data base, models, capacity restraints, etc.), elasticities and patterns of travel behavior, and the analysis of the final candidate toll schedules. Data and detailed descriptions mentioned in or expanding the main report are included in 3 appendices.

Port Authority of New York and New Jersey Feb. 1979, 51 p., Figs., Tabs.

25 194131 SNCF ATTACKS PARIS AREA REVENUE COLLECTION PROBLEMS. Heavy suburban passenger flows in greater Paris present difficult ticket control problems, with complex ticketing rendering effective manual inspection, impossible. With the Interconnexion project with the Paris Regional Transit (RATP) to become operational in 1981-82, the French National Railways has been faced with introduction of a compatible automatic fare collection system. Starting in 1979 a full-scale experiment has been under way on Montparnasse suburban lines with the goal of extending it or a similar system to most of the Paris suburban area by the late 1980s.

Railway Gazette International Mar. 1979, pp 217-219, 2 Phot. ORDER FROM: ESL

25 195567 THE CONSEQUENCES OF SHORT-RANGE TRANSIT IMPROVEMENTS: AN OVERVIEW OF A RESEARCH PROGRAM. Because of Congressional interest evidenced in 1974 legislation, special emphasis is placed on the evaluation of fare-free transit services. This paper presents an overview of a research program designed to improve understanding of the costs and consequences of various transit fare and service level policies, and focuses particularly on objectives and methods. The principal questions for research concern the existence and magnitude of various possible outcomes from short-range improvements. Broadly categorized, these outcomes relate to: 1) the demand for transit service; 2) the quality of service experienced by the user; 3) operating costs; 4) the transit industry; 5) broader urban transportation; 6) the incidence of impacts; and 7) other longer-term considerations. Forty-seven different types of potential consequence are discussed, and priorities are suggested for their investigation. The paper explores the appropriateness of four different general research activities to appraising the most important of the potential

outcomes. These four activities are the analysis of existing transit operating experience, with and without the collection of new data, and the mounting of social experiments, either in a "real world" operating environment, or in a simulated setting. In each of the general categories, certain specific research studies are suggested, and their advantages and disadvantages are discussed. The paper concludes by placing partially subjective priorities for Federal support on the thirteen different research studies proposed. /UMTA/

Kemp, MA ; Urban Institute, (UI-5050-5-1) UMTA-DC-52-0002-78-1, May 1978, 140 p.; Sponsored by the Urban Mass Transportation Administration.; Contract DC-52-0002; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-294438/AS

25 196892 CONCESSIONARY FARES FOR ELDERLY, BLIND AND DISABLED PEOPLE. This green paper sets out the government's proposals for a national scheme providing a minimum half-fare concession on local public transport for the elderly, blind and disabled. The proposals include for the first time full transferability so that concessions would be available on local journeys everywhere and not just in the area where the eligible person lives. They would cover local rail journeys as well as buses. Local authorities would be obliged to operate the national scheme, but would retain the discretion to run more generous local schemes as well in parallel to the national scheme. The special cases of Scotland, Wales and Northern Ireland are dealt with. /TRRL/

Her Majesty's Stationery Office Monograph Command Paper 7475, Feb. 1979, 16 p.; Published for the House of Commons.; ACKNOWLEDGMENT: TRRL (IRRD 240633)

25 197590 FARE ELASTICITIES FOR EXCLUSIVE-RIDE TAXI SERVICES. The increased awareness of taxicabs as an important public transportation mode has also increased the need to know how taxi usage changes in response to fare increases. This usage change, or fare elasticity, is important for several reasons, not the least of which is that it indicates whether fare increases will increase or decrease total revenue. In this research a unique data set was assembled to test eight hypothesis regarding taxi fare elasticities. Operatory data were collected from 24 taxi operators in different cities across the United States. Data were also collected in the socio-economic, demographic, and transit service characteristics of these cities. The data cover twenty-two months beginning January, 1976. The hypothesis tests showed that demand for taxi service is primarily inelastic with respect to fare increases. Some evidence was found to substantiate the hypothesis that higher fare levels produce more elastic responses to fare increases; however, this hypothesis could only be tested in a tentative way. Two major conclusions emerge from this project. The first of these is that taxi demand is inelastic with respect to fare changes. The second is that fare changes are not very important in explaining ridership changes.

Fravel, FD Gilbert, G ; North Carolina University, Urban Mass Transportation Administration Final Rpt. UMTA-NC-11-0006-79-1, Oct. 1978, 70 p.; Grant DOT-UMTA-NC-11-0006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296201/7ST

25 197651 AMHERST, MASSACHUSETTS FARE-FREE BUS RESEARCH AND DEMONSTRATION PROJECT. This final report on the Amherst, Massachusetts Fare-Free Bus Research and Demonstration Project reviews the project background and scope, details its conduct and extensive data collection and analysis, presents findings and conclusions, and discusses the transferability of these findings and conclusions to other urban areas. The major objectives of the project was to determine to what extent at first providing a fare-free bus service, and later, increasing restrictions on intra-campus automobile use would have in a shift away from commuting by automobile in favor of commuting by bus. There was also concern as to how changes in transportation services would affect community attitudes toward public transportation. Significant findings were that: (1) introducing high frequency, fare-free transit services attracts high levels of ridership of low income groups, while only slightly reducing automobile usage and traffic congestion; (2) increased parking fees are not as effective a deterrent to automobile use as are reduced parking availability and strict parking regulations enforcement; (3) increases in parking fees that are perceived as relatively large, will be met with strong opposition from lower income workers for whom the automobile is the only available mode; and (4) fare-free transit will have significantly positive impact on the demand for multi-family housing and sales volumes of retail establishments, depending upon their relative proximity to transit bus stops.

Goss, WP Shuldinger, PW Giglio, RJ Kaczka, EE Webster, LA ; Massachusetts University, Amherst, Urban Mass Transportation Administration, (UMTA-MA-06-0006) UMTA-MA-06-0006-79-1, Apr. 1978, 312 p.; See also report dated March 76, PB-251502.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295097/OST

25 199003 DENVER OFF-PEAK FREE FARE PUBLIC TRANSIT EXPERIMENT. The Denver project investigates the effects of the elimination of off-peak fares on transit operations and costs, ridership, public attitudes, and regional travel patterns. The Denver experiment indicates that a systemwide free-fare program can be implemented with fairly minimal disruption and attract many new riders to transit during low-productivity hours. The distribution of the benefits of such a program among socio-economic and racial groups appears to be similar to that of the prior transit service. The cost of such free service is very high, constituting a major obstacle to implementation in most cities. However, if further study in Denver supports early indications, temporary free fare programs may be more successful in increasing the permanent ridership base than any other strategy yet attempted.

Swan, S McKnight, R ; De Leuw, Cather and Company, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. UMTA-CO-06-0010-79-1, May 1979, 59 p.; Contract DOT-TSC-1409; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298783/2ST

25 199010 FINDINGS OF PRELIMINARY ANALYSES OF THE TRENTON OFF-PEAK FARE-FREE TRANSIT DEMONSTRATION. The report was prepared as an interim informational summary of the progress of the Trenton

Fare-Free Demonstration. It presents findings of interim analyses regarding ridership impacts; passenger profiles and trip characteristics; and transportation supply and cost impacts. Given the limitation of this report, it can be useful as an interim informational summary pending completion of the full evaluation and preparation of the final project report. The report concludes that: Mercer Metro off-peak ridership has increased 45-50 percent during all free-fare periods; the Bus drivers have complained that the program has caused them to be late more often and to miss breaks because of more passengers and additional stops; and the cost of additional bus and driver service has increased but has not yet been estimated.

Connor, DL ; De Leuw, Cather and Company, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NJ-52-0001) Intrm Rpt. UMTA-NJ-52-0001-79-1, Jan. 1979, 58 p.; See also report dated Dec 78, PB-291 455.; Contract DOT-TSC-1409; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298893/9ST

25 260125 FREE PUBLIC TRANSPORT. After reviewing transport studies in Germany and elsewhere, the author examines the demand for private transport by investigating the costs of journeys by private and by public transport, sounding the opinion of motorists to suggested reductions in fares by means of opinion surveys, and conducting empirical demand studies. A study is made of the relative importance of the price factor in determining demand. The annual costs of free public transport are estimated for a number of German towns together with the social rate of return on free transit. The author concludes that the possible diversion from private to public transport has been over estimated and the cost under estimated, and that the benefit derived from free transport may not go entirely to those in need of it.

Baum, HJ (Cologne University /Germany/) *Journal of Transport Economics and Policy* Vol. 7 No. 1, Jan. 1973, pp 3-19, 11 Tab., 48 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 205904)

25 260376 NO FARE AND LOW-FARE TRANSIT: AN EVALUATION OF THEIR FEASIBILITY AND POTENTIAL IMPACT IN THE SAN FRANCISCO BAY AREA. An evaluation of the potential benefits and disadvantages of a free or low fare public transportation system considers the feasibility of implementing such a system in the San Francisco Bay area, and review the likely economic, social and political impact of such a program. Reviews are made of other experiments with no fare or low fare, with an evaluation of their applicability to the Bay Area. The report includes alternatives or complements to no or low fare transit and reviews financing alternatives.

Lovelock, C Twichell, J ; Metropolitan Transportation Commission, (UMTA CA-09-0020) Final Rpt. MTC-TF-73-01, June 1973, 93 pp; ACKNOWLEDGMENT: NTIS (PB-223190/0); ORDER FROM: NTIS, Repr. PC, Microfiche

25 262388 NO FARE PUBLIC TRANSIT: SEATTLE'S \$64,000 QUESTION. A congested area of central Seattle is now the site of a no fare bus service experiment. The reaction to the

project so far has been enthusiastic with greatly increased patronage on some routes. Data is now being collected on how increased usage has effected automobile use and pollution. The article also describes four types of no fare operations; total no fare, no fare for specific groups, no fare in special locations and examples of each in various cities. No fare transit is becoming increasingly popular in light of the energy crisis. The cost of implementing such systems is compensated for by the social, economic and environmental benefits of increased public transit usage.

Twichell, J (California University, Berkeley) Lovelock, C (Harvard Business School) *Metro-politan* Vol. 70 No. 1, Jan. 1974, pp 19-22, 1 Tab.

25 262604 PUBLIC TRANSPORT. SESSION 3: ONE MAN OPERATION AND FARE COLLECTION SYSTEMS. This session on one man operation and fare collection system contains the following papers: The Receipts Impact of One Man Operation; Some Explanations and Predictions, Fairhurst, MH; Time Spent by Buses at Bus Stops, Coburn, TM; Omo; A Move to Wholesaling, Perkins, RG. /TRRL/

Fairhurst, MH (London Transport Executive) Coburn, TM (Transportation Road Research Laboratory) Perkins, RG (Merseyside Passenger Transport Executive) ; Planning and Transport Res & Computation Cc, Ltd Conf Paper 8 Fig., 4 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 209631)

25 263926 EFFECT OF FARE REDUCTION ON TRANSIT RIDERSHIP IN THE ATLANTA REGION: SUMMARY OF TRANSIT PASSENGER DATA. This paper presents in summary form the findings from an intensive onboard survey conducted by the Metropolitan Atlanta Rapid Transit Authority during November 1972. On March 1, 1972, transit fares in Atlanta were reduced from 40 cents to 15 cents, with free transfers. Patronage immediately increased significantly and continued to increase as the Authority initiated implementation of service improvements as part of its short-range transit improvements program. The research was designed to answer specific questions generated after the ridership increase was observed, including the magnitude of the increase and the distribution of increase between new transit riders and additional tripmaking by previous riders, the magnitude of diversion from automobile users, and characteristics of new and old riders. This is one of a series of reports from the overall research effort, which includes the on-board study to determine rider characteristics as well as an in-home study to determine attitudes of nonriders and the reasons they do not use transit.

Bates, JW (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 499, 1974, pp 1-11, 9 Tab.; ORDER FROM: TRB, Orig. PC

25 264762 AN EVALUATION OF A COMPLIMENTARY PASS PACKAGE AS AN ACCEPTABLE MARKETING TECHNIQUE FOR ATTRACTING NEW PASSENGERS TO URBAN BUS TRANSIT LINES. The urban bus transportation industry's dramatic patronage decline since the Second World War has resulted, in part, from transit management's lack of a marketing awareness. Only through a complete marketing program can the industry determine and

provide various services to meet the diverse needs of the community. This research examines a complimentary pass package distribution, one of several marketing "tools" available to transit management, in terms of its ability to attract new passengers to urban bus transit lines. Part one of the study examines, by means of a survey of transit operators, any past uses of complimentary pass packages in ridership promotion campaigns. Part two distributes complimentary pass packages to a random sample in a selected city and determines subsequent pass utilization by various market subgroups. An attitudinal survey of pass recipients' feelings toward various transportation issues is also conducted.

Brogan, JD Heathington, KW ; Purdue University, (UMTA-IN-11-0001-73-2) Final Rpt. CE-TRA-73-1, May 1973, 166 pp, 6 Fig., 28 Tab., 3 App.; ORDER FROM: NTIS, Repr. PC; PB-224748/AS

25 265327 DO OUTSIDERS PAY THEIR OWN WAY ON MARTA? This article studies the Metropolitan Atlanta Rapid Transit Authority public transit system which integrates rail and bus transportation into one unified, complementary system. It is financed in part by taxes collected in the two counties it serves; however no attempt is made to discriminate against passengers from outside the area who may not have paid as much in MARTA taxes as have residents of the taxpaying area. Some such costs are under consideration, focusing specifically on applying special charges to nonresident autos parking in the park-and-ride facilities. This analysis shows that it is likely that residents of the MARTA area will be somewhat better off to encourage outsiders to use system, especially when it is noted that the job of policing outsider use is, in itself, a fairly costly exercise if it is to be effective.

Lindeman, B *Atlanta Economic Review* Vol. 24 No. 6, Dec. 1974, pp 35-39

25 300583 LONDON TRANSPORT PLANS FULL ARC BY 1985. Sweeping proposals for full automation of revenue collection throughout the complex London underground network at a cost of 12.65 million pounds have been approved by the Greater London Council. The author sets out the rationale behind London Transport's decision to press ahead with a system that is being justified principally on the ground of increasing revenue through cutting fraud rather than by staff saving.

Webber, R *Railway Gazette International* Vol. 135 No. 3, Mar. 1979, pp 211-213, 4 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

25 301225 THE EFFECT OF FARE REDUCTION ON TRANSIT RIDERSHIP IN THE ATLANTA REGION. SUMMARY REPORT NO. 2--ANALYSIS OF NON-TRANSIT USER DATA. This paper discusses the results of interviews of Fulton and Dekalb County, Georgia residents concerning ridership of the Atlanta Region Bus System. Nonusers of the bus system generally expressed a favorable opinion of the quality of service. However, it was found that public awareness of the fare reduction of 15 cents was quite low: although, it had been publicized for several months prior to the start of the survey. More than one-half of the new riders interviewed in the on-board survey stated that reduced fare was the reason they began riding the bus.

Metropolitan Atlanta Rapid Transit Authority, Atlanta Regional Commission, Urban Mass Transportation Administration GA-09-0009, Dec. 1974, 17 p., Figs., Tabs.; In cooperation with Atlanta Regional Commission and Georgia State Department of Transportation.

25 301228 THE EFFECT OF FARE REDUCTION ON TRANSIT RIDERSHIP IN THE ATLANTA REGION. The ridership for the first 12 months of operation under the reduced fare of 15 cents (3/1/72 to 2/28/73) was 14.6 percent over that of the preceding year and 20.6 percent greater than the ridership estimated under continued Atlanta Transit System operation. However, based on data from the on-board survey, the indicated increase in ridership for the twelve months ending June 30, 1973, was 30.2 percent taking into account additional fare-induced trips made by old riders, new rider trips, and using continuing old rider trips as a base. During the initial months of reduced fare service, trips by new riders comprised 90 percent of the additional ridership with virtually all induced tripmaking by old riders taking place on weekends. Almost two-thirds of weekday new riders previously made the trip in an automobile--nearly two-thirds of which were drivers. New drivers are generally younger and wealthier than old riders, with a high proportion of males and whites; and a greater percentage of them use transit for making non-work trips.

Metropolitan Atlanta Rapid Transit Authority, Urban Mass Transportation Administration, Atlanta Regional Commission Final Rpt. GA-09-0009, Apr. 1975, 80 p., Figs., Tabs., Refs. In cooperation with Atlanta Regional Commission and Georgia State Department of Transportation.

25 301268 URBAN FARES POLICY. This book explores a number of issues concerned with how public transport services in towns should be charged for. Rural and inter-city services are not considered in their own right, though many of the arguments and conclusions might be applicable there as well. Although written from a practical standpoint, an attempt has been made to unravel certain theoretical issues as well, with the aim of at least partly narrowing the gap between theory and practice that exists in so many disciplines. The earlier chapters review the practical and theoretical difficulties of taking decisions in a complicated environment and in the face of multiple and conflicting objectives. Some new management solutions are suggested which take account of inflation and of the constitutional and organisational framework within which fares policy decisions have to be taken in many industrialised cities. Current fares initiatives round the world are then described and their implications considered. Finally, by way of example, the impact of different fares policies is analysed in detail for London, concentrating particularly on their social implications. /Author/

Grey, A (Greater London Council) ; Heath Lexington Books, (0-347-01090-3) 1975, 160 p., Figs., Tabs.; Published Jointly with Saxon House, England.; ORDER FROM: Heath (DC) and Company, Department RS, 125 Spring Street, Lexington, Massachusetts, 02173

25 301455 DENVER OFF-PEAK FREE PUBLIC TRANSIT EXPERIMENT. This report presents an initial evaluation of the Denver, Colorado systemwide off-peak free-fare transit demonstration project. The demonstration began in February 1978, with "Transit Awareness Month", sponsored by the Denver, Colorado Regional Transportation District (RTD). In March 1978, the Urban Mass Transportation Administration provided assistance to continue the program for an additional eleven months. The Denver project investigates the effects of the elimination of off-peak fares on transit operations and costs, ridership, public attitudes, and regional travel patterns. This study relies solely on data available from RTD, which included operations management reports, two on-board surveys done in February and July by the RTD and various routine systemwide ridership counts. The Denver experiment indicates that a systemwide free-fare program can be implemented with fairly minimal disruption and attract many new riders to transit during low-productivity hours. The distribution of the benefits of such a program among socio-economic and racial groups appears to be similar to that of the prior transit service. The cost of such free service is very high, constituting a major obstacle to implementation in most cities. However, if further study in Denver supports early indications, temporary free fare programs may be more successful in increasing the permanent ridership base than any other strategy yet attempted. The limited scope and quality of these data make possible only the most general findings. A major UMTA/TSC evaluation now in progress will include the development of more complete and reliable data, and may produce results which differ significantly from these early observations. /UMTA/

Swan, S McKnight, R ; De Leuw, Cather and Company, (CO060010(VM929R9757)) Intrm Rpt. UMTA-CO-06-0010-79-1, May 1979, 59 p. Sponsored by Department of Transportation, Urban Mass Transportation Administration. Under Contract to DOT, Research and Special Programs Administration, Transportation Systems Center.; Contract DOT-TSC-1409; ORDER FROM: NTIS; PB-298783/AS

25 301836 A STUDY OF TRANSIT FARE POLICIES, FARE STRUCTURES, AND FARE COLLECTION METHODS. The project involves the studying and bringing together of material on the three elements of transit revenue collection: fare policies, fare structures, and fare collection methods. Theoretical aspects and practical experiences are both examined. Another objective of the project is to determine whether or not there are deficiencies in existing fare collection methods which constrain their usefulness. The authors find a significant lack of uniformity in fare policies. /TRRL/

Department of Transport, Canada Monograph Apr. 1978, 261 p., 36 Fig., 26 Tab., 66 Phot., 86 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241554), Roads and Transportation Association of Canada; ORDER FROM: Department of Transport, Canada, Urban Transportation Research Branch, Place de l'Aviation, Montreal, Quebec H3A 2R3, Canada

25 302804 METHODOLOGY FOR THE SETTING UP OF TARIFFS FOR THE TRANSPORT OF PASSENGERS BY ROAD [Metodología para la fijación de tarifas de transporte de pasajeros por carretera]. In order to obtain greater coordination between the various transport modes, the Colombian government has proposed a study of the methodologies for establishing tariffs for the public transport of passengers by road. The proposed aim requires a preliminary definition by the government, of a series of policy aspects which influence the tariff system, these aspects being defined as follows: the economic efficiency of investment in this sector, professional aspects concerning the workers in the transport companies, level of service offered, mean duration of investments, systems of financing and periods between revisions of tariffs. It is also necessary to take into account in the cost evaluation, the characteristics of the highway infrastructure and the prevailing environmental conditions. A mathematical model is proposed which gives the tariff for each level of service, as a function of cost and benefits. (TRRL) [Spanish]

Hernando, C ; Columbia National University, Columbia Monograph July 1974, 21 p.; ACKNOWLEDGMENT: TRRL (IRRD 106929), Central Laboratory of Bridges & Highways, France, Ministry of Public Works, Spain

25 303281 43RD INTERNATIONAL CONGRESS-HELSINKI 1979. RATIONALISATION OF FARE COLLECTION-SCOPE AND LIMITATIONS. A survey was made of 103 transit organizations world-wide that have been employing automated fare collection methods. They were asked about the types of equipment and methods they were using and their experiences with them. This report is based on their replies. After an introduction, several sections deal with technical data from the questionnaires regarding operating peculiarities, the fare system, payment principles, methods of issuing tickets and control of right of access to transport system, and the constraints of automatic fare collection. Other sections deal with the effects of such systems on both staff and passengers and attempt to weight their benefits against their costs, as to speculate on future trends. (In general, modifications of current systems, rather than wholesale conversions, are seen to be the trend for the immediate future).

Mouzet, J (Regie Autonome des Transports Parisiens, France) Torjussen, F (Hovedstadsomradets Trafikselvskab, Denmark) ; International Union of Public Transport Vol. 5A 1979, pp 3-51, Figs., Tabs., Photos., Apps.; 43rd International Congress-Helsinki, Finland, 10-15 June 1979.

25 303946 INTERIM ANALYSIS OF THE FREE-FARE TRANSIT EXPERIMENTS. This paper summarizes the early results of the two systemwide off-peak free-fare transit experiments being conducted in Trenton, New Jersey, and Denver, Colorado. These experiments, which are sponsored by the Urban Mass Transportation Administration (UMTA) under its Service and Methods Demonstration Program, are the first free-fare programs of such size and comprehensiveness. The demonstrations have already provided a number of interesting, if still tentative, conclusions. The first major conclusion is that, while free fare induces large and sustainable

ridership gains (19 percent in Trenton and 34 percent in Denver), the general aggregate behavior of the population in making their modal choices is not significantly different from what it would be with any other absolute change of an equal amount. The price elasticity of demand for transit implied by the Trenton results was -0.42, which is virtually identical to the transit industry's experience. Saturday evening youth riders and walk trips made up fully 7 percent of the ridership in the free-fare system in Trenton. The demonstration appears to have reduced the peak-load capacity requirements in Trenton's transit system and caused a dramatic shift from the peak to the off-peak. The most surprising finding was that complaints of rowdiness, vandalism, and other incidents increased at both sites to such an extent that some groups called for the abandonment of the experiments.

Studenmund, AH (Occidental College) Swann, S Conner, D (De Leuw, Cather and Company) *Transportation Research Record* No. 719, 1979, pp 13-21, 4 Fig., 9 Ref.; This paper appeared in *TRB Research Record* No. 719, Transit Development.; ORDER FROM: TRB Publications Off

25 303948 REVENUE AND RIDERSHIP CHANGES IN ONTARIO CITIES CAUSED BY TRANSIT FARE INCREASES. This report describes the development, accuracy, and application of a simple method for predicting changes in transit-system revenue (ridership) caused by an increase in fares. The method is based on an empirical cross-sectional model and on data obtained from 29 Ontario transit systems for which all necessary ridership, revenue, and vehicle kilometer data were available. Analysis covered the period of the first nine months after the fare increase. Results show that revenue change caused by a fare increase is predictable and is a function not only of the increase but also of the distance (service level) change, past ridership trends, city size, level of transit service, and time elapsed after the increase. A change in vehicle kilometers can be expected to have a greater effect on revenue than an equivalent percentage change in fares would. The effectiveness of a fare change in producing increased revenue apparently decreases with the time elapsed since the increase.

Hajek, JJ (Ontario Ministry of Transportation & Communic, Can) *Transportation Research Record* No. 719, 1979, pp 26-32, 4 Fig., 4 Tab., 8 Ref.; This paper appeared in *TRB Research Record* No. 719, Transit Development.; ORDER FROM: TRB Publications Off

25 303949 WHO PAYS THE HIGHEST AND THE LOWEST PER-KILOMETER TRANSIT FARES (ABRIDGMENT). This paper takes a close look at fare equity, from the standpoint of the transit user, by investigating fares per kilometer paid by different groups of bus riders. The research consisted of an examination of the ridership profile of the transit system operating in the capital district of Albany, New York. The study showed that fares per kilometer vary greatly among different transit users and that, even when incremental fares are charged in addition to basic flat fares on longer intercity and intraurban routes, the fares per kilometer of bus trips tend to be inversely proportional to the length of bus trips. Work-to-home trips costs less per kilometer than non-work-related trips, and

people without cars or unable to use cars pay higher fares per kilometer on the average than those with cars available. The average fare per kilometer of peak-hour riders is less than that of off-peak riders. In addition, it was found that there was no appreciable difference in fares per kilometer paid by men versus women but that there is a tendency for fares per kilometer to rise as age increases from 18 to 65. Thus, current basically flat-fare systems tend to emphasize inequities already existing in society.

Ugolik, WR (New York State Department of Transportation) Leutze, CB (State University of New York, Albany) *Transportation Research Record* No. 719, 1979, pp 32-34, 1 Fig., 9 Ref.; This paper appeared in *TRB Research Record* No. 719, Transit Development.; ORDER FROM: TRB Publications Off

25 303950 FORECASTING DEMAND AND REVENUE FOR TRANSIT PREPAID PASS AND FARE ALTERNATIVES. This paper presents a relatively low-cost, easily implemented method for forecasting the demand and revenue impacts of alternative transit-fare prepayment (TFP) instruments and transit fares. In addition, alternative TFP strategies and their price implications are derived in some detail from basic TFP objectives. The forecasting technique focuses on computing price elasticities by individual market segments by using data from previous fare and service changes and then applying these results to forecast changes in the present transit system. The market segments are chosen to correspond with the issues being analyzed, thereby increasing the usefulness and accuracy of the procedure. To illustrate how the technique can be used to forecast the impacts of different monthly transit pass programs along with increases in transit fares, a case-study approach that uses local data from the Jacksonville, Florida, transit system was chosen. The data required in the analyses are typically available from most transit properties; therefore, the method is readily transferable to other areas.

Parody, TE Brand, D (Charles River Associates, Incorporated) *Transportation Research Record* No. 719, 1979, pp 35-41, 4 Fig., 2 Tab., 11 Ref. This paper appeared in *TRB Research Record* No. 719, Transit Development.; ORDER FROM: TRB Publications Off

25 305916 SELF-SERVICE FARE COLLECTION. VOLUME II: SURVEY OF EUROPEAN TRANSIT PROPERTIES. This 4-volume study discusses the European SSFC system and the relative merits of the alternative approaches to self-service with respect to their application in the United States. Volume II summarizes the information obtained from eleven European transit properties and one Canadian property.

Strickland, LR ; Mitre Corporation, Urban Mass Transportation Administration MTR-79-W00087-02REV1, UMTA-VA-06-0049-79-3, Aug. 1979, 183 p.; See also Volume 1, PB80-132251 and Volume 3, PB80-132277. Also available in set of 4 reports PC E13, PB80-132244.; Contract DOT-UT-800047; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-132269

25 305917 SELF-SERVICE FARE COLLECTION, VOLUME III: HARDWARE CONSIDERATIONS. This 4-volume study discusses the European SSFC system and the relative merits of the alternative approaches to self-service with respect to their application in the United States. Volume III describes the equipment commonly used to support self-service operations in Europe and discusses the policy and design options which are presented during the selection and specification of equipment for self-service operations.

Deibel, LE ; Mitre Corporation, Urban Mass Transportation Administration MTR-79W00087-03, UMTA-VA-06-0049-79-4, Sept. 1979, 78 p.; See also Volume 2, PB80-132269 and Volume 4, PB80-132285. Also available in set of 4 reports PC E13, PB80-132244.; Contract DOT-UT-80047; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-132277

25 305918 SELF-SERVICE FARE COLLECTION, VOLUME IV: LEGAL AND LABOR ISSUES. This 4-volume study discusses the European SSFC system and the relative merits of the alternative approaches to self-service with respect to their application in the United States. Volume IV summarizes the legal issues of self-service operations in the U.S. transit environment; it also addresses labor, economic, liability, and accessibility issues of self-service in U.S. applications.

Eiseman, GG ; Mitre Corporation, Urban Mass Transportation Administration MTR-79W00087-04, UMTA-VA-06-0049-79-5, Aug. 1979, 59 p.; See also Volume 3, PB80-132277. Also available in set of 4 reports PC E13, PB80-132244.; Contract DOT-UT-80047; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-132285

25 307845 SUNDSVALLS TRAFIK AB-A STUDY OF INCOME FROM TICKETS AND FARES FOLLOWED BY A PLAN FOR A NEW TICKET AND FARE SYSTEM [Sundsvalls Trafik AB-studium av biljett-och taxeininkter med foerslag till nytt biljett-och taxestystem]. Sundsvalls trafik ab (stab) is owned by the commune and takes care of the public transport in the sundsvall area. The company has been greatly affected by increased expenses, which it has not been able to manage. It was decided that this transport business should be investigated and the expenses and their development were one part of the investigation. The purpose was to obtain facts about the income from the ticket sale and fares, to simplify the ticket sale, and to study the effects of the fare changes regarding passenger number and income. Background material was gained from interviews and statistics, the company's bookkeeping and earlier investigations in this field. The result is that stab is in a similar situation as most transport companies. The distribution of the income is not noticeably different from the average. STAB has more ticket types than other companies and the prices are among the highest in the country. The ticket variety could be simplified. The zone-division has been unified. Seasonal variations have been established. Immediately after the fare changes the ticket sale went down, but gradually it reached a level just below the level before the changes. (TRRL) [Swedish]

Nordqvist, L ; Linköping University, Sweden Monograph 1978, 65 p., 14 Fig., Tabs., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242540), Na-

tional Swedish Road & Traffic Research Institute

25 308037 AUTOMATIC FARE COLLECTION, TACKLING THE PROBLEMS. There are numerous advantages in the automated fare collection system, but is also has problems. Fare collection equipment built by Cubic Western Data as installed in the Washington, D.C. Metro System allowing the system to establish a variable rate fare structure based on distance travelled. The machines have produced higher revenues per passenger and lower operating costs. Other benefits are also noted. Problems which have arisen in the operation of these machines are described. A recent check at one station showed a third of the machines were out-of-order. The detrimental effects of cold weather and malfunctioning exit gates (also provided by the same manufacturer) are noted. The Cubic company soon instituted a program to minimize or correct fare collection problems. Additional equipment was installed, additional maintenance personnel were assigned, and the company began to develop better bill and coin handling equipment. Reliability analysis is also being performed as more operational data is obtained. Cubic's expanding export business is noted.

Hebert, R (Angeles Times) *Mass Transit* Vol. 6 No. 7, July 1979, pp 24-32, 2 Phot.

25 309105 THE REDISTRIBUTIVE EFFECTS OF REDUCED TRANSIT FARES FOR THE ELDERLY. Redistributive effects concern which socioeconomic groups pay for a particular program and which socioeconomic groups benefit from it. Considering the off-peak reduced fare for senior citizens required by UMTA section 5 funding, an analysis of the resulting financial implication is the first step in examining any redistribution. Knowledge of the number of rides switched from peak to off-peak times, the number of new off-peak rides generated and any cost changes are necessary. It appears that such a policy will likely lower net revenue. If the loss is not reimbursed, a redistribution from non-elderly and peak riders to the elderly users will result; if reimbursement is available, a different result will be obtained. A survey of the literature fails to establish whether reducing fares is preferable to directly transferred income as a means of redistribution. It is concluded that off-peak reduced fare is more efficient than reduced fare at all hours. Finally, the redistribution due to the reduced fare funding mechanism used in Illinois appears to favor the poor. (a)/TRRL/

Rock, SM (Illinois Institute of Technology) *Transportation Research. Part A: General* Vol. 13A No. 5, Oct. 1979, pp 361-365, 1 Fig., 1 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244300)

25 309526 SELF-SERVICE FARE COLLECTION, VOLUME I: REVIEW AND SUMMARY. Interest in the European system of fare collection for urban transit broadly known as Self-Service Fare Collection (SSFC) has been growing in the U.S. The European experience indicates the SSFC promotes greater operating efficiency and improved service delivery. The common features of SSFC--self-monitoring, fare payment, receipts, ticket inspection and penalties--represent substantial departures from the current operating procedures and existing

legal powers of U.S. transit systems. This 4-volume study, sponsored by the Urban Mass Transportation Administration, discusses the European SSFC system and the relative merits of the alternative approaches to self-service with respect to their application in the United States. Volume I of this study describes the European approach to and rationale for self-service fare collection; documents the experience European approach to and rationale for self-service fare collection; documents the experience European transit systems have had with using and enforcing these procedures; and discusses the relative merits of the alternative approaches to self-service with respect to their application in the United States. Volume II summarizes the information obtained from eleven European transit properties and one Canadian property. Volume III describes the equipment commonly used to support self-service operations in Europe and discusses the policy and design options which are presented during the selection and specification of equipment for self-service operations. Volume IV summarizes the legal issues of self-service operations in the U.S. transit environment; it also addresses labor, economic, liability, and accessibility issues of self-service in U.S. applications. (FHWA)

Deibel, L Stern, S Strickland, LR Sulek, J ; Mitre Corporation, Urban Mass Transportation Administration, (MTR-79W00087 01) UMTA-VA-06-0049-79-2, Aug. 1979, 410 p.; The 4-volumes of the Self-Service Fare Collection Study are titled, sequentially: Review and Summary (UMTA-VA-06-0049-79-1); Survey of European Transit Properties (UMTA-VA-06-0049-79-3); Hardware Considerations (UMTA-VA-06-0049-79-4); and Legal and Labor Issues (UMTA-VA-06-0049-79-5); Contract DOT-UT-800047; ORDER FROM: NTIS; PB-80132244, E13

25 309859 THE ECONOMICS OF CONTRACT BUS SERVICES. An analysis is made of the prices charged by privately owned bus and coach companies for works and school contract services in a particular area. A regression equation is obtained which relates the contract price to the type of contract (works or school), vehicle size and distance run. This equation is used to compute the fare required for a works contract service to break-even at varying loads and journey lengths. This shows that it is unlikely that, because of their low capacity, break-even services could be operated with minibuses. In order to break-even at stage bus fares, a contract coach service would need to attract about 25 passengers. Increased loads would result in proportionally lower fares. To become financially attractive to car drivers a service would need to carry 40 passengers for an average journey length of at least 10 km. It is shown that, on average, each vehicle earned about ,150 per week from its peak hour contracts. Standard costing indicates that an equivalent period of stage-carriage operation would cost at least ,200 per week. (Author/TRRL)

Jackson, RL Martin, PH ; Transport and Road Research Laboratory Monograph LR899, 1979, 13 p., 5 Fig., 3 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244415)

25 310572 MARGINAL COST PRICING OF SCHEDULED TRANSPORT SERVICES. A DEVELOPMENT AND GENERALISATION OF TURVEY AND MOHRING'S THEORY OF OPTIMAL BUS FARES. Turvey and Mohring's theory is that the optimal price for scheduled transport services consists of (1) producer marginal cost plus (2) the difference between user marginal cost and user average cost. In the present paper it is argued that the "medium run" is pricing-relevant. In the medium run item (2) is generally negative because of "vehicle number economies" in user costs. Given co-existing "vehicle size economies" in producer costs, it follows that optimal pricing yields a financial deficit. The size of the deficit depends on the relative importance of the user costs and sensitivity for service accessibility in time and space. (a) (TRRL) [French]

Jansson, JO (National Swedish Road & Traffic Research Institute) *Journal of Transport Economics and Policy* Vol. 13 No. 3, Sept. 1979, pp 268-294, 5 Figs., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244333)

25 310731 SELF-SERVICE FARE COLLECTION-LEGAL AND LABOR ISSUES. VOLUME IV. Self-service fare collection makes the passenger responsible for determining and paying the proper fare prior to taking a trip. Complete monitoring or control of the payment of the proper fare is not performed by vehicle drivers, station attendants, or automatic equipment; all or nearly all responsibility for fare enforcement falls to special personnel who randomly check compliance. This method of fare collection is frequently referred to as an "honor" system. However, self-service does not completely transfer responsibility to the passenger since random inspection by roving checkers is a necessary feature of self-service. The typical features of self-service represent substantial departures from the current operating procedures and existing legal powers of U.S. transit systems. This paper summarizes the legal issues of self-service operations in the U.S. transit environment. Also addressed are labor, economic, liability, and accessibility issues of self-service in U.S. applications. Volume I describes the European approach to and rationale for SSFC, documents the European experience, and discusses the relative merits of the alternative approaches to self-service with respect to their application in the U.S. Volume II summarizes the information obtained from a survey of European properties. Volume III describes the hardware required to support self-service fare collection and discusses the trade-offs associated with the various options for its deployment and with the numerous features available through the hardware. (AUTHOR)

Eisemar, GG Mitre Corporation, (MTR79W00078-04) UMTA-VA-06-0049-79-5, Aug. 1979, 55 p, 2 Tab., 10 Ref.; Contract DOT-UT-80047; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS

25 310764 SELF-SERVICE FARE COLLECTION-HARDWARE CONSIDERATIONS VOLUME III. European applications of self-service fare collection are typically supported by a variety of automated equipment to facilitate ticket purchase and validation by passengers and ticket sales by drivers and station attendants. This report describes the common hardware

features employed by these ticket vending the validation devices and examines the general policy and hardware design trade-offs which need to be addressed by properties contemplating self-service implementation. Other volumes in this series cover various aspects of the self-service demonstration project being sponsored by the Office of Service and Methods Demonstrations, Urban Mass Transportation Administration. Volume I provides an overview of the European approach to the rationale for self-service fare collection; documents the experience European transit systems have had with using and enforcing these procedures; and discusses the relative merits of alternative approaches to self-service and respect to their application in the U.S. Volume II summarizes the information obtained from a survey of European properties. Volume IV reviews the legal and labor issues associated with self-service fare collection. (UMTA)

Mitre Corporation ; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract DOT-UT-80047

25 312087 AUTOMATIC TICKET BARRIERS-A SUMMARY RESEARCH REPORT. A programme of research with the aim of gathering information potentially useful for the specification of automatic ticket barrier systems was commissioned by the Transport and Road Research Laboratory, Departments of Transport and Environment. The programme had three main areas of research, namely: (I) field observations of three types of automatic ticket barriers in use by the public; (II) laboratory evaluations of five types of ticket barriers; (III) a ticket barrier engineering design appraisal. The studies have revealed useful information concerning the problems that face barrier users. The field observations quantified several user characteristics, including the quantity and type of luggage carried by passengers. The laboratory trials involved the evaluation of tripod, paddle and pneumatically operated barriers which included three different ticketing systems. The trials obtained data ranging from the impressions of subjects using the barriers for the first time to measuring flow rates for experienced users. All the trials included subjects ranging from the young and fit to the elderly and mothers with children. The research has shown that the barrier ticketing system is currently the major limiting factor of barrier performance. It can also cause a great deal of frustration and inconvenience to the user which could result in alienating the person from the system. The engineering appraisal of ticket barriers provided guidelines for the specification of technical performance. It also raised factors that should be given careful consideration during the early stages of specification formulation. This report summarises the work and main findings of the project.(a) see also IRRD abstract no 246161.

Stroud, PG Baines, PA ; Loughborough University of Technology, England Monograph Nov. 1978, 43 p., Figs., 13 Tab., 3 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246162); ORDER FROM: Loughborough University of Technology, England, Institute for Consumer Ergonomics, Dept of Transport Tech, Loughborough LE113TU, Leicestershire, England; P8001058

25 312088 AUTOMATIC TICKET BARRIERS-FIELD OBSERVATIONS, LABORATORY EVALUATION AND AN ENGINEERING APPRAISAL. A programme of research to gather information potentially useful for ticket barrier specifications was commissioned by the Transport and Road Research Laboratory from the Institute for Consumer Ergonomics and Department of Transport Technology, Loughborough University. The research comprised three main areas, these were: (I) field observations of three different types of ticket barrier; (II) laboratory evaluation of five selected ticket barriers; (III) an engineering appraisal of ticket barrier design. The field observations were taken from film of tripod and automatic barriers in use at London Transport underground stations and bi-directional tripod barriers at Glasgow central railway station. A description of the passenger sample was derived from the analysis of the film from each site. Analysis of the passengers' luggage showed that over 65% were carrying at least one item of luggage. Incidents of barrier misuse were categorised to obtain information about the problems encountered by passengers in the three transport systems. The proportion of passengers involved in misuse varied between the sites (from 3% to 16%) but problems concerning the ticket operation were the most frequent at each site. The laboratory trials to evaluate three manual barriers and two automatic (pneumatic) barriers were conducted using volunteer members of the public as subjects. The main areas investigated were; the problems encountered by first time users, the subjects' preferences for different aspects of the ticket barriers, (e.g. Ticket operation, perceived safety) and the flow rates for different subject groups and barrier operation conditions. Following the series of trials, subjects gave suggestions for improvements to the tested barrier designs. See also IRRD abstract no 246162.

Stroud, PG Baines, PA ; Loughborough University of Technology, England Monograph Dec. 1978, 184 p., Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 246161); ORDER FROM: Loughborough University of Technology, England, Institute for Consumer Ergonomics, Dept of Transport Tech, Loughborough LE113TU, Leicestershire, England; P8001059

25 312457 TRANSIT PASSES.....INNOVATIONS FROM BUSINESS AND TRANSIT. PART I: EMPLOYER-SPONSORED TRANSIT PASS PROGRAMS. PART II: EMPLOYER TRANSIT PASS PROGRAMS. This preliminary report has been compiled to disseminate information to those who use and benefit from promoting transit usage among employees. Part I of the report describes eleven representative employer-sponsored pass programs. Three types of pricing arrangements are described: employers purchase passes at regular prices and then offer them to employees at a discount; transit authorities sell at a discount to employers if the firm offers a subsidy to the employees; both employers and employees purchase passes at regular monthly prices. Aggressive marketing of programs can produce dramatic increases in monthly pass sales. This is illustrated by an effective campaign in Portland, Oregon. Preliminary results from the demonstration evaluation program show that transit pass programs sponsored by employers can be very effective in encouraging

transit ridership. In some cases, to 30% of those who have purchased passes have been diverted from the auto. Part II of this report briefly outlines the operations of the programs.

Department of Transportation Apr. 1980, 8 p., Tabs.; Contract DOT-I-80-12

25 312461 POTENTIAL OF PRICING SOLUTIONS FOR URBAN TRANSPORTATION PROBLEMS: AN EMPIRICAL ASSESSMENT. This paper surveys the available empirical evidence on the elasticity of travel demand to assess the potential of pricing policies to alter travel behavior and thereby to solve various urban transportation problems. The first set of studies considers the responsiveness of fuel use to changes in gasoline price. The second set, econometric models of urban travel demand, estimates the direct and cross-price elasticities of the use of different modes with respect to different components of trip cost. The third set of evidence is composed of arc elasticity estimates based on the impacts on travel behavior of actual changes in the levels of roadway user charges and transit fares. For each study dealt with, the paper briefly summarizes its methodology, data base, and findings and subjects these to critical evaluation. The paper concludes with an evaluation of the body of results for the usefulness of pricing policies in urban transportation. (Authors)

Pucher, J (Rutgers University, New Brunswick) Rothenberg, J (Massachusetts Institute of Technology) *Transportation Research Record* No. 731, 1979, pp 19-29, 3 Tab., 22 Ref.; This paper appeared in TRB Record No. 731, Evaluating Transportation Proposals.; ORDER FROM: TRB Publications Off

25 313181 SHARE A FARE: A USER-SIDE SUBSIDY TRANSPORTATION PROGRAM FOR ELDERLY AND HANDICAPPED PERSONS IN KANSAS CITY, MISSOURI. The Share A Fare (SAF) program in Kansas City, Missouri, is a user-side subsidy program designed by the City to provide low-cost door-to-door transportation for the City's elderly and handicapped citizens. The City, acting as broker, coordinated between user and provider by enrolling participants, enlisting providers, and matching the two through the trip scheduling process. Share A Fare began operation in May 1977 and is totally funded through a 1/2 cent city sales tax designated for transportation purposes. After 20 months of service, SAF has 13,182 enrollees and subsidizes almost 11,000 trips a month. The transportation service is provided by three not-for-profit agencies, two taxicab companies, one for-profit medical provider, and three city-owned vans. The service is available for any Kansas City resident who is 65 years of age or older or physically disabled. SAF participants fall into two major categories: the affiliated rider, who is a client of a social service agency carrier, and the unaffiliated rider, who is a non-client. This final report documents the Share a Fare project during its first 20 months of operation.

Dorosin, E Phillips, J ; Crain and Associates, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. UMTA-MA-06-0049-7911, July 1978, 96p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-142193

25 313212 EVALUATION OF RIDERSHIP, REVENUE AND EQUITY IMPLICATIONS OF DISTANCE-BASED FARES FOR TRANSIT SYSTEMS. EXECUTIVE SUMMARY. The purpose of this project was to develop a micro-simulation model to evaluate the impact of selected distance-based fare policies on various sub-groups of the population in terms of revenue, ridership, and average fare paid in the Albany, New York Metropolitan Area, using data from an on-board ridership survey conducted by the local transit agency. The fare structure currently employed by most local or regional transit agencies consists of large zones within which passengers are charged the same amount regardless of the distance traveled. The micro-simulation technique was adopted because of the need to capture considerable detail at the level of the individual rider, which will permit subsequent aggregation by any desired characteristic such as age, sex, and trip purpose, for the equity analysis. The use of a disaggregate methodology also increases the model's potential for transferability. An interactive software package has been developed to implement the micro-simulation model.

Ballou, DP Mohan, L ; State University of New York, Albany, Urban Mass Transportation Administration, (UMTA-NY-11-0016) Final Rpt. UMTA-NY-11-0016-80-1, Dec. 1979, 85p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-148695

25 314454 TRANSIT FARE PREPAYMENT DEMONSTRATIONS IN AUSTIN, TEXAS AND PHOENIX, ARIZONA. The report covers two demonstration projects, testing transit fare prepayment (TFP) innovations in Austin, Texas, and Phoenix, Arizona. The innovations consisted of two consecutive sales of prepaid tickets and passes at discounts of 20% and 40%, accompanied by expansion of sales outlet networks and intensive advertising and promotional campaigns. The purpose of the demonstrations was to measure the impacts of these innovations on: (1) the volume and mix of sales of the various TFP instruments; (2) the transit-riding levels; and (3) the transit costs and operations. In addition, special attention was given to evaluating the relative cost-effectiveness of the special advertising and promotional campaigns conducted in both sites.

Bloomfield, P Crain, J ; Crain and Associates, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. UMTA-MA-06-0049-80-1, June 1979, 306p; Contract DOT-TSC-1408; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-192818

25 316665 PLAN FOR TRANSIT FARE PREPAYMENT PROMOTED BY EMPLOYERS. This paper outlines a plan for the marketing program and the selection and solicitation of employers and their employees for participation in a transit-fare-prepayment program. Participating employers will make monthly transit passes available to their employees at their workplaces. The information in this paper was gathered from the experience of four transit systems and was applied to transit-fare-prepayment programs aimed at promoting a monthly transit pass through employers for single mode and multi-mode systems. The methods described in this paper yielded the most positive response, from employers and their employees, of the methods

tested. The plan described can be used as an aid for assisting transit systems in initiating similar programs. (Author)

Beach, BF (Sacramento Regional Transit District) *Transportation Research Record* No. 735, 1979, pp 27-30; This paper appeared in Transportation Research Record No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

25 318182 SELF-SUSTAINING PUBLIC TRANSPORTATION SERVICES. VOLUME I. GUIDELINES FOR IMPLEMENTATION. These guidelines are based on examination of three self-supporting, or nearly self-supporting, public transportation services. The three systems studied were: the express bus routes operated wholly within the City of New York, the Chicago and North Western Railway's suburban service, and the PATCO Hi-Speed Line from Philadelphia to Lindenwold, New Jersey.

Morlok, EK Viton, PA ; Pennsylvania University, Philadelphia, Urban Mass Transportation Administration Final Rpt. UMTA-PA-11-0017-80-1, Nov. 1979, 42p; See also Volume 2, PB80-196157.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-196140

25 319337 WHAT PUBLIC TRANSPORTATION MANAGEMENT SHOULD KNOW ABOUT POSSIBLE USER REACTIONS, AS SHOWN BY THE EXAMPLE OF PRICE SENSITIVITY. This paper shows that the decrease in demand for urban public transportation if fares are increased can only be predicted accurately by studying the users of public transportation and the possible ways they might react to fare increases. In order to do this, the paper categorizes the users of public transportation according to factors that influence their demand for public transportation. Those persons who have alternative modes of transportation available to them are identified and divided into groups that are sensitive or not sensitive to price increases. These different factors make it possible to estimate the decrease in demand for public transportation if fares are increased. Furthermore, the paper stresses the importance of two groups of persons who do not directly cause a decrease in demand for public transportation. The first group are those persons who have no alternative to the use of public transportation but would be severely hurt economically by fare increases. The second group are those persons who would complain about price increases but would continue to use public transportation. The former group gives useful information on the public's ability to pay, and the latter group indicates the probable public reaction to a fare increase. (Author)

Brog, W Forg, OG *Transportation Research Record* No. 746, 1980, pp 30-35, 2 Fig., 4 Tab., 1 Ref.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

25 319587 PEAK-PERIOD SUPPLEMENTS: THE CONTEMPORARY ECONOMICS OF URBAN BUS TRANSPORT IN THE UK AND USA. This report is concerned with the worsening economic viability of bus public transport in the US and Britain, and the constraints of management and regulatory attitudes and practices that

have kept the industry from efficiently adjusting to its changing market. The report considers the growing orientation of transit service to peak periods, most prominently a result of the larger decline of off-peak demand relative to that of the peak. It is proposed that established public transit authorities (pta's) begin to divest of their sole (monopoly) responsibility for peak-period service provision, and develop a role for coordinated peak-period supplement services. The first chapter describes the industry's present dilemma, that expansion of service in peak-periods requires inordinate subsidy. The supplement innovation is shown to represent a fundamentally different operating framework than has been dominant in the industry. Chapter 2 describes the role and function of supplements. Chapter 3 reviews a variety of trends, observations, and assessments of the industry. It documents the evolution of a more difficult demand structure and operating environment, and reviews findings of recent (primarily UK) studies of public transport service provision and cost allocation, showing that deficits are primarily attributable to excessive peak-period orientation. The industry's poor and worsening productivity record, and the growth of deficit are assessed. Chapter 4 overviews recent UK developments in cost allocation methodology for bus transport, which provide enormous improvement over the long-used average cost assessment methods. Chapter 5 discusses the inefficiency-inducing effects of dated industry practices, and concludes that supplements are a practical and feasible approach to improved efficiency, as a surrogate application of marginal cost pricing. Chapter 6 briefly describes some examples, mostly recent us innovations, that support the supplement concept. The concluding chapter argues that efficiency and service maximization must become central objectives of modern public transport provision. Appendices, references, and bibliographies are included. (TRRL)

Oram, RL; Pergamon Press Limited, (0305 9006) Monograph 1979, 74p, Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 247728)

25 322262 TRENDS IN FAREBOX RECOVERY. Fare revenue is closely intertwined with two other areas of transit policy: the level of service and the level of the operating subsidy. The fare revenue plus operating subsidy must equal operating expenditures. At any given level of operating subsidy, a transit system has a wide range of options in fare policy and service policy. The article concludes that fare reductions would not be an effective means of helping transit conserve energy; stability in fare and subsidy policy can help enhance long-range planning in facing the 1980's; external factors have a great influence on farebox recovery; transit orientation in a community is a matter of history, and it cannot be changed in a short period of time--fare policy alone will not do it, and there is a need to look beyond money issues at the attitudes and assumptions about transit in a community.

Warren, RM (Toronto Transit Commission, Canada) *Transit Journal* Vol. 6 No. 2, 1980, p 35; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

25 324328 REPORT OF THE REGIONAL TASK FORCE TO REVIEW THE METRO FARE SYSTEM. This report was prepared by a task force directed to evaluate the advantages and disadvantages of the existing fare collection equipment and the present fare structure, including their impact on transit riders and jurisdictions, and to consider other collection systems and fare structures including those using turnstiles. The findings of the task force are summarized. These findings relate to the following areas: capital, operating and maintenance costs; adaptability to a mileage-based fare structure; interface capability between Metrobus and Metrorail, flexibility of the system, susceptibility to abuse, subsidy formulae, distribution of revenues, equity among jurisdictions, effect of fare collection system on patronage and rider attitude, and ability to serve Metrorail beyond the 101-mile system. Details are given of the alternative evaluation criteria and assumptions, the evaluation of alternative fare collection systems, as well as other considerations.

Washington Metropolitan Area Transit Authority Oct. 1980, 47p, 7 App.; ORDER FROM: Washington Metropolitan Area Transit Authority, 600 5th Street, NW, Washington, D.C., 23006

25 328240 FREE PARKING AS A TRANSPORTATION PROBLEM. As many as 40 percent of all those commuting by auto to the downtown areas of U.S. and Canadian cities appear to park free at their destinations. This surprisingly widespread practice is a significant but overlooked determinant of mode choice. The study attempts to estimate how many of those who are offered employer subsidized parking decide to drive alone rather than commute by carpool, transit, or another means. The best estimate appears to be that approximately 20 percent of those who now drive alone and receive free parking would form carpools or begin using transit for the trip to work if required to pay for parking. This estimate reflects the results of a variety of mode choice models, as well as comparisons of the behavior of similar commuters who park free and who pay for parking, and the results of imposing charges for parking formerly provided free. The major incentive for employers to provide free parking appears to be the fact that as a fringe benefit, free parking escapes income taxation. Enforcing the reporting and taxation of its cash value, however, is a difficult and predictably unpopular approach. Instead, this study recommends two policies intended to extend the subsidy for work travel now enjoyed by many drivers, in the form of free parking, to travel by other modes: (1) amend the Internal Revenue Code to permit employers to pay employees a tax-exempt travel allowance in lieu of free or subsidized parking; and (2) extend free parking only to drivers who carpool (e.g., only to autos with three or more occupants). Both policies promise significant increases in carpooling and transit use at very low or no public expense.

Shoup, DC Pickrell, DH; California University, Los Angeles, Department of Transportation Final Rpt. DOT/RSPA/DPB50-80/16, Oct. 1980, 75p; Contract DOT-OS-80011; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-123325

25 330174 RELIABILITY OF FARE-COLLECTION SYSTEMS FOR RAIL TRANSIT: AN OVERVIEW. The present performance of graduated-fare automatic collection equipment is compared with that of similar fare-collection systems, desirable performance is estimated, and research and development needs are identified. A series of flowcharts for three actual rail systems that indicated the range of functions and approaches that could be incorporated into a fare-collection system were developed. Queuing models could not be used directly to estimate the impact of the collection system on passenger flow without developing a two-stage model by use of the binomial probability distribution. Reliability data were collected by using interviews and the review of operating records. The data-collection methods varied greatly. Mean transactions between failures was found to be a useful and practical measure for comparing equipment reliability. The operating costs of rail transit fare-collection systems vary between 7 and 31 percent of revenues collected. The reliability of fare-collection equipment varies between 40,000 transactions/failure for a token-accepting turnstile to several hundred transactions per failure for a stored-value farecard vendor. Improved performance is obtainable, but the potential extent is unclear. Systems with a combined reliability of 0.22 percent failures/passenger can function without station attendants. It is important to specify failures in terms of component replacement and in terms of clearing of jammed tickets or money. The results provide an initial basis for comparing the performance of alternate fare-collection systems and focusing development resources.

Rubenstein, L (Jet Propulsion Laboratory) *Transportation Research Record* No. 760, 1980, pp 46-53, 3 Fig., 5 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

25 345230 SELF-SUSTAINING PUBLIC TRANSPORTATION SERVICES. Between 1970 and 1978, transit deficits in the United States grew by over 700%. The rapidly mounting deficits are of great concern because governmental outlays for transit cannot be expected to grow indefinitely. If transit service is to continue to expand, it is likely that means will have to be found to narrow the gap between revenues and expenses. This paper surveys three U.S. transit systems which have been self-supporting in the sense of passenger revenues covering operating costs. From a detailed examination of fares, level of service, costs and characteristics of areas served by these systems, in comparison with the same descriptors of conventional loss-incurring transit systems, there emerges an overall concept of a self-supporting transit service. It is characterized by high quality of service, a relatively high fare, a targeting of the service toward users who are willing to pay for the high level of service provided; and finally, providing information that is readily available to both regular transit users as well as prospective new riders. The final section of the paper considers whether the concept is generalizable, and discusses some possible objections to the institution of such service. (Author/TRRL)

Morlok, EK Viton, PA (University Of Pennsylvania) *Transport Policy and Decision Making* Vol. 1 No. 2/3, 1980, pp 169-194, 3 Fig., 11 Tab., 19

FARES & PRICING

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Ref.; ACKNOWLEDGMENT: TRRL (IRRD
253903), Institute for Road Safety Research;
ORDER FROM: Institute for Road Safety Re-
search, P.O. Box 71, Deernss, traat 1

26 041295 MOVING PEOPLE SAFELY. The 166-page paperback was prepared as a means of enhancing the already enviable safety record of the rail transit industry. It contains guidelines in a number of areas of safety and is intended not only for those systems now operating but also for the systems which are now building or are being planned. From the guidelines in this volume it is intended that specific safety rules can be prepared for each system. The seven chapters cover Safety First, Inspections: Facilities; Inspections: Cars; Inspections: Communications; Power; Uniform Code of Operating Rules; and Emergency. There is also a section on uniform accident reporting.

Institute for Rapid Transit 166 pp; This book was prepared by the Passenger Safety Committee of the Institute for Rapid Transit and Announced in *Railway Locomotives and Cars*, V146, N8, September 1972.; ACKNOWLEDGMENT: *Railway Locomotives and Cars*; ORDER FROM: Institute for Rapid Transit, 1612 K Street, NW, Washington, D.C., 20006 Repr PC

26 047971 LOW-SMOKE CABLE NOW AVAILABLE. A new flame resistant/low smoke jacketed control cable has been developed by The Okonite Company, especially suitable for installation in subway tunnels for signal and communications controls. Smoke emission from the new cable is reduced approximately 55% compared with standard design when subjected to external flame. The small amount of smoke given off is white or translucent, but believed to be of sufficient density to actuate smoke-detecting equipment.

Railway System Controls Vol. 4 No. 4, Apr. 1973, pp 20-21; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

26 050337 SAFETY IN URBAN MASS TRANSPORTATION: THE STATE OF THE ART. This report is a survey of safety practices on various transit systems, including rail rapid transit systems. Safety rules, safety devices, warning devices, and accident prevention and accident reporting are covered.

Highway Research Board Apr. 1973, 177 pp, 11 App; Report prepared by Highway Research Board Task Force on Urban Mass Transportation Safety Standards.; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

26 051339 TOKYO UNDERGROUND STATION AND ITS DISASTER PREVENTION SYSTEM. Here is outlined the newly constructed Tokyo Underground Station and its disaster prevention system, which is to play an important role in the underground railway.

Ejima, A (Japanese National Railways) *Japanese Railway Engineering* Vol. 14 No. 2, 1973, pp 9-14, 8 Fig, 2 Phot; ACKNOWLEDGMENT: Japanese Railway Engineering; ORDER FROM: ESL, Repr PC, Microfilm

26 051401 SYSTEM SAFETY AND RAPID TRANSIT PROJECTS. This paper is a brief review of Systems Safety and its relationships to transit projects. Hopefully, it will lead to a better understanding of the unique problems presented by the transit industry. System Safety is now and

will continue to play a significant role in the transit industry. Its value, in proper perspective, is obvious. However, its success in the future will depend on how well we keep in mind the relative importance to society of pursuing the elusive goal of a perfect safety record versus accomplishing the mission at hand, which is to review the vehicular congestion of our urban areas.

Hackley, PF (Kaiser Engineers of Pennsylvania, Incorporated); American Society of Mechanical Engineers Paper 73-ICT-56, Sept. 1973, 8 pp, 8 Fig, 7 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

26 051404 BART SCALE MODEL SAND BUMPER ARRESTOR TESTS. Scale model tests were performed to evaluate the effectiveness of an end-of-track sand bumper arrestor. The tests were conducted using a 1/15 replica of the BART A car at scale speeds to 80 mph. A second dummy car was used to model a two-car train and scale speeds to 60 mph were tested. The results indicate that a 24-ft sand bumper would be effective to approximately 20 mph with a two-car train and speeds below that with longer trains. Increasing the bumper length will improve the stopping power, but beyond 50 ft the first car has risen above the 3-1/2 ft high sand bumper and is unstable. A scale model sled-sand braking system was tested with a single BART car and was found to be effective up to 80 mph.

Krachman, HE (Developmental Sciences, Incorporated) McCutchen, WR (Bay Area Rapid Transit District); American Society of Mechanical Engineers Paper 73-ICT-75, Sept. 1973, 8 pp, 6 Fig; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

26 051939 LOW-SMOKE CABLE MADE FOR SUBWAYS. The Okonite Corporation has started production of its new Okonite-Okoprene VFR/LS (Very Flame Resistant/Low Smoke) jacketed control cable. The cable uses the standard Okoprene insulation, retaining the physical and electrical characteristics of regular railroad signal cable. Smoke emission from either the control or power cable is reduced by approximately 55%, compared with the standard design, when subjected to external flame. The small amount of smoke given off is white and translucent but seems to be of sufficient density to actuate smoke detecting equipment. The new organic jacketing approximately doubles the time required to short-circuit a control cable during flame testing. The new cable is also noted for not showing any candlewick effect.

Railway Age Vol. 174 No. 3, Feb. 1973, 1 p, 2 Phot; ORDER FROM: XUM, Repr PC

26 054310 MONTREAL TIGHTENS UP FIRE PRECAUTIONS. Tenders to be opened on March 21 for 423 pneumatic-tyred cars required as part on Montreal's 1976-78 metro expansion programme must comply with a new specification designed to reduce heat build-up in tunnels and the associated risks of fire. Floors, walls and

ceilings must be of material which does not release noxious gases when heated, and each car must carry fire extinguishers and emergency tools. Choppers with provision for regenerative braking will reduce the amount of waste heat generated, but ventilation inside the cars will also be improved.

Railway Gazette International Vol. 130 No. 3, Mar. 1974, 1 p; ACKNOWLEDGMENT: *Railway Gazette International*; ORDER FROM: IPC Transport Press, Repr PC

26 057860 LIGHTING EFFECT IN THE SMOKE OF TUNNEL FIRE. To investigate an appropriate lighting system for safe evacuation of passengers from tunnels and to compare three types of lamps--fluorescent, high-pressure mercury and high-efficiency sodium--in transmittance through fire and smoke and as normal tunnel illumination, measurements were carried out. Also checked was the visibility in smoke of indicator lamps showing location of telephones and other facilities. As a result of test, a 40-watt fluorescent lamp was chosen for tunnel illumination and a 20-watt fluorescent for indicator lamps. Through these tests, it has been made clear that even if surface luminance of an indicator lamp exceeds 1000 cd/sq m, the threshold smoke density does not increase correspondingly.

Tanaka, H Takaoka, S *Railway Technical Research Institute* Quart. Rpt Vol. 15 No. 2, 1974, pp 83-84, Tabs.; ACKNOWLEDGMENT: Railway Technical Research Institute; ORDER FROM: Ken-yusha, 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

26 057881 RAILROAD ACCIDENT REPORT. COLLISION OF THE STATE-OF-THE-ART TRANSIT CARS WITH A STANDING CAR, HIGH SPEED GROUND TEST CENTER, PUEBLO, COLORADO, AUGUST 11, 1973. On August 11, 1973, the UMTA state-of-the-art rail rapid transit cars (SOAC's) collided with a standing railroad gondola car at the U.S. Department of Transportation's High Speed Ground Test Center near Pueblo, Colo. The SOAC's were being operated on the transit test track when they were inadvertently diverted through a switch onto an adjacent track and into the gondola. The motorman on the SOAC was killed. The National Transportation Safety Board determines that the probable cause of this crash was the failure of a locomotive crewmember to align a switch properly and the failure of the motorman to detect the open switch in sufficient time to stop the SOAC's short of a gondola standing on the track. Contributing to the accident were the failure of the Transportation Systems Center's representatives (UMTA's systems manager) to implement operating procedures that would secure the intended pathway and the absence of a systematic risk management program at the Highway Speed Ground Test Center. This report examines the crashworthiness of the SOAC's and the institutional errors that led to the accident. Recommendations intended to prevent a recurrence of the accident and to improve crashworthiness of rail transit cars are directed to the Federal Railroad Administration and the Urban Mass Transportation Administration.

National Transportation Safety Board NTSB-RAR-74-2, May 1974, 53 pp, Figs., Photos., 4 App.; Railroad Accident Report. This report contains Safety Recommendations R-

74-13 through R-74-21.; ACKNOWLEDGMENT: National Transportation Safety Board; ORDER FROM: NTIS, Repr. PC

26 072083 SAFETY IN PUBLIC TRANSPORTATION. Safety is an important consideration in public transportation both economically in terms of equipment repair and medical costs, and psychologically in terms of public acceptance. Accidents result primarily from human failures, both of operating personnel and passengers. Less than ten per cent are due to equipment failure of abnormal conditions. Accidents are more likely where a roadway is shared. The calculation of accident seriousness is quite complicated. The numbers of injured, the gravity of the injuries, and the cost of the injuries are possible measures, expressed per passenger-trip, -hour or -kilometer. Figures also vary depending on whether or not suicide attempts and illnesses are counted. Safety regulations cover equipment, operations, personnel, and passengers, but are usually created in response to the occurrence of some accident, rather than as a result of foresight.

Secretary of State for Transportation, France
June 1974, 54 pp, Tabs.; ACKNOWLEDGMENT: TSC

26 072559 SAFETY AND AUTOMATIC TRAIN CONTROL FOR RAIL RAPID TRANSIT SYSTEMS. The anticipated construction and expansion of rail rapid transit systems in the United States over the next 10-15 years implies major capital expenditures. A significant level of automation in train control is likely to be central to these systems. The potential safety problems associated with various implementation alternatives, several possible levels of automation, and uncertainty in the corresponding proper role of the human operator raise issues requiring timely resolution. This report describes the state-of-the-art in rail rapid transit system automatic train control, assesses the safety related interrelations between the train control system, functions of the human operator and other portions of the total system, and makes recommendations, based on current experience, to aid the process of planning, funding approval, design, implementation, test, safety certification and operation of new systems or modifications of existing systems. The Study suggests that the Federal Government develop safety criteria by which to evaluate future proposals and establish guidelines for safety certification procedures. It also concludes that knowledgeable application of system engineering skills and advanced development program techniques together as a process, are probably more important to achieving a successful new rail rapid transit system than are individual design decisions or application of advanced technology.

Pawlak, RJ Colella, AM Knable, N Robichaud, RH Sussman, ED ; Transportation Systems Center, (OE404-R4602) Final Rpt. DOT-TSC-OST-74-4, July 1974, 278 pp; ACKNOWLEDGMENT: TSC; ORDER FROM: NTIS, Repr. PC; PB-235/492/6 st, DOTL NTIS

26 080091 FIRE EXPERIMENTS OF COACH. As part of the equipment development program of the Japanese National Railways, steps are being taken to step up the fire prevention and protection qualities of passenger cars. Because of

the high speeds, long tunnels and subways in which trains operate, and the large amount of new rolling stock which is planned, preventing train fires is given high priority. The resistance of various seat upholstery materials to ignition from a burning newspaper were checked initially. Subsequently the same second class coach was ignited and the fire allowed to burn fiercely with smoke concentrations, gasses and temperatures monitored as the conflagration continued inside the standing car. Further work on fire suppression is planned.

Oikawa, I *Railway Technical Research Institute Quart Rpt.* Vol. 15 No. 3, Sept. 1974, pp 131-132, 3 Fig.; ACKNOWLEDGMENT: Railway Technical Research Institute; ORDER FROM: Ken-yusha, 1-45-6, Hikari-cho, Kokubunji, Tokyo, Japan Repr. PC

26 080349 SAFETY EVALUATION OF MASS TRANSIT SYSTEMS BY RELIABILITY ANALYSIS. A problem-independent concept for the reliability analysis of complex systems is presented. A method of system reliability analysis which is based on a selection of generally applicable mathematical models and computer programs for efficient numerical evaluation of the models emerges from this concept, general safety model based on the same reliability analysis techniques and procedures is presented. A case study shows the application of the safety models and the methods of reliability analysis.

Frey, HH *IEEE Transactions on Reliability* Vol. R-23 No. 3, Aug. 1974, pp 161-169; ACKNOWLEDGMENT: EI (EI 74 080415); ORDER FROM: ESL, Repr. PC, Microfilm

26 080793 A STUDY OF THE DYNAMICS OF PEDESTRIANS AND GENERALLY UNSUPPORTED TRANSIT SYSTEM OCCUPANTS IN SELECTED ACCIDENT MODES. Pedestrian impact accounts for approximately 20 percent of the motor-vehicle-related fatalities in the U. S. and over 40 percent in some European countries. Despite the magnitude of this problem, however, until recently virtually all experimental research in the area of crash injury reduction has been concentrated on developing knowledge systems, and devices which will increase the probability for survival or reduced injury of conventionally seated vehicle occupants. An in-house program to study the pedestrian/vehicle impact problem indicated that one of the factors responsible for the relative lack of experimental effort on pedestrian impact injury attenuation was a basic lack of an experimental methodology which could treat this complex accident mode in a highly controllable-repeatable manner (e. g., in a manner similar to the crash simulation procedures utilized extensively in the development of seat belts, energy-absorbing steering columns, etc.). The subject study, therefore, proceeded to develop an experimental test methodology which could utilize actual or "stylized" vehicle front end structures mounted on a Hyge sled to impact "pedestrians" simulated by instrumented anthropomorphic adult and child dummies. A total of 22 fully-instrumented pedestrian-vehicle sled shots were conducted, and the results indicate that a very viable methodology has been developed. The results also indicate that (1) work on vehicle profile modifications and/or energy absorbing schemes should be fruitful and (2) the same basic test methodology should prove useful

in addressing the problem of crashes involving generally unsupported occupants such as standees riding in a mass transit vehicle.

Herridge, JT Pritz, HB (Battelle Memorial Institute) *American Association for Auto Medicine Conf Proc* Vol. 17 Nov. 1973, pp 70-86, 8 Fig., Tabs., 44 Refs.; ACKNOWLEDGMENT: National Safety Council, Safety Research Info Serv (740650 R)

26 082729 SAFETY IN MASS TRANSIT: A CASE STUDY OF BUS ACCIDENTS IN WASHINGTON, D.C. The purpose of this report was to obtain an increased understanding of the variables involved in transit bus accidents. It is a case study of bus accidents in Washington, D.C. The methodology is an analysis of 1971 District of Columbia police accident reports that have a bus coded as one of the vehicles involved in the accident. To give the research perspective and facilitate the development of a research design, the future role of transit buses in urban transportation and traffic safety was analyzed and a review of relevant traffic safety research and programs was conducted. It is in the area of injuries that transit buses have their greatest safety problems. Factors in the operating environment such as traffic congestion, intersection width, differences in maneuverability between vehicle types, and route design were found to have an important role in the frequency and severity of transit bus accidents. Because vehicle design is significantly circumscribed by the requirements of intracity bus service, improved bus safety requires, according to the author, a reduction of safety hazards in the operating environment in addition to vehicle design innovation. Recommendations for reducing safety hazards in the operating environment are made and an inexpensive safety program for implementing these recommendations in different metropolitan areas is proposed. /UMTA/

Shanley, JW ; Consortium of Universities, (DC-11-0003) UMTA-DC-11-0003-74-3, Oct. 1974, 146 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238940/AS

26 091887 TRANSIT FLAMMABILITY REQUIREMENTS. Control of the flammability characteristics of furnishings within a structure will reduce the fire hazard to the structure and enhance the life safety of its occupants. Flammability of materials should be considered along with comfort, cost and wear. Quantifying flammability, setting acceptable standards, identifying appropriate test procedures, and locating the material to satisfy the standards are steps taken by the Port Authority of New York and New Jersey.

Schafran, E ; Transit Development Corporation, Incorporated Final Rpt. TDC/500-74/3, June 1974, 11 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241851/5ST, DOTL NTIS

26 091888 SMOKELESS CABLE. The transit industry embarked upon a program to realistically and comprehensively develop an understanding of fire safety in the use of electrical wire and cable insulations and jacketing materials. The New York City Transit Authority has devoted extensive time and effort to identify the potential

dangers. The fire safety problem concerned with excessive heat characteristics is described.

Mombach, J Connell, WM ; Transit Development Corporation, Incorporated Final Rpt., E TDC/500-74/2, June 1974, 12 p, 2 Ref.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241850/7ST, DOTL NTIS

26 093610 CRASHWORTHINESS ANALYSIS OF THE UMTA STATE-OF-THE-ART CARS. An engineering assessment of the crashworthiness of the UMTA State-of-the-Art Car (SOAC) has been conducted as part of a program to provide safer transportation to urban rail vehicles. Crash dynamics and crashworthiness methodology based on post-yield energy absorption characteristics and a 'weighted acceleration' severity index has been applied. Sensitivity studies have been conducted to show the effect of car buff strength, passenger relative velocity, passenger spacing, and cushioning on casualties as defined by the severity index. Major gains in injury reduction through improved internal cushioning are indicated. The prevention of car penetration by override is treated. The SOAC collision dynamics model is validated by comparison to the SOAC-gondola accident of August 11, 1973, and by comparison to a nonlinear finite element mathematical simulation of the SOAC in crash conditions.

Widmayer, E Tanner, AE Klump, R ; Boeing Vertol Company, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0025-7515, Oct. 1975, 193 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247230/6ST, DOTL NTIS

26 094136 AN ASSESSMENT OF THE CRASHWORTHINESS OF EXISTING URBAN RAIL VEHICLES. VOLUME I: ANALYSES AND ASSESSMENTS OF VEHICLES, CHAPTERS 1 THROUGH 7. The crashworthiness of existing urban rail vehicles (passenger cars) and the feasibility of improvements in this area were investigated. Both rail-car structural configurations and impact absorption devices were studied. Recommendations for engineering standards for urban rail vehicles were developed. The report covers: (1) The development of analytical tools to predict passenger threat -environment during collision; (2) criteria for predicting passenger injury due to train collisions; (3) an application of injury criteria and analytic models to predict passenger injuries resulting from collisions of trains that represent existing construction types; (4) a preliminary investigation of applying impact absorption devices to transit vehicles; (5) a design study of car structural configurations for improved impact energy management; (6) a review of engineering standards for Urban Rail Car Crashworthiness.

Cassidy, RJ Romeo, DJ ; Calspan Corporation, Department of Transportation Final Rpt. UMTAMA06-0025-7516V1, Nov. 1975, 199 pp; Paper copy also available in set of 2 reports as PB-249 141-SET, PC\$13.00.; Contract DOT-TSC-681; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249142/1ST, DOTL NTIS

26 094137 AN ASSESSMENT OF THE CRASHWORTHINESS OF EXISTING URBAN RAIL VEHICLES. VOLUME II: ANALYSES AND ASSESSMENTS OF VEHICLES, CHAPTERS 8 THROUGH 12 AND APPENDICES AND REFERENCES. This publication presents information related to the following: Railcar override; Priority areas for the development of cost effective improved car structures; Preliminary design study of impact energy absorbing device; Cost effectiveness of structural improvements; Development of uniform standards.

Cassidy, RJ Romeo, DJ ; Calspan Corporation, Department of Transportation Final Rpt. UMTAMA06-0025-7516V2, Nov. 1975, 171 pp; Paper copy also available in set of 2 reports as PB-249 141-SET, PC\$13.00.; Contract DOT-TSC-681; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249143/9ST, DOTL NTIS

26 094558 HIGHWAY ACCIDENT REPORT: SISKIYOU UNION HIGH SCHOOL DISTRICT SCHOOLBUS/AUTOMOBILE COLLISION AND ROLLOVER, I-5, ASHLAND, OREGON, MAY 9, 1975. On May 9, 1975, a 1972 schoolbus carrying 20 persons crashed through a section of guardrail on the northbound portion of Interstate 5 in Ashland, Oregon. The vehicle fell down a steep slope and rolled about its longitudinal axis before it came to rest in an upright position about 213 feet from the edge of the pavement. Except for one sidepost-roof bow connection, the roof separated from the bus body. Nineteen of the 20 occupants were ejected through the gap created by the roof separation. Of the 19 occupants ejected, 3 were killed and 15 were injured. The only occupant who remained in the bus was not injured. The National Transportation Safety Board determines that the probable cause of this accident was: (1) The failure of the schoolbus driver to select the proper gear to descend the steep grade, and (2) the maladjustment of the brakes on the bus.

National Transportation Safety Board NTSB-HAR-76-1, Jan. 1976, 34 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250050/2ST

26 094690 A FIRE HAZARD EVALUATION OF THE INTERIOR OF WMATA METRORAIL CARS. A series of fire tests was conducted for the Washington Metropolitan Area Transit Authority to assist them in assessing the potential for fire hazard in the new Metrorail subway cars. Results of small-scale laboratory tests were found inadequate for this assessment. Results of full-scale tests on mock-ups of the interior (and on a real car for a smoke penetration test) show that the potential for hazard arises primarily from the seat padding and covering and from the plastic wall lining. The hazard arises both from smoke development and from spread of flame and heat. The times to reach unacceptable conditions has been determined for several test conditions. It is recommended that the authorities review these times in the context of what they consider to be appropriate times for safe escape. Recommendations are made for increasing the amount of time available for escape. These would require changes in the seating and wall lining materials.

Braun, E ;

National Bureau of Standards, Washington Metropolitan Area Transit Authority, (NBS-4927371) Final Rpt. NBSIR-75-971, Dec. 1975, 35 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249776/6ST, DOTL NTIS

26 096326 SAFETY PRIORITIES IN RAIL RAPID TRANSIT-VOLUME I REPORT. VOLUME II-EXHIBITS. Rail rapid transit enjoys an enviable safety record in the field of transportation. It produces the lowest number of fatalities of any of the major passenger transportation modes. Despite the position that rail rapid transit enjoys with respect to other public carriers, accidents have happened, and it is this fact that prompted the Urban Mass Transportation Administration (UMTA) in 1973 to fund a Grant Project (DC-06-0091) on Rapid Rail System Safety. The grant recipient was the Transit Development Corporation (TDC) who was assigned the task of developing and designing a plan reflecting the safety priorities and requirements of the rail rapid transit operating properties. This report describes the techniques and procedures used in fulfilling the task assignment and the results. TDC utilized the contributed services of rail rapid transit industry experts in developing a program that identified what should be done to aid in assuring that rail rapid safety continues. All aspects of rail rapid transit safety were reviewed, hazards were identified, priorities established and suggested remedial action endorsed.

Connell, WM ; Transit Development Corporation, Incorporated Final Rpt. UMTA-DC-06-0091-75-1, Mar. 1975, 316 pp, Figs., 27 Ref.; Contract DC-06-0091; ORDER FROM: NTIS, Repr. PC, Microfiche

26 097324 FIRE-RETARDANT CABLE SYSTEMS. The increasing use of nonmetallic cables in cable trays for industrial applications as recognized in the 1975 National Electrical Code, Article 340, mandates that these cables be suitable for this application and that the outer sheath be flame-retardant. The significance of various flame tests is discussed, and data obtained following procedure and modifications of IEEE Standard 383-1974, Section 2.5, are presented. It is evident that nonmetallic sheathed tray cables are available that will comply. Furthermore, when a flame-resistant jacket is applied over type ALS, MC, or AC armored assemblies, it results in an exceptionally rugged, corrosion, and flame-resistant nonpropagating construction.

McIlveen, EE (Okonite Company) *IEEE Transactions on Industry Applications* No. 3, Vol. IA-11, May 1975, pp 301-307, 2 Fig., 8 Tab., 11 Ref.; ACKNOWLEDGMENT: IEEE Transactions on Industry Applications; ORDER FROM: ESL, Repr. PC, Microfilm

26 099009 ACCIDENT PREVENTION IN RAIL TRANSIT. Rail Transit, one of the safest modes of transporting people, will carry more and more passengers in the next decade as metropolitan areas expand transit facilities to offset combustion engine pollution and automobile congestion. This paper discusses the need for system safety emphasis in this expansion, who must contribute, and a manufacturer's approach to fulfilling his responsibility in the effort. A summary of current and anticipated transit systems in areas such as New York, Philadelphia,

Boston, Chicago and San Francisco is given for background. Then the roles of the passenger, transit authorities, manufacturers, government and public in enhancing the safety of these systems is postulated. Within this framework the author's approach to conducting an effective yet practical application of system safety in car building is described. The basic elements include: 1) judicious combination of management and technical resources, 2) qualitative hazard identification, criticality ranking, and reduction efforts, 3) design reviews (broad perspective) 4) manufacturing practices (quality), 5) awareness, training and credibility, and 6) accident data feedback. However, in the end, a minimum risk transit system depends on the cooperation and contribution of owners, builders, passengers and the public. /Author/

MacMonagle, LL (General Electric Company) *Human Factors Society Proceedings* Vol. 17 Oct. 1973, pp 483-496, 9 Fig., 6 Tab.; ACKNOWLEDGMENT: National Safety Council, Safety Research Info Serv (SRIS 750413R)

26 099185 SAFETY PRIORITIES IN RAIL RAPID TRANSIT. VOLUME 2-EXHIBITS. This report contains the exhibits of the Volume 1 report, a report which develops a program to identify what should be done to aid in assuring that rail rapid transit safety continues to produce the lowest number of fatalities of any of the major passenger transportation modes. Exhibits are: (1) Work Statement; (2) Project Implementation Plan; (3) Safety Advisory Board; (4 & 5) Safety Advisory Board Meeting Agendas and Minutes; (6) Safety Advisory Board Committee Meeting Minutes; (7) Montreal Fire Report; (8) Compilation of Safety Related Items; (9) Accident Source Items Final Listing; (10) TDC Monograph Series 500 "Transit Flammability Requirements" 500-3; (11) UITP-Combustibility of Material Used in the Construction of Modern Rolling Stock; (12) Work Statement on Non-metallic Materials; (13) Consultants Report on Fire Safety of Materials; (14) Engineering for Fire Safety of Rail Rapid Mass Transit Systems-SRI; (15) TDC Monograph Series 500 "Smokeless Cable" 500-2; (16) NASA Problem Statement No. 72-04-025 Smokeless Non-toxic Cable; (17) Fire Extinguishing System-8-74; (18) Work Statement The Development of a Method and Equipment for Early Detection of Fire, etc; (19) a proposed Study of Accidents on Fixed Stairs in Rapid Transit Stations-E. Novell; (20) Proposed Work Statement "Design, Test and Acceptance Criteria for Transparencies; (21) Work Statement for the Production and Distribution of a Safety Film on Mass Transit; and 6 other exhibits with relevancy to the main report.

Connell, WM ; Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, (UMTA-DC-06-0091) Final Rpt. UMTA-DC-06-0091-75-2, Mar. 1975, 280 pp; Sponsorship was by the Urban Mass Transportation Administration, DOT. See also Safety Priorities in Rail Rapid Transit. Volume 1-Report. Paper copy also available in set of 2 reports as PB-242952/SET.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-242954, DOTL NTIS

26 099186 SAFETY PRIORITIES IN RAIL RAPID TRANSIT. VOLUME 1-REPORT. Rail Rapid transit presently produces the lowest

number of fatalities of any of the major passenger transportation modes. This report develops a program to identify what should be done to aid in assuring that rail rapid transit safety continues. All aspects of rail rapid transit safety are reviewed, hazards are identified, priorities established, and remedial actions recommended. Recommendations include: (1) an evaluation program for materials which utilizes new methods of computing and assessing risk in the areas of flammability, smoke and toxicity; (2) compilation and dissemination of procedures, techniques, and equipment used in the safe evacuation of rail rapid transit patrons; (3) an improvement study of fixed stairs in rail rapid transit facilities to determine whether significant reduction can be achieved in the number of patron falls; (4) a safety education plan to produce films for public education and use in primary schools; (5) work efforts in the development of fire detection and transit vehicle fire extinguishing equipment; (6) establishment of criteria for transparencies used for transit vehicles; (7) determination of hazards of power regeneration and the evolution of procedures to eliminate them; and (8) continuation and support of the Safety Advisory Board techniques for analyzing and assessing safety in rail rapid transit to help assure coordinated technical information input to transit safety development. A bibliography is furnished.

Connell, WM ; Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, (UMTA-DC-06-0091) Final Rpt. UMTA-DC-06-0091-75-1, Mar. 1975, 45 pp; Sponsorship was by the Urban Mass Transportation Administration, DOT. See also Safety Priorities in Rail Rapid Transit. Volume 2-Exhibits. Paper copy also available in set of 2 reports as PB-242 952-SET, PC \$11.00.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242953, DOTL NTIS

26 125502 SCIENTIFIC FREEDOM AND RESPONSIBILITY. Science and its applications now affect the quality of life for everyone, largely technological developments that can bring great benefits but can also expose us, and our environment, to grave and often unforeseen hazards. Scientific experts who feel an obligation to speak out on such issues may come into sharp conflict with their employers, or with other vested interests. This report maintains that the professional societies should assume a greatly increased responsibility for their members, in conflicts that involve defense of the public interest on issues related to the professional competence of the members of the society. The difficulties associated with this proposal, and possible ways of solving them are discussed. Some of these problems are illustrated by the case of the three Bay Area Rapid Transit engineers who warned of dangerous deficiencies in the BART automatic control system. /HRIS/

Edsall, JT ; American Association for Advancement of Science Misc. Pub. 75-4, 1975, 50 pp; ORDER FROM: American Association for Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C., 20005 Orig. PC

26 126404 STATISTICAL STUDY OF TRAM DRIVER ACCIDENTS. Two basic hypotheses are considered; The accident proneness theory

and the spell theory. These hypotheses were tested on the basis of a correlation analysis of accident distribution in a group of tram drivers over a five year observation period. The analysis showed the negative binomial distribution and the "short" distribution were successfully fitted, while the Poisson distribution significantly differed from the observations. Correlation analysis showed a significant correlation between the number of tram driver accidents over different periods, and that this correlation, although decreasing with an increase of the interval between observation periods, remained significant. The conclusion is that the proneness hypothesis explains more satisfactorily than the spell hypothesis, the occurrence of accidents in tram drivers during the observation period.

Milosevic, S (Psychotechnic Laboratory, Yugoslavia) Vucinic, S (Psychotechnical Laboratory, Yugoslavia) *Accident Analysis and Prevention* Vol. 7 No. 1, May 1975, pp 1-7, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

26 127048 SAFETY IN URBAN TRANSPORTATION: GUIDELINES MANUAL AND RESEARCH REPORT SUMMARY. An investigation was carried out with the purpose of providing information and reporting the results of analyses about the current level of safety and the need for additional safety effort in urban mass transit. The Research Report Summary outlines the steps followed in the investigation, and serves as an introduction to the final report which is now in preparation and will contain a full presentation of data on the safety performance of all passenger transportation modes, comparative analyses of their safety problems, and the rationale underlying the strategy and practice of safety management recommended in the report and reflected in the guidelines manual. The manual presents a series of organizational and technical safety guidelines designed for use of the transit management community. The guidelines are intended to show how the transit industry--supplier firms and operators--can develop programs that will assure satisfactory operational safety levels. By describing ways in which suppliers and operators can set logical safety goals and establish organizations and engineering procedures to attain them, the manual sets forth a model for industry management and for basing the interaction, regarding safety, between pertinent Government agencies and the transit industry. The manual covers the following topics in separate chapters: foundations of safety in urban mass transportation; safety management and planning; techniques for safety analysis; trade-off considerations; system safety data base; safety standards and specifications; and intermodal interface safety considerations. These guidelines are in the form of suggested or recommended practices accompanied by explanation. They are designed to have a considerable latitude of user interpretation so they can fit the wide variety of specific situations found in the transit industry.

Cheaney, ES Hoess, JA Thompson, RE Svehla, RL ; Battelle Columbus Laboratories, Naval Underwater Systems Center, (G-2460-1) UMTA RI06-0005-751,2, May 1975, 101 pp; Contract also sponsored by UMTA.; Contract N00140-73-C-A394; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245413/OST, DOTL NTIS

26 127700 FIRE SAFETY AND FIRE HAZARDS RELATED TO POLYMERIC MATERIALS IN CARS OF WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY. This report by the National Materials Advisory Board of the National Research Council represents a review of the technical decisions made by WMATA in selection of materials and design for car interiors from the viewpoint of fire safety. It is concluded that electrical fires are a continuing threat to rapid transit system safety and that awareness of fire safety in transport vehicles was only emerging when the WMATA cars were planned. Review of prior fire experiences was not made; emphasis on comfort and styling have increased fire load in car interiors; hydraulic brake systems increase the probability of electrical fires; choice of polymeric interior materials and wool carpeting should be reevaluated.

National Academy of Sciences-Natl Research Council 1975, 25 pp, Figs., Tabs., 11 Ref.; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244971/8ST, DOTL NTIS

26 127835 MOORGATE TUBE TRAIN DISASTER. This two-part article describes the medical aspects of the crash of a London Underground transit train in a dead end tunnel which resulted in 43 deaths and 72 injuries requiring hospital treatment. Part I describes the experience of the medical staff and reports a substantial advantage in using on-site medical teams that could offer anaesthetic facilities. Adequate communication between the accident site and hospital is important. Part 2 reviews injuries sustained by 113 casualties, showing the need for rapid evacuation. Recognition of the "crush syndrome" is important and a radical surgical approach is suggested. Chest injuries were common and contributed to many of the deaths.

British Medical Journal Vol. 3 No. 5986, Sept. 1975, pp 727-730 Direct requests to J.O. Robinson.; ACKNOWLEDGMENT: *British Medical Journal*; ORDER FROM: St Bartholomew's Hospital, Department of Surgery, London EC1A 7BE, England Repr. PC

26 130909 SAFETY-AVAILABILITY STUDY METHODS APPLIED TO BART. The paper describes the San Francisco Bay Area Rapid Transit (BART) system with emphasis of its underlying safety and availability concepts. The novel characteristics of this system which differentiate it from transit systems in other locations are pointed out.

Welker, EL (TRW Systems Group) Buchanan, HN *Annual Reliab Maintainability Symp. Proceedings* Proc Paper #1263, 1975, pp 269-275; Presented Jan 28-30, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

26 132900 MANAGEMENT'S ROLE IN SAFETY. The point is made that management's role in improving safety performance encompasses the recognition of the importance of safety, search for innovative new techniques and, a well-reasoned evaluation of all dilemmas faced in optimizing safety. It is pointed out that large transit systems must be involved not only with safety in moving people but also with industrial safety because of manufacturing type activities. Experiences at the Chicago Transit Authority (CTA) are described. Concern for safety at CTA led to the

reorganization of the safety related staff functions into a group raised to department level, and safety functions at line level within the transportation and maintenance departments were strengthened. The responsibilities of the staff safety officer, and the safety department are outlined, and funding assistance for safety improvements are discussed. Two-way voice communication, lighting of vehicles and stations, handrails and personal security for riders are also described.

Krambles, G (Chicago Transit Authority) *Passenger Transport* Vol. 33 No. 51, Dec. 1975, pp 6-7

26 134563 AIRCRAFT-TYPE CRASH INJURY INVESTIGATION OF A COMMUTER TRAIN COLLISION. Methodology for investigating the causes and circumstances of rail accidents. An aircraft-type investigation conducted following a collision between two commuter trains in the Chicago area, was able to identify the weaker points in the organization of public transport in heavy-traffic zones and fix technical safety standards for the construction of rolling stock.

Braden, GE *Wesleyan University* Vol. 46 No. 9, Sept. 1975, pp 1157-60, 1 Tab., 2 Phot., 1 Ref.; ACKNOWLEDGMENT: UIC; ORDER FROM: Aerospace Medical Association, Washington National Airport, Washington, D.C., 20001

26 136400 FIRE HAZARD EVALUATION OF CABLES AND MATERIALS. Test methods currently used for testing cables and cable materials are discussed and improved techniques are proposed. The virtues of the proposed techniques are illustrated by means of a typical fire retardant cable compound development. Finally the concept of a fire hazard rating system is introduced as a rationalization of the interpretation of cable and materials flammability testing.

Gouldson, EJ (North Electric Company, Montreal) Woolerton, GR Checkland, JA ; Army Electronics Command 1975, pp 26-36, 19 Ref. 24th Annual Int Wire and Cable Symp, Proceedings, Cherry Hill, New Jersey, November 18-20, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS

26 136411 HAZARD ANALYSIS--SPACE APPLICATIONS TO MASS TRANSIT. The paper describes an aerospace hazard analysis method practiced by Martin Marietta for National Aeronautics and Space Administration (NASA)/United States Air Force (USAF) Shuttle programs and presents an example of how this method is directly applicable to a mass transit system. Emphasis is given to the incorporation of an active and methodical hazard analysis program from the earliest possible design phase of a new system through the initial revenue years of the operational system, including maintenance activities.

Mumma, GB (Martin Marietta Corporation) O'Halloran, WR ; Institute of Electrical and Electronics Engineers Proc Paper No. 1360, 1976, pp 251-256, 9 Ref.; Presented at the Annual Reliab Maintainability Symp., Las Vegas, Nev., Jan. 20-22, 1976 sponsored by ASME and IEEE.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

26 136567 LBL ROLE AND RECOMMENDATIONS WITH RESPECT TO PUC HEARINGS ON BART SAFETY APPLIANCES AND PROCEDURES. Methods are discussed for increasing the level of safety of the Bay Area Rapid Transit (BART) by reducing the susceptibility of the BART system to human error. Recent incidents clearly demonstrated the vulnerability of operations carried on in the manual mode. The recommendations emphasize that: (1) the potential of the automatic systems be more fully used, particularly with respect to maintenance vehicle detection; (2) the safety regulations for manual operations be analyzed thoroughly; and (3) an intense task force be assigned to address high-priority problems.

Scalise, DT Evans, DM ; California University, Berkeley Feb. 1975, 23 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-3775, DOTL NTIS

26 136606 MEASUREMENTS AND OBSERVATIONS OF THE TOXICOLOGICAL HAZARD OF FIRE IN A METRORAIL INTERIOR MOCK-UP. Oxygen depletion, carbon monoxide, carbon dioxide, hydrogen chloride and hydrogen cyanide were selected for measurement and identification in Metrorail fire tests. Male rats exposed to the combustion products were examined for changes in blood chemistry, gross pathology and loss of function. Hydrogen cyanide and carbon monoxide levels in blood were elevated and functional changes were noted.

Paabo, M Pitt, B Birky, MM Coats, AW Alderson, SE ; National Bureau of Standards, Johns Hopkins University, Baltimore, (NBS-4911677) Final Rpt. NBSIR-75-966, Feb. 1976, 20 pp; Prepared in cooperation with Johns Hopkins Univ., Baltimore, Md. School of Hygiene and Public Health.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250768/9ST, DOTL NTIS

26 137030 RAILROAD ACCIDENT REPORT: REAR END COLLISION OF THREE MASSACHUSETTS BAY TRANSPORTATION AUTHORITY TRAINS, BOSTON, MASSACHUSETTS, AUGUST 1, 1975. On August 1, 1975, during the evening rush hour, southbound traffic on the Red Line of the Massachusetts Bay Transportation Authority in Boston backed up because of a train standing at a stop signal in the tunnel south of Charles Street Station. Train 1402, a four-car 'Bluebird' train, stopped at signal 236 because of the backup. Train 1604, a four-car 'Silverbird' train, was keyed by signal 234 and crashed into 1402 about 4:58 p.m. About 3 minutes later, a four-car 'Bluebird' train, 1431, crashed into the rear of train 1604. One hundred and fifty-four persons were injured; total damage to equipment was estimated to be \$425,000. The National Transportation Safety Board determines that the probable cause of this accident was the malfunction of the train-stop tripper and the subsequent operation of trains 1604 and 1431 in violation of the rules and in excess of the speed at which they could stop short of collisions in the available sight distances.

National Transportation Safety Board NTSB-RAR-76-6, Apr. 1976, 40 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253360/2ST, DOTL NTIS

26 141582 AN OPERATIONAL DEMONSTRATION OF TRAILING END VISIBILITY ENHANCEMENT DEVICES FOR COMMUTER RAILROAD TRAINS. This report describes the demonstration which compared under actual operating conditions various means of enhancing the visibility of commuter train ends. The visibility enhancement devices included in the demonstration were: 1) Xenon strobe lights; 2) Large and small red market lights; 3) Amber flashing beacons and 4) Various patterns of brightly colored paints and fluorescent/reflective tapes on car ends. Data concerning the visibility and other attributes of the above devices was collected by means of a series of questionnaires directed at groups of people considered to be significantly impacted by the devices. The groups surveyed were: 1) Train crew members; 2) Independent observers; 3) Residents along various rail rights-of-way; 4) Commuters and 5) Motorists. The survey results are discussed and the conclusions arrived at are used to make recommendations regarding which devices are most appropriate for inclusion in a regulation to govern the visibility enhancement of passenger train ends. In addition, performance specifications and guidelines for the use of these devices are given.

Englund, DB ; Illinois Department of Transportation Final Rpt. FRA-ORD-76-292, June 1976, 129 pp, 12 Fig., 5 Tab., 11 Ref., 1 App.; This demonstration was conducted by the Illinois DOT with the support and cooperation of the Federal Railroad Administration and three Chicago area commuter railroads: Burlington Northern, Chicago & Northwestern, Illinois Central Gulf.; ACKNOWLEDGMENT: Illinois Department of Transportation, NTIS; ORDER FROM: NTIS; PB-259901/7ST, DOTL NTIS

26 143329 RAILROAD ACCIDENT REPORT: CHICAGO TRANSIT AUTHORITY COLLISION OF TRAINS NO. 104 AND NO. 315 AT ADDISON STREET STATION, CHICAGO, ILLINOIS, JANUARY 9, 1976. On January 9, 1976, at 8:06 a.m., Chicago Transit Authority (CTA) train No. 315 struck the rear end of train No. 104 while it was standing at the Addison Street Station platform in Chicago, Illinois. The impact forces extensively damaged the lead car of the moving train and the rear car of the standing train, and slightly damaged the other cars in both trains. Damage to the equipment and track was estimated to be \$267,000. Of the 381 passengers who were injured in the collision, 1 passenger died. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the motorman of train No. 315 to perceive standing train No. 104 at a sufficient distance to permit him to stop his train before striking No. 104. Contributing to the collision were the rule that permitted the operation of the train with the automatic train control and the cab signals inoperative, the lack of consistent enforcement of operating rules, the absence of flag protection against following trains, the failure of the train phone system to provide reliable communications, and the violation of the 25-mph speed limit required by Rule 178B.

National Transportation Safety Board NTSB-RAR-76-9, July 1976, 36p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256593/5ST, DOTL NTIS

26 144227 DECELERATION SIGNAL SYSTEM STUDY (AS REQUIRED BY AB 1260, 1972 LEGISLATIVE SESSION). The results of the experimental study of the Cyberlite deceleration signal on Yellow Cabs in San Francisco are as follows: 1. Collisions with the rear of cabs were reduced by 60% during the 4-month study period. 2. Complaints in 48 letters stated that the Cyberlite was too bright, was particularly irritating at night, in dark wet weather, and gave an aggravating signal because of cab drivers riding the brakes. 3. Opinion surveys of traffic officers paralleled the comments in the letters. They expressed concern about peripheral accident hazards due to lane changes of drivers escaping from behind the bright lights and about the irritating sea of lights that could occur in congested traffic if many vehicles were so equipped. 4. Specific requests to three Bay Area Police Departments for a report of each collision in which Cyberlite was mentioned as a peripheral cause resulted in zero reports. Recommendations relating to deceleration signals are also presented.

Bureau of Mines, California Business and Transportation Agency May 1973, 145 pp, Figs., Tabs., Refs., 1 App.; This report is also titled: Report to the Legislature of the State of California.; ACKNOWLEDGMENT: National Safety Council, Safety Research Info Serv (760475 R)

26 146447 HOW BIG IS THE FIRE HAZARD IN OUR PUBLIC SERVICE VEHICLES? [Hur brandfarliga aer vaara kollektiva transportmedel?]. Fire safety precautions in public service vehicles are based on the same requirements as in buildings. The risk of fire in a vehicle is due to technical malfunctions or to vandalism in unmanned vehicles. As the overall weight of vehicles has been reduced over the past few years, so has the proportion of combustible materials. In a bus the total weight of combustible materials is about 10% of gross bus weight, in a modern underground car 7-8% of overall weight and 10% of car weight. Actual weight is 1-1.5 ton. Foamed plastics have replaced the old horsehair upholstery in seats to improve comfort, but this has increased the fire risk. Since traction and auxiliary equipment is separated from the passenger compartment, fire risks due to technical malfunctions are reduced. The greatest risk of fire in public service vehicles is due to vandalism and sabotage. Evacuation of buses and underground cars is easy. Fire fighting is dependent on external conditions; in underground trains extinguishers have had to be put in the driver's cab because of theft and misuse. /TRRL/ [Swedish]

Lagerberg, E *Svensk Lokaltrafik* Analytic No. 4, 1976, pp 6-8, 2 Phot.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN38017E), TRRL (IRRD 222434)

26 147827 WITH LOW SMOKE, TOXICITY, BURNING RATE, CAN PLASTICS FILL AIRCRAFT AND TRANSIT NEEDS. Government pressure, in the form of guidelines, proposed rules and actual requirements, is forcing companies building airplanes, subways and buses to look for materials that provide better burning characteristics. A number of plastics producers either have announced or are planning to announce grades that are substantial improvements over existing ones for panelling, seating and glazing. The question is-are these plastics adequate? Beyond this question, extensive research in

many areas such as toxicity may change existing requirements and thus again the status of materials being considered.

Houston, AM *Materials Engineering* Vol. 84 No. 2, Aug. 1976, pp 20-22; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

26 148297 SOME RELIABILITY, DEPENDABILITY AND SAFETY CONSIDERATIONS FOR HIGH-CAPACITY PRT SYSTEMS. Safety is a consideration of major importance in the planning and implementation of an automated small-vehicle fixed-guideway transit system. Analysis of safety considerations necessarily entails identification of the spectrum of possible failure modes and the definition of procedural and design responses thereto. Procedural responses must consider not only the attainment of a high degree of passenger safety, but also a high level of service dependability; e.g., responses to emergency situations which result in significant service disruptions must be avoided if it is possible to do so without significantly jeopardizing passenger safety.

Olson, CL (Aerospace Corporation) Fuller, GH Fling, RB ; Colorado University, Denver Conf Paper Vol. 2, Paper 45, 1975, 19 pp, 19 Ref.; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

26 148310 REVIEW OF AUTOMOBILE CRASHWORTHINESS EXPERIMENTS WITH RESPECT TO PRT SYSTEMS. The basic concept of crashworthiness relative to human transport systems is discussed. Experimental testing methodology which has been developed over several years is reviewed with special emphasis on automotive crashworthiness. Common elements between automotive and PRT system crashworthiness are identified and pertinent, existing experimental data noted. Methods that would permit future PRT system crashworthiness research to take advantage of automotive technology are considered and appropriate recommendations are developed.

Miller, PM (Calspan Corporation) Shoemaker, NE ; Colorado University, Denver Conf Paper Vol. 2, Paper 42, 1975, 34 pp, 14 Ref.; This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

26 148312 SAFETY ESTIMATES FOR URBAN TRANSIT SYSTEMS. The paper presents the methodology and results of the safety analysis conducted for each of the transit alternatives being considered for Denver, Colo. It contains the historical data, methodology, and various assumptions used to develop the appropriate accident, and accident severity rates to forecast the safety status of various transit alternatives for the year 2000. The expected accident rates for the various concepts are summarized by hazard category and by the system's section. The comparison of total annual fatalities for the concepts is presented in terms of lives saved. The line haul

sections of various concepts, and typical auto fatality rates are also compared to the domestic scheduled airline annual fatality rate.

Moraq, D (De Leuw, Cather and Company) McGean, TJ ; Colorado University, Denver Conf Paper Vol. 2, Paper 43, 1975, 34 pp, 10 Ref.

This paper was presented at the International Conference on Personal Rapid Transit held in Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Denver, Center for Urban Transportation Studies, Denver, Colorado, 80202

26 148581 A SOLUTION TO TRAIN FIRES. In the wake of a disastrous tunnel fire in 1972, Japanese National Railways undertook actual train fire tests, first on open line and then in a tunnel. Extensive instrumentation was installed on the car in which fire was ignited and in the adjacent cars. Determined were relation between train speed and fire conditions, difference between ordinary and fire-resistant cars and the conditions existing in cars adjacent to the car on fire. It has been concluded that even a substantial fire on a train running in a tunnel can be countered by evacuating passengers to other cars, continuing to operate until the train is in the open, but that other problems remain to be solved.

Tanaka, T (Japanese National Railways) *Japanese Railway Engineering* Vol. 16 No. 1, 1975, pp 4-6, 2 Fig., 2 Tab., 1 Phot.; ORDER FROM: ESL

26 153273 SYSTEM SAFETY/RISK ANALYSIS TECHNIQUES APPLIED TO MOTOR VEHICLES AND RAPID TRANSIT SYSTEMS. Since 1969 Booz, Allen & Hamilton Inc. has performed safety analyses of a number of ground transportation systems. The analyses were directed at the automobile, the transit bus, and the rail rapid transit system. Fault tree analysis techniques were used in all three cases. This paper discusses the utility of fault tree analysis techniques in setting safety requirements and goals for new equipment designers and system managers. The prioritization of safety requirements and goals was obtained through effects or cost benefit analyses and was an integral part of the fault tree analysis technique. The safety analysis of the automobile was confined to component degradation as a causation factor in automobile accidents. The transit us safety work analyzed over 92 types of accidents, both onboard and offboard. Two major outputs were derived from the safety analysis of rail rapid transit systems; these were safety criteria and a system safety program plan for the future design and development of such systems. In all three transit modes the analytical methodology, results, and conclusions are presented. /Author/

Mayteyka, JA (Booz-Allen and Hamilton, Incorporated) Talley, J *Journal of Safety Research* Vol. 9 No. 1, Mar. 1977, pp 2-14, 5 Fig., 2 Tab., 9 Ref.; ACKNOWLEDGMENT: National Safety Council, Safety Research Info Serv (SRIS-770201); ORDER FROM: ESL

26 154586 TRANSIT VEHICLE MATERIAL SPECIFICATION USING RELEASE RATE TESTS FOR FLAMMABILITY AND SMOKE. PHASE I REPORT. The report relates to two of the most important features in fire safety design of a transit vehicle's interior finishes and furnishings: to allow time for evacuation, and prevent a self-propagating fire. Comparative eval-

uation of fire performance of a fire system (as contrasted with the evaluation of the individual materials in the system) are discussed in terms of a model in which the interdependence of materials and the system are mathematically simulated to give an absolute (as compared to comparative) evaluation of a fire system and to predict what limits on loading will prevent fully developed fires in a specific situation.

Smith, EE ; Ohio State University, Transit Development Corporation, Incorporated, American Public Transit Association Final Rpt. IH-S-76-1, Oct. 1976, 36 pp; Prepared in cooperation with Transit Development Corp., Inc., Washington, D.C., and American Public Transit Association, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262895/6ST, DOTL NTIS

26 155054 SUMMARY OF DEVELOPMENT AND RECOMMENDATIONS FOR A QUALITY ASSURANCE PROGRAM FOR THE PROCUREMENT AND MANUFACTURE OF URBAN MASS TRANSIT OPERATING EQUIPMENT AND SYSTEMS. A viable quality program for the urban mass transit industry, and a management approach to ensure compliance with the program are outlined. Included are: (1) a set of guidelines for quality assurance to be imposed on transit authorities, and a management approach to ensure compliance with them; (2) a management approach to be used by the transit authorities (properties) for assuring compliance with the QA guidelines; and (3) quality assurance guidelines to be imposed by properties and UMTA for procurement of hardware and systems.

Witkin, SA ; Jet Propulsion Laboratory Final Rpt. NASA-CR-149559, Aug. 1976, 23 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N77-16954/8ST

26 155055 QUALITY ASSURANCE PROGRAM GUIDELINES FOR APPLICATION TO AND USE BY MANUFACTURERS OF RAIL/GUIDEWAY VEHICLES, BUSES, AUTOMATIC TRAIN CONTROL SYSTEMS, AND THEIR MAJOR SUBSYSTEMS. Guidelines are presented for a quality assurance system to be implemented by the manufacturer in support of designing, developing, fabricating, assembling, inspecting, testing, handling, and delivery of equipment being procured for use in public urban mass transit systems. The guidelines apply to this equipment when being procured for: (1) use in revenue service; (2) demonstration of systems that will be revenue producing or used by the public; (3) use as a prototype for follow-on operational/revenue producing equipment procurements; and (4) qualification tests.

Witkin, SA ; Jet Propulsion Laboratory NASA-CR-149558, Aug. 1976, 33 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N77-16955/5ST, DOTL NTIS

26 156881 FRP THIRD RAIL PROTECTIVE COVER SYSTEM. An FRP protective cover is being used over the energized contact rail on the new Washington, D.C. METRO transit system. A unique combination of mechanical, electrical and special requirements led to the development of a system consisting of a pultruded cover supported by moulded brackets for this applica-

tion. The various investigations which led to the optimum choice of materials and methods is described. The quality control procedures required to assure compliance with the specifications are reviewed.

Connors, LP ; Society of the Plastic Industry, Incorporated Conf Paper Paper 10-C, 1976, 7 pp; Presented at the 31th Annual Technical Conference of the Reinforced Plastics/Composites Institute.; ACKNOWLEDGMENT: British Railways; ORDER FROM: Society of the Plastics Industry, Incorporated, 355 Lexington Avenue, New York, New York, 10017

26 165032 CRASHWORTHINESS AND CRASH SURVIVABILITY FOR PERSONAL RAPID TRANSIT VEHICLES. The paper proposes guidelines for the design of PRT vehicles in which the possibility of serious injury to occupants is minimized during a collision. Basic trade-offs between seating arrangements, passenger restraints, and shock absorbers are evaluated both qualitatively and quantitatively. The quantitative portion of the study is restricted to small PRT vehicles having a capacity of three to six seated passengers.

Garrard, WL (Minnesota University, Minneapolis) Caudill, RJ Rushfeldt, TL ; Colorado University, Boulder Conf Paper Vol 2, Pap 41, 1975, 18 pp, 15 Ref.; Presented at the International Conference on Personal Rapid Transit, Denver, Colorado, September 16-19, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: Colorado University, Boulder, Center for Urban Transportation Studies, Boulder, Colorado, 80302

26 165694 SCHOOL BUS STOPS-PLANNING FOR SAFETY. Accidents involving buses and child pedestrians at school bus stops in New South Wales were investigated. It was found that the most common accident type was where a child alighted from a school bus then ran from behind it into the path of another vehicle. An examination was made of various countermeasures for this type of accident, with particular attention being paid to the use of flashing warning lights on the school buses. It was concluded that the utilization of hazard warning flashing lights to inform approaching drivers that children were alighting, was worthy of consideration as a countermeasure. It was also suggested that school bus stops should be positioned on the departure sides of pedestrian crossings and that due consideration should be given to the school bus stop accident problem in the planning of school bus routes. /Author/TRRL/

Croft, PG (New South Wales Dept of Motor Transport, Australia) ; Ergonomics Society of Australia and New Zealand *Analytic Dec.* 1976, 27 pp, 4 Fig., 5 Tab., 13 Ref.; This paper was presented at the 13th Conference of the Ergonomics Society of Australia and New Zealand.; ACKNOWLEDGMENT: TRRL (IRRD 227853)

26 167063 GUIDELINES FOR IMPROVED RAPID TRANSIT TUNNELING SAFETY AND ENVIRONMENTAL IMPACT. VOLUME I. SAFETY. Two of the major objectives of the Urban Mass Transportation Administration Tunneling Program are to lower subway construction costs and reduce construction hazards and damage to the environment. This study consists of a two-volume report and aims to develop guidelines for improved rapid transit

tunneling safety and environmental impact, that is, this effort is directed toward underground construction applicable to modern transit subway systems in urban areas. Examination of construction safety regulations, tunnel construction accident data, and features of underground construction leading to unsafe work show that a systems approach to safety is required. Ten guidelines were drafted to supplement current construction safety regulations (OSHA 29CFR1926). Recommendations for further study and evaluation were made to complete the systems safety approach.

Bledsoe, JD Chase, AP ; Mathews (A.A.), Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-2-I, Jan. 1977, 117 pp; See also Volume 2, PB-271 048; Contract DOT-TSC-802-1; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271047/3ST, DOTL NTIS

26 170073 RAILROAD ACCIDENT REPORT: REAR END COLLISION OF TWO GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY TRAINS, CLEVELAND, OHIO, AUGUST 18, 1976. About 11:35 a.m., on August 18, 1976, Greater Cleveland Regional Transit Authority train No. 461 struck the rear of train No. 409 which was standing near the East 79th Street Station in Cleveland, Ohio. Twenty persons were injured and property damage was estimated to be \$61,000. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the operator of train No. 461 to comply with the mandatory stop signal indication and to apply the brakes in emergency promptly after the train ahead had been sighted, and operation of the train at an excessive speed. Contributing to the probable cause was the lack of an effective operator training program and the ineffectiveness of the protective devices and procedures to prevent a following train from entering an occupied block. As a result of its investigation of the accident, the National Transportation Safety Board made four recommendations to the Greater Cleveland Regional Transit Authority concerning the operation of the system, and one to the Federal Railroad Administration.

National Transportation Safety Board NTSB-RAR-77-5, Aug. 1977, 20 pp, 5 Fig.; ACKNOWLEDGMENT: National Transportation Safety Board; ORDER FROM: NTIS; PB-294648/1ST, DOTL NTIS

26 173582 FIRE PROTECTION SYSTEMS ON (WMATA) METRO. Smoke and fire detection, fire alarm and fire fighting systems for the Washington Metropolitan Area Transit Authority (WMATA) Mass Rapid Transit System, including some alternate fire fighting system designs, are presented. A combined rate-of-rise/-fixed temperature fire detector is used in areas where rapid temperature changes are abnormal. Fixed temperature fire detectors are used in the other areas requiring protection. The below grade passenger stations have a wet pipe standpipe system. This system also includes a dry pipe and siamese connection to increase the volume and pressure of the water above the nominal city water pressure. The aerial and surface stations have a dry pipe standpipe system. All passenger

station standpipe systems provide water to a hose valve within each fire equipment cabinet and to each angle hose valve located under manhole covers on the platform. The train tunnels also have a dry standpipe system.

Ell, WM (De Leuw, Cather and Company) *ASCE Journal of Transportation Engineering* Vol. 104 No. 1, Jan. 1978, pp 69-74; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

26 175793 RAILROAD ACCIDENT REPORT. HEAD-ON COLLISION OF TWO GREATER CLEVELAND REGIONAL TRANSIT AUTHORITY TRAINS, CLEVELAND, OHIO, JULY 8, 1977. About 10:05 a.m., E.D.T., on July 8, 1977, two trains of the Greater Cleveland Regional Transit Authority collided head-on on the eastbound track of the Shaker Heights Line, near 92nd and Holton Streets in Cleveland, Ohio. Sixty persons were injured and property damage was estimated to be \$100,000. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the Greater Cleveland Regional Transit Authority to have established rules and procedures, and special instructions to assure safe train operations. Contributing to this accident were the failure of both supervisors to establish and coordinate adequate local procedures for operating trains in both directions on a single track, and, further, the vegetation along the curve which was allowed to grow to the extent that the view was blocked.

National Transportation Safety Board NTSB-RAR-78-2, Feb. 1978, 23 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278191/2ST, DOTL NTIS

26 175810 RAILROAD ACCIDENT REPORT. REAR END COLLISION OF TWO CHICAGO TRANSIT AUTHORITY TRAINS, CHICAGO, ILLINOIS, FEBRUARY 4, 1977. About 5:27 p.m., C.S.T., on February 4, 1977, Chicago Transit Authority Lake-Dan Ryan train No. 930 struck the rear of Ravenswood train No. 415, which was standing on the elevated rail structure at the intersection of Wabash Avenue and Lake Street. The four lead cars of the eight-car Lake-Dan Ryan train overturned and fell from the elevated structure to the street. One end of each of the two rear cars of the Ravenswood train derailed. Eleven persons were killed and 266 persons were injured. Property damage was estimated to be \$1.2 million. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the motorman to exercise due care in meeting his responsibilities and the unauthorized operation of the Lake-Dan Ryan train into a signal block occupied by the standing Ravenswood train, at a speed that was too fast to stop after the operator sighted the standing train.

National Transportation Safety Board NTSB-RAR-77-10, Nov. 1977, 38 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-277961/9ST, DOTL NTIS

26 176291 FIRE HAZARD EVALUATION OF BART VEHICLES. A fire hazard evaluation of the subway cars used on the San Francisco Bay Area Rapid Transit District was performed. After analyzing the cars' interior and exterior design, five recommendations were made that, if implemented, would improve passenger safety by de-

creasing the probability of developing a hazardous fire situation. Among these recommendations were the upgrading of current upholstered urethane seat assemblies and the need for the development of a fire detection system appropriate for rapid rail transit vehicles. Those system improvements would not only provide passengers a safer traveling environment but would also provide a modest level of protection for the heavy investment in rail vehicles.

Braun, E ; National Bureau of Standards, Urban Mass Transportation Administration Final Rpt. NBSIR-78-1421, Mar. 1978, 24 pp; Contract DOT-AT-70007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281383/OST

26 178140 HOW SYSTEM SAFETY WORKS IN THE NEW YORK CITY TRANSIT AUTHORITY. No Abstract.

DeVito, JP *Traffic Safety* Vol. 78 No. 2, Feb. 1978, 3 pp; ORDER FROM: National Safety Council, 444 North Michigan Avenue, Chicago, Illinois, 60611

26 178784 DEVELOPMENT OF A SAFETY PROGRAM PLAN FOR THE OFFICE OF SAFETY AND PRODUCT QUALIFICATION: VOLUME I AND VOLUME II--APPENDIX D. The Institute of Safety and System Management of the University of Southern California under a grant from UMTA undertook a four month development of information to be used in the development of a Safety Program Plan for the Office of Safety and Product Qualification (OSPO). This report contains the results of the research project. The purpose of this project was to identify and describe the critical safety issues which should be included in the Safety Plan for OSPO. Six Key Objectives were developed from a review of legislative acts, administrative directives, past and present programs, goals of UMTA, and recommendations of associated agencies. The Six interrelated Key Objectives are the following: Decrease Accident Rates; Eliminate Catastrophic Accident Conditions; Prevent "Unsafe" Conditions; Assure Use of "Best" Technology; Accomplish Objectives in a Cost-Effective Manner; and Determine and Correct "Unsafe" Conditions. In addition twenty-nine Critical Objectives and over ninety Specific Objectives were developed. This report recommends 16 specific programs for top priority consideration. The Appendixes herein are: Accident Data Base Forms (from Federal Railroad Administration, Bureau of Motor Carrier Safety, National Highway Traffic Safety Administration, American Public Transit Association, and UMTA); Data and Statistics; References; and On-Going Research by Mitigation Type (Appendix D--Volume II).

Jones, GP ; University of Southern California, (CA-06-0105) Final Rpt. UMTA-CA-06-0105-78-1, UMTA-CA-06-0105-78-2, Sept. 1977, 473 pp; This report was sponsored by the DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279331, PB-279332

26 180338 METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY SYSTEMS SAFETY, FIRE PROTECTION, AND CODE DOCUMENTATION FOR STATIONS. The intent of this phase of MARTA systems safety is

to (1) prevent fires; (2) protect the general public, employees and fire department personnel from injury due to fire, smoke, explosion or panic; and (3) protect structures and equipment from damage due to fire. This has necessitated trade-offs between subsystems, and required consideration of state and local codes within jurisdictions in which MARTA operates.

Gooden, WE (Parsons, Brinckerhoff, Quade and Douglas, Inc) Troy, JJ (Gage-Babcock and Associates, Incorporated); System Safety Society Proceeding 1977, pp 517-527; Third International System Safety Conference, October 17-21, 1977, Stouffer's National Center Inn, Washington, D.C.; ACKNOWLEDGMENT: System Safety Society; ORDER FROM: System Safety Society, P.O. Box 165, Washington, D.C., 20044

26 180340 EXPANSION OF SYSTEM SAFETY PROGRAM PLANNING TO THE RAILROAD INDUSTRY, SYSTEM SAFETY IN SIGNAL APPLICATIONS. The special problems involved with safety analysis of railroad and rapid transit signaling installations are discussed.

McNenny, PJS (General Railway Signal Company); System Safety Society Proceeding 1977, pp 657-664, 1 App.; Third International System Safety Conference, October 17-21, 1977, Stouffer's National Center Inn, Washington D.C.; ACKNOWLEDGMENT: System Safety Society; ORDER FROM: System Safety Society, P.O. Box 165, Washington, D.C., 20044

26 180342 SAFETY AND SYSTEM ASSURANCE RESOURCES APPLIED TO THE DESIGN AND DEVELOPMENT OF A RAIL RAPID TRANSIT SYSTEM. MARTA management is committed to a formalized research, review and systematic approach to implementation of a safety and system assurance program. The procedures and manpower involved are described.

Gooden, WE (Parsons, Brinckerhoff, Quade and Douglas, Inc) Lock, AM (Metropolitan Atlanta Rapid Transit Authority); System Safety Society Proceeding 1977, pp 687-698, 5 Fig.; Third International System Safety Conference, October 17-21, 1977, Stouffer's National Center Inn, Washington, D.C.; ACKNOWLEDGMENT: System Safety Society; ORDER FROM: System Safety Society, P.O. Box 165, Washington, D.C., 20044

26 180343 THE SAFETY PROGRAM FOR THE BALTIMORE REGION RAPID TRANSIT SYSTEM. This paper describes the overall safety program in the Baltimore Rapid Transit System. The emphasis is on the safety aspects in facility design which is essentially complete, whereas the specifications for the vehicle and train control have not progressed as far.

Hunt, H (Daniel, Mann, Johnson and Mendenhall); System Safety Society Proceeding 1977, pp 699-714; Third International System Safety Conference, October 17-21, 1977, Stouffer's National Center Inn, Washington, D.C.; ACKNOWLEDGMENT: System Safety Society; ORDER FROM: System Safety Society, P.O. Box 165, Washington, D.C., 20044

26 180344 OPERATIONAL SAFETY OF TRANSPORTATION SYSTEMS. It is essential for public acceptance that the mass transit com-

puter systems (i.e., software), electrical systems, and the systems they control be operationally safe and reliable. "Sneak Analysis" assures system operability by identifying all potential anomalies which can be caused by unplanned operational modes inherent in the system design. The correction or avoidance of these modes will then lead to a safer, more reliable system. Boeing Aerospace Company has found that "network trees" containing combinations of four basic topological patterns constitute all electrical systems and their analogs. Utilizing these topological trees, all latent signal paths which can inadvertently initiate a function or inhibit a desired one--independent of component failure--are detected. Sneak Analysis has found latent operational capabilities in every system analyzed, including parts of the San Francisco Bay Area Rapid Transit and Morgantown Personal Rapid Transit systems. The technique also aids in locating areas of weak design. The resulting network trees can aid in shortening test and troubleshooting time. These also simplify the work required and accuracy of other analysis techniques which specifically examine component, environmental, and human related operational problems. The ability of the analysis technique to disclose unsafe operational modes after other techniques have certified reliability and even after years of normal operation indicates that Sneak Analysis is almost essential in critical areas of transportation systems.

Gieda, AC (Bay Area Rapid Transit District) Sidley, RF (Boeing Aerospace Company); System Safety Society Proceeding 1977, pp 715-730, 8 Fig., 9 Ref.; Third International System Safety Conference, October 17-21, 1977, Stouffer's National Center Inn, Washington, D.C.; ACKNOWLEDGMENT: System Safety Society; ORDER FROM: System Safety Society, P.O. Box 165, Washington, D.C., 20044

26 180345 MARTA SYSTEMS SAFETY VERIFICATION. A RAIL RAPID TRANSIT APPLICATION OF SYSTEMS SAFETY TECHNOLOGY. This program assures that system safety goals and criteria are established and implemented; that safety hazards are identified and assessed as early as possible during design; that actions will be taken to eliminate or control identified critical/catastrophic hazards; and that the system will be verified to be safe for revenue service prior to opening.

Lock, AM (Metropolitan Atlanta Rapid Transit Authority) Gooden, WE Jacob, RH (Parsons, Brinckerhoff, Quade and Douglas, Inc); System Safety Society Proceeding 1977, pp 731-741, 4 Fig.; Third International System Safety Conference, October 17-21, 1977, Stouffer's National Center Inn, Washington, D.C.; ACKNOWLEDGMENT: System Safety Society; ORDER FROM: System Safety Society, P.O. Box 165, Washington, D.C., 20044

26 181341 EVALUATION METHODOLOGIES FOR NINE FEDERAL MOTOR VEHICLE SAFETY STANDARDS: FMVSS 105, 108, 122, 202, 207, 213, 220, 221, 222. This is one of two studies to develop methodologies for evaluating a total of nine Federal Motor Vehicle Safety Standards: Hydraulic brake systems in passenger cars, Side marker lamps and high intensity headlamps, Motorcycle brake systems, Head restraints, Seating systems, Child seating

systems, School bus rollover protection, School bus body joint strength, and School bus seating and crash protection. This report provides a summary and overview of the sixteen preceding reports, and an integration of the individual approaches for evaluating each Standard as presented in the earlier reports. The report includes conclusions and recommendations, and it briefly reviews the nine Standards, and the approaches to evaluating the Standards. It discusses the statistical analyses of accident data, field and mail surveys, and laboratory testing which comprise the methodologies for evaluating the effectiveness of each Standard, and presents Work Plans with clearly-defined decision points between various tasks in each evaluation program. The evaluation programs may require from three to six years to complete.

Northrop, GM Ball, JT Bancroft, DRE Reidy, JCJ; Center for the Environment and Man, Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-388, CEM-4228-4229-600, Mar. 1978, 202 pp; Contract DOT-HS-7-01674; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283034/7ST

26 183702 RELIABILITY DATA AND ANALYSIS FOR TRANSIT VEHICLES. This report provides a data base for the reliability of transit vehicles and their components. This data is essential for the successful implementation of quantitative reliability methods. Failure data on approximately 500 subway cars, 400 streetcars and 1100 buses was obtained from the Toronto Transit Commission for a period of 28 weeks. This results of the analysis of this data are presented in this report. For each category, viz. subway cars, streetcars and buses, the vehicles have been grouped according to the year of acquisition to minimize the differences due to age and design. The available failure data is a combination of complete and censored observations and, therefore, the method of hazard plotting has been used for the analysis. The computed measures of reliability of the vehicles and their components are the Mean Miles Between Defects (MMBD), Miles Per Defect (MPD), and the probability density function (pdf) of the miles between defects. The Miles Per Defect are further calculated for the different levels of severity of the impact on revenue service. It has been found that the more recently acquired subway cars and their components have generally lower reliability than the older stock. For buses the newer ones are more reliable than the older ones and the failure rate tends to stabilize after the fourth year of operation. Exponential and Weibull distributions with a shape parameter less than unity appear to fit the data for the miles between defects of the components. The possible reasons for this phenomenon are discussed. The possible uses of hazard plots for obtaining estimates of the cumulative distribution function, percentiles of the distributions, reliability and conditional probability of failure are also described. The results contained in this report can be usefully applied in planning, operation, design, reliability demonstration and life-cycle costing studies. The relevance of this data analysis to these areas is briefly discussed. The study indicates a need for further investigations and the desirability of collecting more detailed failure data, and also data for the lower level of components. /Author/

Singh, C Kankam, MD ;

Ontario Ministry of Transportation & Communication, Can Jan. 1977, 73 pp, 6 Fig., 7 Tab., 7 Ref.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada, TRRL (IRR-240995); ORDER FROM: Ontario Ministry of Transportation & Communication, Can, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8, Canada

26 186163 FIELD TEST EVALUATION OF REAR LIGHTING SYSTEMS. The objective of this study was to establish the effectiveness of different rear lighting and signalling systems in reducing rear-end collisions. The most significant finding of the study was that the taxicabs equipped with a single center, high-mounted stoplight had less than half the rear-end collisions experienced by a control group consisting of cabs having manufacturer's configurations of taillights. This reduction was achieved whether measured in terms of absolute number or frequency of accidents or in terms of accident rate per million vehicle miles. In addition, the effectiveness of the single light configuration increased during nighttime operation and also under conditions where there was almost complete certainty that the stoplights were illuminated just prior to or at the time of impact. Finally, the mean cost to repair cabs with this rear lighting system was lowest, by an order of magnitude, among the systems tested, indicating that these accidents were less severe than accidents involving other stoplight configurations.

Malone, TB Kirkpatrick, M Kohl, JS Baker, C ; Essex Corporation, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-467, Feb. 1978, 57 p.; Contract DOT-HS-5-01228; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286948/5ST

26 186852 SAFETY IN URBAN MASS TRANSPORTATION: RESEARCH REPORT. The Research Report covers three major topics: (1) an analysis of the current state of safety; (2) determination of acceptable safety levels; and (3) development of the Safety Guidelines Manual. Safety performance in several modes of transportation are compared as a basis for assessing the safety situation. Methods of establishing acceptable safety levels and setting safety goals are analyzed. A safety program is formulated for the urban mass transportation industry wherein system safety principles are applied in this industry's technical and institutional environment. Conclusions are drawn that urban mass transportation, although inherently hazardous, is not troubled by immediate, severe safety problems. However, these problems will confront the industry as it moves into use of new high-performance technology. Also, problems with injuries and fatalities concern the industry today and merit remedial action. Management approaches are recommended for meeting these safety problem areas.

Cheaney, ES Hoess, JA Thompson, RE Svehla, RL ; Battelle Columbus Laboratories, Urban Mass Transportation Administration, Naval Underwater Systems Center Final Rpt. BATT-G-2460-0001, UMTA-RI-06-0005-75-3, Mar. 1976, 199 p.; See also PB-245413, RRIS 12 127048; Bulletin 7601; Contract N00140-73-C-A394; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287872/6ST

26 188701 RAILROAD ACCIDENT REPORT--COLLISION OF PORT AUTHORITY OF ALLEGHENY COUNTY TROLLEY CAR NO. 1790 AND BUS NO. 2413, PITTSBURGH, PENNSYLVANIA, FEBRUARY 10, 1978. About 8:03 a.m., on February 10, 1978, a trolley car and a bus owned by the Port Authority of Allegheny County collided in Pittsburgh, Pennsylvania, when the trolley car suddenly turned into the path of the oncoming bus. Four persons were killed, 37 persons were injured, and damage was estimated to be \$48,000. The National Transportation Safety Board determines that the probable cause of this accident was the operator's inadvertent and untimely operation of an unprotected track switch, which caused the trolley car to be routed into the path of the approaching bus. Contributing to the accident was the operator's operation of the car at a speed too great to permit stopping when he detected the turning movement of the car, and the lack of protective devices to control the switch operation. Two recommendations were made to the Port Authority of Allegheny County, Pennsylvania, about the means by which the track switch can be operated from the trolley car and about providing protection against the switch operating when another vehicle is in a danger zone. A recommendation was also made to the Governor of the Commonwealth of Pennsylvania, urging the State to encourage communities that have emergency response facilities to establish emergency procedures for disasters.

National Transportation Safety Board NTSB-RAR-78-5, Aug. 1978, 26 p., 4 Fig., 2 App.; ACKNOWLEDGMENT: National Transportation Safety Board; ORDER FROM: NTIS; PB-285705/0ST, DOTL NTIS

26 190479 IMPROVED VISIBILITY FOR SCHOOL BUSES DURING ADVERSE WEATHER. VOLUME I. The objectives of the program were to develop realistic performance requirements and compliance test procedures which could be used by school bus manufacturers as well as testing agencies to assure that school bus defogging equipment will meet vehicle drivers' visual requirements for forward, sideward, and rearward views under conditions of fog formation on the interior surfaces of the vehicle's glazing during adverse weather. Several buses, including Type I, Type II, and Transit-type buses, were tested utilizing normal engine operation and also with an auxiliary hot water system. Results of these tests were used in preparing a detailed defogging test procedure and recommended performance requirements.

Heisler, M Davis, S ; Dynamic Science Corporation, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-601, 8305-77-75A, June 1978, 214 p.; See also Volume 2, PB-288480. Also available in set of 3 reports PC E11, PB-288 478-SET.; Contract DOT-HS-6-01398; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288479/9ST

26 190480 IMPROVED VISIBILITY FOR SCHOOL BUSES DURING ADVERSE WEATHER. VOLUME II. APPENDIXES. The volume contains the following final compliance test procedure: Environmental Chamber preparation procedure, Bus preparation procedure, Detailed Test procedure (I-winter), Detailed Test procedure (II-summer), and the Data Analysis and Evaluation procedure.

Heisler, M Davis, S ; Dynamic Science Corporation, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803602, 8305-77-75B, June 1978, 240 p.; See also Volume 1, PB-288479, and Summary Report, PB-288481. Also available in set of 3 reports PC E11, PB-288 478-SET.; Contract DOT-HS-6-01398; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288480/7ST

26 190481 IMPROVED VISIBILITY FOR SCHOOL BUSES DURING ADVERSE WEATHER. SUMMARY REPORT. The objectives of the program were to: (1) Develop performance requirements for school bus defogging equipment, (2) develop test procedures to determine whether or not the defogging system of any specific school bus meets the performance requirements, (3) select a range of school buses which are representative of the school bus population, (4) develop a methodology for repeatably documenting cleared glazing areas, and (5) verify that the performance requirements and test procedures are realistic through verification testing of the school buses.

Heisler, M Davis, S Pakula, JP ; Dynamic Science Corporation, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-603, 8305-78-104, June 1978, 30 p.; See also Volume 2, PB-288480. Also available in set of 3 reports PC E11, PB-288 478-SET.; Contract DOT-HS-6-01398; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288481/5ST

26 192146 FIRE SAFETY GUIDELINES FOR VEHICLES IN A DOWNTOWN PEOPLE MOVER SYSTEM. The results of a study to formulate fire safety guidelines to be required for vehicles used in Downtown People Mover (DPM) systems for the movement of people in a congested urban area are presented. Through a review of the design features of existing people mover vehicles and systems, and a review of proposed new systems, fire scenarios are developed and guidelines suggested to minimize the fire risk to passengers. Methods and criteria, based on established test procedures, are proposed for assessing the flammability and smoke generation of interior finish and furnishing materials. Fire and smoke detection and suppression equipment are recommended, along with proposed guidelines for emergency evacuation provisions and emergency communication requirements. An extensive bibliography of flammability in fixed guideway transit systems is included.

Peacock, RD ; National Bureau of Standards, Urban Mass Transportation Administration Final Rpt. NBSIR-78-1586, Jan. 1979, 56 p.; Sponsored in part by Urban Mass Transportation Administration, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292600/4ST

26 192228 ANALYSIS OF BART CAPITAL COSTS. BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impact of BART on transportation and travel in the Bay Area. The report documents the capital costs of BART and its components and analyzes the difference between

the actual capital cost of the System (\$1,636 million) and the cost predicted by the 1962 planning report (\$994 million). The apparent 65% cost overrun is shown to be explained almost entirely by (1) increases in scope, (2) inflation at higher rates than anticipated, and (3) inflation associated with delays to the construction schedule.

Davidson, N Merrick, F Sherrit, A; Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-40-3-77, Mar. 1978, 40 p.

Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Color illustrations reproduced in black and white; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293855/3ST

26 195677 FIRE BLACKENS BART IMAGE. A loose equipment cover that fell from beneath a Bay Area Rapid Transit train and damaged the third rail in the TransBay Tube stalled and damaged a subsequent train that then caught fire in the 3.6 mile tunnel. The emergency procedures of BART and city fire departments proved inadequate as the seven cars were destroyed or damaged by the fire. Recounted are the events of January 17-18, 1979, as well as subsequent investigations while the most important segment of BART was shut down for 2.5 months.

Demoro, HE, Technical Editor *Mass Transit* Vol. 6 No. 7, July 1979, p 12, 3 Phot.; ORDER FROM: Carter (C Carroll), 538 National Press Building, Washington, D.C., 20004

26 197358 AIRTRANS URBAN TECHNOLOGY PROGRAM, PHASE II: IRAN PROGRAM. INSPECT, REPAIR AS NECESSARY ON THE AIRTRANS AGT VEHICLE. This is a report on the AIRTRANS Inspect Repair as Necessary (IRAN) project performed under the AIRTRANS Urban Technology Program, Phase II. The main objective was to critically evaluate the condition of an AGT vehicle after 268,000 miles and five years of operation and to provide a guide for the establishment of IRAN plans for future AGT systems as they are deployed in an urban environment. A program plan was developed to systematically inspect, and repair as required, the structural and other subsystems of the vehicle in operation at the Dallas/Ft. Worth Airport. The approach included Non-Destructive Tests (NDT) procedures, including radiograph, and dye penetration. The use of a high-powered magnifying lens with bright lighting conditions was also employed in the inspection procedures. The detailed inspection revealed a sound frame and chassis construction with no evidence of cracking in the welded structure. The other subsystems that were inspected, such as the suspension and drivetrain, displayed the normal wear patterns. Repairs were made on the acrylic/fiberglass exterior body panels. Subsequent followup revealed these repairs generally failed, as have previous repair attempts. Repairs were made to the vehicle roof because of a temperature related problem with the acrylic/fiberglass construction. The result of the project indicates that the maintenance procedures developed for this system are excellent. With the exception of the

exterior body panels, the vehicle appears capable of attaining the 20-year service life. A five-year IRAN program is recommended to assure continued high performance.

Hawkes, DL; Dallas/Fort Worth Regional Airport Board, Vought Corporation, Urban Mass Transportation Administration, (UMTA-TX-06-0020) UMTA-TX-06-0020-79-1, Aug. 1978, 61 p.; Prepared by Vought Corp., Dallas, TX. See also report on Phase I, dated Jan 78, PB-291128.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294784/4ST

26 197359 SYSTEM SAFETY PROGRAM PLAN. The report contains a recommended System Safety Program Plan for the Chicago Transit Authority (CTA) rail system. It contains a recommended policy statement, recommendations for specific actions to improve CTA system safety management practices and processes, and finally, recommendations for a process for up-dating and re-evaluating the Program Plan. The suggestions presented build upon substantial foundation established previously by the CTA in its current system safety efforts. The Plan is divided into four sections: (1) Safety Policy Statement; (2) Current CTA Safety Activities; (3) Recommendations to Strengthen Current CTA Safety Management Practices and Processes; and (4) Recommendations for Re-Evaluation and Modification of the System Safety Program. These recommendations are to a great extent tailored to the specific facilities, personnel, and philosophy of the organization of the CTA, and are not intended as a set of general guidelines for the rail transit industry.

Chicago Transit Authority, Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration UMTA-IL-09-0033-79-2, Aug. 1978, 63 p.; Prepared by Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div. See also PB-295 523.; Grant DOT-UMTA-IL-09-0033; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294788/5ST

26 197371 SAFETY AND SYSTEM ASSURANCE STUDY. The report contains the results of a study of safety and systems assurance-related technical management practices and processes of the Chicago Transit Authority (CTA) rail system. The study involved an evaluation of technical management practices associated with system safety, equipment reliability/maintainability, system availability/dependability, and quality assurance. Special studies of human factors and train protection were also performed. While the overall scope of the project was broad, the primary objective was to develop and recommend improvements in safety and systems assurance technical management process and practices.

Chicago Transit Authority, Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IL-09-0033-79-1, Sept. 1978, 72 p.; Prepared by Booz-Allen and Hamilton, Inc., Bethesda, MD. Transportation Consulting Div. See also PB-294 788.; Grant DOT-UMTA-IL-09-0033; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295523/5ST

26 198274 SAFETY EVALUATION OF PRIORITY TECHNIQUES FOR HIGH-OCCUPANCY VEHICLES. Priority treatments for high-occupancy vehicles (HOV) can introduce

new safety problems due to operational or geometric modifications. At the same time, they can reduce the accident potential by improving overall traffic operations. The research focused on five major areas of HOV projects: (1) an examination of the pertinent accident rates, (2) an analysis of causative factors influencing safety, (3) an identification of difficult maneuvers and potential safety problems, (4) the development of recommendations to improve safety, and (5) a review of the legal authority and legal liability issues faced by HOV projects.

Miller, C Deuser, RB Wattleworth, J Wallace, C Beiswenger, Hoch and Associates, Florida University, Gainesville, Federal Highway Administration Final Rpt. FHWA-RD-79- 59, Feb. 1979, 194 p.; Prepared in cooperation with Florida Univ., Gainesville. Transportation Research Center.; Contract DOT-FH-11-9182; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297420/2ST

26 198581 SAFETY OF MULTIPURPOSE VANS. Since 1970, the sales of multipurpose vans have increased threefold. Vans are popular because of their versatility; outdoorsmen, small businessmen, service technicians, and the 'week-end vanner' are using vans for personal transportation, business operations, and weekend outings. In fact, in the near future, vans are expected to replace the station wagon. Many owners have customized the interiors of their vans with sinks, bars, refrigerators, beds, and paneling to make them more convenient. Currently, there are no standards or voluntary specifications on how to install these types of items to the van structure. As a result, in a crash environment, they often break loose and injure or kill the van occupants. The National Transportation Safety Board has investigated 18 low-to-moderate speed crashes involving vans to collect data for this study. We have evaluated the crashworthiness of vans from the following standpoints: Injury-producing environments, occupant restraints, crashworthiness, postcrash fires, and ease or difficulty of escape. Further, several existing Federal Motor Vehicle Safety Standards do not apply to vans. These include Standards 201, 202, 203, 204, 212, 214, 215, and 216. In addition the Safety Board has evaluated the standards listed above as they affect each of the five main areas of investigation.

National Transportation Safety Board NTSB/HSS-79/1, Mar. 1979, 47 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294789/3ST

26 260377 SAFETY METHODOLOGY IN RAIL TRANSIT SYSTEM DEVELOPMENT. The report records the results of a study by the National Transportation Safety Board of the October 2, 1972, accidental derailment of a BART train and of the significant management and institutional approaches used to achieve safety as they influenced this system. The purpose of focusing attention on the cause and effect impact of this subject matter on the safety of the BART hardware system is to make this experience available to other municipalities who are implementing or are contemplating the development of a new rail rapid transit system. The report recommends abandonment of the fail-safe concept, and an organized disciplined approach to accomplishing rapid transit system safety,

through the application of current safety management and engineering concepts. /NTIS/

National Transportation Safety Board Spcl Study NTSB-RSS-73-1, Aug. 1973, 43 pp; ACKNOWLEDGMENT: NTIS (PB-223157/9); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-223157/9

26 264972 REAR-END COLLISIONS REDUCED: A LARGE-SCALE EXPERIMENT UNDER NATURAL CONDITIONS. A deceleration warning light system installed on taxicabs in San Francisco for 12.3 million miles of normal on-road driving reduced the rear-end collision rate by 60.6% compared to the rate for a concurrent control group of cabs which traveled 7.2 million miles. Comparing the experimental group with the concurrent control group revealed that the warning light prevented 5.4 collisions per million miles, 1.02 cab driver injuries per million miles, and 643 dollars of taxicab damage per million miles. An amber light was center mounted on the rear of several hundred taxicab and was designed to communicate information about the tax's deceleration to following drivers. /HSRI/ Voevodsky, J (Voevodsky Associates, Incorporated); Society of Automotive Engineers SAE 740614, Aug. 1974, 11 pp, Figs., Tabs., 31 Ref.; This report was presented to the Society of Automotive Engineers, West Coast Meeting, August 12-16, 1974, Anaheim, California.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-30683)

26 301439 BETTER MANAGEMENT OF METRO SUBWAY EQUIPMENT WARRANTIES NEEDED. Washington Metropolitan Area Transit Authority has acquired \$300 million in rolling stock, train controls, communications, fare collection equipment and escalators for which contract provisions covering warranty and reliability were not effectively administered. Methods for assessing reliability and collecting for warranty work necessary to keep subsystems operable were not established. It is recommended that future contracts include provision for bill-back when operating conditions require in-house repairs; that clear and consistent interpretations be made of warranty classes; and that clear lines of authority be established for enforcing warranty provisions and for making repairs to items so covered.

General Accounting Office PSAD-79-41, Feb. 1979, 41 p., 6 App.; ORDER FROM: General Accounting Office, Distribution Section, Room 1518, 441 G Street, NW, Washington, D.C., 20548

26 302011 ASSESSMENT OF CURRENT U.S. DEPARTMENT OF TRANSPORTATION FIRE SAFETY EFFORTS. The Urban Mass Transportation Administration (UMTA), has undertaken the task of assessing the entire area of fire research to determine how to provide means to reduce the fire threat in transit systems, and thus, to provide a safer means of transportation for the traveling and commuting public. This report presents the results of that assessment by the Transportation System Center (TSC). The study identifies and recommends suitable remedial actions and reflects the present state of transportation fire safety efforts. Emphasis has been placed on Federal Government efforts, and particularly those by the Department of Trans-

portation (DOT). Although the assigned task is directed at fire safety in transit systems, the assessment encompasses all transportation-related fire safety. The intent of this approach has been to emphasize the similarities which exist among the problems and in the programs of the modes. In many instances, the programs of one mode will benefit one or more of the other modes. In conducting this assessment, TSC has reviewed and incorporated into this report the pertinent information resulting from the following efforts: 1) a search and review of public and private sector programs; 2) identification and review of existing data banks (materials and accident statistics); and 3) identification and review of existing regulations, standards, specifications, and guidelines. Each of these efforts is discussed in detail in the report, and where necessary, in Appendix A: Bibliography of Fire Safety Literature and Appendix B: Survey of Dot Fire Safety Products. /UMTA/

Hathaway, WT Litant, I; Transportation Systems Center, Urban Mass Transportation Administration, (UM921/R9703) Final Rpt. UMTA-MA-06-0051-79-4, July 1979, 144 p., Apps.; Contract MA-06-0051; ORDER FROM: NTIS; PB-2399110/AS

26 302103 NEW MEASURING METHOD FOR RIDE COMFORT IN TRANSIT VEHICLES. Principles of several ride comfort criteria in use are presented and compared. The proposed criterion of exposure duration for given vibration levels by the International Organization for Standardization (ISO) were selected for ride comfort measurements. The portable Ride Comfort Meter provides single value measurements which correspond to ISO weighted rms values of effective accelerations. Each measurement takes 15 seconds and is called the Ride Index (RI). Statistical methods were used to analyze the ride comfort data obtained. Resultant statistical means for vertical and lateral RIs versus vehicle speeds in guideway curves and on straight sections are shown. Linear regression using all data points yielded RI equations for describing the relation of vertical and lateral RI to vehicle speed. Results of ride comfort are shown as the percentage of trip time which the vertical and lateral RIs were exceeded. The ISO reduced comfort boundary is used as a basis for comparison between the Morgantown system and other transit systems, additional ride comfort measurements were made at three other automated guideway systems and five conventional transit systems. All ride comfort measurements were performed, employing the new Ride Comfort Meter Type II developed and built by Delft University of Technology in Holland.

Bamberg, W (Lea (ND) & Associates, Incorporated) Ludwig, H; Institute of Electrical and Electronics Engineers Conf Paper 79CH1378-9VT, 1979, pp 266-270; Prepared for IEEE Vehicular Technology Conference, 29th, Conf Rec of Pap, Arlington Heights, Illinois, March 27-30, 1979. Also available from IEEE Service Center, Piscataway, New Jersey.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

26 304678 REVIEW OF POSSIBLE EFFECTS OF SOME SELECTED FEDERAL ACTIONS ON NEW TRANSIT PRODUCT INTRODUCTION. The main concern of the study is to evaluate the feasibility and effectiveness of new

concepts and modification of existing concepts by which the Federal government can encourage the deployment of the most appropriate innovation in urban mass transit. In order to perform the study, information was gathered on the problems facing the innovation process and possible methods that could alleviate these problems. Fifteen concepts were examined by which UMTA could strengthen its role in the technology deployment phase of the innovation process. From the in-depth discussions based on a questionnaire with nine members of the transit industry, the transit operators identified uncertainty over future Federal design and performance guidelines as the single major barrier to new product introduction. The transit suppliers cited uncertainties over the stability and volume of annual product sales, opportunity costs of foregone investments, and lowest-bid procurement as their barriers. Of the 15 concepts, six were ranked as highly feasible and effective: (1) standard set of performance guidelines; (2) lowest life-cycle cost procurements; (3) Federal grants for the purchase and test of limited production quantities; (4) coordination of transit products orders by UMTA; (5) use of Federal capital incentives to influence local authorities to adopt regulations to encourage transit use; and (6) formation of a transit operators and supplies committee to facilitate greater cooperation in the development cycle. In-depth analysis was performed on the six selected concepts and examples of UMTA programs incorporating recommended concepts were discussed.

Chin, DK; Onyx Corporation, Urban Mass Transportation Administration, (UMTA-MD-06-0032) Final Rpt. UMTA-MD-06-0032-79-1, July 1979, 111 p.; Grant DOT-UT-80023; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300965/1ST

26 305182 RAILROAD ACCIDENT REPORT-DERAILED OF NEW YORK CITY TRANSIT AUTHORITY SUBWAY TRAIN, NEW YORK, NEW YORK, DECEMBER 12, 1978. About 4:38 p.m., on December 12, 1978, the sixth and seventh cars of a New York City Transit Authority subway train designated "CC" 4:06 p.m. derailed within moments after departing 59th Street station. Twenty-two persons were injured, and property damage was estimated to be \$667,500. While the Safety Board was investigating this accident, three other trains derailed from what appeared to be similar causes. Therefore, the investigation was expanded to include all four accidents. The National Transportation Safety Board determines that the probable cause of each of the four accidents was a cracked wheel which had resulted from extensive overheating. Contributing to the cause of the overheating of the wheels was the partial application of a handbrake. Because of a lack of adequate inspection procedures, the New York City Transit Authority employees failed to detect the partially applied handbrake and the thermally damaged wheels before they cracked.

National Transportation Safety Board NTSB-RAR-79-8, Aug. 1979, 37 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299196/6ST, DOTL NTIS

26 310553 TRAFFIC SAFETY OF CHILDREN. A REPORT FROM THE SWEDISH TRAFFIC SAFETY COMMISSION [Barns trafiksaekerhet. Betaenkande avgivet av trafiksaekerhetsutredningen]. This Swedish Commission report deals with questions relating to the traffic safety of children up to 16 years. The report contains the following chapters: (1) traffic safety and conditions, (2) safety problems and preventive measures, (3) education forms and resources, (4) proposals regarding traffic education, (5) traffic environment, (6) school transport, (7) school patrols, (8) age limit for bicycle riding, (9) bicycle design and equipment, (10) child restraint systems in cars, (11) traffic regulations and surveillance, (12) traffic safety information and (13) research and development. (TRRL) [Swedish]

Kommunikationsdepartementet Monograph DS K 1979 G, 1979, 175p, 2 Fig., 6 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 244086), National Swedish Road & Traffic Research Institute

26 312440 NEW COLLISION AVOIDANCE SYSTEM USING BASEBAND REFLECTOMETRY. This paper describes a guided wave, baseband radar-type sensor for protecting automated rapid transit vehicles traveling in dedicated guideways. The system has been given the acronym CASBAR for Collision avoidance System using Baseband Reflectometry. A baseband pulse signal, 2 nanoseconds wide, is transmitted through a surface waveguide (Goubau line) supported alongside the guideway. Reflections from a passive target located on an adjacent vehicle down the track are processed in a receiver. One output of the receiver controls the brakes which can be applied in dangerous situations. The maximum range of the system is 300 feet and its range and range rate resolutions are 1 foot and 0.5 feet/sec. respectively.

Ross, GF Cronson, HM Rama Rao, B ; Microwave Exhibition and Publications Limited Conf Paper 1978, pp 594-597; Conference Proceedings of the European Microwave Conference 8th, Paris, France, September 4-8, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: Microwave Exhibition and Publications Limited, Sevenoaks, Kent, England

26 313245 HIGHWAY SAFETY RESEARCH, DEVELOPMENT, AND DEMONSTRATION. CONFERENCE PROCEEDINGS HELD AT THE DULLES MARRIOTT CONFERENCE CENTER, CHANTILLY, VIRGINIA ON APRIL 22-26, 1979 [Final rept]. The 1979 Conference on Highway Safety Research, Development, and Demonstration was held to review proposed activities to be undertaken by the National Highway Traffic Safety Administration over a five-year period, FY1980-FY1984. The report contains the proceedings of the conference. Program plans reviewed include 55 mph noncompliance and other unsafe driving acts; occupant restraints; alcohol and drugs; pedestrian, bicyclist, public transportation; driver licensing; motorcycle and moped safety; young driver; Emergency Medical Services; state traffic records; state program management; traffic law adjudication; police traffic services; motor vehicle registration, titling, and antitheft; and the National Driver Register. In addition to specific program elements, the report reviews issues related to program priorities, the basis for their selection,

the transfer of program results, and their responsiveness to the needs of the national highway safety community.

Transportation Research Board, Washington, DC. National Highway Traffic Safety, Administration, Washington, DC. UR-16, DOT-HS-805-231, Dec. 1979, 134p; Contract DOT-HS-9-02113; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-154149

26 315017 TUNNEL FIRE SPECTER SPARKS MANY SAFETY PROGRAMS. After the major fire in the Transbay tunnel of Bay Area Rapid Transit in 1979, all North American subway systems are giving increased attention to fire prevention and fire fighting. These have included changes in tunnel cables, water supply and venting, in emergency training for transit employees, and in new coordination with municipal emergency services. Two handbooks for design, UMTA's Subway Environmental Design Handbook and APTA's Guidelines for Design of Rapid Transit Facilities, will soon be supplemented by a new water piping standard for fixed guideway transit by National Fire Protection Association.

Engineering News-Record Vol. 204 No. 24, June 1980, p 24, 3 Phot. ORDER FROM: ESL

26 315117 FIRE SAFETY ASPECTS OF POLYMERIC MATERIALS. VOLUME 8-LAND TRANSPORTATION VEHICLES. This is the eighth volume in a series. The fire safety aspects of polymers are examined with primary emphasis on human survival. This volume is concerned with the polymeric materials used in subway, surface, and elevated urban railway vehicles; railroad vehicles; other rail vehicles (including unattended and semicontrolled type); buses, trucks; passenger automobiles; and miscellaneous vehicle types (including motorcycles and snowmobiles). Other volumes in the series deal with materials (state of the art); test methods, specifications, and standards; smoke and toxicity; fire dynamics and scenarios; aircraft (civil and military); buildings; ships, and mines and bunkers. A volume on elements of polymer fire safety and guide to the designer has been added to the series to pull together the disciplinary material of the first four volumes. This report examines the fire safety aspects of those polymeric materials currently used, or expected to be used, in land vehicles that transport people and materials. Excluded from consideration are specific materials such as fuels, engine lubricants and other engine polymers and hydraulic fluids.

National Materials Advisory Board NMAB 318-8, 1979, 189 p., Figs., Tabs., Refs., 1 App.; ORDER FROM: National Academy of Sciences, Publications Office, 2101 Constitution Avenue, NW, Washington, D.C., 20418

26 318972 PERSONNEL SAFETY ON ELECTRIFIED RAILROADS. Potential electrical hazards to fire, police, and rescue personnel responding to emergencies on electrified railways are examined. Data on descriptions of electrical facilities, types of accidents and danger to emergency personnel, and reviews of operating procedures have been obtained during a series of visits to electrified rail and transit systems. Programs to reduce electrical hazards to emergency personnel are proposed. These programs are evaluated by a

cost-benefit comparison, and recommendations are selectively made. Joint development of emergency operating plans by rescue and railroad organizations, and installation of direct telephone lines to the power director are recommended as being most cost-effective.

Abbas, JD Phillips, WE, Jr Kusko, A King, CM Transportation Systems Center, Federal Railroad Administration Final Rpt. FRA/ORD-80/36, DOT-TSC-FRA/80-14, June 1980, 60p; Prepared in cooperation with Kusko (Alexander), Inc., Needham, MA.; Contract DOT-TSC-1180; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-220858, DOTL NTIS

26 322510 FIRE REMAINS A BIG POTENTIAL HAZARD. One of the main hazards that can occur on a metropolitan railway is to have a fire on board. Several metropolitan railways, including those in London, Hong Kong, San Francisco, Stockholm and New York, have made a study of non-flammable materials.

International Railway Journal Vol. 20 No. 5, May 1980, p 47, 3 Phot. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013

26 322837 SAFETY OR RELIABILITY MUST WE CHOOSE? The transit industry has traditionally depended upon fail-safe design techniques and practices to achieve safety in the application of its control and communications systems. The ability to produce a reliable design using these techniques is somewhat limited, particularly as the level of automation increases. The aerospace industry has provided safety in the systems they have developed through disciplined programs of hazard analysis and risk assessment, combined with design techniques which enhance the reliability of the systems. It would appear that an amalgamation of some of these techniques and practices into the transit design processes holds some promise of helping to provide reliable automated ground transportation while maintaining the safety of the riding public at an acceptably high level.

Needels, FR (Community Redevelopment Agency) *ALAA Monographs* Vol. 25 1979, pp 19-23; Proceedings of the Soc and Aerospace Technology Workshop, Los Angeles, California, November 15, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Western Periodicals Company, 13000 Raymer Street, North Hollywood, California, 91605

26 324996 MAN-MADE POLYMERS--THE FIRE SAFETY ISSUE REACHES FLASH-POINT. The National Academy of Sciences will issue recommendations in mid-January designed to halt "improper, unsafe use of polymers" Pointing to marked increases in the use of manmade polymers in virtually every transportation vehicle, the unpublished report says, "the sharply increased fire load, with relatively unknown fire characteristics, poses a substantial problem that has not yet been fully realized, much less evaluated". The Academy will urge an immediate ban on the use of polyurethane in new mass transit vehicles and its replacement in operating equipment. The Academy notes that passenger compartment furnishings are now almost 100% polymeric material (predominantly flexible polyurethane, polyvinyl chloride, poly-

propylene, and SBF elastomers) which are "major contributors to the high frequency of passenger compartment fires". The Academy warns that although these materials are required to pass Federal Motor Vehicle Safety Standard (FMVSS) 302 with a horizontal burning rate of 4-in. (10.2 cm) per minute, most of them are used in a vertical configuration where the actual burning rate would be expected to reach several times that exhibited in the horizontal configuration.

Hodges, PD *Automotive Industries* Vol. 159 No. 12, Dec. 1979, pp 73-76; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

26 325734 A REPORT ON INVESTIGATIONS INTO RAIL PASSENGER SAFETY. Investigations are made into issues affecting rail passenger safety in intercity and commuter rail service. The objectives of the study were to identify important safety issues that need resolution, to describe means for resolving these issues, and to describe further research that is critically needed. Special attention was given to those issues highlighted by the National Transportation Safety Board (NTSB) in recent recommendations. The important safety issues identified are briefly described as communications, train control systems, vehicle crashworthiness, vehicle interior design, emergency regress and lighting, equipment maintenance and inspection, and employee training.

Mattison, PD Palmer, DW Nayak, PR ; Little (Arthur D), Incorporated, Federal Railroad Administration Final Rpt. FRA/ORD-80/65, ADL-80589-30, Oct. 1980, 93p, Figs., 4 Tab., 4 App.; Contract DOT-FR-74261; ORDER FROM: NTIS; PB81-116196, DOTL NTIS

26 326035 IDENTIFICATION OF THE FIRE THREAT IN URBAN TRANSIT VEHICLES. To improve mass transportation, UMTA tasked the Transportation Systems Center (TSC) to assess the overall fire threat in transit systems and to identify and recommend suitable remedial actions. This report presents the identification of the fire threat in urban transit vehicles. The study is based on site visits/surveys to nine representative U.S. transit properties, namely: Massachusetts Bay Transportation Authority (MBTA);

Bay Area Rapid Transit District (BART); New York City Transit Authority (NYCTA); San Francisco Municipal Railway (MUNI); Southern California Rapid Transit District (RTD-Los Angeles); Denver Rapid Transit District (RTD-Denver); Metropolitan Atlanta Rapid Transit Authority (MARTA); Washington Metropolitan Area Transit Authority (WMATA); and Chicago Transit Authority (CTA). The data collected from the nine transit properties represented all bus and rail rapid transit fire and smoke incidents which occurred at those transit properties during the calendar year 1978. Data was obtained from daily logs, operator reports, accident reports, police reports, and maintenance reports. These data are supplemented by fault tree diagrams and scenarios in identification of the fire threat. These are based on actual transportation fire and smoke incidents in TSC files, data analysis, interviews with transit personnel, and the use of maintenance manuals. Following a description of the TSC data acquisition methodology, the data are analyzed and discussed along with the relationship of the fault trees and scenarios to the identification of countermeasures.

Hathaway, WT Flores, AL ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-80-8, UMTA-MA-06-0051-80-1, June 1980, 109p; Contract DOT-MA-06-0051; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-217631

26 328279 IDENTIFICATION AND EVALUATION OF OPERATIONAL ALTERNATIVES FOR MATERIALS DATA BANK. The Urban Mass Transportation Administration (UMTA) has expended considerable effort in assessing the fire performance characteristics of materials used in transit vehicles. The collection and dissemination of pertinent flammability information are an important part of this research. The large volume of data associated with the flammability characteristics necessitated the establishment of a system for storing the data in such a manner that it would be easily available upon request. In the past, a request for such data required a search of files, journal articles, and manufacturers' litera-

ture. To address these problems, a plan for a computerized information storage and retrieval system was devised to accommodate such data queries. This report is intended to provide a review of the organization and operation of UMTA's Materials Data Bank which was established and is maintained by the Transportation Systems Center (TSC). Contained within the Materials Data Bank are two basic categories of information: (1) non-metallic materials flammability data, and (2) fire extinguisher data. Included in this review are the reasons for the Bank's establishment, details of its contents, present operational status, and the identification and evaluation of operational alternatives directed at improving its visibility and its usefulness to the technical community. It is recommended that the best method for managing and disseminating the technical data will be accomplished through TSC. A notice of the availability of this system will be published in the Federal Register.

Hathaway, WT Bogner, CE Litant, I ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-80-15, UMTA-MA-06-0051-80-2, July 1980, 35p; Contract DOT-MA-06-0051; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-124869

26 343839 TECHNOLOGY TRANSFER: TRANSPORTATION. The successful application of aerospace technology to problems related to highways and rail and rapid transit systems is described with emphasis on the use of corrosion resistant paints, fire retardant materials, and law enforcement. Possible areas for the use of spinoff from NASA technology by the California State Department of Corrections are identified. These include drug detection, security and warning systems, and the transportation and storage of food. A communication system for emergency services is also described.

Anyos, T Christy, L Lizak, R Wilhelm, J ; SRI International, National Aeronautics and Space Administration Annual Rpt NASA-CR-152673, Dec. 1978, 98p; Contract NAS2-9846; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N81-27981/2

27 047406 TV AIDS RAILROAD SECURITY FORCES. Star-Tron, one of the nation's first commercially available passive night-vision systems, has been introduced as a crime deterrent for the railroad industry by Smith & Wesson. The system—a relatively new concept in crime detection and deterrence—is currently in operation on the Southern Railway System to uncover thieves, vandals and trespassers.

Railway System Controls Vol. 4 No. 8, Aug. 1973, 1 p. ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr. PC

27 048186 VANDALISM AND PASSENGER SECURITY IN THE TRANSIT INDUSTRY. This paper summarizes the goals and objectives of an Urban Mass Transportation Administration project designed to measure the scope of transit-related vandalism and crime in terms of its characteristics and costs. The discussion includes all current efforts to reduce vandalism, passenger harassment, and crime in terms of vandal-resistant materials and equipment; community, social, and educational programs; and deterrent, protection, surveillance, and apprehension systems. The paper also discusses problems of institutional cooperation and conflict as well as current and planned demonstration projects designed to measure the effectiveness and costs of particular procedures and techniques for deterring vandalism and crime.

Schnell, JB Smith, AJ (American Transit Association) *Highway Research Record* No. 449, 1973, pp 21-33, 2 Ref.; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr. PC

27 057337 SUMMARY REPORT ON VANDALISM AND PASSENGER SECURITY IN THE TRANSIT INDUSTRY. This paper summarizes the findings of a study on crime, vandalism, and passenger security on urban transit systems. The study's major goals were to appraise the national scope of transit crime and vandalism and to explore means of controlling the problems and make suggestions on the basis of the research findings. The emphasis in this summary is on means of controlling the problems. Several ideas to control transit crime and vandalism are discussed: the use of materials that are specially fashioned to withstand criminal and vandal acts on transit; procedures and tactics to protect transit passengers, employees, and properties and ways to detect and deter offenders, keep them under surveillance, and apprehend them when necessary; mechanical and electronic devices, as well as features of stationary sites, for assisting police and security forces in their duties; programs for involving the community in formulating anticrime and vandalism measures and programs for maintaining a liaison with educational authorities and personnel; the methodical cultivation of good relations with police, courts, and the media; and the attitudes of the public toward transit crime and vandalism to ascertain whether fear of crime and vandalism influences passenger decisions to use urban transit. Suggestions for further research on transit crime, vandalism, and passenger security are also given.

Thrasher, EJ Schnell, JB (American Transit Association) *Transportation Research Record* No. 487, 1974, pp 46-54, 3 Ref.; ORDER FROM: TRB, Repr. PC

27 057338 STUDIES OF PUBLIC ATTITUDES TOWARD TRANSIT CRIME AND VANDALISM. This paper describes the findings of six studies in five cities on the question of whether fear of transit crime and vandalism affects a person's decisions to use urban transit systems. Although the studies do not give a firm answer, they offer some tentative conclusions: Transit crime and vandalism can exert strong influence on decisions concerning use of urban transit, but there are many variations depending on the volume of crime or vandalism in the area served by a particular route, the transportation alternatives available to passengers, the hours at which they must ride, and other factors. In general, transit crime and vandalism are more likely to influence passenger decisions concerning riding on rapid transit than on buses. Riders are more likely to view with serious concern the potentially menacing aspects of rowdiness such as verbal threats and vandalism than "nuisance" aspects such as the pushing and shoving involved in horseplay. Riders' concern is likely to be more intense when they personally witness crime or serious rowdiness than when they are not personally involved. Those who are reluctant to ride urban transit because of personal security considerations least favor riding after 7:00 p.m. Transit crime and vandalism may have a potential influence on all classes of riders regardless of age or sex, although possibly not in the same degree. It is extremely difficult to establish that a given change in ridership is caused by a single factor such as crime or vandalism. In any situation, there may be a combination of factors that influence ridership and make it all but impossible to determine the degree of influence of any one factor.

Thrasher, EJ Schnell, JB (American Transit Association) *Transportation Research Record* No. 487, 1974, pp 26-33, 3 Ref.; ORDER FROM: TRB, Repr. PC

27 057339 SCOPE OF CRIME AND VANDALISM ON URBAN TRANSIT SYSTEMS. This paper reports on an attempt to quantify the extent and seriousness of crime and vandalism on urban transit systems. Although many imprecisions in the recording of criminal incidents and the computing of vandalism costs impose limitations on the data, the authors believe that the findings constitute a significant first step toward knowledge of the incidence of transit crime and the monetary costs of transit vandalism. On the basis of data obtained from 37 U.S. transit systems, the total number of criminal incidents on all systems in 1971 is estimated at approximately 33,000 to 39,000. No functional relationships were found between various factors such as total crime indexes and total crime per 100,000 vehicle-miles or 100,000 revenue-passengers. A computed transit exposure index led to the tentative conclusion that the risk of being involved in a criminal incident could be at least twice as great when riding on urban transit vehicles as in nontransit circumstances. If this conclusion is sound, the problem of crime on transit systems may be proportionately more serious than has been generally credited. The total national transit vandalism costs for 1971 are estimated at \$7.7 million. Direct transit vandalism costs on the average amounted to less than 0.5 percent of operating costs in 1971, but the problem assumes

greater dimensions when indirect costs are also considered. Window breakage was the largest component, followed by damage to seats, damage to stationary facilities, and graffiti. National transit system costs of liability claims resulting from incidents of crime and vandalism in 1971 are estimated at \$1.85 million to \$2.33 million.

Thrasher, EJ Schnell, JB (American Transit Association) *Transportation Research Record* No. 487, 1974, pp 34-45, 7 Tab.; ORDER FROM: TRB, Repr. PC

27 072729 PERSONAL SECURITY ON PUBLIC TRANSIT. While conventional modal choice models consider time and cost, safety has been largely ignored. This study examined the safety aspect of a public transit facility through user-perception survey. A bus and elevated line of the Chicago Transit Authority were chosen as the survey areas. It was found that the variable most frequently cited as decisive in using, or not using, the bus or elevated is freedom from personal attack or harassment. The users' perception of safety is examined. The study cites some shortcomings of the survey method and notes that system design should have a major role in persuading potential riders that safety is assured.

Ferrari, ND Trentacosts, MF (New York State Department of Transportation); Cross (Richard B) Company *Proc Paper* Vol. 15 No. 1, 1974, pp 214-223, 2 Fig., 8 Tab., Refs.; This paper is from *Transportation in Focus, Proceedings of the Fifteenth Annual Meeting of the Transportation Research Forum, San Francisco, California, 10-12 October 1974.*; ACKNOWLEDGMENT: Transportation Research Forum; ORDER FROM: Vietsch (Grant C), 181 East Lake Shore Drive, Chicago, Illinois, 60611 Repr. PC

27 080627 CITIZEN SAFETY AND BUS TRANSIT. This report investigates all of the major factors which effect the relationships between bus transit, crime and the citizen in the Washington, D.C. area. These factors include: (1) actual reported on-bus incidents; (2) reported incidents that occur at local bus stop intersections and bus stop approaches; (3) incidents observed by bus riders; and (4) attitudes of bus riders and non-riders about bus related personal safety. The report documents the current methods of transit crime reporting and investigates obstacles to the provision of thorough accounting and reporting of transit crimes. Major related issues such as passenger victimization, public perception of transit crime vs. actual reported incidence levels, and prerequisites to maintaining the public confidence are discussed in conjunction with recommendations for agencies involved. /UMTA/

Metropolitan Washington Council of Governments, (IT-09-0020) UMTA-IT-09-0020-74-1, June 1974, 99 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237740/AS

27 081948 THE IMPACT OF POLICE ACTIVITY ON SUBWAY CRIME. The impact of police manning and apprehension activities on New York City subway crime, with emphasis on robbery, is analyzed for the period 1965-1971. With increased uniformed patrol between 8 p.m. and 4 a.m., the number of felonies decreased both during the hours of increased manning (a deterrent effect) and during the rest of the day (a phantom effect). Displacement of crime is ana-

lyzed via the relationship between subway and bus robberies.

Chaiken, JM Lawless, MW Stevenson, KA ; Rand Corporation P-5203, Mar. 1974, 56 pp; ACKNOWLEDGMENT: NTIS (AD-786863/ISL); ORDER FROM: NTIS, Repr. PC, Microfiche; AD-786863/ISL, DOTL NTIS

27 092224 VANDALISM SUPPRESSION BY HELICOPTER. PRELIMINARY EXPLORATION. The research project is a preliminary exploration into procedures, applications and effects of helicopter surveillance of commuter and freight railroad facilities in an urban environment. The project was conducted in the Philadelphia Metropolitan Area in the Spring and Summer of 1972 for the Federal Railroad Administration and with the cooperation of the Penn Central Transportation Company and the Reading Railroad. An attempt was made to document effects of the helicopter patrol and to provide insight into the requirements of a more exhaustive program to attain statistical validation of observed impact of helicopter use.

Aylworth, CE ; Naval Ammunition Depot, Federal Railroad Administration Final Rpt. FRA-OPPD-74-1, Jan. 1973; See also RRIS 12 052071 7402 and 153082 7702.; Contract DOT-AR-20013; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-244099/8ST, DOTL NTIS

27 128947 SECURITY OF PATRONS ON URBAN PUBLIC TRANSPORTATION SYSTEMS. This report presents a wide range of current thinking on the nature of the crime problem on public transit system, its effect on transit patronage, measures taken to meet the problem, projections about what the problem will be in the future, and the kind of research required to meet future needs. The citizen's perception of crime on public transit and its effect on ridership will be an essential factor in the planning and operating of public transportation. These basic crime control strategies are: increase of police manpower including flexible deployment strategies; expansion of electronic devices to complement police patrol; and operational strategies such as the elimination of stops in high crime areas. The application of current knowledge to automated small vehicle systems in discussed.

Carnegie-Mellon University Res. Rept. Feb. 1975, 68 pp, Tabs., 13 Ref., 3 App.; Report on the Workshop on Transit Security, Feb. 24-25, 1975.

27 139383 ST LOUIS HELICOPTER PROJECT-A COOPERATIVE EFFORT AMONG FOURTEEN RAILROAD DEPARTMENTS. The specific objective of the project, undertaken and funded by the Department of Transportation, was to test and demonstrate the effectiveness of a collective approach to railroad security by coordinating the efforts of all security resources within the railyards at St. Louis-East St. Louis. These resources included a helicopter and special communications equipment for common use among several railroad companies. The report describes the Railroad Police System in Greater Metropolitan St. Louis and then deals with the implementation of the project including securing equipment, insurance, and training. The operation of the system is documented including the

determination of flight schedules, radio procedures, surveillance, and apprehension procedures used by the helicopter. The impact of the project is evaluated and nineteen recommendations on how a permanent airborne surveillance program should be organized and operated are set forth. The findings support the conclusion that helicopters can be an effective component of a railroad security system. The project also demonstrated the effectiveness of coordinating and pooling all available law enforcement resources in reducing vandalism, trespassing, and cargo theft. There was a marked increase in joint police ventures and the concept of a common radio frequency was almost universally endorsed by the participating railroad police. Appended to the report are a copy of the helicopter services contract, a personal injury liability agreement, and the project evaluation forms used by the participants.

Patterson, TV Sanders, MS ; Naval Ammunition Depot DOT-P-5200.9, 1973, 111 pp; Sponsored by UMTA.; ACKNOWLEDGMENT: Department of Justice; ORDER FROM: GPO

27 143214 TRANSIT SAFETY AND SECURITY: A DESIGN FRAMEWORK. The study is an analysis of transit crime data for the Southern California region. It examines safety and security deficiencies in transit design and recommends ways in which they can be ameliorated. The study contains the following: (1) development of security and safety objectives in the operation of major transit systems, (2) assessment of crime patterns and safety problems for selected regional transit corridors, (3) examination of the effectiveness of crime prevention by physical design of transit facilities, and (4) development of a reference document for safety and security design criteria in transit facilities. Some specific design areas examined include the following: park-and-ride facilities, parking structures; site planning and landscaping; illumination levels; passenger boarding safety; subway and elevated systems; station visibility; closure and monitoring; traffic and parking criteria; and the special needs of the elderly and handicapped.

Southern California Association of Governments, Federal Highway Administration, California Department of Transportation. (HPR) Final Rpt. Apr. 1976, 170 pp; Sponsored in part by Federal Highway Administration, Washington, D.C., and California State Dept. of Transportation, Sacramento.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256518/2ST, DOTL NTIS

27 152787 CRIME AND PERCEPTION OF CRIME ON A METROPOLITAN MASS TRANSIT SYSTEM. Crime on transit systems has become a serious problem. Besides the hardship placed on those who are victimized, crime also seems to be a cause of decreasing patronage. Expansion of present systems or construction of new ones will alleviate the energy-environmental crunch only if commuters can be recruited away from their use of private automobiles. A study of transit crime coupled with a telephone survey reveal that transit crime is perceived differently from street crime. The results indicate that transit systems require uniquely designed security systems to reduce crime and increase public confidence in the system.

Cooley, WL (West Virginia University) Bartel, EW Shellow, R ; Institute of Electrical and Electronics Engineers, (75CH0999-31A) Conf Paper 1975, pp 377-381; Presented at the 10th

IEEE Industry Applications Society Annual Meeting, Conference Record, Atlanta, Georgia, September 28-October 2, 1975.; ACKNOWLEDGMENT: EI (EIX770200044); ORDER FROM: ESL

27 152788 ELECTRONIC SURVEILLANCE/-RESPONSE SYSTEM TO REDUCE CRIME ON A MASS TRANSIT FACILITY. This paper covers Carnegie-Mellon University's design of a surveillance response system to reduce crime on the City of Chicago's transit system. It includes a brief review of the possible electronic devices applicable to a public transit system security network. The "Television Alert System", which has been accepted and is being installed in Chicago is described in detail.

Bartel, EW (Carnegie-Mellon University) Cooley, WL Shellow, R ; Institute of Electrical and Electronics Engineers, (75CH0999-31A) Conf Paper 1975, pp 382-388; Presented at the 10th IEEE Industry Applications Society Annual Meeting, Conference Record, Atlanta, Georgia, September 28-October 2, 1975.; ACKNOWLEDGMENT: EI (EIX770200045); ORDER FROM: ESL

27 168934 PROCEEDINGS OF WORKSHOP ON METHODOLOGY FOR EVALUATING THE EFFECTIVENESS OF TRANSIT CRIME REDUCTION MEASURES IN AUTOMATED GUIDEWAY TRANSIT SYSTEMS, HELD AT CAMBRIDGE, MASSACHUSETTS ON MAY 25-28, 1976. The workshop focused on current methods of assessing the effectiveness of crime and vandalism reduction methods that are used in conventional urban mass transit systems, and on how they might be applied to new AGT systems. Conventional as well as novel methods of assessment were presented and discussed. Among the major issues discussed were the use of critical incident techniques to assess the community's needs with regard to transit security; the establishment of a board similar to the National Transportation Safety Board, which will focus on security issues; and the role of security specialists and management in transit planning. The information herein should be of interest to transit security planners and researchers, law enforcement agencies, planners of AGT systems, and in general those people who are concerned with the problems of crime and vandalism in transit systems.

Hawkins, W Sussman, ED ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. DOT-TSC-UMTA-77-27, UMTA-MA-06-0048-77-1, July 1977, 118 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273695/7ST, DOTL NTIS

27 174409 CRIME IN NEW YORK, PHILADELPHIA, LOS ANGELES, AND WASHINGTON, D.C. This article discusses the safety aspects of public transportation systems in four major cities: New York, Philadelphia, Los Angeles, and Washington, D.C. New York's safety program includes the use of decoy policeman on the subway trains and platforms, uniformed officers near turnstiles at key stations, and juvenile programs for offending youths. This year a T.V. surveillance camera will be installed in certain stations as part of a federal demonstration project. Philadelphia's system includes a transit police unit, radio communication on all trains, a

K-9 Corp, plainclothes police officers, and closed-circuit T.V. On the Lindenwold Line, the police force patrols the parking lots where there has been a high rate of stolen cars. Also, officers on that line have jurisdiction in both Pennsylvania and New Jersey. The Southern California Rapid Transit District (SCRTD) attribute the drop in serious crime to greater law enforcement cooperation and an increasing number of radio equipped buses. Of all the serious accidents, thefts from operators have been the most prevalent. About 800 of SCRTD's buses are equipped with two-way radios, silent alarms, four-way flashing lights, and numbers painted on their roofs for easy aerial identification. Washington's rapid rail system to date has had a very good safety record. This can be attributed to patrol cars near station entrances, uniform and plainclothes District police riding the system, a well trained and experienced police force, a safety oriented subway system design, a "no cash" fare policy, and the high-quality of its riders. Metro officials are worried, however, about opening the system until 11 PM and the additional seven-mile link. Both of these factors will put an additional strain on Metro's police-force.

Mazza, F (New York Daily News) Hackney, DC (Philadelphia Bulletin) Hebert, R (Los Angeles Times) Crosby, T (Washington Star) *Mass Transit* Vol. 5 No. 3, Mar. 1978, pp 12-19, 13 Phot.

27 178150 ROLE OF SECURITY IN MARKETING URBAN MASS TRANSPORTATION. The study reported was conducted to provide input on the security-oriented attitudes and perceptions of users and non-users of public transportation for use in a large scale transit marketing study of the Chicago metropolitan area. Consideration is given to the saliency of security among these different groups, to various dimensions of the security problem as perceived by the respondents, and the implications of these perceptions for the marketing of urban mass transit.

Feldman, LP (Illinois University, Chicago) Velenga, DB *High Speed Ground Transportation Journal* Vol. 11 No. 2, 1977, pp 157-172, 22 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

27 190881 TRANSIT CRIME STUDY. This report presents statistic data and information which enabled a determination that the northeast region of New Jersey is the only location in the state where transit crime statistics are collected and tabulated. Security systems and techniques are evaluated and several systems are chosen as possible successful countermeasures for the high transit crime locations in the region. Two-way radio communication is suggested for the bus and subway locations. Helicopter Track Patrols are suggested for the commuter rail locations. All these systems are examined and funding priorities are established. Activities necessary for evaluation of the recommended security systems are included. (Portions of this document are not fully legible)

Graf, CR Roberts, AW; New Jersey Department of Transportation, New Jersey State Law Enforcement Planning Agency Final Rpt. 77-008-7890, July 1977, 108 p.; Sponsored in part by New Jersey State Law Enforcement Planning Agency, Trenton.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289703/1ST

27 272002 CRIME ON TRANSIT SYSTEMS MAY DETER MOTORISTS FROM SWITCHING FROM CARS. Robert Shellow, professor of urban affairs in Carnegie-Mellon University's School of Urban and Public Affairs, speaking at the recent 53rd Annual Meeting of the Highway Research Board, states the anxiety over crime on mass transit systems may generate a political whirlwind as fuel shortages force the affluent and politically powerful auto commuters into the ranks of captive riders. He describes a system designed to protect riders from crime and harassment. The system features a security-surveillance system called "Televue Alert System." This system is seen as cheaper than police patrols and as effective. The findings of the survey and study also indicated that perceived security is at least as important as the reality of crime.

Highway Research News, Hwy Res Board No. 54, 1974, pp 50-51 ORDER FROM: TRB, Repr. PC

27 272041 CRIME IN RAPID TRANSIT SYSTEMS: AN ANALYSIS AND A RECOMMENDED SECURITY AND SURVEILLANCE SYSTEM. This study is directed toward identifying the influence that crime has on transit ridership and toward developing measures for increasing patron and system security on a major transit network. Because of the preponderance of crime and harassment on rapid transit as opposed to surface transit, recommendations are directed toward test demonstrations on the rapid transit segment of the system. All suggested improvements are based on systematic analyses of transit crime patterns, ridership trends, a survey of public perception of transit crime, present security measures, and general operating procedures. Profiles of transit crime are derived from an 18-month series of crime data collected on the system. A crime-ridership index is employed to measure risk to patrons on various parts of the transit system. Present inadequacies in surveillance and response capability of police are described. The question of increasing manned patrols as opposed to substituting electronic or mechanical systems is examined from the viewpoint of assuring patrons of rapid protective response should an emergency arise. A publicly activated closed-circuit television system is offered as one means of addressing the security needs on highrisk portions of the rapid transit network.

Shellow, R Romualdi, JP Bartel, EW (Carnegie-Mellon University) *Transportation Research Record* No. 487, 1974, pp 1-12, 9 Fig., 5 Ref.; ORDER FROM: TRB

27 272042 PERSONAL SECURITY IN BUSES AND ITS EFFECTS ON RIDERSHIP IN MILWAUKEE. This paper deals with the problem of personal security on bus transit vehicles and its effects on transit ridership. A survey was conducted in Milwaukee along a transit route that has a high degree of transit crime and vandalism. The route chosen traversed a cross section of land uses and neighborhoods of widely different socioeconomic levels. A sample of bus riders and a group of randomly selected households along the chosen corridor were asked to complete questionnaires. The survey result gives an indication of the relationship between and the relative degrees of passenger perceptions of destructive and personally hostile acts as well as the actual

occurrence of such acts. The survey results are analyzed according to the respondents' rates of use of transit service as well as their ages and sexes. The responses are evaluated separately for crime and vandalism. The responses about personal security are further examined in relation to the various service characteristics. The survey results are also analyzed according to the land use and socioeconomic characteristics of the identified zones. It is determined that the degree to which transit crime and vandalism affects transit patronage is related to land use and socioeconomic characteristics of the neighborhoods, but the problem of personal security is less important than such service factors as frequency of service, convenience of routes, fare level, and travel time.

Sinha, KC (Marquette University) Roemer, FP (Milwaukee Bureau of Engineering) *Transportation Research Record* No. 487, 1974, pp 13-25, 2 Fig., 10 Tab.; ORDER FROM: TRB, Orig. PC

27 309107 REPORT ON THE SITUATION RELATING TO THE DISTURBANCE OF ORDER AND SAFETY IN THE URBAN AND REGIONAL TRANSPORT [Rapport over de situatie met betrekking tot de verstoring van orde en veiligheid bij het stads-en streekvervoer]. An inventory is made of delinquent behaviour in public transport in the Netherlands. An evaluation is given of the efficiency of countermeasures and proposals for improvements are presented. The data are relevant to the first nine months of 1978. Urban transport is relatively most frequently confronted with non-paying passengers and damage, regional transport with damage only. Recommendations are: to bring about an amelioration of mental attitude, supporting control-staff, to bring the offenders to trial immediately, replacement of vulnerable materials, increasing the number of vehicles equipped with walkie-talkie. /TRRL/ [Dutch]

Ministerie van Verkeer en Waterstaat Monograph Jan. 1979, 35 p., 4 Fig., 7 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 243432), Institute for Road Safety Research

27 310542 SUBWAY LIGHTING-AN OVERALL CONCEPT. A footpath network to segregate pedestrians from traffic needs to be attractive, and subways should be safer, have easy access, and be of good overall design. This article describes a mini-bridge type subway consisting of two trapezium shaped blocks of in situ concrete carrying a monolithic deck slab. The importance of surface finishes is stressed and the overall design and standard of lighting is considered. The aesthetic appearance of installations and their location to prevent vandalism is emphasised. The design and construction of the luminaires, and the materials used are considered in some detail, noting the need for protection against weather, corrosion and vandalism. (TRRL)

Singleton, FW (Redditch Development Corporation) *Institution of Municipal Engineers, Journal of* Vol. 106 No. 4, Apr. 1979, pp 128-129, 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 243587)

27 313134 URBAN MASS TRANSIT: CRIME AND RELATED PROBLEMS-A BRIEF HISTORICAL REVIEW, 1850-1977, WITH ANNOTATED BIBLIOGRAPHY. The paper reviews criminal activity involving public transit systems from 1850-1977. It shows that the type of

crime evolved from primarily non-violent, e.g., pickpocketing, prior to 1930 to violent, e.g., assaults-robbery after 1930. Attempts by transit systems to cope with the problem through legislation, police, public relations, and modern technology is described herein. The bibliography presents in one document references to data associated with urban transit security. Bibliographical entries, in this report, are annotated, and indexed by author, periodical, subject, title, and foreign references. It is organized into eight parts: (1) Theses and Books; (2) Government Reports; (3) Private Reports; (4) Periodical Articles; (5) Newspaper Articles; (6) Unpublished Papers, Reports, and Speeches; (7) Legislative and Legal Documents; and (8) Suggested Readings. Instructions for obtaining cited items is included.

Wallace, PS ; Illinois University, Chicago, Urban Mass Transportation Administration Res Rpt. UMTA-UTD-50-79-1, Aug. 1977, 101 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-140361

27 322246 AMERICA'S FIRST TRISTATE, MULTI-JURISDICTIONAL POLICE

FORCE. This article is an overview of the police force established by the Washington, D.C. Metropolitan Area Transit Authority for surveillance of the recently constructed subway system in the Washington metropolitan area. The transit authority was formed by an interstate compact adopted by Maryland, Virginia, and the District of Columbia City Council with the consent of the U.S. Congress. The organizational structure and training requirements of the police force and summarized. The department's view of its primary rail mission focuses on high-visibility patrol for trains and station platform areas to create an aura of passenger safety through conspicuous police presence. Toward this objective, patrol manpower is deployed in a variety of ways, overtly and covertly. The following strategies are employed to combat crime: the assignment of patrol officers to a given station, train patrols, coverage of multiple stations, substantial increase in patrol manpower at a given location to maximize visibility, the deployment of officers posing as potential crime victims, and covert surveillance. Although some local residents had expressed a fear that crime might increase in the vicinity of the

Metrorail stations, statistics indicate to the contrary. It would appear that criminals prefer to operate where people and police are not visible.

Hannon, M (Washington Metropolitan Area Transit Authority) *FBI Law Enforcement Bulletin* Nov. 1978, pp 16-22, 1 Fig., 1 Tab., Photos.

27 328236 CLOSED CIRCUIT TELEVISION IN TRANSIT STATIONS: APPLICATION GUIDELINES. It is intended that readers will acquire information from this document that will help in planning, designing, installing, operating, and evaluating the most appropriate CCTV transit surveillance system for their own purposes. This report is arranged to first identify key concepts in the main areas associated with CCTV transit station security systems, and then are focused individually on those main areas which include equipment, personnel, procedures, evaluation, and costs. Appendices which include lists of manufacturers of CCTV components, glossaries of terms and abbreviations, and a comprehensive bibliography are included in this report. The information for this study was obtained from literature surveys, suppliers, visits to existing transit CCTV installations, consultations with subject-matter experts, and the prior experience of the project staff.

Bloom, RF ; Dunlap and Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0048) Final Rpt. ED-80-1, DOT-TSC-UMTA-80-33, Aug. 1980, 209p; Contract DOT-TSC-1314; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-122913

27 329514 PLANNING PROCEDURES FOR TRANSIT STATION SECURITY. The article discusses the principal issues in station security and describes a set of procedures for designing safe terminal areas. Environmental factors that influence both actual and perceived security are reviewed, and proposed crime countermeasures are identified and linked to security goals. A planning procedure is developed for designing transit stations for improved security.

Richards, LG (Virginia University) Hoel, LA *Traffic Quarterly* Vol. 34 No. 3, July 1980, pp 355-375, 19 Ref.; Also available from NTIS, PB81-126344.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

27 330173 SECURITY CONSIDERATIONS IN THE DESIGN AND OPERATION OF RAPID TRANSIT STATIONS (ABRIDGMENT). Design principles for rapid transit stations and off-peak transit ridership as a function of personal security are discussed. A survey was conducted at two rapid transit stations in Cleveland, Ohio, for the purpose of determining user attitudes toward personal security and developing station design principles based on the findings. The major finding is that a "critical mass" of station patronage seems to be required before people feel secure in rapid transit stations. People avoid underused stations (which exacerbates the problem of poor patronage) and avoid riding in off-peak time periods at all stations. In both cases, survey respondents stated that they feel vulnerable in a transit station when there are few people around. Ironically, poor station patronage, which is considered to be a security problem, is largely a marketing problem, and improving off-peak ridership, which is generally considered a marketing problem, is largely a security problem. People provide the best security. It is concluded that, although traditional security measures such as good lighting, well marked stations, and security patrols are beneficial, improved security and improved transit marketing are closely associated and should be considered together in transit planning.

Andrle, SJ Barker, B Golenberg, M (SG Associates, Incorporated) Richards, LG, Discussor (Virginia University) *Transportation Research Record* No. 760, 1980, pp 42-45, 1 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

28 047307 CONSUMER ORIENTED APPROACHES TO MARKETING URBAN TRANSIT. The study sees marketing as playing a key role in urban transit operations because of its focus on understanding and satisfying consumer needs. Marketing strategy is discussed on the basis of detailed knowledge of the consumer, how he goes about deciding to make a trip, and how he selects a mode of transportation. To facilitate understanding of this decision process and how it may be influenced, a microanalytic model of modal choice behavior was developed in flow chart form. To improve knowledge of these variables, a large scale consumer survey was undertaken in the San Francisco Bay area. Various multivariate statistical techniques are used to analyze the resulting survey data. The study concludes with several proposed strategies to use in the marketing mix.

Lovelock, CH ; Stanford University Final Rpt RR-3, Mar. 1973, 425 pp; Contract CA-11-00080; ACKNOWLEDGMENT: NTIS (PB-220781/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-220781/9

28 050746 MARKETING TECHNIQUES AND THE MASS TRANSIT SYSTEM. The report, a transit information and marketing study, was performed with two objectives in mind: To identify marketing and information techniques being used successfully by mass transit systems to increase patronage and to make their systems more accessible to the public; and to develop a model for evaluating transit information and marketing systems and to develop methods to increase the effectiveness of these systems. Three methods were used to gather the information in the report: a literature search, a written questionnaire to transit systems, and visits to five cities for personal interviews with transit system officials. The main problems are found to be competition with other transit modes (especially automobiles), increasing costs, and communications barriers between the transit service and the public. Recommendations are made and areas where further work and research may be useful are suggested. A companion handbook to the report includes specific examples of advertisements and promotional pamphlets for use by all media.

National Urban League, Incorporated, (UMTA-DC-06-0020) Final Rpt. UMTA-DC-06-0020, July 1973, 107 pp; Prepared in cooperation with Mark Battle Associates, Inc., Washington, D.C. See also PB-223 736.; Contract DOT-UT-533; ACKNOWLEDGMENT: NTIS (PB-223735/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223735/2

28 050747 MARKETING TECHNIQUES AND THE MASS TRANSIT SYSTEM-A HANDBOOK. The handbook contains a selection of materials that have been used by transit systems to promote their service or to provide the public with information about using their service. The samples represent some of the more creative pieces that were provided by the 58 transit systems covered in the research on the companion report, 'Marketing Techniques and Mass Transit Systems'. The volume is designed as a guide to aid other transit systems in the selection of materials for their own marketing campaigns. Contents include pamphlets on video reinforcement, newspaper advertisements on rider reinforcement, encouraging modal switch and notices of systems

changes, special information tools, schedules, maps, news releases, radio-spot advertising, multi-lingual announcements and announcements of special public relations activities. The format is largely graphic. Portions of this document are not fully legible.

National Urban League, Incorporated, (UMTA-DC-06-0020) July 1973, 122 pp; Prepared in cooperation with Mark Battle Associates, Inc., Washington, D.C. Supplement to PB-223 735.; Contract DOT-UT-533; ACKNOWLEDGMENT: NTIS (PB-223736/0); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223736/0

28 051356 PROBLEMS STANDING IN THE WAY OF ACCOMPLISHING THE MOST ECONOMICAL MARKETING SYSTEM. This publication contains the paper presented at the IRT Annual Conference for 1973. The papers cover such topics as transit planning, rail car technology, the energy crisis and government planning.

Institute for Rapid Transit 1973, 70 pp; Presented at the Institute for Rapid Transit, Annual Conference, 1973. Appeared in the IRT Annual Conference Digest.; ORDER FROM: Institute for Rapid Transit, 1612 K Street, NW, Washington, D.C., 20006 Repr PC

28 081175 PITTSBURGH'S NEW RIDERSHIP PROGRAM. The New Ridership Program is based on improved service and equipment to the passenger at attractive fares with expanded information and promotion. The first step has been to improve service. The new system operates 95 Light Rail PCC Cars and 915 Diesel Buses on 171 routes traveling over 1,932 miles of route. In 1973, 91,753,819 passengers used the system.

Geissenheimer, HH ; Port Authority of Allegheny County Apr. 1974, 9 pp; Presented at the ATA Rail Transit Conference, San Francisco, Calif., 18 April 1974.; ACKNOWLEDGMENT: NTIS (PB-232775/7); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232775/7

28 084699 SELLING URBAN TRANSIT. This article provides transit managers with a conceptual format for designing useful marketing programs, focusing on short-run alternatives available in marketing vehicular modes of mass transit. A flow model for transit marketing programming is presented, and customer profiles developed. Five customer segments are discussed: manager/professional, clerical, inner city residents, elderly, and suburban housewives. Marketing strategy involves the integration of the various components of the marketing mix-product, price, promotion, and distribution to tap opportunities uncovered by segmentation analysis.

Kangun, N Staples, WA *Business Horizons* Vol. 18 No. 1, Feb. 1975, pp 57-66

28 084708 TRANSIT MARKETING: DO'S AND DON'TS FOR A SUCCESSFUL PROGRAM. Marketing in the transit industry has two main goals: 1) increased patronage, and 2) public support for transit service. Management is a most important factor to consider in a marketing program seeking to promote transit. Public information procedures such as news media and customer information services can be most effective in encouraging patronage. In regard to

promoting transit's image, and eye-catching logo and color scheme for the vehicle is an effective device. Transit stops should be more clearly marked, and the provision of benches and shelters is a convincing aspect of the claim of providing better service. Color-coded maps of the system and telephone inquiry answering services are other indications of improved service. Community participation should be encouraged to obtain public reaction and possible suggestions for further improvement. A concern often ignored is that of driver courtesy. A training program for drivers should be provided so that all the other improvements won't appear worthless because of an inconsiderate driver. One of the most innovative marketing features is the use of promotional programs to increase ridership and keep the system in the news. These include ride home free, special family fare, ride all day, low-fare special, park-n-ride, bus decoration, special passes, charter service, and bus lanes. Transit marketing techniques are being reviewed and updated constantly, and many ideas are borrowed from consumer product marketing. Only experimentation will tell what is most effective. In any case, transit systems are on the rise today as a result of both ecological and energy concerns.

Walbrecker, R (Voorhees (Alan M) and Associates, Incorporated) *Metropolitan* Vol. 71 No. 1, Jan. 1975, pp 9-12, 1 Phot.; Excerpted from a monograph in "Short-Range Transit Planning", published by Urban Mass Transit Administration.

28 095588 MARKETING CONVENTIONAL TRANSIT: INFORMATION PROVISION AND INTRODUCTORY REWARDS. This paper addresses one aspect of a complex issue: the attempt to develop viable transit systems through the generation of noncaptive patronage. Two general premises underlie the action-oriented study on which this report is based. The first is that middle-income and upper-middle-income residents do not consider public bus transportation as a reasonable mode for intracity travel and in fact do not possess sufficient information to do so. The second is that the best promotion is an actual "initiation" to the services of the bus system. Results from a study involving a small section of Cedar Rapids, Iowa, seem to substantiate the assumptions. In the study, promotional materials and free bus trips were combined with several questionnaires, both before and after a free-trip period.

Wilson, EM Hultquist, JT Peterson, SJ Kendall, KW (Iowa University, Iowa City) *Transportation Research Record* No. 519, 1974, pp 46-55, 1 Fig., 2 Tab., 9 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

28 097123 MARKETING AND THE MANAGEMENT ATTITUDE. While it is true that we must serve those who have no other way of getting around, it is also true that, in the long run, there is no such thing as a captive transit rider. The captive rider dies, moves, or scrapes together the down payment on an automobile, and we lose him the instant we are no longer competitive. In fact, we lose current riders every day. To improve transit, we must build on the base of present ridership, and that can only be done by attracting riders who are now choosing another form of transportation. Transit ridership will increase only if: people are persuaded, one by one, to try

the transit system as a solution to individual transportation problems; and people, having tried transit, find that the service is, in fact, one "worth using."

Weiglin, PC *Transit Journal* Vol. 1 No. 2, May 1975, pp 35-44

28 097467 A PROMOTIONAL STUDY FOR PUBLIC BUS TRANSPORTATION TO IMPROVE KNOWLEDGE AND RIDERSHIP BY NON-CAPTIVE, MIDDLE-INCOME HOUSEHOLDS. This study involves an investigation of the information currently available and of the means and effects of supplying transportation information to middle-income households. The main objectives of the study were: (1) to determine the level of knowledge the public presently has about the city's transit systems; (2) to determine what effect a change in the level of knowledge would have on daily ridership; (3) to induce people to ride the city bus system through different promotional materials; and (4) to measure the effectiveness of the promotional materials used in the study. Cedar Rapids, Iowa, an urban region with approximately 125,000 inhabitants, was the study area. The purpose of the study was to determine how the limited resources of smaller cities and towns might be effectively applied to transit promotion. Pre-and post-treatment of transit related knowledge, combined with monitoring of patronage to and from the sampling area, were employed. General characteristics of two respondent groups as obtained from home interviews were presented. Among the conclusions are that the majority of trips from middle-income areas are made without regard to potentialities of existing transit systems and that informational levels regarding existing systems can be improved through relatively inexpensive promotional materials. References are furnished. The appendix contains the study questionnaire.

Wilson, E Hultquist, J Peterson, S Kendall, K ; Iowa University, Iowa City, (IA-11-0002) UMTA-IA-11-002-73-1, Jan. 1973, 57pp; This report was sponsored by the Urban Mass Transportation Administration, Department of Transportation.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB237147/AS, PB-221435/LK

28 098931 THE MARKETING OF PUBLIC TRANSPORTATION METHOD AND APPLICATION. Methodology is described for determining community desires and attitudes concerning transportation mode selection and design, with an emphasis on improving and marketing public transportation modes. Data drawn from questionnaires administered to a general sample of adults and a "city leaders" sample in the Austin, Texas area are analyzed. The information obtained related to travelling frequency for work trips, the mode selected and the criteria, and ratings for a car and a bus for these trips. This data was used to identify key target switchers to mass transit as well as needed improvement in their perceptions of mass transit. Determinant attribute analysis for shopping and personal business trips, measurement of attitudes toward financing public transportation, as well as transportation's role in city planning, pollution etc., measurement of respondents' exposure to various general media, and the measurement of basic demographic information are the other tasks accomplished.

Alpert, M Davies, S ; Texas University, Austin, (RR19) DOT/TST-75/142, Jan. 1975, 60 pp, Tabs., 12 Ref., 2 App.; Contract DOT-OS-30093; ORDER FROM: NTIS, Repr. PC, Microfiche

28 126185 MARKETING AND PROMOTION OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 2. Marketing demand-responsive transportation (DRT) is discussed largely on the basis of experiences in Rochester, New York (implemented in 1973) and a new service in Denver. Marketing is viewed as the dynamics of making a beneficial service available to the communities served for value received. In Rochester, a flexible fare policy was developed to offset the rather high fares (the system was entirely locally financed). Discounted weekly passes, home-to-work, home-to-school, feed-a-bus, and dial-a-bus rates were established. Groups of 2 or more can ride for reduced rates provided everyone in the group have a common origin and destination. Other promotional fares included Rider Appreciation Week, when home-to-work passes were reduced. Another fare promotion called "Lets Split" was designed to introduce DRT to residents of a new service area by splitting the \$1 fare with them. A flexible fare policy is planned in the Denver Regional Transportation District's DRT service planned for the elderly and handicapped. The newly designed buses (of this door-to-door service) have lower floors, wheelchair lifts and tie downs, and an extending entrance step.

Reading, JE (Regional Transportation District) *Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 131-132;* Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

28 126186 MARKETING AND PROMOTION OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 3. The successful marketing program of the CNY Centro which registered substantial increases in ridership and revenues is described. Marketing functions have included the following: researching group transportation needs (which uncovered a great deal of latent demand) and elderly and handicapped transportation needs; the establishment of reasonable pricing policies; modification of bus design and equipment of minibuses for the elderly and handicapped (equipped with a wheelchair); monthly call-a-bus newsletter and literature; programming activities (guidelines are issued by a policy making advisory committee) which include the elderly and disabled, and involving social agencies; and instituting special promotions and services involving reduced rates. Projects which have improved the image of the total system and have become responsive and responsible to the social services and commercial enterprises in the region are listed and discussed. These include the a super shopper's special, a farmers market bus, a cooperative arrangement with a restaurant corporation, a park-and-ride venture operating 5 parking lots, a subscription service, major techni-

cal improvements in equipment and service, winning of a maintenance efficiency award, a driver patrolling service, and newspaper sales on buses.

Frank, WH (Central New York Regional Transportation Authority) *Transportation Research Board Special Reports Conf Paper No. 154, 1975, pp 132-136;* Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

28 127668 PERCEIVED RISK: THE KEY TO TRANSIT TRIAL. Increasing public transit ridership must involve creative marketing that will reduce the non-users perceived risk of using public transit. Perceived risks in transit riding include the possible risk of time loss, of hazards, of ego loss and of money loss. These can be off set by marketing techniques of endorsements, brand loyalty, private testing, free samples, money back guarantees and word of mouth. A blunt attack on misconceptions about public transit is not advocated but rather a less direct marketing approach is needed if the perceived risk can be reduced, more people might make the decision to try public transit.

Cutler, FG (Tram, Incorporated) *Passenger Transport* Vol. 33 No. 43, Oct. 1975, pp 6-7, 1 Phot.

28 129820 ATTRACTING LIGHT RAIL TRANSIT RIDERSHIP. This paper addresses the complex planning considerations for attracting ridership to transit systems, particularly light rail transit systems. Taking the viewpoint of a potential rider, the authors present some observations that lay the foundation for understanding ridership response. Users are not interested in technology per se but in the level of service the system provides. Level of service is a complex combination of many system attributes such as travel time, cost, comfort, and convenience. Different user groups (market segments) make different trade-offs among these attributes. They assign different relative weights or importance to each attribute. To attract maximum ridership, the system should be tailored to the particular needs and constraints of the market segments it is serving. No single system is superior for all market segments. The paper discusses the various level-of-service attributes and their relative importance to different market segments based on empirical evidence and attitude surveys. Although one cannot generalize because different market segments assign different relative weights to level-of-service attributes, the following rank ordering of attributes from most influential to least influential is most typically the case: out-of-vehicle travel time, in-vehicle travel time, cost, comfort, and safety. For work trips travel time reliability should be added as either the first or second most important attribute. The characteristic convenience is dismissed from this list as being too broad to be specifically and universally defined. The paper goes on to introduce disaggregate, behavioral, travel-demand models as an emerging analytical technique that the transit planner can use to more precisely address the

problem of the ridership response of different market segments to different level-of-service packages. Examples of these models are then used to demonstrate how different prototypical households would respond to various technologies under various representative operating policies. Some conclusions are drawn on the situations in which light rail transit would appear to be the most attractive form of public transportation from the rider's point of view, and some suggestions are made on how to improve attraction of light rail transit ridership.

Jessiman, WA (Cambridge Systematics, Incorporated) Kocur, GA *Transportation Research Board Special Reports* No. 161, 1975, pp 126-146, 5 Fig., 5 Tab., 16 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

28 131850 TRANSIT MARKETING MANAGEMENT HANDBOOK: USER INFORMATION AIDS. This handbook which is designed to aid the public transportation professional in the development or improvement of user information systems, presents the community perspective and discusses the creation of conceptual objectives. A systems approach to user information is examined, and working with elements, modules and components is described. The various communication channels (mass media, face-to-face, public speakers, on board the bus, on the street, and distribution network channels) are reviewed, and the total system is outlined. This manual was developed on the basis of evaluation of potential aids by three hundred participants in laboratory research activities. The results of these research activities are summarized.

Urban Mass Transportation Administration
Nov. 1975, 162 pp, Refs.

28 132275 THE FORMULATION OF MARKETING STRATEGY IN URBAN PUBLIC TRANSPORT. This paper prescribes the parameters of marketing strategy formulation in the context of urban public transport and emphasizes in particular the usefulness of the marketing mix and segmentation concepts. A marketing mix comprising the two primary dimensions of service attributes and promotion is advocated, the service attributes to include price, in-vehicle time, mesh density, frequency, reliability and comfort. Three primary trip purpose segments are identified viz. Journey-to-work, shopping, and leisure/social trip segments, but these may be expanded into a twenty-four cell matrix once origin-destination and car access factors are included. The sensitivity of demand in these segments is examined mostly by reference to demonstration and experimental project data drawn from the United States and the United Kingdom. For the three primary trip purpose segments demand elasticity is shown to be greater for non-price than for price features; for both price and non-price service features elasticity is shown to be a function of journey purpose being least elastic for journey-to-work trips and most elastic for social-leisure trips. The role of promotion is examined and its importance to the successful marketing of public transport clearly demonstrated. (A) /TRRL/

Moran, AJ (Department of Overseas Trade, Australia) Jones, WH (Aston-In-Birmingham University, England) *Transportation (Netherlands)* Vol. 4 No. 3, Sept. 1975, pp 209-229, 3 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-216083)

28 133697 THE MANAGEMENT OF URBAN PUBLIC TRANSPORT. A MARKETING PERSPECTIVE. This subject is dealt with in three sections: the urban environment and the competitive position of public transport is reviewed; the managerial response of urban public transport is discussed; and the progress made towards a more competitive system of urban public transport is considered. The latter section considers in particular the use of market research for service improvements and strategies for urban public transport management. /TRRL/

Hovell, PJ (Liverpool University, England) Jones, WH (Aston University, England) Moran, AJ (AUSTRALIAN GOVERNMENT); Saxon House, D.C. Heath Limited 1975, 275 pp, 3 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-216852)

28 134642 TRANSIT MARKETING MANAGEMENT HANDBOOK: MARKETING ORGANIZATION. The findings are presented of an evaluatory study of the effectiveness of alternative organizational structures and its ultimate impact on the quality of service provided. The study also included an examination of the marketing function in certain non-transit organizational structure which are potential applicable and transferable to the transit industry. Marketing as it pertains to the transit industry is discussed, and the state-of-the-art of marketing in the mass transit industry is reviewed. Guidelines and a checklist are provided for evaluating the nature of a transit system's marketing structure, capabilities, and orientation. The four basic ways (product or service; market territory; by market customers; and function) a marketing unit may be organized are detailed, and the functional descriptions of organizational units and descriptions for marketing staff positions are presented. After the evaluation process, the actual reorganization process is accomplished in 4 interrelated steps: planning; initial implementation; transition; and full operation. Three distinct levels of formal planning are employed by most large commercial firms. They are: policy planning; program planning; and implementation planning. The organizational structure, functional descriptions and position descriptions are prepared and approved during the initial implementation step. The transition step of the reorganization proceeds simultaneously on two fronts: operation of the new marketing department commences and the reorganization process continues. The full operation step of the reorganization process begins upon final approval by the marketing reorganization committee.

Urban Mass Transportation Administration
Nov. 1975, 86 pp, Figs., Refs., 2 App.

28 138813 THE EXPLOITATION COSTS OF PUBLIC TRANSPORT [De Exploitatiekosten van Het Openbaar Vervoer]. With a review to reducing overall operating costs a case is put forward for no charge to be made on public transport and for expenditure on advertising it to

be reduced. It is argued that the decrease in revenue from the use of the transport would be more than offset by the savings made in restrictions on its promotion. /TRRL/ [Dutch]

Vanlman, F *Openbaar Vervoer* Vol. 8 N No. 1, Nov. 1975, pp 299-304, 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219716), Institute for Road Safety Research

28 142359 STARTING THE TRANSIT INDUSTRY ON A SEARCH FOR AFFLUENT MARKETS. This paper describes the logic behind the design of a state-level government program to assist the transit industry in the adoption of marketing practices. Marketing is seen as essential, given the awkward standing of transit in the travel market and the tentative nature of its political support. In marketing, the diffusion of innovation model postulates that the industry will accept marketing practices in a series of stages. Each stage, while growing less experimental, will draw new adherents who need increasing experimental, will draw new adherents who need increasing earlier stage. The opportunity for government is to manage this process by creating the material and environment that stimulate the maximum participation of those in transportation who are able to move in each stage. The emerging California Department of Transportation program, tailored to the existing stage of early adopter behavior, is to highlight the concept of market segmentation and its corollary strategy of offering specialized services at different fares to distinct affluent groups identified by market research. /Author/

Reed, RR (Social Engineering Technology, Los Angeles) Ingram, KR (Division of Mass Transportation) *Transportation Research Record* No. 590, 1976, pp 9-13, 1 Fig., 8 Ref.; ORDER FROM: TRB Publications Off

28 142361 ANALYSIS OF SUBURBAN SHOPPER MARKET FOR PUBLIC TRANSIT: A CASE STUDY (ABRIDGMENT). The feasibility of applying marketing techniques to urban public transit to influence shoppers to use transit are examined. Two major aspects are reviewed: The feasibility of instituting local shopper-oriented transit service, to major shopping centers or districts, comparable to that provided for CBD's; and, special features incorporated into the service as a means of attracting shoppers to public transit. Methods of data collection and analysis, and results of the study are examined. Conclusions and recommendations highlight the feasibility of shopper service and special features of shopper oriented service.

Aerni, DR (City-County Planning Board, Great Falls, Montana) Surti, VH (Center for Urban Transportation Studies, Denver) *Transportation Research Record* No. 590, 1976, pp 17-20, 5 Ref.; ORDER FROM: TRB Publications Off

28 146653 TRANSIT MARKETING. The 7 papers in this Record include (a) report on highlights of the findings of a base-line study to assist the Orange County (California) Transit District in marketing public transportation now and in the future; (b) summary of the results of a statewide survey conducted in New York state on citizen opinions on public transportation roles, service, and financing; (c) description of the logic behind the design of a state-level government program to assist the transit industry in the

adoption of marketing practices; (d) abridgment on the demonstration of potential for improved user-oriented transit to major trip generator; (e) abridgment on analysis of suburban shopper market for public transit (a case study); (f) report on survey results of characteristics and attitudes of dial-a-bus and park-and-ride users in New York state; and (g) description of a new fare structure, FAIRTRAN, involving use of punch-coded credit cards specially issued for the UMTA project in the Lower Naugatuck Valley of Connecticut.

Blankenship, DP ; Transportation Research Board, Washington, D.C. TRB/TRR-590, 1976, 36p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259412/55T

28 149160 URBAN TRANSPORTATION AND THE PRESS: A SURVEY OF EDITORIAL OPINION. The editorial opinions expressed in the news press can provide information on which issues are currently prominent concerns of the public, and on how public opinion may be aligned on those issues. A survey of all urban transportation-related editorials appearing in a sample of 155 U.S. newspapers during a period of 19 months in 1973-74 revealed that a number of issues, related to transit financing, transit and highway investment, bicycles, and the transportation planning process were currently under debate in the urban press. This paper presents the survey's findings regarding the incidence and viewpoint of articles on these and other issues. Transit financing concerns clearly emerged as the most frequently discussed, and some agreement in editorial viewpoint was also found. The paper concludes with the authors' subjective observations on the scope and style of editorial discussion of urban transportation issues. /Author/

Olsson, ML Kemp, MA (Urban Institute) *Transportation (Netherlands)* Vol. 5 No. 4, Dec. 1976, pp 407-418, 7 Tab., 2 Ref., 1 App.

28 157259 SURVEYING THE BUS TRANSIT MARKET RESEARCH SCENE. A study is reported in which information was solicited from 300 bus operators on market investigations that they may have been or are conducting. Projects undertaken in Atlanta, Georgia and various other cities were examined, and it was found that their objectives were to determine ridership patterns and increasing transit patronage. The methods of data collection in the various studies are reviewed. The on-board survey was the most popular method. Data analysis is discussed, and the types of variables investigated by transit surveys are tabulated. It was found that the common pattern is for the researchers to present tabulations and cross-tabulations of data and to draw conclusions from these relatively simple statistical computations. The results thus run the risk of being misrepresentative of what the actual underlying relationships between variables may be.

Vanier, DJ (San Diego State University) *Transit Journal* Vol. 3 No. 2, 1977, pp 71-79, 2 Tab., Refs.

28 163378 THE BRADFORD BUS STUDY 3. THE RESULTS: BUS PROMOTION. The author refers to early stages of the Bradford bus study project which consisted of a series of research topics including, for example, system accessibility, cross-subsidisation and one-man op-

erations. Research results led to the development of models to provide a consistent basis upon which to examine proposals for development of the bus system, not only during the course of the study, but also following it. The development of the passenger demand model is described which assumed that the number of passengers depends on the quality of service as reflected in the effort, time and money cost involved in travelling. The main elements of journey cost were assumed to be ride time, walking distance, waiting time and fare; and by adopting a minute of ride time as the basic unit of journey cost it is shown that a penny fare (September 1975 prices) was the equivalent of 1.58 generalised cost minutes (gcm). Behavioural values of time assumed in the demand model were thus taken, ride time at 38.0 pence per hour, walking time at 66.5 and waiting time at 85.5. These components of cost are analyzed. Service improvements are discussed relative to passenger demand in both peak periods (0700-0900, 1600-1800 h) and off-peak periods, and the economic effects of selected hypothetical measures of improvement to both passengers and operator are tabulated. Various types of economy measures which were examined from the point of view of net savings to operators and disbenefits to passengers are described. The main results are summarised, from which it was found that the most effective way to make economies is to reduce service levels at peak periods. Pricing and subsidisation policies in relation to the Bradford pte are discussed. /TRRL/

Parker, GB *Traffic Engineering and Control Analytic* Vol. 18 No. 3, Mar. 1977, pp 113-117, 7 Fig., 4 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-226433)

28 163692 TIDEWATER TRANSPORTATION COMMISSION MARKETING. This report which covers the most important marketing elements, discusses the marketing background (definition of consumer markets, market size and demand statistics, marketing cost history and major problems), states the primary objectives, describes the overall strategy, discusses functional objectives and budgets, and makes strategic recommendations. The Commission's objectives are to sustain ridership within the choice market by 10 percent. The Commission will also seek to improve the image of public transportation, develop a more unified rate structure, increase off-peak daily and weekend ridership, and provide a greater level of public information on the system. It is noted that marketing includes product design, place of availability, price or amount of method of payment, and promotion with advertising and information services. Four major marketing strategic considerations are discussed: positioning of the product, marketing mix, target market, and buying incentive. The implementation of the recommendations in each of these areas will be executed in 2 phases. The actions to be taken in each phase are briefly outlined.

Lawler Ballard Little Advertising Mar. 1976, 63 pp, Figs., Tabs.

28 165559 ROLE FOR MARKETING IN PUBLIC TRANSPORT. Firstly, marketing is defined and a rationale for its incorporation into the operation of public transport is presented. Next, some marketing techniques are discussed and finally, two case studies are presented and an

illustration of application in Australia. /TRRL/ Sorraghan, R (Voorhees (Alan M) and Partners, Pty, Ltd, Aus.) Stark, S (Martin and Voorhees, England) ; Institution of Engineers, Australia, (0 85825 074 8) *Analytic* Mar. 1977, pp 32-38, 1 Fig., 7 Ref.; Proceeding of the Institution of Engineers, Australia Engineering Conference 1977, Cooma, Australia, March 14-18, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227861), Australian Road Research Board

28 165564 APPLICATION OF CONSUMER BEHAVIOUR THEORY TO PUBLIC TRANSPORT MARKETING. This paper begins with a brief description of a general model of consumer behaviour and a more specific model of transport mode choice. The key element in the latter is the concept of the 'modal pool'. When people plan a trip they bring into their modal choice decision only those modes which they regard as suitable and available to them for that trip. Their perception of what is suitable and available may or may not correspond with what actually exists. A mode cannot be chosen if it is not in a person's modal pool. The paper goes on to report a study conducted in Adelaide in which the processes of formation and change in modal pools were investigated. The conclusions reached are applied to market segmentation, with the market for travel to work examined in detail as an example. The application of consumer behaviour theory to practical marketing planning is illustrated by discussion of development and promotion of new services in outer suburban areas. /Author/TRRL/

Godfrey, AWW (PA Consulting Services Propriety, Ltd, Australia) Affleck, FN (Affleck (Fred) and Associates, Australia) ; Victoria Ministry of Transport, Australia *Proceeding* May 1977, 16 pp, 2 Fig., 1 Tab.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use from the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227898), Australian Road Research Board

28 168033 MARKETING: TRANSIT'S DELIVERANCE OR PASSING FAD? Marketing can ultimately strengthen understanding of local transportation needs between the citizenry, governmental officials, planners, highway engineers, and transit operators. After all, its unique tools for gathering and analyzing attitudinal data as well as behavioral information from the entire community offer a way to identify the total community's mobility needs--as the public sees them. Ultimately, then, marketing could be the catalyst pulling highway and transit-development projects together into a total transportation program that fully meets today's urban needs. But it all starts with marketing's fundamental principle: Identify and satisfy people's needs. /GMRL/

Bade, N (Greyhound Lines, Incorporated) *Highway and Urban Mass Transportation* June 1977, pp 4-7; ACKNOWLEDGMENT:

28 168061 MARKETING APPROACH USING PRODUCT DIFFUSION KNOWLEDGE TO MEASURE CONSUMER TRANSIT ATTITUDES (ABRIDGMENT). This paper describes a method that can be used to develop a measuring instrument that will determine specifically why

shoppers do not use the urban bus system, and be sufficiently sensitive to identify whether the problem is a bus system design problem or a promotion problem. Such an instrument could be used by transit marketing managers to more effectively allocate their resources towards the goal of increasing bus patronage. The measuring instrument should be capable of providing information on all items and in the trade-off except the capital investment. The theoretical construct, questionnaire design, and validation of the questionnaire are also discussed. The author concludes that the measuring instrument developed and tested can be used to: Identify why many customers have never tried to use an urban bus; Identify the specific causes for consumer rejection; Identify the specific causes for consumer discontinuance after having adopted the bus for an extended period of time; Identify why occasional users do not use the bus more frequently; Determine which barriers to adoption of the bus system can be removed by promotion alone and which require system redesign; And, assist in determining how to best allocate resources in order to increase bus patronage.

Schwartz, ML (Miami University (Ohio)) *Transportation Research Record* No. 625, 1977, pp 4-6, 1 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

28 168062 CONSUMER REACTION TO TRANSIT MARKETING IN BOULDER, COLORADO. The results of a questionnaire used to measure resistances to the adoption of urban transit during off-peak hours in Boulder, Colorado, are discussed. The findings have implications for transit marketing managers regardless of the cities in which they are located. The questionnaire was administered to middle-class women, aged 20 to 65. A systematic cluster sample was used to identify potential respondents, and a 55 percent usable response rate was obtained. The results suggest that the barriers to trial of transit are different from the causes of rejection of transit after trial, from the causes of discontinuance of transit after adoption, and from the causes of low-frequency use by occasional users. The causes of rejection after trial are also different from the causes of discontinuance after adoption of transit. Although the specific barriers to adoption will differ among cities, depending on the structure of the city and of the transit system, the Boulder results illustrate the fact that differences do occur among different user groups within at least one market segment and that different marketing strategies may be needed to obtain increased transit ridership within each group. /Author/

Schwartz, ML (Miami University (Ohio)) *Transportation Research Record* No. 625, 1977, pp 7-11, 1 Fig., 2 Tab., 1 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

28 168128 MASS TRANSIT: DEVISING A RESEARCH BASED MARKETING PLAN. This study presents a marketing planning procedural model that can be operationally used by marketing managers. The model enables the user to assess his company's performance on the various attributes of the marketing mix and to

design a marketing program that caters to the needs of his marketplace. The model is applied here specifically to mass transit and is tested empirically. Within this context, it permits transit marketing to aim at increasing the probabilities of (I) greater usage on the part of existing riders and (II) attracting prospects and converting them into actual customers. /Author/TRRL/

Bacon, W (Oxford Polytechnic, England) Wotruba, TR (San Diego University) *Transportation Research* Vol. 11 No. 4, Aug. 1977, pp 245-253, 1 Fig., 3 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 229065)

28 170278 AGGRESSIVE AND MEASURABLE MARKETING PROGRAMS FOR THE NATIONS LARGEST FERRY SYSTEM. The tools of private business—namely the tools of marketing—can and are helping the Washington State Ferry System to better control the numerous, disparate issues which arise in handling 16,000,000 rides annually. The WSFS, as with other land-based transit systems which serve a large commuter audience twice daily, suffers a significant operational disutility during off-peak periods each day. Increased tourism during the prime summer months can be actively stimulated through the mass and other media to compensate for the off-peak maintenance costs of a commute-designed system. However, during the other nine months of each year, there is the further, more requiring need to create other, discretionary ridership from among those residents of the operations area—Puget Sound—to help reduce the operational deficit of the USFS. Furthermore, those Washington State citizens who are not conveniently situated to Puget Sound, yet who contribute to the tax funds which underwrite the system deficit, must be considered as a critically important audience for the overall communications and marketing program for the WSFS; a primary message element which must be communicated to this latter audience is the ability of the marketing program to actually offset (or at least attempt to hold level) the operational subsidy. The paper will consist of two highly practical parts: (1) the 1977 marketing plan, and (2) the 1978-79 marketing plan, both with budgets, work timetables, research, rationales, etc. The first of these parts is a "pioneering" effort, while the second part will summarize the practical achievements and marketing plan adjustments which stem from marketplace reaction and result.

Darland, SA (Concept Management Incorporated); American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

28 170921 PROMOTING TRANSIT: A MARKETING HANDBOOK. This handbook presents the basic components of a marketing program and provides specific examples of promotional tools and campaign ideas. Statistical findings are presented which provide an objective basis for decisions regarding the effectiveness of marketing strategies and promotional campaigns, and facilitates the identification of service requirements and media preferences within the

transit market. The data could also be used for future research. Alternative strategies (undifferentiated, differentiated and concentrated marketing), market research and market segmentation are covered, as well as customer services/ public relations, service development, and promotional strategies. Other aspects considered here include: increasing public awareness, reinforcing positive attitudes of current riders, encouraging a modal switch away from the automobile, promoting new services, facilities and conveniences, and measures of marketing effectiveness. Demand for transit among the elderly, blue collar and white collar females, housewives, blue and white collar males are also considered.

Hatfield, NJ Bovey, SI Guseman, PK; Texas Transportation Institute, Texas State Department of Highways & Public Transp, (TTI 2-10-76-1052-3F) UMTA-TX-09-8002, No Date, 39 pp, Figs., Tabs., Photos.; This report was prepared in cooperation with the Department of Transportation, Urban Mass Transportation Administration.

28 183111 MARKETING—A TALE OF TWO CITIES. Good transit marketing means doing everything needed to get riders to use transit instead of their cars and efforts in St. Paul-Minneapolis and Pittsburgh are doing just that. /GMRL/

Morris, B (Mar/Trans) *Mass Transit* Vol. 5 Feb. 1978, pp 6-9; ACKNOWLEDGMENT:

28 183490 ESTIMATING THE POTENTIAL FOR MARKETING URBAN PUBLIC TRANSPORT. The paper describes a market research case study which assessed the potential of marketing to control the rate of growth of the Perth urban public transport operating subsidy. Emphasis is on philosophy and methodology. Subjects covered include the collection and use of attitudinal and factual information, market segmentation and possible financial implications. The identification of the work trip and shopping trip target markets is described in more detail. An assessment is made of the size and financial significance of these potential markets and one of the conclusions reached is that a public transport marketing campaign, incorporating substantial media advertising, would be an acceptable and feasible approach to increase passenger revenues. /Author/TRRL/

Bettison, GE Donovan, RJ (Donovan (RJ) & Associates Proprietary Limited) Wildermuth, HK; Director General of Transport, Western Australia, (0313-6655) 1978, pp 347-378, 3 Fig., 7 Tab., Refs.; Australian Transport Research Froum. Fourth Annual Meeting, May 24-26, 1978, Perth, Forum Papers.; ACKNOWLEDGMENT: TRRL (IRRD-234179), Australian Road Research Board

28 184131 SURVEYS AND FOLLOW-UP STUDIES OF PUBLICITY CAMPAIGNS PROMOTING TRANSPORT [Enquetes et suivi d'expériences de promotion des transports]. Numerous towns in France are in the process of reorganising their bus network and want to know the reactions of the population and to estimate expected patronage. IRT conducted some surveys and, based on their results, it was decided that surveys are a very efficient method of helping in the selection of a system. Various types of survey are discussed, and examples of surveys carried out

in Toulouse, Besancon, Sceaux and Grenoble are given. /TRRL/ [French]

TEC-Transport Environment Circulation No. 15, Mar. 1976, pp 16-19, 1 Fig., 3 Tab., 2 Phot. ATEC: Association pour le Developpement de Techniques de Transport, d'Environnement et de Circulation; ACKNOWLEDGMENT: Institute of Transport Research (IRRD-105147), Central Laboratory of Bridges & Highways, France, TRRL

28 184201 USE OF A QUANTITATIVE MARKETING MODEL TO ESTIMATE IMPACTS OF CAR-POOLING POLICIES. This paper discusses a quantitative marketing approach applied in a study designed to estimate the impacts on work travel of various proposed policies for encouraging car pooling. The decision to commute by car pool is influenced by a number of "soft" factors, such as comfort, safety, and midday mobility, that are not easily handled by traditional modal-split techniques. This study provided an opportunity to test the feasibility of adapting and applying quantitative marketing techniques to the projection of modal split under various car-pooling policies. A trade-off model, previously used primarily in traditional product market research, was adapted for modal-split estimation. The model estimates modal split on the basis of quantitative preference (utility) levels calculated for each of the competing modes, which distinguish between car pool and solo driver. The utilities are obtained from responses to paired-comparison questions on work-trip preferences asked of a representative sample of commuters. Modal split and other travel impacts were estimated for each of 14 proposed car-pooling policies. The marketing approach produced useful quantitative results. Additional efforts in the development of this approach are warranted, however, to improve the overall quality of the results and enhance the usefulness of the approach as a tool in transportation research. /Author/

Transportation Research Record No. 650, 1977, pp 54-59, 2 Fig., 3 Ref. This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

28 188494 MASS TRANSIT ISSUES FROM A MARKETING PERSPECTIVE. In the long run, the restoration of mass transit system to their former demand levels of some 25 years ago will depend on changed life styles and land-use patterns in the United States. If housing patterns, for example, become more dense, then fixed-route transit systems can become feasible. Meanwhile, much can be done in the area of aggressively marketing mass transit services to specific consumer segments by recognizing the need for strategic planning and effective controlling of marketing decisions. Strategic considerations of mass transit services requires the assessment of consumer profiles, competitive profiles, and market trends in order to conduct sensitivity and contingency analyses regarding present and future demand. These data serve to identify the service factors within the control of transit decision makers which are most critical to both users and non-users, and which market trends beyond their control need to be anticipated. Through effective controlling of mass transit decisions by

developing marketing objectives and continuously monitoring market reactions, the productivity and efficiency of these services can be increased to acceptable levels. /Author/

McDermott, DR (Syracuse University) *Transportation Journal* Vol. 18 No. 1, 1978, pp 28-35, 1 Tab., Refs.; ACKNOWLEDGMENT: Transportation Journal

28 193704 SERVICE PLANNING AND MARKETING. Two models are discussed for predicting the demand estimate for new transit services or service modification--macroscopic mathematical models based on land-use and population characteristics and marketing models based on consumer awareness of and attitude toward service. The way consumer marketing was applied to the Nashville marketing demonstration project sponsored by the Urban Mass Transportation Administration is described. Attitudinal change was more predictive of increased ridership than any other factor. A methodology and a predictive equation based on theoretical data for quantifying the relation between consumer attitudes and transportation ridership is proposed. /Author/

Morgan, AI (Grey Advertising, New York) Dial, RB, Discussor Fisher, RJ, Discussor (Urban Mass Transportation Administration) *Transportation Research Board Special Report* No. 184, 1979, pp 79-84; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

28 197431 AN INTRODUCTION TO TRANSIT MARKETING. The report presents a general overview of the marketing process as applied to transit, to the value of marketing, and to the marketing plan and its components. It also presents some cautionary remarks about transit marketing. The report contains a selected bibliography of marketing publications as well as a list of marketing assistance sources for transit operators.

Urban Mass Transportation Administration, (UMTA-UPM-40) UMTA-UPM-40-79-1, May 1975, 16 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294954/3ST

28 197455 BASIC MARKET RESEARCH TECHNIQUES FOR TRANSIT SYSTEMS. Market research provides the foundation for effective transit service delivery. Acceptance or rejection of the system and mandated service modifications are dependent on the public's evaluation. The critical importance of sound marketing efforts emphasized the need for a basic guidebook, geared specifically to the transit industry, outlining the principles and procedures of market research. The major responsibilities of a transit market research activity are to collect data, analyze the needs and preferences of the various target markets, and, subsequently, to forecast the potential demand for transit services. Other key functions of market research within the transit field include assessing needs for services by specific target population segments, evaluating the effectiveness of service improvements and alterations, determining the public's attitude toward the transit system, and measuring the effectiveness of specific advertising campaigns and themes. Three general approaches to be used in a transit marketing capacity were discussed: (1) Sample surveys, (2) Field observation, and (3) Secondary data analysis. In comparing these

three broad procedures, each has strengths and weaknesses which make them distinct methods.

Hatfield, NJ Guseman, PK ; Texas Transportation Institute, Urban Mass Transportation Administration, Texas State Department of Highways & Public Transp Res Rpt. TTI -2-10-76-1052-4, UMTA-TX-09-8003-79-2, June 1978, 93 p.; Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295079/8ST

28 198179 NATIONAL TRANSIT MARKETING CONFERENCE-PROCEEDINGS, HELD AT ARLINGTON, VIRGINIA ON JUNE 9-11, 1975. Marketing increasingly is being recognized as a key element in revitalizing urban public transportation, and is a significant transit management tool. Technical sessions centered on an in-depth examination of marketing's tools and components as they apply to transit. Case histories and workshops were among the approaches used to familiarize participants with the marketing concept. The report offers an excellent resource for those interested in transit marketing.

Urban Mass Transportation Administration, American Public Transit Association UMTA/UPM-40/79/2, Sept. 1975, 207 p.; Prepared in cooperation with American Public Transit Association, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296191/0ST

28 260171 LONG BEACH TRANSIT MARKETING PROJECT. The Long Beach Public Transportation Company received an UMTA demonstration grant to fund a program which, through innovative marketing, would attempt to focus on increased ridership among traditional "non-transit users", specifically those in moderate income categories and others not considered "transit captives." The foremost goal of the Transit Marketing Project was to familiarize the citizens with the advantages of bus travel and the services of the city-owned Long Beach Public Transportation Company. An extensive public information campaign was launched in the community. Augmenting the community outreach efforts were a newspaper-radio campaign and special on-board services such as free coffee. It was felt that these measures would do much to increase "middle class" acceptance of transit as a socially acceptable form of mobility, as well as increase awareness of the availability of public transportation among lower income persons. Statistical analysis enabled the determination of changes in 5 basic variables: ridership patterns; attitude toward riding the bus; trip frequency; source of bus information; and revenue data. Results of the evaluation are in table form. Appendices include the survey instrument and examples of newspaper advertisements. / UMTA/

Cunningham, Short, Berryman and Associates, Inc UMTA-CA-06-0018-74-1, Jan. 1974, 41 pp; Contract CA-06-0018; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233876/AS

28 262286 PROMOTION OF URBAN PUBLIC TRANSPORT. The Urban Transport Group studied methods and projects attracting

more patrons to public transportation services and then assessed the main results achieved. Emphasis was on experimental measures taken to promote public transport to show what might be done in the future, demonstrate its feasibility and thus pave the way for a new general policy for the organization of traffic. Promotional experiments, such as reserved or reversible bus lanes, demand-responsive systems, flexible route planning, and redesigning of buses, are described. Basic criteria for application include before and after studies for measurement of improvements in the quality of service, increases in patronage, changes in modal split, public reaction, and financial results. Annexes to this paper illustrate public service transport activities, including informational activities in 14 European cities and describe similar policies for cities in Japan.

European Conference of Ministers of Transport ISBN 92-821-1018-4, Dec. 1973, 86 pp; ACKNOWLEDGMENT:

28 262387 THE MARKETING APPROACH TO MODERN TRANSIT. The flexibility of bus transit is not being used to the full extent. The planning and implementing of efficient bus transit services could benefit from a marketing approach; an approach oriented to what the customer wants. This article breaks down the applicable phases of the marketing approach. Consumer research needs to be done to identify what motivates people in selecting a particular mode of transportation. That will then help in the choice scheduling, routing and subscriptions, decisions and in hardware related decisions. Promotion of the transit service by public information services like newspapers, information centers at key places would encourage use. Also simplified timetables and maps would make bus transit more marketable. Bus operations should be consumer oriented rather than product or operations oriented.

Lundberg, BD (Bartlett Tree Expert Company) *Metropolitan* Vol. 70 No. 1, Jan. 1974, 3 pp, 1 Phot.

28 262602 PUBLIC TRANSPORT-SESSION 4: MARKETING. This session on marketing contains the following papers: Unlimited Travel Tickets-A Case Study in a Smaller City, Slevin, R; The Role of Marketing in Public Transport, McIver, C; The Effects of two Differential Pricing Policies on the Demand for Transport in the Selneq Area, Tyson, WJ; Marketing in London Transport, Brown, ACN; Marketing Local Rail Services, Hollings, D. /TRRL/

Slevin, R (Cranfield Institute of Technology) McIver, C (Colin McIver Associates Ltd) Tyson, WJ (Manchester University, England) Brown, ACN (London Transport Executive) Hollings, D (A.M.V. Limited); Planning and Transport Res & Computation Co, Ltd Conf Paper 8 Fig., 12 Tab., 5 Ref.; Proceedings of the Seminar on Public Transport.; ACKNOWLEDGMENT: TRRL (IRRD 209632)

28 267007 MARKETING URBAN MASS TRANSIT-1973. In 1962, Dr. Lewis M. Schneider collected data on the marketing practices of 12 U.S. transit systems (Marketing Urban Mass Transit, Harvard University Press, Boston, 1965). This 1974 report is an update of the marketing progress that has been made in the 10 years since Schneider's study. Forty-one transit systems are

examined in this study. Eighteen of the 41 polled now have formal departments of marketing and the vast majority of marketing officers are considered members of the top management team. In terms of marketing activity, the decision to create or expand the marketing role has occurred more frequently in medium and a few small transit systems rather than in large systems. It was found that the average expenditure for marketing by transit systems was not different from that determined by Schneider. Smaller systems appear to lead the shift from a product to a market-oriented transit industry. Internal problems of marketers are delineated and include line vs. staff conflicts. According to the author, development and implementation of an integrated marketing strategy designed to attract different classes of riders has not yet been accomplished although the past 10 years have been ones of marketing awareness for some. Tables and figures support the text. Appendices are "Marketing Practices in Transit Industry" questionnaire and a worksheet of results of the survey. References are included.

Mundy, RA (Pennsylvania State University, University Park); Pennsylvania State University, University Park, (PA-11-0010) TTSC-7402, Jan. 1974, 26 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231310/AS

28 272051 MARKETING PUBLIC TRANSPORTATION. The marketing of transit is defined as the dynamics of making a beneficial service available to the public for value received. A five step procedure for marketing transit is outlined: establish a reasonable goal by identifying the segment of the public to whom you are going to market which aspect of transit; determine the peculiarities of both the market and the environment in which the two must meet; establish a plan of procedure; implement the plan; analyze the results, and based on this analysis, establish another goal and start over again. The 6 groups of people who must be addressed in marketing campaigns are: transit employees, labor union leaders and members, transit passengers, local government officials, employers and residents. Successful marketing experiences of the Rochester Regional Transit Service (RTS) are reviewed. A 30-hour effective management course is required of all management employees and of those other employees expecting promotion. Work by employees above and beyond the normal call of duty is rewarded by a certificate for community service. A handrail has been added and other modifications have been effected for the convenience of handicapped passengers. A training program for blind persons is sponsored by the transit service. Information is disseminated in booths located in shopping centers, hotels and offices. The RTS and General Motors are working together on the development and demonstration of a passenger information system which will be couple with the platooning system of moving buses rapidly through the downtown. Brochures have been put out which give information on historical sites and charter services. Other factors such as free downtown shopping ride and color-coordinated route maps with points of interest listed on them, have encouraged ridership.

Reading, JE (Regional Transit Service, Incorporated) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 95-97; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway

Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

28 272052 MARKETING PUBLIC TRANSPORTATION. The paper answers certain questions regarding the marketing of transit service (what are good marketing strategies, can these be applied and how?) as it applies to an airline company. Airline marketing has been directed to the entire market in order to sell to the greatest possible number. Every carrier talks of the same aspects of air travel. This makes it difficult for the consumer to differentiate among carriers, and customer usage becomes a function of advertising and promotion weight. In planning marketing strategy, the types of consumers are first identified. Radio is used as the primary medium for communicating with business people. Unusual and interesting aspects of cities are created into stories and used to publicize them. The radio which provides a low price medium and the required local flexibility, was also used to disseminate flight information (frequency and times) and run commercials. The newspapers have been used to disseminate flight and service information. New products that will appeal to business people and personal travelers are being continually pursued. Cost saving for off-peak travel and free flights on leisure class are some products offered by the airline. The new patterns of leisure and recreation time were studied and promotion campaigns were built around low weekend air fare and other special packages. A spring promotion campaign in newspaper and television was successful. In sales promotion, advertising was backed up with brochures giving details of special packages. Special products were developed for families. The success of these advertising campaigns may be related to the consistency in tone of voice and style in radio and television, and in the graphic and logo treatment. Research indicated that the size of advertisements was associated with multiplicity of destinations. An important element in the marketing campaign has been the commitment that was originally made to the theme of "wings of man."

Kelley, ML, Jr (Eastern Airlines Incorporated) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 97-101; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

28 272065 MARKETING PUBLIC TRANSPORTATION. A few examples are described of the many types of advertising and promotional means that have been used by the marketing department of a transit system. A color-the-bus contest sponsored by the San Diego Transit brought much free newspaper publicity. Publicity was also achieved when arrangements were made for bus drivers to drive some new buses to the city from Pontiac, Michigan. The bus system's concern for the populace was brought home by its reduction of fares for senior citizens and extension of student passes for 24 hours a day, 7 days a week and all year long. Other advertising campaigns included a reduced fare program for family tours on Sunday. The closure of a ferry service and the introduction of exact-fare also brought with it much advance publicity. The celebration

for receiving a grant for an office facility was well publicized. Catchy phraseology and good humor evident in slogans used on the sides of buses have been a great success in increasing ridership. Innovative advertising and promotion have also been used in Toronto.

Schnell, JB (American Transit Association) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 93-95; Appeared in *Issues in Public Transportation*, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

28 272066 MARKETING PUBLIC TRANSPORTATION (INTRODUCTORY REMARKS). The focus in this session has been on the current use and effectiveness of marketing and advertising programs for transit industry. The issues that were addressed are: how much money should be budgeted for marketing; can it be a positive force in attracting riders; how can information on successful new types of service be disseminated; is it important to wait for a better product before marketing; and what are good marketing strategies? In the papers presented here, the promotional devices used in San Diego, Los Angeles and Toronto are cited and the need is emphasized for understanding the dynamics of making available a beneficial service. The approach is one of determining the goal, conducting the research on methods, developing a plan for proceeding and an action program to implement it and evaluate the result. In the discussion of an airline company's approach to marketing, the need is noted for the advertising agency to be used as a full partner is the firm's activities rather than be called in for advertisement preparation. The need is also emphasized for identifying the different consumer markets and tailoring media and material to effectively influence each of them.

Morin, DA (Federal Highway Administration) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, p 93; Appeared in *Issues in Public Transportation*, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

28 300702 IOWA'S APPROACH TO TRANSIT MARKETING. ABRIDGMENT. Rural transit marketing in Iowa is described. Several approaches were used in basic market research. All of the data collected were organized, tabulated and used in each region's transit plan to provide direction on how to improve existing services and make more transportation available. The program also included communication and awareness efforts. Television and radio public service announcements were produced on energy, economy, planning and public service. A marketing tool was developed for transit systems through a project called Focus on Transit, which consists of a package to be used for presentation to fourth through sixth graders. Regional systems in Iowa find that advertising, promotion, system image, and public relations are critical to success. Pricing strategies are also receiving attention. Telephone information systems are being organized. Regional administrative agencies are designing comprehensive local marketing programs. The Iowa DOT is working with state regions to develop transit plans; is helping regional systems improve their management skills; is providing

training programs for drivers, mechanics and service persons; is making financial requirements easier by simplifying applications, developing a single reporting package, and coordinating with other state agencies.

Short, J (Iowa Department of Transportation) *Transportation Research Record* No. 696, 1978, pp 55-57; This paper appeared in *TRB Record* No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

28 301296 THE MANAGEMENT OF URBAN PUBLIC TRANSPORTATION: A MARKETING PERSPECTIVE. The authors prescribe strategies and recommend organizational structures which will enable the managements of large passenger transport undertakings to exploit their market opportunities. A diagnosis is made of metropolitan trends, travel patterns, and mode preferences, and current managerial attitudes and practices prevailing in British public transport enterprises and comparable organizations in North America and Western Europe. /Lexington Books/

Jones, W Aston University, England Moran, A ; Heath Lexington Books, (0-347-01098-9) 1975, n.p., Figs., Tabs.

28 308035 MARKETING RESEARCH PROJECT FOR THE DELAWARE AUTHORITY FOR REGIONAL TRANSIT. The DART Planning Program was designed to define and coordinate future requirements for the Delaware Authority for Regional Transit (DART). The program consists of ten separate tasks (Tasks A through J) and will result in ten separate reports. This Marketing Research Project (Task C of the DART Planning Program) purports to gather the necessary data to determine how DART can best promote their services to the public, as well as, to relate the data gathering process and the formats in which that data is available, and the general level of acceptability and implications associated with the data. The object of this data gathering phase was to obtain a one percent sample of the population within the entire New Castle County portion of the Wilmington Urbanized Area plus selected contiguous areas, and to compare their needs and opinions to those of the general public. Data was gathered through Mail-Out Surveys and On-Board Bus Surveys. Survey data was processed by the College of Urban Affairs and Public Policy/University of Delaware; this processing resulted in numerous formats of data presentation. The report concludes that results of both surveys indicate a high rate of "choice" transit riders, those who have the available income and available automobile to make the trip when the bus option was chosen. The WILMAPCO staff is of the opinion that this data collection phase was successful with very limited exceptions. /UMTA/ Wilmington Metropolitan Area Plng Coord Council, (IT-09-0066) UMTA-IT-09-0066-79-1, Nov. 1979, 90 p.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration, Region III.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB 80-112238

28 308075 CREATING AN UPWARD CYCLE IN URBAN TRANSIT RIDERSHIP: A CASE STUDY. The Champaigne-Urbana (Illinois) Mass Transit District (CUMTD) is analyzed in an

attempt to identify the initial as well as sequential factors influencing ridership increases. The CUMTD achieved the largest percentage of ridership growth (42 percent) among all transit systems in North America in 1974. The population size served by the CUMTD is approximately 100,000, making it representative of a number of communities experiencing transit growth problems. Factors which contribute to ridership increases are identified. Shift in management strategies by CUMTD led to the initial increase in ridership. The implemented strategies are summarized under the headings, "Efforts towards building a favourable public image", and "Increased quality of service". Comments are made on the take-off stage and the (3rd) upward cycle stage. The CUMTD experience lends emphasis to certain target areas on which management strategies must focus. Efforts to build a positive community image toward public transportation, coupled with increases in service quality (dependability, cleanliness, driver education) are critical factors in achieving initial ridership increases, which in turn, attract the necessary public support. Once these factors are present, they form a basis for promoting an upward cycle that has a multiplier effect for further ridership increases.

Kim, TJ (Illinois University, Urbana) Wolk, WL (Champaign Urbana Mass Transit District) *Traffic Quarterly* Vol. 33 No. 4, Oct. 1979, pp 501-510, 4 Fig., 2 Tab.

28 310046 PUBLIC TRANSPORT AWARENESS IN BASILDON. Bus services within Basildon New Town were significantly revised during May 1978. To accompany this revision, an extensive publicity campaign was mounted. Each household within the town received the following: (a) a full colour schematic town route map; (b) an area timetable; (c) details of a new travel card scheme; and (D) a railway timetable. In conjunction with this, each bus stop was allocated a name and identification code which appeared on the bus stop plate at the roadside. The code and stop name also appeared on the route map, bus timetable cards and county bus timetable. Following the introduction of the services and the distribution of the publicity material, a survey of 1016 households was carried out to assess the ease of understanding and usefulness of the publicity. Additional data was also obtained on the demographic characteristics, bus ridership and awareness of the travel card for all households interviewed. The numerical and statistical results of the survey are detailed in this report.(a) (TRRL)

Basildon Development Corporation Monograph 1979, 37 p., Figs.; ACKNOWLEDGMENT: TRRL (IRRD 244489)

28 310763 THE MARKETING OF MASS TRANSPORTATION TO DIVERSE GROUPS WITHIN A COMMUNITY. Recent "broadening" trends in marketing and an awakened stress on public transportation have combined to evoke developments in the marketing of public transportation. This article discusses these trends and presents a research method for identifying persons likely to switch to improved public transportation systems. Market segmentation strategies are developed for this group, as well as a community "leaders" segment, whose support is also required for effective transportation im-

provement. Attributes of transportation which may determine modal choice were investigated for a general adult sample, potential switchers to public transportation and community leaders. These determinant attributes for modal choices and the demographic profiles were significantly different among these different groups. This suggests that advertisements directed toward the general public (or to potential switchers) are not likely to appeal as strongly to the leaders. Two distinct operationally meaningful, market segments have been identified and they should be treated as such. (AUTHORS)

Alpert, MF Golden, LL (Texas University, Austin) *Journal of Urban Analysis* Vol. 5 No. 2, 1978, pp 285-302, 5 Tab., 10 Ref.

28 311158 IMPROVING PARKING EFFICIENCY THROUGH TSM. The hypothesis is present that certain transportation systems management techniques that rely on human behavior might be more effective if developed in a "marketing" approach using the concept of market research, product development, and promotion and advertising. The concept was illustrated through the development of a parking plan for a major destination ski area of the western United States. Market surveys consisting of an origin-destination survey, bus surveys, parking patron surveys, and "ski lift" surveys provided the market data for the program development. TSM techniques that were integrated into the program include transit service improvement, congestion pricing, preferential parking treatment to high occupancy vehicles, and promotion and advertising. A number of the strategies are currently being implemented. Analysis of the results await complete implementation, two to three years in the future.

Matel, LJ (Transportation Development Associates, Inc) *ASCE Journal of Transportation Engineering* Vol. 106 No. 1, Jan. 1980, pp 11-17, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

28 311787 THE NATIONAL BUS COMPANY 'MAP' MARKET ANALYSIS PROJECT. 3. SYSTEM DESIGN. This article, the third in a series of four, deals with the processing and use of survey data to revise existing bus operations. The authors give details of the design processes at individual study level, and indicate the requirements for certain central studies of costs, patronage and revenues. Considerations associated with the selection of new services are outlined together with the implementation of results. The effects on the analysis of bus system parameters, externalities and patronage are described. Examples are given of bus running time problems, and the distribution of passenger journeys related to car ownership, sex, time of day and purpose. Costs are analysed to suggest relationships that could be used to determine the effect of changes in route, service levels and fares. Part 1 was published in *Traffic Eng Control*, October 1979, 20 (10), 471-4, Part 2 in *Traffic Eng Control*, November 1979, 20 (11), 541-5, Part 4 in *Traffic Eng Control*, January 1980, 21 (1), 14-20.

Bursey, N McCallum, D (Colin Buchanan and Partners) MacBriar, I Mills, K (National Bus Company) *Traffic Engineering and Control* Vol. 20 No. 12, Dec. 1979, pp 575-582, 12 Fig., 1 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 245463)

28 314083 A SECTION 147 RURAL PUBLIC TRANSPORTATION DEMONSTRATION MANUAL. NUMBER 5. MARKETING RURAL PUBLIC TRANSPORTATION [Final rept.]. The report describes how to market transit services in rural and small urban areas. It covers how to set goals and objectives for a marketing program, developing and costing such a program, market research techniques, advertising and promotion approaches, and community relations. The report emphasizes the need to select the correct communications medium in developing a promotion strategy. Techniques described include system maps, discount fares and passes, development of printed schedules, how to ride brochures, and use of radio announcements.

Panbianco, TS ; Florida Department of Transportation, Department of Transportation Final Rpt. DOT-I-79-8, Aug. 1979, 125p; See also Number 4, PB80-181423. Also available in set of 5 reports PC E13, PB80-181381.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181431

28 314649 NEW YORK CITY TRANSIT MARKETING PROJECT. The Project's overall objective was to develop a marketing and communications program that would result in increased revenues for the New York City transit system. Since the system is already operating at near-capacity during rush hours, the project was oriented toward increasing off-peak ridership particularly for shopping trips. Available ridership and attitudinal data was analyzed to determine the important attitudinal barriers and incentives to increased ridership. A marketing strategy was developed which would emphasize low cost, and convenience for buses and subways, as well as speed in the case of subways and which would take advantage of the potential for retail promotion tie-ins for off-peak shopping trips, geographic concentration and the use of localized media. Several sample advertisements and radio and television scripts fulfilling the programs objective were then written and are included in this report.

Grey Advertising Incorporated Final Rpt. IT-09-0058, Jan. 1980, v.p., Tabs., Photos., Apps. Prepared for and submitted to the City of New York Department of City Planning, 2 Lafayette Street, New York, NY, 10007

28 316658 ATTITUDINAL MARKET SEGMENTATION FOR TRANSIT DESIGN, MARKETING, AND POLICY ANALYSIS. The segmentation of a population into groups that have similar perceptions of transit attributes or similar outlooks on transportation issues could be very useful in the design, marketing, and operation of transit systems and in the analysis of transit policies. This paper uses a variety of statistical methodologies in the development of such market segments. The data are from a representative sample of households in the Sacramento metropolitan region. A set of 23 general transportation attitude items and a set of 30 specific transit attributes are the basic inputs into the analysis. Responses to items in each set are factor analyzed, and the resulting factor scores are input into a hierarchical cluster-analysis program. The outputs are the market segments. The segments are then examined for differences in objective characteristics and travel behavior patterns. Groups that have similar patterns of

general or specific attitudes were found to emerge, and these groups differ in some objective characteristics and travel behavior. The market segmentation based on specific transit attributes appears to be useful for design and marketing decisions; the general market segments are primarily useful for analyzing support for transportation policies. (Author)

Tardiff, TJ (California University, Davis) *Transportation Research Record* No. 735, 1979, pp 1-7, 4 Tab., 14 Ref.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

28 316660 COMPONENTS OF A TRANSIT MARKETING PROGRAM-ABRIDGEMENT. A general framework for building a unified transit marketing program is provided. The first step in coordination of the marketing program is organization of its components: market research, market planning, service planning and development, pricing strategies, communication channels, public relations, passenger amenities, and other services. Each of these components is discussed. Each marketing element must be treated as part of a larger program instead of an independent project. The way in which the different element in a short-term price discount promotion might be coordinated is illustrated schematically and general descriptions of the different price categories are given. Investigations and preparative research provide data that guide the promotional program. Research needs in this area are noted.

Thelen, KM Liddicoat, NK McNulty, RC (Knoxville-Knox County Metropolitan Planning Comm) *Transportation Research Record* No. 735, 1979, pp 12-14, 1 Fig., 2 Ref.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

28 317281 THE MARKET POSITION OF PUBLIC TRANSPORT ON THE MOVE. The necessity for a satisfactorily functioning public transport is increasingly appreciated. It is also clear that public transport has difficulty in maintaining and improving its market position. This article attempts to gather the factors which influence this difficulty and aims to give an order for the whole area of road public transport; thereafter it is studied which factors are essential and what are the priorities for a more successful market promotion to be proposed. (TRRL) treat the smallest of areas as well as very large surfaces in a continuous manner. Daily outputs of up to 20000 M2 have been achieved, and the economy of the maintenance train has been proved during many years of use.

Bakker, P (Adviesgroep Voor Verkeer En Vervoer, Utrecht) *Magazine for Transport Science* Vol. 15 No. 4, 1979, pp417-433, 5 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 247046), Institute for Road Safety Research

28 319184 GREATER PORTLAND TRANSIT DISTRICT MARKETING STUDY. This report provides recommendations to improve the Greater Portland Transit District (GPTD) service in the Portland, Maine area according to perceived needs identified in surveys of users and non-users. The recommendations were based on survey data, an analysis of the demographics of Portland's population, and transit marketing

experience in other New England cities. Transit marketing includes: designing the product, providing (creating) the product, pricing the product, making the product reliable, and promoting the product. The first recommended step in any improvement program is to establish service and marketing goals. Then, the following more specific steps can be taken: creation of a marketing program; delegation of the implementation of the marketing program to staff; establishment of a GPTD promotion budget each year; strengthening of GPTD's information program by developing "take one" posters, installing information centers, printing more informative schedules, and promoting GPTD's telephone number; development of a "bus tour" program to educate people about transit, a sensitivity program in driver training, and a mystery ride program and rewards for drivers; to find promotional partners, in the private sector and develop joint program promotion; building on ongoing sustained public relations program by visiting editors and news directors, planning a series of news releases, and developing feature stories; and feasibility study of service improvements--increased night service, increased weekend service, additional shelters, miscellaneous route improvements, improved bus maintenance and cleaning, and a park-and-ride program.

Gordon Fay Associates, Incorporated, Fitzgerald-Toole and Company, Incorporated. Final Rpt. UMTA-ME-09-0015, Apr. 1980, 70p, Tabs., 6 App.; Prepared for Greater Portland Council of Governments, in cooperation with Greater Portland Transit District and Department of Transportation.; Contract FRC JF 0119

28 322259 LET'S ALL LEAVE OUR CARS AT HOME HALF THE TIME AND SAVE \$520. The changing attitudes to public transit are noted, and comments are made on the experience in Europe, and on marketing and community relations. Automobile sales figures indicate that the commuter is beginning alter his attitudes and travel habits. This change is being reinforced by government action. Actions taken in Europe, Asia, and Africa to discourage automobile use include the implementation of car-less downtown malls, special licenses to enter downtown, tariffs to discourage import of autos, and the introduc-

tion of car-less days. Governments in Europe provide a greater share of the costs of public transportation than in North America. The importance of marketing and consumer behavior is noted and the concept of marketing mix is discussed. The latter concept is composed of controllable (product, price and promotion) and uncontrollable (consumer attitudes, weather, economic conditions, legal and social constraints, company resources and competition) factors. Highlights of the Toronto Transit Commission's (TTC) strategy are noted. The strategy stresses the economy of taking TTC and potential savings by leaving cars at home half the time. TTC is also using strategies to promote off-peak ridership. It is noted that it is important to inform and convince citizens before projects are implemented. The TTC holds a bi-weekly meeting at which the public and politicians may voice their opinions, and conducts attitudinal research. Equipment maintenance is also considered a critical element in TTC's marketing mix.

Gallo, AJ (Toronto Transit Commission, Canada) *Transit Journal* Vol. 6 No. 2, 1980, p3;

ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

28 322651 MARKETING GUIDELINES. This article outlines and discusses the areas that ATE addresses when reviewing a transit system's marketing activities, which include: organization and management of the marketing function, the marketing plan, the marketing budget, market research, advertising and promotion, the customer service program, user information aids, internal marketing charter sales, and transit advertising. Guidelines for the marketing budget specify the following: it should encompass 1.8% to 2.2% of the total operating budget; it should allow \$800-\$1,200 per peak vehicle; for each marketing dollar spent, \$13 to \$16 of line revenue should be generated; the amount of marketing budget spent per rider, excluding transfers, should be 1.5, to 2.0; and the amount spent per person in the system's service area should be 22, to 25. The transit advertising monthly financial reports

should contain the following information: names of all clients, agency for client, dates when client contract begins and ends, amount of contract showing, rate card for the showing, amount of monthly billing by client and total, amount of monthly commission by client and total, net monthly billing by client and total, total account receivable by client and total, and date of last payment by client.

Lang, JM *Transitions* 1980, pp 33-39

28 322672 A MARKETING ANALYSIS OF THE KINGSTON TRANSIT SYSTEM. This report analyzes the appropriateness of the operating deficit of the Kingston Transit System, in addition to identifying opportunities for increasing bus ridership. Of interest to researchers concerned with the modal choice process are the results of a probability sample of metropolitan Kingston residents. Cognitive, affective and conative responses to alternative modes are analyzed within the context of Fishbein's multiattribute attitude model. Of interest to transportation marketers are the results of a longitudinal comparison of Kingston respondents before and after the implementation of a marketing strategy for the Kingston Transit System. The strategy was based upon an analysis of consumer needs and perceptions and attempted to correct perceptual problems through an extensive program of advertising and promotion. Illustrations of the advertising are included in a case study which accompanies the report. The case can be used as a vehicle for implementing a discussion on the marketing of public transportation. Of particular interest are the results which appear to indicate that marketing had little or no effect on travellers' responses to the bus system. (Author)

Arnold, SJ ; Queen's University, Canada Final Rpt. Rept 78-15, Sept. 1977, 59p, Figs., Tabs., 5 Ref., 1 App.; ORDER FROM: CIGGT

29 081298 PUBLIC TRANSIT INFORMATION SYSTEMS: WHAT LEVEL OF SOPHISTICATED? This report describes a transportation information center which is designed to perform the following functions: (1) provide simple route and schedule information, (2) provide information on special transit offerings such as commuter specials, holiday specials, etc., (3) provide a public transit sightseeing trip planning service, and (4) refer calls to other transit district services such as a community representative. The system is to be telephone based staffed by multilingual operators and would be open twenty-four hours. Three different information retrieval systems are discussed. System A is a manual, hardcopy file system containing maps and schedules color coded for rapid use. System B utilizes a microfiche video display with the route and schedule information on slides. System C is an interactive computer system with video display and light pen interaction. Operators and phone lines required as well as the annual cost of each system are analyzed. The author concludes that the computer system would be much more costly than either of the other two systems and that the volume of information would not be so large that it could not be handled just as efficiently by a trained operator.

Wells, WR ; Stanford University Final Rpt. UMTA-CA-11-0008-73-2, May 1973, 45 pp; Contract DOT-CA-11-0008; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche

29 090515 POINT-TO-POINT TRIP MANAGEMENT PROGRAM (PRELIMINARY ANALYSIS). The preliminary analysis of Point-To-Point Trip Management (PTPTM) was prepared for the Urban Mass Transit Administration in Washington, D.C. PTPTM is concerned with providing prospective riders of mass transit with the necessary detailed information for particular trips. This report contains the results of a literature search on automation in the telephone information center, and analyzes the data collected from 29 existing centers. Additionally, on-site visits were made to three operational centers, and tapes of actual telephone inquiries and responses were obtained and analyzed. The use of microfiche and computers are examined as an aid to the operators in these centers. Total automation of these centers is also discussed. Conclusions and recommendations for further study in this area, and an annotated bibliography, are also part of this report.

Kienstra, WG Minnick, DJ ; National Bureau of Standards, Urban Mass Transportation Administration, (MD-06-0013) Final Rpt. NBSIR-75-665, UMTA-MD-06-0014-75-1, Feb. 1975, 27 pp; Sponsored in part by Urban Mass Transportation Administration, Washington, D.C.; Contract DOT-AT-20018; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; COM-75-10421/6ST

29 092150 AUTOMATION OF PERIODIC REPORTS. The manual is a user's guide to the automation of the 'Summary of National Transportation Statistics.' The System is stored on the in-house PDP-10 computer to provide ready access and retrieval of the data. The information stored in the system includes cost, inventory, and performance data describing the passenger and

cargo operations of the following modes; air carrier, general aviation, automobile, bus, truck, local transit, rail, water and oil pipeline, as well as supplementary data on transportation and the economy. Included in the user's guide is: an explanation of the coding system developed for the different transportation modes; sample outputs and instruction on the use of the reports and plots developed; a listing of the information contained in the system.

Kaprelian, AS Folan, R Condell, H ; Transportation Systems Center, Office of Policy, Plans and International Affairs Report DOT-TSC-OST-75-19, June 1975, 60 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243444/7ST, DOTL NTIS

29 092627 TECHNOLOGY TRANSFER-TRANSPORTATION. The application of aerospace technology to the solution of urban public transportation problems is considered. Data are given on highway and railway systems with particular attention given to safety devices, fuel economy, and measures for profiling railways and highways. The development of streamlined truck bodies, to reduce air drag, and efficient brake systems for light trucks and other vehicles was also dealt with.

Anoyos, T Lizak, R Wilhelm, J Hirschberg, K ; Stanford Research Institute Annual Rpt NASA-CR-143040, Sept. 1974, 39 pp; Contract NASW-2455; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; N75-26931/6ST, DOTL NTIS

29 092741 THE USE OF MASS MEDIA BY LOCAL AND REGIONAL GOVERNMENTS (A BIBLIOGRAPHY WITH ABSTRACTS). The bibliography presents studies on the use of various communications media to inform the public on mass transportation, driving safety, water resources, pollution, and law enforcement. The citations have applications in both urban and regional planning. (Contains 77 abstracts)

Lehmann, EJ Adams, GH ; National Technical Information Service Bibliog. Aug. 1975, 82p; Supersedes NTIS/PS-75/083; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PS-75653/6ST

29 095645 PASSENGER INFORMATION IN URBAN RAILWAYS [Fahrgastinformation Im S-Bahnbereich]. The existence of information facilities is a decisive factor in the attraction of mass transit systems. The author, using the example of the Munich urban railway, explains how passengers obtain information about the journey, fare, departure time and platform, special services provided, etc. Train arrival and any interesting item of information are given over the public address system. Other features quite useful to passengers are: network map on the train, adequate signposting in stations, indications regarding connection possibilities and the geographical position of the station in the town, etc. [German]

Claussnitzer, OH *Die Bundesbahn* Vol. 50 No. 8, Aug. 1974, pp 501-506, 13 Fig.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: Hestra[Verlag, Holzhofallee 33, 61 Darmstadt, West Germany Repr. PC

29 098946 DISSEMINATION OF INFORMATION TO INCREASE USE OF AUSTIN MASS TRANSIT: A PRELIMINARY STUDY IN THE AREA OF URBAN TRANSPORTATION AND COMMUNICATION. This study of the relationship of information to mass transit usage (of city buses in the context of environmental crisis, air pollution and fuel shortages) includes a survey of efforts by cities to use information and education to increase mass transit usage, an observation of the traditional coverage of transportation news by mass media, and a brief account of the recent research on communications and transportation. The project tested the use of a new fleet of buses and a customer service center. The results indicate that the print media were most responsive to promotion of mass transit; that public phone calls to the transit offices increased; and that total city bus ridership continued to increase. Some recommendations are made relating to: press coverage; public education and the mass media; future communication and transport projects; and potential support by local agencies and groups.

Burd, G Ganju, V ; Texas University, Austin Oct. 1973, 82 pp, Figs., Tabs., Refs.

29 099204 TRANSIT DIRECTORY OF PRODUCTS AND SUPPLIERS. The 71 page directory lists transit products and the addresses of suppliers.

Modern Railroads Vol. 30 No. 5, May 1975, p 93 ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

29 099783 TRANSPORTATION SYSTEMS BIBLIOGRAPHY. The compiler prepared this bibliography while conducting research for a book on the subject. It is arranged topically under the five headings Models in Transportation, Network, Socio-Economic Effects of Transportation, Effects of Transportation, Effects of Transportation on Urbanization, and Transportation Planning. There is a sixth section titled "Other Bibliographies." The compiler states that the work "can be used as a helpful reference source for future research in the area and/or, equally as well, can be used in the classroom."

Bierman, DE (Louisville University) ; Council of Planning Librarians Apr. 1974, 11 pp; ACKNOWLEDGMENT: High Speed Ground Transportation Journal; ORDER FROM: Council of Planning Librarians, P.O. Box 229, Monticello, Illinois, 61856 Repr. PC

29 126316 STATE-OF-THE-ART OF MOTORIST AID SYSTEMS. This report presents the analysis of a questionnaire survey administered to the governmental agencies which have or have had motorist aid systems (MAS) and those manufacturers of recent MAS equipment. There are 13 states which have 40 operational motorist aid systems with a total of approximately 5,200 aid stations. The costs and benefits of all motorist aid systems have not been fully determined. Changes to the present MAS, as indicated by the states, to improve operations included: providing illumination at aid stations for nighttime use; establishing uniform signing; redesigning field communications facilities; and incorporating in the pre-planning stage all participating agencies.

Maintenance of motorist aid systems indicated problems caused by vandalism at the aid stations, and severance of buried cables. Trends, as indicated by both the users and suppliers of MAS, are toward voice communications and radio equipment. The concept of in-vehicle communications is anticipated to replace or complement the present motorist aid systems.

Ritch, GP ; Texas Transportation Institute Res. Rpt. TTI-2-18-72-165-17, June 1975, 44 pp; ORDER FROM: NTIS; PB-245036/9ST

29 128291 THE USE OF COMPUTERS FOR PROVIDING INFORMATION TO BUS PASSENGERS. An L.T. Working party report published in 1973 made various proposals for improving information for bus passengers. These included more detailed bus stop displays, the re-introduction of pocket timetables and, if practicable, the production of local bus maps for selected suburban centres. Providing this information on a large scale would require routine manipulation of large amounts of data and is probably beyond the scope of existing resources and is therefore a candidate for computerisation. This memorandum describes an initial investigation into what can be done and demonstrates the potential for producing bus maps and bus stop displays by computer. (A) /TRRL/

Uren, M ; London Transport Executive R&D rept. OR Memo M 304, Jan. 1975, 9 pp, 2 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 215029)

29 132943 COMPUTER GENERATED PASSENGER ROUTING INFORMATION. An innovative passenger routing information system for public transit lines has been developed. Named PARIS (Passenger Routing Information System), the system provides detailed information on optimal point-to-point itineraries in a scheduled transit system quickly enough to produce cost savings as well as passenger benefits. PARIS uses transit system data including, headway sheets (times), routings, incremental distances between stops, fare zones, landmark information and transfer data. The system features an itinerary defined by the arrival time, route numbers and direction of each bus; arrival and departure times and location of each transfer point along the route, arrival time at the destination, total elapsed time, and fare. Average processing time does not exceed five seconds for a bus system of up to 15,000 stops.

Gates, R (Systems Development Corporation) Crilley, M ; Institute of Electrical and Electronics Engineers 1975, pp 267-269, 5 Ref.; Presented at the 10th IEEE Comput. Soc. Int. Conf. (COMPCON 75), San Francisco, Calif., Feb 25-27, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: IEEE; Cat n 75CHO920-9C

29 137333 COMPUTER GRAPHICS APPLICATIONS IN TRANSPORTATION INFORMATION SYSTEMS. This paper reports on the results of the application of interactive computer graphics to those public transportation information systems which answer inquiries from the general public. Primary emphasis was placed on development of a graphics application package to control the existing Transit Information System developed by the Stanford/UMTA research group in the Stanford Industrial Engineering

Department. Other areas of investigation included operator interaction with the computer display; sorting and searching a large geographic data base; and the practical limitations of geographic displays on a CRT. The U.S. Census Bureau's DIME data base was analyzed, and an interactive graphics map editor was developed.

Wingate, FB ; Stanford University, Urban Mass Transportation Administration, (UMTA-CA-11-0008) Res. Rpt. RR-23, UMTA-CA-11-0008-75-1, Aug. 1975, 36 pp; Contract DA-11-0008; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254795/8ST, DOTL NTIS

29 139598 PUBLIC AWARENESS OF TRANSPORT AGENCIES AND INFORMATION: A SMALL-SCALE STUDY IN SUNDERLAND. This report presents and discusses the results of a small-scale survey undertaken in Sunderland to investigate the public awareness of public transport agencies and sources of public transport information, in the context of a particular situation in which this awareness might be expected to alter. Interviews were carried out in a pedestrian precinct in the town centre one week before and at varying intervals after the Tyneside Passenger Transport Executive had assumed responsibility for the operation of the Sunderland Corporation buses. The takeover had been accompanied by a publicity programme, the aim of which was to inform the public of the change of operator and to publicise the provision of a pocket timetable which was to be put on sale. The report concludes that the public's awareness of public transport agencies was not high and that the publicity programme did not have a marked effect in increasing this awareness. There was some evidence that the new timetable would be helpful to members of the public seeking public transport information. /Author/

Bruce, S Ennor, PD ; Newcastle-Upon-Tyne University, England Working Paper 17, Mar. 1976, 32 pp, 4 Fig., 30 Tab., 3 Ref., 1 App.

29 156890 SPATIAL ORIENTATION IN A SUBWAY SYSTEM. The absence of a clear structural legibility within the New York City subway system tends to make its users dependent on other informational aids about its structural design and operations-such as signs, announcements, and especially the official New York City subway map and guide. The effectiveness of the New York City subway guide was tested by assigning 20 subjects a travel route which consisted of four trip-segments of varying difficulty. Of the total 80 trip segments, only 37 were traveled via acceptable (as determined by authors) solutions, with subjects having more difficulty planning acceptable solutions for more complex trip-segments. Interviews revealed that subjects felt insecure traveling the subway because the graphics in the system did not serve to reinforce their train selections. The findings suggest that the New York City subway system needs an improved map to guide its passengers as well as better systemwide graphics. /Author/ TRRL/

Bronzaf, AL (New York City University) Dobrow, SB (Fairleigh Dickinson University) O'Hanlon, TJ (New York City University) *Environment and Behaviour* Analytic Vol. 8 No. 4, Dec. 1976, pp 575-594, 4 Fig., 3 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225334);

ORDER FROM: Sage Publications Limited, St George's House, 44 Hatton Garden, London, England

29 159321 COST/BENEFIT ANALYSIS OF AUTOMATED TRANSIT INFORMATION SYSTEMS. This report discusses the costs and benefits associated with automating the route-finding portion of a telephone transit information system. The various costs of implementing such a system are categorized and compared with those of a manual system over an appropriate time span using a present value approach. A queuing model, described in the report, is used for computing manpower requirements of the two systems, manual and automated. Outputs of the queuing model for a wide range of input parameters are tabulated in an appendix. Benefits from automating transit information route-finding are discussed, and measures of performance improvement available as output from the queuing model are provided.

Shier, DR Gilsinn, JF ; National Bureau of Standards, Urban Mass Transportation Administration, (NBS-2050402) Final Rpt. NBSIR-77-1253, June 1977, 112 pp; Sponsored in part by Urban Mass Transportation Administration, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268424/9ST

29 167290 AN AUTOMATED INFORMATION DIRECTORY SYSTEM (AIDS)-REVIEW AND SPECIFICATIONS. An Automated Information Directory System (AIDS) will provide assistance to transit systems in disseminating transit information to patrons by telephone. This document presents the performance and technical specifications for AIDS, an Urban Mass Transportation Administration-sponsored project, to be demonstrated and evaluated in service at the Washington Metropolitan Area Transit Authority (WMATA). The objective of this demonstration is to develop and evaluate a usable and effective computer aided transit information system that can be used throughout the United States, particularly where properties operate a complex transit network.

Munkasey, MP Noonchester, ML O'Sullivan, DF Mitre Corporation, Washington Metropolitan Area Transit Commission, Urban Mass Transportation Administration, (UMTA-VA-06-0038) UMTA-VA-06-0038-77-1, MTR-7571, July 1977, 166 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272253/6ST

29 170000 HIGHWAY RESEARCH IN PROGRESS (HRIP). Two developmental issues (September 1965 and April 1976) and eight annual issues (January 1968-July 1975) were published. The first seven annual issues contained HRIS summaries of on-going research projects from the U.S. and non-U.S. countries. The eighth and final issue (1975) contained only HRIS summaries of on-going research projects in the U.S. The subjects of the research projects cited by the summaries pertain to highways and highway transport; to rural and urban non-rail transit; and to urban transportation planning. Topics included in each issue range from planning, financing, design, construction, operation and maintenance, to energy, environment, safety and human factors. In addition to project summaries each issue contains an index to the summaries by retrieval

subject terms, an alphabetical index of funding and performing agencies. The summaries in each issue are arranged according to the HRIS classification scheme of 34 subject areas. The price of the 1973, 1974 and 1975 issues is \$40.00 each. Additional information about the projects cited by the summaries may be obtained by writing to the project investigator at the performing agency. Additional information about HRIS can be obtained by writing to HRIS at the address given above. HRIP information gathered subsequent to 1975 has been published by the International Road Federation in its World Survey of Current Research and Development on Roads and Road Transport, which is available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

Highway Research In Progress Yearly
ORDER FROM: TRB Publications Off

29 170001 HRIS ABSTRACTS. A PUBLICATION OF THE HIGHWAY RESEARCH INFORMATION SERVICE. HRIS Abstracts is published quarterly during the Spring, Summer, Fall and Winter of the year. Each issue contains from 800 to 1100 abstracts of journal articles, technical papers in conference proceedings and research reports; and announcements of bibliographies. The subject content of the published works cited by the abstracts pertain to highways and highway transport; to rural and urban non-rail transit; and to urban transportation planning. Topics included in each issue range from planning, financing, design, construction, operation and maintenance to energy, environment, safety, and human factors. In addition to abstracts each of the 200 to 300 page issues contain indexes to the abstracts by retrieval subject terms, personal authors and publication sources. The Winter issue contains cumulative indexes to the four issues of abstracts that comprise an annual volume. The abstracts in each issue are arranged according to the HRIS classification scheme of 34 subject areas. The annual subscription price of HRIS Abstracts for 1977 was \$40.00. Selection are made from more than 400 periodicals. Coverage of the transportation literature is world wide. All of the abstracts published in HRIS Abstracts are in the English language, however the source document for the abstract is usually written in the language of the country of origin. Each issue contains availability information for acquisition of full text documents including addresses of document delivery centers, publishers and publications. Individual issues of volume 10 (1977) could be purchased for \$12.00. Additional information about HRIS can be obtained by writing to HRIS at the address given above.

HRIS Abstracts Quarterly No Date, 1000 Ref.
ORDER FROM: TRB Publications Off

29 174102 INFORMATION ON BUS NETWORKS [L'information sur le reseau d'autobus]. A well organized promotion campaign for buses is based on comprehensive data. This leaflet reviews the various types of information made available by the RATP bus network (data can be obtained at home, at bus stops and shelters, exchange stations, and inside the vehicles). Details are given of the research undertaken to improve the efficiency of the information supplied (basic improvement and localized improvement). /TRRL/ [French]

RATP Documentation Information K Z B, E, 15 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 105098), Central Laboratory of Bridges & Highways, France, Idaho State Traffic Safety Commission

29 176541 ABSTRACTS FOR UNIVERSITY RESEARCH PROJECTS. The purpose of this document is to provide a listing of abstracts of published report for research projects supported by UMTA's University Research and Training Grant Program. The reports abstracted in this document are divided into 30 subject categories. Categories are arranged alphabetically.

Urban Mass Transportation Administration, (UPP-35) UMTA-UPP-35-78-1, Feb. 1978, 263 pp; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-278646

29 183687 LRT NEWS. LRT News is published intermittently by the Transportation Research Board for the purpose of disseminating information on new developments in light-rail transit planning, technology, and operations. The newsletter reports on new studies, current literature, and conferences. Lee H. Rogers and Glen Bottoms, editors. Stewart F. Taylor, chairman, TRB Committee on Light-Rail Transit. David Ewing and W. Campbell Graeb, TRB staff. Submit news items to LRT News, Transportation Research Board, 2101 Constitution Avenue, N.W., Washington, D.C. 20418, telephone 202-389-6548. ISSN 0162-8429.

Rogers, LH *LRT News* Oct. 1978, 4 pp, 1 Fig., 2 Phot.; ORDER FROM: TRB Publications Off

29 184193 COMMUTER INFORMATION SYSTEM: A NEW RIDER-SHARING TOOL. The Commuter Information System is a new package of computer programs, for use by local agencies or organizations, that provides ridesharing information to commuters on an individual basis. The system includes three functional components: (a) a state-of-the-art car-pool matching program; (b) a bus-pool and van-pool planning program; and (c) a transit information system that informs applicants of transit routes that can serve their commuting needs. Because the system is modular, any component can be used independently, and because it is highly user oriented, it is applicable to a wide range of local situations. All programs were written in COBOL. The development effort was based on a nation-wide survey of major ride-sharing efforts. Before the system was distributed, the city of Dallas tested and evaluated the entire package using live data. The Commuter Information System is being distributed by the Federal Highway Administration. It is intended to be a standardized data-processing tool for ride-sharing agencies as the Urban Transportation Planning System is for transportation planning agencies. It is applicable to transportation system management projects, U.S. Environmental Protection Agency regulations, and energy conservation efforts. /Author/

Glazer, L Courington, W Barnett, D Ross, S (Crain and Associates) Redmond, R Davison, P (Federal Highway Administration) *Transportation Research Record* No. 650, 1977, pp 8-14, 10 Fig.; This paper appeared in Transportation Research Record No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

29 184428 COSTS AND BENEFITS OF A BUS-SERVICE INFORMATION LEAFLET. TRRL has studied the effects of a distribution of bus service information leaflets, to determine whether expenditure on such activities can be justified by resultant increases in traffic. A well-established network of eight rural services in south and west Yorkshire was chosen for the study. Principal findings were that the extra revenue attributable directly to the information leaflet was some four times the cost of production and distribution. Patronage on the bus services in the area covered by the information leaflet was up by 13 per cent four weeks after distribution and was still detectably above the pre-distribution level 17 weeks after distribution. Additionally, extra rural interchange traffic was generated at points where the services connected. (a) /TRRL/ Ellson, PB Tebb, RGP ; Transport and Road Research Laboratory Monograph Lab Rpt. 825, 1978, 21 p., 4 Fig., 7 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234610)

29 184451 ATTRACTIVE PUBLIC TRANSPORT-PASSENGER INFORMATION [Attraktive kollektivtrafik-Trafikantinformation]. This report comprises three studies dealing with various aspects of information to passengers used by public transport companies. The first study is a survey of requirements and needs of different groups of road users (public transport passengers, car travellers, newcomers). The following opinions of the passengers were expressed: (1) the information at bus stops could be more detailed, (2) the information on regulations concerning fares and changing routes is insufficient, (3) the next stop should always be announced. The second study is an inventory of Swedish and foreign information material for passengers. The study resulted in an evaluation of various information components. The third study, practical design and testing of information material, was aimed at bus stop information. Typical examples of various information components were compiled, tested and evaluated. With the test as a basis a proposal for the design of passenger information at bus stops is presented. /TRRL/ [Swedish]

Sjoeborg, K Callheim, B ; Chalmers University of Technology, Sweden, EKNIK Monograph 1976, 61 p., 1 Fig., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234689), National Swedish Road & Traffic Research Institute

29 184604 FEASIBILITY STUDY OF AN OHIO PUBLIC TRANSPORTATION MAP/DIRECTORY. This study presents information concerning the types of transportation data that can and should be presented in a map/directory of public transportation services in Ohio. The general elements of such a publication and possible formats for the map/directory are discussed. Alternatives are evaluated on the basis of effectiveness and practicality. Overall study findings and recommendations are presented. This feasibility study is designed to provide sufficient information to determine the general make-up of a practical and useful Ohio public transportation map/directory.

Tutas, RP Meacham, DG Nortrom, DM ; Ohio Department of Transportation Final Rpt. Mar. 1978, 90 p., 7 Fig., 6 Tab.; Contract UMTA OH-09-8003; ORDER FROM: NTIS

29 189153 CURRENT PRACTICE IN THE FIELD OF INFORMATION FOR BUS NETWORKS [Pratiques actuelles des reseaux d'autobus en matiere d'information]. User information is one of the current preoccupations of those involved in the promotion of public transport. This study attempts to outline and to analyse current practice in the field of user information. It defines: the modes of diffusion adopted, the media used, the contents and the form of the proposed information. These information practices will be examined with respect to the result of surveys carried out amongst users of certain networks. A synthesis and commentary are presented, which attempt to take into account the problems arising from the presentation of different information contents as regards their use by users. /TRRL/ [French]

Saad Poulenat, C ; Institute of Transport Research Monograph Jan. 1977, 135 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 105280), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

29 196712 DESIGN SPECIFICATION FOR PUBLIC TRANSPORT INFORMATION DISPLAY UNIT. This report was prepared for the South Australian Department of Transport. The objective was to undertake a design study for public transport information display units. The proposal for this design study was based on a brief proposed by the Department of Transport. This report provides a summary of the work carried out in fulfilment of the project objectives. Two designs have been recommended, one basic design for small pole mounted units and one for large area displays. /TRRL/

South Australia Department of Transport, Australia Monograph Oct. 1978, n.p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 238014), Australian Road Research Board

29 300234 ROAD SIGNS FOR BUS AND TAXI SERVICES: FINAL REPORT. This report was prepared for the Transport Regulation Board, Victoria. It covers: a) a review and critical appraisal of the literature on methods of conveying information used in Australia and overseas for public transport users, b) the collection of information pertaining to current practices including manuals used by transport authorities in other states, c) a review of existing regulations with particular reference to the legal implications of the wording of signs, d) whether the design used on such signs could be part of an overall promotion of public transport, e) recommendations concerning the type of information to be shown on signs for bus and taxi users, locations of such signs and what combinations of such signs may be required, e) recommendations regarding the layout and construction of signs to be employed, g) recommendations concerning the provision of road marking, the numbering of stops, and the marking of "end of section". /TRRL/

GHD-Parsons Brinckerhoff Proprietary Limited Monograph Aug. 1978, n.p., Figs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 238095), Australian Road Research Board

29 301037 TRANSIT MAPPING PRACTICES IN CANADA. This illustrated report contains examples of the techniques and styles used in transit system maps for public distribution. The examples are drawn from thirty-five maps issued

by Canadian transit operations, representing thirty-two cities with populations ranging from less than fifty thousand to several million people. The report is divided into three parts, the first of which features an analysis of the characteristics of the maps surveyed, the cities and systems they represent, and a list of thirty-one recommendations for use in map preparation. The second part deals with the purpose of maps to the public. This includes discussion of geographical coverage, map scales, schematic and topographical alternatives and their uses. The third part of the report is concerned with the technicalities of map production. Some general cost characteristics are given, and distribution strategies are evaluated. /TRRL/

Blurton, M (Precursor Limited) Hill, HS ; Transport Canada Monograph 60 p., 30 Fig., 8 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 241362), Roads and Transportation Association of Canada

29 302121 SUPPORTING INFORMATION AID SYSTEMS. Management support is essential for a productive consumer-oriented transit system, and it should be possible to translate this orientation into a viable consumer information system. A uniform consumer information system requires a great deal of marshalling of support and cooperation. The number of variables within a transit system's organization is listed, and it is noted that marketing's placement within the organization indicates the degree of the system's commitment to consumers. Actual practice at the Twin Cities Metropolitan Transit Commission is described. The first step in the development of a consumer information program is comprehensive planning involving the integrating of timetables, maps, bus and street signs, etc, and the setting of criteria for specific information elements. Prototypes for consumer testing should then be developed. Next, the process of ongoing production and distribution must be initiated. Coordination is most critical at this stage. A process for periodic updating, production and distribution of information must also be developed. Emphasis must be placed on accuracy. Marketing should play a prime role in distributing information aids via a carefully managed network agency and nonagency outlets. The area of street signs is of great importance and requires coordination. The effectiveness of the information program must be evaluated through ongoing marketing research.

Kouneski, AM (Metropolitan Transit Commission, St Paul, Minn) *Transit Journal* Vol. 5 No. 3, 1979, pp 51-56

29 305095 THE USE OF MASS MEDIA BY LOCAL GOVERNMENTS (A BIBLIOGRAPHY WITH ABSTRACTS). The bibliography presents studies on the use of various communications media to inform the public on issues, such as mass transportation, driving safety, water resources, health, pollution, and law enforcement. These citations have applications in both urban and regional planning.

Kenton, E ; National Technical Information Service Oct. 1979, 151 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/1045/8ST

29 307537 OFF-PEAK AD IMPACT STUDY. The Methodology, analytical framework, study

findings and media strategy implications of a study to assess the impact of the Queen City Metro's (QCM) "Off-peak" advertising campaign are presented. Data tables and survey questionnaire are also included. Telephone interviews (300) were conducted among 3 groups of off-peak respondents age 18 and over: students; odd-hour workers; and housepersons. A 2-stage random digit dialing sampling procedure was employed. Questions concerning the carrying medium, message recall, perceived communication intent, credibility for medium were asked, as well as OCM usage likelihood and the importance of metro benefits. The study found that future research should involve a 3-stage process consisting of copy development evaluation, pre-, and post-campaign measurements. The study indicated that within a constant level of gross rating points (GRP), greater communication impact may be achieved by varying reach and frequency strategies. It was concluded that frequency needs to be strengthened at the expense of reach within the same overall GRP Levels.

Action Data, Incorporated UMTA-IT-09-0063, Apr. 1979, 43 p., 22 Tab.; Prepared for Southwest Ohio Regional Transit Authority, Queen City Metro Operating Division.

29 310687 PASSENGER INFORMATION SYSTEM FOR THE URBAN RAPID TRANSIT SYSTEM IN STUTTGART, WEST GERMANY [Fahrgastinformationssystem fuer die S-Bahn Stuttgart]. A passenger information system is described which comprises in its first stage 14 stations with 61 mobile train-service indicators and eight special indicators. The installation is fully automatic. By means of route tracking, the actual situations are covered. The whole system is divided into five self-sufficient working areas, the respective core of which is formed by the area control unit. With the aid of the information system, fully automatic and comprehensive information for passengers is guaranteed at any time depending on the actual operational situation. [German]

Schwab, H (AEG-Telefunken, West Germany) Brockmann, J *Elektrische Bahnen* Vol. 77 No. 6, June 1979, pp 183-186; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

29 311317 TRANSIT USER INFORMATION AIDS: AN EVALUATION OF CONSUMER ATTITUDES. The overall purpose of the Transit User Information Project has been to identify the necessary components (both currently used and potential) of an effective transit information program which will provide the appropriate types and levels of information for persons to successfully use a transit system. A major output of this project is a handbook of transit user information aids which will provide transit operators with guidelines for developing an effective set of information aids. This handbook is based on an extensive inventory of currently used user information aids, interviews with a selected sample of transit operators, development of new potential information aids (form, design, etc.), and evaluation of existing and proposed transit user information aids through a series of laboratory group activity sessions. The laboratory evaluation was a means of objectively studying the impacts of the alternative techniques for providing transit information. As stated in the proposal for this project, the evaluation goals are "to determine what user

information aids and dissemination techniques work best to satisfy existing and potential rider needs, physical and psychological, in specific test situations considering multiple influence forces". In short, the laboratory sessions have been a primary mechanism for testing how accurately information aids and techniques reflect the perceived information needs of transit users. More specific objectives of the laboratory evaluations have been to test: 1. degrees of information levels required by specific information aid types to supply necessary information; 2. the level of information and design content at which complexity and mass becomes unclear, confusing, and counterproductive to purpose; 3. importance of specific information aids and dissemination techniques and their ability to satisfy rider needs and stimulate ridership; 4. user information's ability to satisfy certain psychological, as well as physical, components of the urban transportation trip, specifically: treatment, predictability, individualization, security, and accessibility; and 5. the effect that brief exposure to information aids may have on attitudes and/or propensity to ride transit. (Author)

Battelle Memorial Institute Feb. 1976, 90 p., 25 Tab., 1 App.; Prepared for the Department of Transportation, Urban Mass Transportation Administration, Office of Transit Management.

29 311803 ROAD PASSENGER TRANSPORT AND ROAD GOODS TRANSPORT. The book contains two reviews concerned with road transport and gives references to sources of statistical material, where data may be obtained and what are the limitations to their use. Each review presents a brief summary of the activity and detailed information on statistical sources. A subject index to each review lists textual references. The first review "Road Passenger Transport" (Munby,D) covers all inland transport on land in Great Britain except railways. The review is in four sections: the organization of passenger transport; sources of road passenger statistics; information on pedestrians, bicycles, cars, motorcycles, taxis, public transport and regional statistics; and, comments on the adequacy of the statistics. The second review "Road goods Transport" (Watson,A) reviews sources of information on goods transport covering carriage for reward and carriage 'on own account'. The data review covers characteristics and organization; licensing and regulations; trade associations; importance relative to other transport; and, statistical reporting. (TRRL)

Maunder, WF, Editor Munby, DL Watson, AH Pergamon Press, Incorporated Monograph 1978, 127 p., Figs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 245401)

29 312086 TRANSPORT STATISTICS GREAT BRITAIN 1968-1978. Data are presented in tabular form regarding the various modes of inland surface transport in Great Britain. The arrangement of the tables is as follows: part 1-general (expenditure, travel, long distance travel, freight transport); part 2-road expenditure and network; part 3- road traffic; part 4-motor vehicles: stock and new registrations; part 5-car ownership; part 6 ; public road passenger transport; part 7-road goods transport; part 8- driving licences and tests; part 9-vehicle tests; part 10 -railways; part 11-accidents; part

12-inland waterways; part 13-sea transport; part 14-air transport; part 15- pipelines: oil and petroleum; part 16-international; part 17-miscellaneous (energy, air pollution emissions, employment etc). Notes and definitions giving further details of individual tables are included.

Her Majesty's Stationery Office Monograph 1979, 211 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 246164); ORDER FROM: Pen-dragon House, Incorporated, P.O. Box 255, Old Mystic, Connecticut, 06372

29 312091 TRANSPORT STATISTICS GREAT BRITAIN 1967-1977. Data are presented in tabular form regarding the various modes of inland surface transport in Great Britain. The tables are arranged as follows: part 1-general (expenditure, travel, long distance travel, freight transport). Part 2-road expenditure and network. Part 3 -road traffic. Part 4-motor vehicles: stock and new registrations. Part 5-car ownership. Part 6-public road passenger transport. Part 7-road goods transport. Part 8-driving licences and tests. Part 9-vehicle tests. Part 10-railways. Part 11-accidents. Part 12- inland waterways. Part 13-sea transport. Part 14-air transport. Part 15-pipelines: oil and petroleum. Part 16 -international. Part 17-miscellaneous (energy, pollution, employment etc). Notes and definitions giving further details of individual tables are included.

Her Majesty's Stationery Office Monograph 1979, 208 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 245612); ORDER FROM: Pen-dragon House, Incorporated, P.O. Box 255, Old Mystic, Connecticut, 06372

29 312269 MICHIGAN SMALL BUS PROGRAM MANAGEMENT HANDBOOK. The State of Michigan has successfully provided small bus public transportation in small and medium-sized cities as well as in entire counties. The program has three components: interim elderly and handicapped program, transportation services consolidation program, and the general public transportation program including the small bus county incentive program and the urban and rural small bus program. This handbook which is intended to be a practical guide for system managers focuses on personnel relations, operations, management, marketing and funding. Procedures for getting through the State's grant and contract process are also included. The various chapters are as follow: Project Management (small bus start-up process, transition process: demonstration to ongoing); Operations (administrative and operating alternatives, operating procedures and forms); Contracts (state-local first party contracts, operating contracts (third party contract), stte contract development procedure); financial management (accounting guidelines, charts of accounts, accounting process); Purchasing Equipment (selecting equipment, bus specifications, lift specifications, transit radio systems); Equipment Management (preventive maintenance, state accident reporting requirements); Marketing (goals and objectives, advertising, public relations, system information program, community and employee relations, evaluation, start-up activities); Personnel Management (job descriptions, driver training/retraining, personnel selection, policies and procedures); and Monitoring & Evaluation (standards of performance, surveys, use of results).

Michigan Department of Transportation Sept. 1979, 193 p., Photos.; Contract DOT-1-80-2

29 314025 MOVING PEOPLE: THE CASE FOR PUBLIC TRANSPORTATION. The report is a Handbook on public transportation for the general public. The issues that it covers include: transportation planning; transportation costs and financing; user benefits of public transportation; social benefits of public transportation; public perceptions of public transportation; and marketing of public transportation. The purpose of this Handbook is to explain how public transportation is planned, how the individual citizen can make his views heard, why subsidies are necessary, and finally, what is being done to improve public transportation. These issues are explored in a question and answer format and several case studies are included to illustrate complex issues and explore topics in greater detail.

McKnight, C Johnson, C ; Illinois University, Chicago, Urban Mass Transportation Administration, (UMTA-IL-11-0025) Final Rpt. UMTA-IL-11-0025-80-1, Jan. 1980, 60p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-182686

29 316381 USERS OF TRANSPORTATION RESEARCH INFORMATION NOW HAVE ON-LINE ACCESS TO THE TRIS DATA BASE. The TRB information service files are now part of the Transportation Research Information (TRIS) on-line data base at Lockheed Systems in California. Individual records in the TRIS data base are either (a) abstracts of reports, articles and other documents that include descriptions of statistical data holdings and computer programs, or (b) resumes of on-going or recently completed research projects that are relevant to the planning, development, operation and maintenance of transport systems and their components. Under an agreement with the U.S. Department of Transportation, the TRB supplies records that have been selected and stored by five of its information services (relating to Highway, Maritime, Railroad, Air, and Urban Mass Transportation systems) on behalf of modal sectors of the transportation research community. The TRB maintains a number of exchange agreements between the information services and other transportation related information services in the U.S. and abroad. The preparation of records for TRIS supply includes checking for duplicates as well as the addition of codes and reformatting of records into a common set of data elements. Approximately 133,000 records were stored in the five TRIS Subfiles in June 1980, and it is estimated that an average of about 2000 records permonth will be included in monthly updates. The Subject coverage, data elements for TRIS records, search and output procedures with illustrative examples are briefly outlined in the article.

Transportation Research News No. 88, 1980, pp 10-18, 6 Fig., 4 Tab. ORDER FROM: TRB Publications Off

29 316663 STUDY OF COMMUTER CHOICE OF INFORMATION SOURCE TO IMPROVE TRANSIT INFORMATION SYSTEMS-ABRIDGEMENT. In an effort to gain a better understanding of information-source choice behavior and to suggest a way it could be

applied to the improvement of transit information system design, a study was made which was based on the results of a demonstration project conducted to develop more informative bus stop signs. The project consisted of three parts: development, field demonstration, and evaluation of experimental bus stop signs. A before-demonstration survey of bus riders on three routes was designed to determine the commuter information-retrieval pattern for the existing transit information system. Based on survey results, an experimental bus stop sign was developed. After the sign was installed, a second survey of bus users was performed to obtain feedback on specific evaluation dimensions. The results of the survey are discussed. The information source choice model developed from the results is presented. In the model, relationships between the trip and personal characteristics and choice of information source were established. The model expands on these relationships to develop a dynamic framework, which depicts the normative behavior of a transit consumer. The implications for transit system management are examined.

Robinson, RK (Marquette University) Bakr, MM (Wisconsin University, Milwaukee) Thomson, TL (Wisconsin Department of Public Works) *Transportation Research Record* No. 735, 1979, pp 20-23, 1 Fig., 1 Tab., 8 Ref.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

29 316664 COMMUNICATION CONSIDERATIONS FOR TRANSIT ROUTE AND SCHEDULE BROCHURES. Route and schedule brochures provide information on the specific service features of fixed-route transit. Clear, concise, and easy to understand information on these pamphlets is important to both users and prospective users of transit services. To date, insufficient attention has been directed toward development of effective communication techniques on these pamphlets. Many are difficult to interpret, incomplete, or poorly formatted, which makes them of marginal value to prospective users. The assumption that the reader is familiar with transit service characteristics, and thus able to translate any printed information, can make the brochures difficult to comprehend for automobile-oriented individuals. Nonusers cannot be expected to use the transit mode if they are uncertain about the characteristics of a specific service. The paper outlines methods by which communication techniques can be improved for route and schedule brochures. The design process should be governed by rational and systematic design principles, which are proposed and explained. The principles have been applied to the redesign of Knoxville Transit's route and schedule brochures. Each element on the brochure cover, timetable, and route map is briefly discussed in terms of desirable design practices and the rationale for each. (Author)

Thelen, KM (Knoxville-Knox County Metropolitan Planning Commis) *Transportation Research Record* No. 735, 1979, pp 23-27, 6 Fig., 3 Ref.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

29 317269 INFORMATION FOR USERS OF BUS NETWORKS. INFORMATION PROCESS AND THE NEEDS OF THE USER [Information des usagers des reseaux d'autobus. Processus d'information et besoins de l'usager]. A qualitative enquiry has been carried out amongst the population (users and non-users of public transport) of le mans and nice to determine the level of knowledge regarding the availability of transport on the part of the residents, to analyse the manner in which this knowledge is developed and to identify the role of different means of information in this regard. Attempts are made to identify the principal difficulties in comprehension which are posed by written information to the users. Results of this enquiry, carried out amongst 130 people in october/november 1977, show problems as regards current practice in the field of information regarding bus networks; these, in effect, are centred almost exclusively on providing information on the network whilst the population requires information regarding the city and the public facilities. The survey also provides evidence regarding the considerable difficulties in comprehension of the written information. (TRRL) [French]

Poulenat-aballea, C Tarius, A ; Institute of Transport Research Monograph Res Rpt 33 (Tome 1), June 1978, 95 p, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 105663), Institute of Transport Research

29 319244 ECMT AND URBAN TRANSPORT. A BIBLIOGRAPHY [La CEMT et les transports urbains]. This bibliography was compiled from information specially obtained from the data base developed by ICTED (international cooperation in the field of transport economics documentation). The references are set out in 3 sections: material from ECMT's annual reports, from symposium reports and from round tables. A subject index in French and in English is appended. (TRRL) [French/English]

OECD European Conference of Ministers of Transport Monograph 1979, 82p, Refs.; ACKNOWLEDGMENT: TRRL (IRRD 247302)

29 319569 TICKET TO RIDE. A GUIDE TO PUBLIC TRANSPORT IN SCOTLAND STATISTICS AND TRANSPORT STATISTICS. 1977 AND 1978. The report presents a guide to public transport in Scotland where such services are more essential than is generally appreciated. Only 46% of Scottish families have a car, often only used by one member of the family. The planning emphasis should be on improving and extending forms of public transport not superseding them with expensive facilities needed for individual private transport. The aim of the booklet is to improve public awareness at a time of change in transport policy. With the focus on passenger transport, the intention is to clarify the legal and financial position, to outline government policy and to detail responsibilities of the authorities involved. (TRRL)

Scottish Association for Public Transport Monograph Sept. 1979, 52p; ACKNOWLEDGMENT: TRRL (IRRD 247285), TRRL

29 319691 URBAN TRANSPORT IN WESTERN EUROPE. This bibliography is selective and includes material on European cities excluding those in Britain or communist bloc countries. Many of the original items are in foreign lan-

guages but English abstracts are usually provided. The bibliography is arranged by country, with a general European section first. (TRRL)

Hamlyn, P ; Greater London Council, (0 71681063 8) Bibliography 105, Dec. 1978, 35p, Refs.; ACKNOWLEDGMENT: TRRL (IRRD 248122); ORDER FROM: Greater London Council, GLC Bookshop, County Hall, London SE1 7PB, England

29 322284 MOVING PEOPLE--THE CASE FOR PUBLIC TRANSPORTATION. After several decades of neglect, the United States is showing a renewed interest in public transportation. In 1964, congress passed the Urban Mass Transportation Act, which sets out national public transportation policy and provides a means for the Federal government to assist local communities in planning and financing public transportation. While support for public transportation is growing, many people question the large subsidies from Federal and local taxes that have been necessary to maintain and expand transportation systems. This report is a Handbook on public transportation for the general public. The issues that it covers include: transportation planning; transportation costs and financing; user benefits of public transportation; social benefits of public transportation; public perceptions of public transportation; and marketing of public transportation. The purpose of this Handbook is to explain how public transportation is planned, how the individual citizen can make his views heard, why subsidies are necessary, and finally, what is being done to improve public transportation. These issues are explored in a question and answer format and several case studies are included to illustrate complex issues and explore topics in greater detail. (UMTA)

McKnight, C Johnson, C ; Illinois University, Chicago, Urban Mass Transportation Administration, (IL-11-0025) Final Rpt. UMTA-IL-11-0025-80-1, Jan. 1980, 60p; ORDER FROM: NTIS; PB80-182686

29 322289 INNOVATION IN PUBLIC TRANSPORTATION. A DIRECTORY OF RESEARCH, DEVELOPMENT AND DEMONSTRATION PROJECTS. This eighth annual directory contains descriptions of current research development and demonstration (RD&D) projects sponsored and funded by the Urban Mass Transportation. The intent herein is to make public information regarding UMTA's RD&D activities. The directory focuses on activity that took place in fiscal year 1979. All projects described herein are funded under Sections 6, 9, and 11 of the Urban Mass Transportation Act of 1964, as amended. Section 6 programs relate mainly to technology development and deployment, service and methods demonstrations, transportation (Technical Studies) and special planning studies; and Section 11 programs relate mainly to policy development and research (including University Research and Training Grant Program). The appendixes provide information about federal research and development in urban mass transportation grants and contracts. This document also provides an index of agencies/contractors, a project index, and a subject index. (UMTA)

ORDER FROM: NTIS; PB80-204142

Transportation Systems Center, United States
Customs Service, (MA-06-0086) UMTA-
MA-06-0086-80-2, 1979, 245p;

31 044515 HOW TO SAVE URBAN AMERICA. This book, prepared by the Regional Plan Association, covers several of the critical issues facing the New York City metropolitan area. The issues covered are housing, transportation, environment, poverty, and cities and suburbs. To the extent that some of the proposed solutions are followed, they have implications for rapid transit, for commuter services, for the movement of building materials, and for the movement of fuels for utilities. To the extent that the proposed solutions may be adopted by other metropolitan areas, they may have implications for transportation far beyond New York.

Regional Planning Association Incorporated
1973, 230 pp; ORDER FROM: New American Library, P.O. Box 999, Bergenfield, New Jersey, 07621 Repr PC

31 046015 METROPOLITAN ATLANTA RAPID TRANSIT SYSTEM. The Metropolitan Atlanta Rapid Transit Authority (MARTA) has filed an application for Federal capital grant assistance to construct a rapid transit system (50-mile rapid rail) which will include 9 miles of subway, 16 miles of elevated rail and 25 miles of surface rail. In addition, there will be 14 miles of new exclusive busway included in the system. The project affects the total 50-mile system of the City of Atlanta, from the CBD to the Fulton and DeKalb County limits. The permanent adverse environmental impacts for this project include community disruption, family and business displacement and relocation, inappropriate land use changes traffic intrusions, severance of neighborhoods, noise and visual intrusions. Also, there will be acquisition of comparatively small amounts of parks and ecological areas. The historical markers will be relocated.

Urban Mass Transportation Administration
Final Rpt ELR-0799, May 1973, 654 pp;
Environmental Impact Statement.; ACKNOWLEDGMENT: NTIS (EIS-GA-73-0799-F); ORDER FROM: NTIS, Repr PC, Microfiche; EIS-GA-73-0799-F, DOTL NTIS

31 047475 URBAN RAILWAY MAPS. 'Integration' of urban public passenger transport is all the rage. With few exceptions, the urban (and usually underground) lines in big cities and the suburban routes of the main-line railways are under separate managements. Many municipal and other urban transport authorities publish maps showing bus, tram, pre-metro and their own urban railway railway networks. Despite the need for co-operation in all modes of transport and indeed active co-operation in fare fixing and through-ticket issue, one seldom sees maps that show all transport routes. In many cases, more particularly in such vast networks as those of London, New York and Tokyo, it is hard enough to show all rail routes, let alone buses or trams. Few system maps issued by urban railway operators show in any detail the suburban routes and stations of the main-line railways. The best exception to date is a new London Transport map in poster and pocket and pocket folder form that shows all LT and British Rail suburban lines and all the more than 600 passenger stations in an area extending 25 miles from the centre.

Modern Railways Vol. 30 No. 299, Aug. 1973, 1 pp; ACKNOWLEDGMENT: Modern Railways; ORDER FROM: Allen (Ian) Limited, Terminal House, Shepperton TW17 8AS, England Repr PC

31 047756 PUBLIC TRANSPORT INNOVATIONS IN PRINCIPAL EUROPEAN CITIES. The report describes several innovations in European public transport which have been adopted as solutions to urban transportation problems. These recent developments in European transport are of particular relevance to the United States as they illustrate the range of viable alternatives that have been considered and the results achieved. Discussion of the results of planning and technology for several European cities includes both incremental and institutional improvements as well as new system and network innovations. The cities selected for evaluation are Hamburg, Gothenburg, London, Paris, and Run-corn, as each furnished a significant illustration of public transport responses to major urban problems.

Hoel, LA ; Carnegie-Mellon University, (UM-TA-PA-11-0007) Final Rpt CMUTRI-TP-73-11, May 1973, 54 pp; ACKNOWLEDGMENT: NTIS (PB-221419/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-221419/5, DOTL NTIS

31 047980 HOWARD STREET RAPID TRANSIT STATION PASSENGER SURVEY. During the summer of 1972, the New Trier High School of Northfield, Illinois conducted their sixth annual seminar in community affairs. The seminar began on June 19th and ended on August 4, 1972. Participants included junior and senior high school students from all walks of life and from numerous geographic sections of the Chicago Metropolitan Area. During the seminar among their activities was a survey of Rapid Transit passengers who boarded the Chicago Transit Authority El lines at the Howard Street Northline Station. The survey was conducted entirely by the seminar students under the leadership and guidance of their director Mr. Jamie McClendon.

Hayhurst, WC *CATS Research News* Vol. 15 No. 1, Feb. 1973, pp 11-17; ORDER FROM: Chicago Area Transportation Study, 230 North Michigan Avenue, Chicago, Illinois, 60601 Repr PC

31 048181 THE LINDENWOLD LINE. A CASE STUDY OF THE NEWEST RAIL RAPID TRANSIT. A new rail rapid transit line has been brought into operation as the foundation of the Southern New Jersey Rapid Transit System. This System, operated by the Port Authority Transit Corporation (PATCO), a subsidiary of the Delaware River Port Authority, presently consists of a rail transit line between Philadelphia and the suburban community of Lindenwold, New Jersey. Popularly known as the Lindenwold Line, it has been operating for over two years and is promoted as the predecessor of "a new era of mass transportation." Indeed, the transit line already includes many innovative features that are being planned and developed for new rail rapid transit systems in other metropolitan areas. As a new system, the Lindenwold Line also presents an opportunity to study the impact of rail rapid transit in an urban setting to get an idea of what similar systems might be able to do for other cities. This case study examines the development of the Lindenwold Line, its financing, and its effectiveness in improving transportation in the Philadelphia urban area.

American Automobile Association 32 pp, 3 Fig, 7 Tab, 7 App; ORDER FROM: American Automobile Association, 1712 G Street, NW, Washing-

ton, D.C., 20006 Repr PC

31 048185 PREDICTING PARK-AND-RIDE PARKING DEMAND. This study is concerned with the determination of design criteria for prediction of parking demand at park-and-ride facilities in medium-to-large cities in the United States. Ninety-three change-of-mode parking facilities in 10 cities were used in the study. Data were collected through a mail survey. The report includes an analysis of important physical, operational, and locational characteristics of change-of-mode parking facilities experienced by 26 agencies operating 73 rail and 20 bus facilities. The change-of-mode demand is estimated through a prediction equation developed by linear regression analysis. The prediction model was tested for its applicability by using separately supplied data from a committee of the institute of Traffic Engineers. Input to the model consists mainly of characteristics of the city, the transit system, and the location of the parking facility.

Abdus-Samad, UR Grecco, WL Alter, CH
Highway Research Record No. 449, 1973, pp 45-61, 8 Fig, 7 Tab; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

31 048189 THE POTENTIAL OF A RAIL RAPID TRANSIT SYSTEM. The potential of rapid transit lies in its ability to move large numbers of people comparatively quickly along a given corridor with minimum disturbance to the surrounding environment. The term mass transit is more correct because such a system is not economically justifiable unless it is moving a large mass of people. The cost of providing the basic structure is invariably high and so is the cost of running the minimum acceptable level of service. To cover these costs alone a large number of passengers must be carried, but the extra cost to cater for more passengers is quite small. In accountancy terms, the break-even point is high but once it is reached the marginal cost incurred by extra services is small and hence profitability increases rapidly above the break-even point.

Scott, M *Modern Railways* Vol. 30 No. 298, July 1973, pp 276-280, 3 Fig; ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England Repr PC

31 050459 BOMBAY PREPARES FOR COMMUTER GROWTH. To handle increases in commuter traffic resulting from population growth as well as alleviating chronic overcrowding on existing lines, the Bombay Metropolitan Transport project provides north-south rapid transit routes closely interwoven with the present suburban lines.

Railway Gazette International Vol. 129 No. 10, Oct. 1973, 3 pp, 2 Phot. ORDER FROM: IPC Transport Press, Repr PC

31 050551 STUDIES OF PEDESTRIAN MOVEMENT IN RAILWAY STATIONS WITH DENSE SUBURBAN TRAFFIC. Observations were made of pedestrian streams in one-way traffic in stations of the Deutsche Bundesbahn and of the Berlin (Underground) Transport Services. The findings are outlined in the form of functions and survey diagrams. The following are considered worthy of special mention: walking speed and walking time on plat-

forms of detraining passengers; platform clearance times for various types of platform exits, contingent on the dispersing crowd; simulation of overlapping passenger streams detraining from 2 trains at the same platform; capacity of platform exits and surveys of congestion in front of stairways; surveys of density speed during movement on stationary stairways; and movement phenomena in subways and at barriers. Results of these surveys serve as a practical aid for the planning engineer in designing station facilities with dense passenger traffic. [German]

Westphal, J ; Technische Universitaet, Hannover
ORDER FROM: Westphal (Joachim),
Schmiedeburger Strasse 13, D-3003 Rpmmerberg
3, West Germany Repr PC

31 050629 PRESENT SITUATION AND LIKELY DEVELOPMENT OF SNCF SUB-URBAN NETWORK [SITUATION ACTUELLE ET PERSPECTIVES D'AVENIR DU RESEAU DE LA BANLIEUE S.N.C.F.]. The author is an Ingenieur Principal Hors Classe at the SNCF, and Head of the Paris Region Transport Division. In this article, he describes the present configuration of the Suburban network following the latest modifications, and gives details of the traffic volume. He then deals with the improvements planned and the most recent developments in the spheres of infrastructure and rolling stock in particular, followed by future projects concerning transport quality and capacity, extensions to the network (transversal and new lines), and interconnections (simultaneous use in Paris of standard gauge tunnels by the SNCF and the RATP); finally, he provides some information on studies concerning by-pass and suburb-to-suburb lines. [French]

Charles, J *Revue Generale des Chemins de Fer*
Apr. 1973, pp 205-212, 10 Fig; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

31 050860 LINDENWOLD RAIL LINE AND SHIRLEY BUSWAY: A COMPARISON. Comparisons of different transit modes have seldom given sufficient attention to service parameters. Rather, costs were compared for modes that optimally provide different types of operations. This study utilizes 2 existing systems for a comprehensive comparative study of bus and rail technologies and their different types of operations. It differs from previous studies in 2 respects: First, it performs the analysis on 2 actual systems and thus does not utilize any hypothetical assumptions. Second, it includes more system characteristics than any of the previous studies. The Lindenwold "Hi-Speed Line" offers all-day, high-frequency, reliable service among its 12 stations; it depends heavily (80 percent) on access by automobile. The Shirley Busway provides mostly peak-hour service on very many lines with different routings, but with a lower frequency and reliability than Lindenwold; it relies mostly (84 percent) on access by walking. Lindenwold required very high investment and was completed as one project; its revenues exceed operating costs by a significant amount. The line is extremely well operated and managed. Shirley was introduced with considerably lower investment, but it requires at least a 3 to 5 times higher labor force per passenger than Lindenwold. Its revenues closely cover the operating costs. Lindenwold attracts a 70 percent higher ridership than Shirley. Shirley

can be improved by the introduction of all-day high-frequency service on some of its routes. The main deficiency of the busway concept will remain street operation in the CBD. Both systems are very successful. Their attraction of new riders proves that there is a considerable latent demand for transit, even in low-density auto-oriented suburban areas, and an underutilized potential of modern bus and rail modes.

Vuchic, VR Stanger, RM (Pennsylvania University, Philadelphia) *Highway Research Record* No. 459, 1973, pp 13-28; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

31 051017 THE WAY TO GO: THE COMING REVIVAL OF US RAIL PASSENGER SERVICES. Here is a very different book about public transportation, a book which for the first time gives Americans realistic hope that a new day may be dawning for rail passenger service. It has, in fact, begun; the new Lindenwold Line from Philadelphia to the South New Jersey suburbs; the Bay Area Rapid Transit System for San Francisco and its sister cities; new developments on the Washington-New York-Boston run. These developments and more are recounted, along with a history of how and why rail passenger service has been dying out in the U.S., what it is like in other countries, how we can overcome the problems that have been holding up improvement here, and what is new beginning to happen. Here is an optimistic book about railroads that will be good news to harassed commuters and long-distance travelers, as well as to those concerned with our national ecology.

Southerland, TC ; Simon and Schuster Incorporated 1973, 235 pp; ORDER FROM: Simon and Schuster Incorporated, 1 West 39th Street, New York, New York, 10018 Repr PC

31 051363 A RAPID TRANSIT LINK FOR NEW CITIES DEVELOPMENT. A new city concept, specifically the "village cluster" concept, is reviewed and presented as an alternative to the present trend toward urban sprawl and environmental deterioration. A fundamental requirement for the success of a new cities project is noted to be a rapid transit link between the new cities and an existing urban center.

Avery, JP *High Speed Ground Transportation Journal* June 1973, pp 201-213, Refs; ACKNOWLEDGMENT: Department of Transportation Library; ORDER FROM: ESL, Repr PC, Microfilm

31 051380 SPECIAL REPORT: TECHNOLOGY '74. This special report is a collection of state-of-the-art articles on many areas of technology, including communications, computers, energy, and rail transportation including rapid transit.

Christiansen, D, Editor *IEEE Spectrum* Vol. 11 No. 1, Jan. 1974, 2 pp; ORDER FROM: ESL, Repr PC, Microfilm

31 051459 PUBLIC TRANSPORT IN OSLO [I TRASPORTI PUBBLICI DI OSLO]. The capital of Norway, Oslo, has a population of about half a million inhabitants, has an efficient public transport system represented by a metropolitan network, by a network of urban trams and buses and by some suburban railways and tram ser-

vices. A description is given of the characteristics of the installations and rolling stock of these means of transport and of the service which they carry out in a harmonious manner, with particular regard to the planning and construction of the metropolitan network. [Italian]

Marini, R Ziccardi, G *Ingegneria Ferroviaria* No. 3, Mar. 1973, pp 239-248; ACKNOWLEDGMENT: EI (EI 74 057047); ORDER FROM: ESL, Repr PC, Microfilm

31 051466 AIRPORT ACCESS/EGRESS SYSTEMS STUDY. VOLUME I. TEXT. Studies of airport activities and user characteristics at 34 high volume U. S. airports indicate that disbursed trip origins cannot economically justify rapid transit corridor investments dedicated to airport access travel. Generally, airports have too much off-roadway parking in central terminal areas and this concentration of vehicular activities near terminal buildings congest internal roadways. The study proposes a number of low-capital improvement concepts to airport access/egress. These improvements are generally directed towards improving the traffic flow in the central terminal area through better flow controls, diversion of automobile traffic from the central terminal area, and changes in travel patterns. The latter can be changes in mode and/or time of travel. Three specific operational experiments are proposed to evaluate the effectiveness of the proposed concepts. The experiments are a remote parking experiment at Detroit Metropolitan Airport, bus-rail links from La Guardia and Kennedy Airports in New York and evaluation of a garage-baggage handling system at Seattle-Tacoma Airport. Cost of implementing all these experiments is estimated to be \$1.444 million.

Whitlock, EM Sanders, DB ; Transportation Systems Center Final Rpt DOT-TSC-OST-73-32-1, Sept. 1973, 178 pp; Prepared by Smith (Wilbur), and Associates, New York. See also Volume 2, PB-223 842.; Contract DOT-TSC-462-1; ACKNOWLEDGMENT: NTIS (PB-223806/1); ORDER FROM: NTIS; PB-223806/1, DOTL NTIS

31 051467 AIRPORT ACCESS/EGRESS SYSTEMS STUDY. VOLUME II. APPENDIXES. This report includes: Airport survey questionnaire; Airport description; Remote parking questionnaire; Passenger counting record; On-bus survey questionnaire; Passenger count record; Automobile baggage check-in survey forms; Bibliography.

Whitlock, EM Sanders, DB ; Transportation Systems Center Final Rpt DOT-TSC-OST-73-32-2, Sept. 1973, 277p; Prepared by Smith (Wilbur), and Associates, New York. See also Volume I, PB-223 806.; Contract DOT-TSC-462-2; ACKNOWLEDGMENT: NTIS (PB-223842/6); ORDER FROM: NTIS; PB-223842/6, DOTL NTIS

31 051482 MASS TRANSIT TECHNOLOGY: A COMPREHENSIVE SURVEY OF VEHICULAR HARDWARE. An inventory of mass transit hardware has been compiled, tabulated in an organized format and classified first according to the most appropriate functional usage and then according to physical attributes. Information conveyed includes background data, vehicle description, vehicle performance, system character-

istics, land use, costs and considerations, significant advantages and disadvantages and illustrations. The inventory is to be reviewed not only as a collection of specific transit vehicles and example systems but also with attention given to the advances in vehicle component technology represented therein.

Sibley, KS ; Rensselaer Polytechnic Institute Final Rpt June 1973, 132p; Prepared in cooperation with New York State Assembly Scientific Staff, rept. no SS-304. Sponsored in part by Urban Mass Transportation Administration. Master's thesis.; Grant NSF-GT-32162; ACKNOWLEDGMENT: NTIS (PB-224568/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224568/6, DOTL NTIS

31 051890 PASSENGER REACTIONS TO LONDON'S VICTORIA LINE. The London Underground's rapid transit Victoria Line, 13-1/2 miles long, which was opened in stages between 1968 and 1971, provides a new northeast-center-south link supplementing the network already existing (in the central area for over sixty years) in London. Two detailed surveys were mounted to assess the impact of the new line on passenger ride patterns and on generation of new traffic, and to monitor forecasts made at different dates during the preceding fifteen years.

Robbins, M (London Transport Executive) *High Speed Ground Transportation Journal* Vol. 7 No. 2, June 1973, 4 pp; ACKNOWLEDGMENT: High Speed Ground Transportation Journal; ORDER FROM: ESL, Repr PC, Microfilm

31 052026 STATUS OF DOMESTIC HIGH-SPEED MARINE VEHICLES FOR MASS-TRANSIT. There are some very significant benefits available to commuters, taxpayers and communities from the introduction of a truly effective high-speed marine vehicle into local transit applications, where the origin and destination movement of the people can be accommodated by a water route structure. Any such service must be fully inter-modal to be a success. The marine vehicle must have certain features and these are discussed. Of particular importance is acceptable craft behavior (with regard to speed and ride quality) when the weather deteriorates and the water gets rough, a situation which occurs more often and to a worse degree in protected bodies of water than most people appreciate. Environmental considerations are also covered in some detail. There is currently one vehicle in production for passenger service in the United States, based on proven advanced high-speed technology, the Boeing JETFOIL. The features of this vehicle are discussed and its characteristics compared with other advanced marine vehicles. Finally an excerpt is presented from a report that summarizes the actual experiences of a head-to-head competition between hydrofoils and hovercraft during the summer of 1972 between Copenhagen, Denmark and Malmo, Sweden.

Shultz, WM (Boeing Company) ; Marine Technology Society Proceeding Sept. 1973, pp 409-419; Presented at the 9th Annual Conference of the Marine Technology Society, Sept. 10-12, 1973.; ACKNOWLEDGMENT: Marine Technology Society; ORDER FROM: Marine Technology Society, 1730 M Street, NW, Washington, D.C., 20036 Repr PC

31 052027 DISCUSSION ON THE POTENTIAL OF WATER TRANSPORTATION SYSTEMS TO TRANSPORT COMMUTERS WHILE REDUCING NOISE/AIR POLLUTION AND HAVING MINIMUM ADVERSE IMPACT ON LAND AREAS. The purpose of this presentation is to examine the utilization of existing waterways in the Washington, D.C. and Honolulu, Hawaii areas to reduce the urban traffic congestion and associated air and noise pollution. The practical, technical, and economic feasibility have been examined and the potential advantages of water transportation are explained. A network of possible water transportation routes is designed, a potential commuter market is developed, and then the implementation and operating costs of these water transportation systems are evaluated. The ability of a water transportation system to reduce noise and air pollution, and not impact adversely on current use of land areas are of particular interest.

Hargrove, JQ (Lulejian and Associates, Incorporated) ; Marine Technology Society Proceeding Sept. 1973, pp 387-399; Presented at the 9th Annual Conference of the Marine Technology Society, Sept. 10-12, 1973.; ACKNOWLEDGMENT: Marine Technology Society; ORDER FROM: Marine Technology Society, 1730 M Street, NW, Washington, D.C., 20036 Repr PC

31 052112 ARRIVAL OF LOCAL TRAINS AT LARGE PASSENGER STATIONS OF THE DEUTSCHE BUNDESBAHN [DIE ANKUNFT VON NAHVERKEHRZUGEN IN GROSSEN PERSONENBAHNHOFEN DER DEUTSCHEN BUNDESBAHN]. In connection with the investigation of the station-oriented pedestrian traffic at large junction stations of Deutsche Bundesbahn the arrival of short-distance trains was recorded in temporal and local respect by means of a time-dependent tape recording method. The empirically determined asymmetrical distribution of unpunctual arrivals of such commuter trains during the morning rush hours (6:00 to 9:00 a.m.) exhibits no significant differences between through stations and railheads. The distributions are not comparable to standard distributions. For the stopping eccentricity of short-distance trains in DB's through stations, as referred to the centrally arranged platform stairs, a symmetrical distribution was obtained, which can be considered as normal.

Westphal, J *Glaser's Annalen ZEV* Vol. 97 No. 5, 1973, pp 185-191; ORDER FROM: ESL, Repr PC, Microfilm

31 052113 SURVEYS AT UNMANNED EXIT BARRIERS OF THE DEUTSCHE BUNDESBAHN [UNTERSUCHUNGEN AN UNBESETZTEN AUSGANGSPERREN DER DEUTSCHEN BUNDESBAHN]. A study dealing with pedestrian traffic in railway stations with heavy local traffic included also walking at barriers. At unattended exit barriers of large passenger stations of Deutsche Bundesbahn, through which considerable passenger flows pass in one direction on leaving the trains during the morning rush hours (6:00 to 9:00 a.m.), extensive counts were made by applying a time-dependent tape recording method under actual service conditions. The data material was evaluated by electronic data processing, applying the methods of statistics and in particular of correlations calculus. The results have been compiled in tables and diagrams as far as practicable.

Westphal, J *Glaser's Annalen ZEV* Vol. 97 No. 10, No. 10&11, 1973, 13 pp; ORDER FROM: ESL, Repr PC, Microfilm

31 053749 OIL AND THE FUTURE OF PERSONAL MOBILITY. The implications of the worsening oil situation for surface passenger transport in Britain are set forth clearly and coolly. This alone in the present spate of hasty and confused topical writing makes Mr. Pole's pamphlet a ready source of facts and of plausible estimates--as might be expected from the Director of the Cambridge University Conservation Society's transport research project. In considering passenger transport that does not use fuel oil the author stresses the advantages of electrifying conventional railways, both urban and main-line. In a continued oil shortage the electric APT will have an importance not until recently foreseen, as will new and revived urban electric railways including the Tyneside rapid transit system, shop window for vehicle (Metro Cammell) and other British technology. In view of constant additions to concepts and plans for less conventional guided passenger transport systems (most of which disregard the problems of mass passenger movement at peak periods) the summary of these as substitutes for oil-consuming road vehicles is as comprehensive as can be expected.

Pole, N ; ECO Publications Pamphlet 64 pp; ACKNOWLEDGMENT: Modern Railways; ORDER FROM: ECO Publications, Cambridge, England Repr PC

31 053985 A CRITIQUE OF THE STUDY "EVALUATION OF RAIL RAPID TRANSIT AND EXPRESS BUS SERVICE IN THE URBAN COMMUTER MARKET". The recently released IDA Study discusses some important issues in urban transportation and its contents have already caused considerable controversy. The purpose of this Critique is to analyze the Study--its objectives, methods and findings--evaluate its implications, and suggest what stand UMTA should take toward it. The Critique is based on a thorough review of the Study Report and related literature, as well as on a discussion with Mr. Weiner, the technical monitor of the Study. The Critique analyzes all main aspects of the Study to a depth which is considered necessary to evaluate its approach and findings.

Vuchic, VR (Pennsylvania University, Philadelphia) ; Institute of Public Administration Feb. 1974, 25 pp, 5 Fig, 17 Ref; The original study was done by the Institute for Defense Analysis the critique was sponsored by the Office of Transportation Planning Analysis U.S. Department of Transportation.; ORDER FROM: Vuchic (Vukan R), Towne Building, 220 South 33rd Street D3, Philadelphia, Pennsylvania, 19174 Repr PC

31 054113 THE PHILADELPHIA--LINDENWOLD TRANSIT LINE. This paper describes the successful PATCO Lindenwold Rail Transit Line. It covers the planning, economics, and operation of the line. Rider statistics are given.

Harlow, EH *Traffic Engineering* Jan. 1974, 5 pp, 9 Fig, 1 Tab, 9 Ref; ORDER FROM: ESL, Repr PC, Microfilm

31 054128 NEW CONCEPTS IN RAIL-BUS INTERCHANGE. To plan and design a bus-rail mode-transfer facility within a freeway inter-

change of a transit-freeway transportation corridor, planners and engineers must consider the integration of all transportation facilities. In particular attention should be paid to: (1) The relationship of traffic access location and the freeway interchange; (2) interchange-intersection traffic operational efficiency; and (3) mode-transfer facility access concepts and internal circulation concepts. Major cities in North America have constructed multimode transportation corridors and with them has come the need to provide good access and efficient bus-rail intermodal transfer developed on sound planning, design and operational concepts. To establish these concepts, "Planning Considerations" are presented, including: (1) Interchange configuration influencing mode-transfer facility location and access; (2) multimode transportation corridor system design; (3) integration with arterial street systems; and (4) bus, auto, and passenger traffic generation.

Leisch, JP *ASCE Journal of Transportation Engineering* Proc Paper Vol. 100 No. TE1, #10328, Feb. 1974, 17 pp; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

31 054337 BALTIMORE: RAIL RAPID TO MEET TODAY'S PROBLEMS--AND TOMORROWS. This article describes the rail rapid transit system planned for Baltimore and the surrounding area. It also indicates the reasons for selecting a conventional rail transit system in preference to bus systems or new concept systems.

Kizzia, T *Railway Age* Vol. 175 No. 7, Apr. 1974, pp 32-34, 1 Fig.; ORDER FROM: XUM, Repr PC

31 054676 MBTA MAPS 10 YEAR, 1.5 BILLION RAIL TRANSIT EXPANSION PROGRAM. In 1964 the Massachusetts Bay Transportation Authority (MBTA) was created to control Boston's mass transit system. Recently MBTA announced a 10 year, \$1.5 billion plan to extend, relocate and modernize existing rapid transit lines. MBTA operates four rapid transit lines and the commuter trains over Boston & Maine tracks.

Kizzia, T *Railway Age* Vol. 175 No. 3, Feb. 1974, pp 20-21; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: XUM, Repr PC

31 054805 TRAFFIC DIVERSION PROBLEMS DURING THE BUILDING OF THE URBAN AND UNDERGROUND RAIL NETWORKS AROUND THE CENTRAL STATION IN FRANKFURT/MAIN [PROBLEME DER VERKEHRSLENKUNG BEIM BAU VON S-UND U-BAHN IM BEREICH DES HAUPTBAHNHOFS IN FRANKFURT/MAIN]. Modernisation of suburban rail transport systems in built-up areas calls for extensive planning of transport in town centres. By taking as an example the station forecourt at Frankfurt/Main, an explication is given of how cars, trams, buses, taxis and pedestrians have had to be diverted along constantly changing routes according to the progress of work in the current phase of building. [German]

Schild, H Zabel, J *Eisenbahningenieur* Vol. 24 No. 11, 1973, 5 pp, 3 Fig; ACKNOWLEDGMENT: UIC (80); ORDER FROM: International Union of Railways, BD, 14 rue Jean Rey, 75015 Paris, France Repr PC; 80

31 056908 NORTHWEST PASSAGE DEMONSTRATION PROJECT. The Northwest Passage was designed to provide a convenient pedestrian interchange between a commuter railroad and a rapid transit line in the Chicago area. A modern weather-protected connecting passageway between C and NW's suburban concourse in the main passenger terminal and the mezzanine level of the Clinton-Lake station on CTA's Lake-Dan Ryan rapid transit route was constructed. The Clinton-Lake transit station was rehabilitated. Objectives of study were to: (1) Determine effect of rider use of Passage on C and NW, CTA's rapid transit line and other transportation modes; (2) ascertain characteristics of riders gained or lost and reasons for use of each particular mode, etc.

Chicago Transit Authority, (UMTA-IL-06-0009) May 1973, 65p; Prepared in cooperation with Chicago and North Western Railroad.; ACKNOWLEDGMENT: NTIS (PB-230739/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-230739/5, DOTL NTIS

31 057170 HIGH SPEED TRANSPORTATION--LONG DISTANCE AND URBAN. The paper examines the impact of population growth and increased quality of living on the transportation problem, on a national and global basis. It assesses existing trends and considers future problems of long distance and urban transportation. Evidence is adduced showing that the road system in urban areas is at full stretch with the consequence that it is virtually impossible to implement an "all roads" policy. Modern developments, such as high speed rail and hovercraft vehicles, are considered in the belief that they could make an effective contribution towards a more comprehensive transportation strategy.

Twigg, DJ *Highway Engineer* Vol. 21 No. 4, Apr. 1974, pp 10-16; ACKNOWLEDGMENT: Journal of Institution of Highway Engineers; ORDER FROM: ESL, Repr. PC, Microfilm

31 057509 UNDERGROUND RAILWAYS OF THE WORLD. The story of the underground railway system is the story of the growth of the modern city. The tremendous upsurge in trade and communications, which began in Victorian times, led to a situation where the main line railway stations of our cities rapidly became isolated from the centres of business, and the idea of small linking railways between terminals came into being. The first part of Mr. Nock's book deals with general principles and concentrates on the development of the underground railway in London, but as the title of the book suggests, it goes on to include systems from all over the world--the Paris Metro, the New York system, the Madrid Metro, the Moscow Metro, the San Francisco system, the Canadian subways and European development in general. Signalling, automation and such fascinating and little-known sidelights as a Post Office Tube system are also fully covered.

Nock, OS ; Saint Martin's Press, Incorporation 1973, 288 pp, Figs., Photos.; ACKNOWLEDGMENT: Saint Martin's Press, Incorporation; ORDER FROM: Saint Martin's Press, Incorporation, 175 Fifth Avenue, New York, New York, 10010 Orig. PC

31 057564 THE MOVEMENT OF PEOPLE; RAPID TRANSIT IN MUNICH. This is an account of how Munich rescued its inadequate rapid transit system and made it a model of efficiency at which other (particularly larger) cities might well give close inspection.

Warren, WD *National Railway Historical Society Bulletin* Vol. 38 N 1973, pp 21-24, 4 Phot.; ACKNOWLEDGMENT: High Speed Ground Transportation Journal; ORDER FROM: National Railway Historical Society, 312-314 Empire Building, Philadelphia, Pennsylvania, 19107 Repr. PC

31 057566 GEMS OF SYMMETRY AND CONVENIENCE: SO RICHMOND PROUDLY DESCRIBED ITS ELECTRIC TROLLEYS, THE FIRST TRULY SUCCESSFUL SYSTEM IN THE WORLD. Initiated in 1888, Richmond, Virginia's trolley system, featuring four-wheeled electric cars, was the pride of the city. Within scarcely three months after the system opened, it was transporting 12,000 passengers daily at speeds up to 15 miles per hour. Not only was it, for its time, the largest street railway in the world, it was also "the first trolley system anywhere to operate with a sufficient degree of reliability and economy to represent a truly practical means of urban transportation". The author places operation of this system in historical perspective and provides a fascinating account of early street railway transportation. As one might expect, there are excellent illustrations for the article. Accompanying the article is a column "Vanishing Americans", which gives location of still-operational trolley lines and trolley museums and a description of them. Also featured in this issue is a section in color titled "Old Post Cards Bring Back The Age of the Trolley" (pp. 25-32). The nostalgia power of this section is almost overwhelming, especially the tranquillity of "Rush Hour on West Superior Street, Cleveland, Ohio". Trolley enthusiasts should make this issue a collector's item.

Middleton, WD *American Heritage* Vol. 24 N Feb. 1973, 7 pp; ACKNOWLEDGMENT: High Speed Ground Transportation Journal; ORDER FROM: American Heritage Publishing Company, 1221 Avenue of the Americas, New York, New York, 10020 Repr. PC

31 071753 CONSOLIDATION OF URBAN RAIL FACILITIES. Our present urban rail systems were developed by a number of independent competitive companies without coordination or overall planning, resulting in a considerably overbuilt plant. Changing patterns in distribution have not been reflected in changes in our urban rail systems. Past experience with facility consolidation through such methods as the joint terminal operating company have been unsatisfactory due to resultant high costs and poor service. These proposals have also failed to recognize many of the interests involved in facility changes and have consequently engendered substantial opposition. This paper proposes a method whereby the deficiencies of past terminal companies can be corrected and deals with overcoming opposition from those interests which may be expected to oppose rationalization of the urban rail plant.

Wiersema, RH (Illinois Central Gulf Railroad) ; Engineering Foundation Conferences Proceeding FHWA-32-01-23, Feb. 1974, pp 253-264; This is a paper from the Engineering Foundation Conference, Goods Transportation in Urban Ar-

eas, Berwick Academy, South Berwick, Maine, 5-10 August 1973. The conference was sponsored by the Federal Highway Administration, DOT.; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS, Repr. PC

31 071807 COMPARISON OF PERSONALIZED RAPID TRANSIT AND CONVENTIONAL SYSTEMS IN A PEOPLE-MOVER APPLICATION. As one part of a study to determine economic and design feasibility of developing a people-mover system in Downtown Minneapolis, a comprehensive comparison of new technology (including Personalized Rapid Transit-PRT) and conventional system alternatives was made. This study included a comparison of level of service, technology required, compatibility with the existing area, economics of the system, and impact on the environment. This paper presents the part of the study that compared systems in terms of potential passenger service and compatibility with the existing area. In terms of compatibility, the major emphasis is on the visual impact of an aerial guideway system within a downtown area.

Anderson, PA (Honeywell Incorporated) *Honeywell Computer Journal* Vol. 7 No. 4, 1973, pp 219-227, 2 Ref.; ACKNOWLEDGMENT: EI (EI 74 700715); ORDER FROM: ESL, Repr PC, Microfilm

31 071975 SIMULATION OF PASSENGER MOVEMENTS THROUGH A TRANSIT STATION. The simulation model being developed is a discrete-system, event-oriented representation of the movement of individual passengers through a transit station. The model is stochastic in nature with the entities of the system being the individual passengers whose movement through various activities in the station give rise to the events which drive the simulation. Station activity subsystems, such as the ticketing areas, passenger movement areas and platforms are represented by links, nodes and areas. The outputs from the model are Time Impedance Measures (e.g. Walking Times, Time spent in queue, and Total In-Station Time) and Occupancy or Density Levels (sq. ft. per person) in the movement and queuing areas of the station.

Fausch, PA Dillard, D Hoffmeister, JF *Winter Simulation Conference* Proceeding 20 Ref; ACKNOWLEDGMENT: EI (EIX740903358); ORDER FROM: ESL, Repr PC, Microfilm

31 072036 TRANSPORT SYSTEMS IN NEW TOWNS. A new town one which is created deliberately too far from an existing city to be considered a regular suburb. It is designed to expand the region economically without contributing to further congestion in the parent town. Because the town is just being developed, there are no existing transportation patterns upon which projections can be based, and consequently estimates must be used. Besides internal transportation, the link between the new and the parent town is considered. This report considers the determination of transport demand, and approaches for research and planning. It gives some of the systems used and an evaluation of them. Elements common to most new towns are found to include use of buses, short walking distances to transit, use of rail to connect with the parent town, continued dependence on automobiles, and

acceptance of static urban transport pattern determined for existing cities. It is recommended that future planning be based on a dynamic approach, building on a well-dimensioned infrastructure considering location of external and internal traffic generating points.

European Conference of Ministers of Transport Dec. 1973, 48 pp, 2 Tab.; ACKNOWLEDGMENT: TSC; ORDER FROM: Organization for Economic Cooperation and Devel, Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006 Repr. PC

31 072042 WORLD TRANSPORT DATA. Statistics are given for transport in 137 countries. The types of data given vary, depending on availability for each country. Categories include transport networks, railway rolling stock and traffic, road networks and vehicles, numbers of buses and coaches in public transport, transport vehicles by loading capacity, number of transport enterprises and employment, professional road transport enterprises by number of vehicles, rail passenger traffic, total goods traffic, rail goods traffic by commodity groups, coastal and inland waterway traffic, road goods traffic by commodity groups, international goods traffic, and sea traffic.

International Road Transport Union 1973, 259 pp, Tabs., Refs.; ACKNOWLEDGMENT: TSC; ORDER FROM: International Road Transport Union, Department of Research and Transport Economics, Geneva, Switzerland Repr. PC

31 072127 RESEARCH CONCERNING OVERALL TRAFFIC AND COST BENEFITS. This report deals with the problem of over-congestion in Tokyo traffic and the redevelopment of public transportation. As it is not possible to widen streets and highways due to space shortage, the authors suggested the following solutions: 1) Restrict the number of private vehicles and increase public transportation services. 2) Centralize the existing public transportation system: trains, buses, and subways. This will hopefully cut out any duplication of services created by business competition among these three major means of public transportation. 3) A shift of attitude toward public transportation from profit oriented to nonprofit oriented is recommended. 4) The commercial firms who use public highways and roads should share the cost of construction and maintenance. 5) Further government subsidy. [Japanese]

Japan Transport Economics Research Center Mar. 1974, 79 pp, Figs.; ACKNOWLEDGMENT: TSC; ORDER FROM: Japan Transport Economics Research Center, (105) 1, Shibakotohira-cho, Minato-ku, Tokyo, Japan Repr. PC

31 072179 CONTROL AND EVALUATION OF TRAFFIC ACTUATED SIGNAL SYSTEMS IN URBAN AREAS [Steuerung und Bewertung verkehrsbahngengiger Signalanlagen im Stadtstrassennetz]. Survey of latest traffic actuated signal control systems for intersections, road sections, road systems; survey of the literature. Time-and traffic actuated computer signal system selection is the best traffic control for urban networks. It should be based on optimal fixed-time signal selections (Siglink, Sigop, Trans OECD is urged to introduce a basis of reference for future comparative research. Destination has to be formulated as a function as a

function for the optimization program. It is proposed to minimize loss of time per person transported rather than per vehicle in order to support public transportation. Optimal fixed-time selection programs will be feasible control concepts for the future. In addition, intersection loads may have to be kept below the saturation level by special restrictions on the incoming traffic and special control systems may have to be used to avoid oversaturation of critical traffic junctions. [German]

Kurzak, H *Strassenbau und Strassenverkehrstechnik* No. 172, 1974, 126 pp, Figs., Tabs., 282 Ref.; ACKNOWLEDGMENT: TSC

31 072231 TRAFFIC REGULATION IN FOURTEEN SWEDISH POPULATION CENTERS [Trafiksanering i 14 svenska tätorter Kartläggning utförd av Anders]. Implemented traffic control measures, their goals, and their effects were discussed with government officials and technical experts in 14 Swedish population centers with populations ranging from 4,900 to 119,900. All had undertaken some form of traffic control; in the three smallest, the measures were sketchy, consisting mainly of parking restrictions, one-way streets, walking and bicycling paths under large thoroughfares, etc., while in the five largest cities, more thorough programs were attempted, such as comprehensive traffic redirection and large investments in new streets. Only the largest city, Uppsala, had a complete official set of goals for traffic control policy, while two communities had no official goals at all. Generally espoused goals were to reduce traffic within the CBD and to promote bicycling, walking, and the use of public transportation. A goal adopted by three cities was to reduce traffic to the CBD. The most common justification for these goals was lack of space in the CBD, while another common reason was the desire to increase traffic safety, reduce noise, and protect the cultural historical environment. In general, traffic control is not regarded as urgent compared to other communal tasks, especially if it requires sizeable monetary expenditures. The effects include increased traffic safety, reduced noise and air pollution, and improvements or public transportation. Success is usually limited in each area, but the total effect is generally positive. This opinion is shared by the inhabitants of the cities. The officials interviewed suggest that research on traffic control be broadened to include questions of behaviors and economic consequences.

Transportation Research Delegation 1974, 60 pp, 6 Tab.; ACKNOWLEDGMENT: TSC

31 074337 CONCEPT STUDIES FOR FUTURE INTRACITY AIR TRANSPORTATION SYSTEMS. This report is concerned with describing the possible application of future air transportation systems within urban areas of the United States. The general conclusion of the study is that urban air systems will be technically and operationally feasible, but that economic viability remains inextricably linked to future governmental policies on urban development, and consequently policies for development of urban transportation.

National Aeronautics and Space Administration FTL R-70, Dec. 1970; ACKNOWLEDGMENT: FLIGHT TRANSPORTATION LAB MIT (FTL 6-1); ORDER FROM: Massachusetts Institute of Technology

31 080044 ROLE OF PERSONAL RAPID TRANSIT IN MASS TRANSIT. With the nation looking more and more to mass transit to solve its urban transportation problems, the innovative Personal Rapid Transit (PRT) systems with their "second car" characteristics can be expected to complement bus and rail services, especially in medium-density population areas. After summarizing the role each of these three forms of public transit plays and is projected to play by 1990, the paper describes current specialized PRT applications in the United States and abroad.

Lancaster, TA (Rohr Industries, Incorporated) Hearn, DL ; Society of Automotive Engineers Preprint N 740623, 1974, 10 pp; This paper was prepared for a meeting 12-16 August 1974.; ACKNOWLEDGMENT: EI (EI 74065264); ORDER FROM: ESL, Repr. PC, Microfilm

31 080110 INTERMODAL TRANSFER FACILITIES. The papers describe various aspects of passenger terminals, interchanges whose scope includes anything from a transit platform to a multimodal regional transportation center. Despite this broad spectrum, passenger terminals have common design elements which these five papers address. The first describes principles of different modes to have access to outlying rapid transit terminals. The second describes studies on boarding the alighting time requirements for bus and trolley services. The next paper contains an analysis of park-and-ride lots. The movements of pedestrians in transit stations is next discussed. TRB's Committee on Intermodal Transfer Facilities has developed a general outline and classification for the elements in a typical passenger transfer facility.

Transportation Research Record TRR No. 505, 1974, 47 pp, Figs., Tabs., Refs. These four reports were prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB, Repr. PC

31 080637 APPROACHES FOR IMPROVING AIRPORT ACCESS. There are two airport access travel markets: (1) the Central Business District-to-airport market; (2) the suburban-to-airport market. Approaches for improving airport access include: (1) improvements in existing limousine service; (2) demand-activated transportation service; (3) priority access routes for public transportation; (4) satellite terminals; and (5) extension of the regional rapid transit systems to airports. An economic analysis of the first four of these alternatives leads to the following conclusions: (1) it is possible to provide economically viable service both to low and high-density areas; and (2) increased service to low-density areas may be provided by either extending reservation routes to transfer points where free parking and taxi services are available or by operation of group-riding service.

Ellis, RH Bennett, JC Rassam, PR (Peat, Marwick, Mitchell and Company) *ASCE Journal of Transportation Engineering* Vol. 100 No. TE3, Proc. Paper 10737, Aug. 1974, pp 661-673, 7 Fig., 5 Tab., 4 Ref., 2 App.; ORDER FROM: ESL

31 080656 DESIGN AND DETAIL OF 1974/75 BUS PLAN. The bus plan for the Washington, D.C. metropolitan area is a near-term improvement which integrates services previously oper-

ated by four privately-owned bus companies and now owned by one public organization. It contains many substantial improvements and services and extends new services into growing suburban areas. The additional fleet and operating cost requirements are presented. A major consideration in planning was to maintain a balance between modest modification and extensive change. Needless disruption to existing ridership patterns was avoided. Main features of the plan are: simplification of route structure, extension of the service area, additional crosstown and cross-county routes, service in peaks tailored to meet existing and potential demand, strengthened midday service, and major service improvements to the disadvantaged.

Lewis, RM Keeler, DH ; Washington Metropolitan Area Transit Commission, Smith (Wilbur) and Associates WMATA/TTS-1974-12, 1974, 205 pp; Transit technical studies (Memo Report); ACKNOWLEDGMENT: NTIS (PB-237446/OSL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237446/OSL

31 081006 A FRAMEWORK FOR INVESTING IN URBAN BICYCLE FACILITIES. The bicycle as a transportation and recreation mode has explosively entered the public's consciousness. Accompanying this phenomenon has been a rash of problems including a sharp increase in accident rates and thievery. There is a need to provide facilities that will reduce these problems and accommodate the expected increase in bicycling popularity. This paper raises four basic questions, the answers to which will assist in planning urban bicycle facilities on a more organized basis with a minimum of misdirected effort and a maximum amount of coordination. How much money should be invested in bicycle facilities? What types of trips are the best candidates for bicycling? What type of bicycle facilities should be provided? Where should these bicycle facilities be placed? At this stage of urban bicycle facility planning, these questions are only beginning to be asked and are far from being resolved. Planning and engineering of bicycle facilities are essentially in a shakedown period in which many good and bad ideas will be tested before the best solutions surface and become the norm.

Ohrn, CE Podolske, RC (Barton-Aschman Associates, Incorporated) *Transportation Research Record* No. 508, 1974, pp 60-72, 2 Fig., 7 Tab., 9 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

31 081012 COORDINATED BUS STUDY. Purpose of this report, a summary of 3 individual consultant studies, was to analyze the need for local and feeder transit services in the East Bay communities of Contra Costa County, Livermore-Amador Valley, and the Tri-Cities of Fremont, Newark, and Union City, California. These 3 areas are inside the BART District but outside of the service area of the Alameda-Contra Costa Transit District (AC Transit). In each of the 3 study areas, similar findings and recommendations were made. Recommendations include: transit service along the major corridors should be developed and expanded; local service by itself would not significantly reduce the dominance of the auto; and local transit should be provided to serve the limited mobility population. Feeder and local services were recommended. These systems proposed include conventional bus routes, flexi-

bly routed buses and demand activated bused (dial-a-bus). In addition to dial-a-bus services in the Contra Costa study area, electrically powered, publicly owned automobiles (PAS) were recommended for development. Report also provides an overview of the Bay Area setting for these studies, reviews need for transit, summarizes recommendations regarding transit alternatives, gives a brief overview of impacts of transit alternatives, and describes the implementation procedures, including the institutional, financial, and management arrangements. Maps, charts, tables, illustrations and appendices are included. /UMTA/

San Francisco Bay Area Rapid Transit District, (CA-09-0011) UMTA-CA-09-0011-74-1, Aug. 1974, 91 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238155/AS

31 081828 RESERVED BUS LANES ON URBAN FREEWAYS: A MACROMODEL. An increasing number of cities are becoming interested in operating buses on reserved lanes so that people can be moved more effectively. This paper develops a person-delay model that can be used in determining the feasibility and practicality for implementing a contraflow freeway bus lane in urban areas. The model deals with peak-hour trips on a six-lane, two-direction freeway, and it uses certain relationships to demonstrate its applicability. The derivation of the model is shown, and the paper discusses, by a step-by-step procedure, how transportation planners can easily use it.

Levinson, HS Sanders, DB (Smith (Wilbur) and Associates) *Transportation Research Record* No. 513, 1974, pp 1-7, 1 Fig., 6 Tab., 2 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

31 081857 PROCEEDINGS OF THE SEMINAR ON BICYCLE/PEDESTRIAN PLANNING & DESIGN. The many facts of planning for bicyclists and pedestrians are considered in these Proceedings. Accident prevention is discussed in detail, including such aspects as the dangers to cyclists of parallel sewer grates, pedestrian regulation, and surfacing to be used on pedestrian walkways. Also considered are: age; mobility; planning for handicapped persons; health aspects such as air pollution and recreation; parking facilities; dual-mode buses; side-walks; energy crisis; and regulations, both Federal and local. Crime and hazardous locations, traffic signals, moving sidewalks and personal rapid transit are also discussed, as is the use of time lapse photography for data collection. School child traffic safety and urban play areas are considered, as are benefit cost analyses of bikeways and bikeway and pedestrian facilities.

American Society of Civil Engineers 1974, 700 pp, Figs., Tabs., Photos., Refs.; Conference held at Walt Disney World, Florida, 12-14 December 1973.; ORDER FROM: ASCE, Orig. PC

31 083037 TROUBLE IN MASS TRANSIT: WHY CAN'T THE PEOPLE WHO PUT A MAN ON THE MOON GET YOU DOWN-TOWN? While the primary subject of this article is the Bay Area Rapid Transit and its technological and political problems, other problems associated with advanced transit technology are also illustrated with the experiences of the Pittsburgh Skybus project and the Personal Rapid Transit

installed at Morgantown, W.V. The report cites the success of more conventional rapid transit systems--Toronto Transit and the Lindenwold Line out of Philadelphia. The article concludes that BART experience does not argue against fixed-guideway transit and does not doom new transit technology. It does, however, list some recommendations to avoid future problems of this type.

Consumer Reports Mar. 1975, pp 190-195, 2 Phot. ORDER FROM: XUM, Repr. PC

31 083063 THE ROTTERDAM METRO. In six years' operation, the Rotterdam Metro has fulfilled the expectations placed on it and assumed an importance in that urban area inversely proportional to its relatively short length. The original section has had a major role in alleviating traffic congestion on the two highway crossings of the Maas River and is being extended. Plans are progressing for a second rapid transit line across the city in another direction. Municipal authorities have consistently followed the master plan, implementing segments on schedule and within the cost limits established for each. This article describes the planning, construction and operation of the Netherland's first rapid transit line.

Union Internationale des Transports Publics, Revue Vol. 23 No. 4, 1974, pp 264-271 ORDER FROM: Union Internationale des Transports Publics, Avenue de l'Uruguay 19, B-1050 Brussels, Belgium Repr. PC

31 084377 COMMUTER DEMAND FOR BICYCLE TRANSPORTATION IN THE UNITED STATES. The demand for bicycle transportation is analyzed, and the observation is made that bike-routes must be planned and constructed as part of an overall transportation system so that the total cost of cycling is less than that of driving for the majority of commuters. The cost of owning and using a vehicle and costs of commuting by car or bicycle are examined, and simulated models are used to predict the demand for bicycle transportation. The use of bicycle facilities is discussed, and public policy in this area is examined. Guidelines to be observed in the planning of bike-routes (which will stimulate heavy bicycle usage) are listed.

Everett, M (University of Southern Mississippi) *Traffic Quarterly* Vol. 28 No. 4, Oct. 1974, pp 585-601, 2 Fig., 5 Tab., 24 Ref.

31 084778 THE RELATIVE EFFICIENCY OF ROAD AND RAIL BASED MOVEMENT SYSTEMS. The problem of the private car is discussed, and the return to public transport by bus and rail is reviewed. The costs of these services is examined, and it is observed that the carriage of urban commuters for which railways were considered the ideal, is perhaps economically the role for which they are least suited. The cost advantage of buses are set forth. Priority for buses is considered, as well as the potential benefits from a change from rail to bus in Great Britain.

Dalgleish, A ; Greater London Council July 1974, 6 pp; PTRC Summer Annual Meeting, July 8-12, 1974, University of Warwick.

31 084943 TRANSIT: SEPTA SHOWS THE WAY. The Southeastern Pennsylvania Transportation Authority has acquired and has been

integrating the various private and public mass transit facilities serving the Philadelphia metropolitan area. This article is essentially an interview with SEPTA Chairman J. C. McConnon with much additional information incorporated in the text and accompanying illustrations and boxes.

Ellsworth, KG *Railway Age* Vol. 176 No. 5, Mar. 1975, pp 40-42, 1 Fig., 1 Phot.; ORDER FROM: XUM, Repr. PC

31 090320 TERMINAL AREA FORECAST, 1976-1986. This document presents forecasts of key aviation activity measures for fiscal years 1976, 1977, 1978, 1981, and 1986 for 808 airports, RAPCON's, and RATCC's. The forecasts are prepared to meet the needs of planning personnel concerned with future traffic levels at these facilities. The airports selected for inclusion in this publication met at least one of the following criteria: Existing tower, candidate for a tower, currently receiving or forecast to receive certificated route air carrier or air taxi service, and any general aviation airport which will exceed 60,000 itinerant and/or 100,000 total operations annually by 1977. The report is organized by FAA region and within each region by state.

Federal Aviation Administration Sept. 1974, 296p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD/A-006504/5ST

31 090463 PUBLIC TRANSPORTATION FOR FLORIDA'S GOLD COAST. DADE, BROWARD, PALM BEACH, TRI-COUNTY, FLORIDA. The report is the culmination of a 4 year transit planning effort in which the entire Florida Gold Coast was viewed from a comprehensive regional perspective. In a series of 22 technical reports (described in the Appendix) the need, feasibility and detailed description of the following Florida Gold Coast transit improvements were documented. The regional perspective enabled the location of rapid transit to accommodate heavy travel demand across the Dade-Broward line. South Palm Beach/North Broward Co. local travel market was considered for dial-a-ride service. Transit from Palm Beach Co. to Broward and Dade is recommended by interfacing express buses with regional rapid transit.

Simpson and Curtin Incorporated, Urban Mass Transportation Administration SIMCUR-039-F, Sept. 1974, 45 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239861/8SL, DOTL NTIS

31 091166 A SIMULATION MODEL OF MULTIDIRECTIONAL PEDESTRIAN MOVEMENT WITHIN PHYSICALLY BOUNDED ENVIRONMENTS. In the design of built environments, such as transportation facilities, theaters and shopping malls, little information about pedestrian traffic is available. Although some theories have been developed for certain types of pedestrian movement, they do not include the most frequent form, namely multidirectional or free flow. A major restriction on such models is the fact that they deal only with aggregate flows and thus do not allow comprehensive investigation of environmental influences on movement characteristics. The model presented here is a research tool rather than an application program. It reproduces individual pedestrian navigation, both with respect to the

built and the behavioral environment. It is written as a batch program in SIMULA and is currently being implemented on the UNIVAC 1108 system at Carnegie-Mellon University. In its final form it will provide methods for analysis and prediction of actual moving behavior in an existing or planned environment.

Baer, AE ; Carnegie-Mellon University IPP-47, June 1974, 18 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238856/9ST

31 091187 BICYCLES (A BIBLIOGRAPHY WITH ABSTRACTS). The bibliography contains 41 citations to research reports concerned principally with bicycle safety and accidents. Other areas covered include bikeways, traffic laws as related to bicycles, and physiological effects of using bicycles for exercise.

Gatsoff, C ; National Technical Information Service Jan. 1975, 47 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; NTIS/PS-75/074/5ST

31 091411 VARIABLE CYCLE SIGNAL TIMING PROGRAM. VOLUME 2. PHASE I. OPTIMIZATION OF TRAFFIC SIGNALS IN NETWORKS BY MIXED INTEGER LINEAR PROGRAMMING. The objective of the effort was to develop advanced, 'Third Generation' Traffic Control Policies as part of the Urban Traffic Control Systems (UTCS) Project. These policies are designed to be implemented on a system of urban streets by a digital computer, in real-time. Volume 2 presents two mixed-integer linear programming formulations developed to optimize cycle-based traffic signal timing patterns to service the moderate flow-regime. The more appealing formulation addresses the coupling of all control variables: split offset and cycle length.

Little, JDC Gartner, N Gabbay, H Springer, M KLD Associates Incorporated, Federal Highway Administration Final Rpt. KLD-TR-12, May 1974, 196p; Paper copy also available in set of 4 reports as PB-241 716-SET, PC\$22.00; Contract DOT-FH-11-7924; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241718/6ST

31 091412 VARIABLE CYCLE SIGNAL TIMING PROGRAM. VOLUME 3. CYRANO: CYCLE-FREE RESPONSIVE ALGORITHMS FOR NETWORK OPTIMIZATION: MODERATE, CONGESTED, AND LIGHT FLOW REGIMES. The objective of the effort was to develop advanced, 'Third-Generation' Traffic Control Policies as part of the Urban Traffic Control Systems (UTCS) Project. These policies are designed to be implemented on a system of urban streets by a digital computer, in real-time. Volume 3 presents the formulation and preliminary evaluation of the traffic control policies developed for the light, moderate, and congested flow regimes. These were recommended for on-line implementation.

Lieberman, EB McShane, WR Goldblatt, RB ; KLD Associates Incorporated, Federal Highway Administration Final Rpt. KLD-TR-14, May 1974, 214p; Paper copy also available in set of 4 reports as PB-241 716-SET, PC\$22.00; Contract DOT-FH-11-7924; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241719/4ST

31 091413 VARIABLE CYCLE SIGNAL TIMING PROGRAM. VOLUME 4. PREDICTION ALGORITHMS, SOFTWARE AND HARDWARE REQUIREMENTS, AND LOGICAL FLOW DIAGRAMS. The objective of the effort was to develop advanced, 'Third Generation' Traffic Control Policies and part of the Urban Traffic Control Systems (UTCS) Project. These policies are designed to be implemented on a system of urban streets by a digital computer, in real-time. Volume 4 presents the formulation and evaluation of several models designed to predict approach-specific traffic volumes. Supplementary surveillance hardware requirements are estimated and detailed logical flow diagrams of the Third-Generation software are provided.

Lieberman, EB McShane, WR Goldblatt, RB Wicks, D ; KLD Associates Incorporated, Federal Highway Administration Final Rpt. KLD-TR-24, May 1974, 231p; Paper copy also available in set of 4 reports as PB-241 716-SET, PC\$22.00.; Contract DOT-FH-11-7924; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241720/2ST

31 091480 URBAN TRAFFIC CONTROL SYSTEM AND BUS PRIORITY SYSTEM (UTCS/BPS): TRAFFIC ADAPTIVE NETWORK SIGNAL TIMING PROGRAM (TANSTP). SOFTWARE DESCRIPTION. The document describes the Traffic Adaptive Network Signal Timing Program (TANSTP) of the Urban Traffic Control System/Bus Priority System. The TANSTP software package uses the executive structure, the surveillance data, and the command software of the first generation package, which was installed in the original UTCS System. (The first generation uses a pre-stored timing pattern). TANSTP is a second generation on-line optimization of signal timing patterns using real-time predictions of volume patterns and on-line subnetwork determination. This document contains an overview of the entire UTCS/-TANSTP software system; provides a description of the software routines; includes a description of the subroutines which were constructed to interface the second generation software with the first generation data base; gives a description of the modifications made to the first generation routines to support the second generation package; discusses the procedures to be used in operating the UTCS/TANSTP System; and describes the data base. The Appendix contains a description of two off-line programs used to support the prediction.

Kesemann, R Bolling, L Cooper, DL Ritter, J Bravo, E ; TRW Transportation and Environmental Operations, National Highway Traffic Safety Administration, Washington, D.C. Final Rpt. 96004.007, Aug. 1973, 351 pp; Contract DOT-FH-11-7594; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241870/5ST

31 091562 REGIONAL BIKEWAY SYSTEMS PLANNING AND IMPLEMENTATION. A final report is more on a current regional bikeway planning design, and on implementation techniques for developing regional bikeway systems. The objective of this report is to provide a uniform set of design recommendations concerning bicycle facility development to all jurisdictions within the Denver Metropolitan Area.

Denver Regional Council of Governments, Department of Housing and Urban Development, Urban Mass Transportation Administration, Federal Highway Administration, (HUD-CPA-CO-008) Final Rpt. DRCOG-5-75, May 1975, 198 pp; Prepared in cooperation with Department of Housing and Urban Development, Denver, Colo. Region VIII, and Federal Highway Administration, Washington, D.C.; Contract DOT-UT-730-1; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242375/4ST

31 091699 URBAN AUTOMATED TRAFFIC CONTROL (A BIBLIOGRAPHY WITH ABSTRACTS). The control of urban vehicular traffic movement by means of automatic synchronization of intersection and lane signals is covered in this bibliography of Federally-funded research. Included are studies on sensing and telemetry devices, computer programming, models, system development, and route guidance systems. (Contains 114 abstracts).

Lehmann, EJ ; National Technical Information Service Bibliog. May 1975, 119 pp; Supersedes COM-73-11716.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PS-75403/6ST

31 091885 TELECOMMUNICATIONS-TRANSPORTATION TRADEOFFS. The report evaluates the implications of potential communications and computer technology alternatives to urban transportation, particularly the commute to work. Three criteria for successful telecommunications alternatives to transportation were used to evaluate the feasibility of 'telecommuting' in various situations. These criteria are: (1) economic benefits, (2) adequate technological base, (3) semantic and psychological effectiveness. Emphasis was placed on the utility of telecommuting in the information industry. The study concluded that existing and near term technologies provide a suitable economic basis for allowing organizations to decentralize using telecommuting. Potential impacts on energy consumption, transportation and urban development are discussed.

Nilles, JM Carlson, FR Gray, P Hanneman, G ; University of Southern California, National Science Foundation Final Rpt. Dec. 1974, 237 pp; Grant NSF-GI-39019; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241871/3ST, DOTL NTIS

31 092106 MASS TRANSIT DEVELOPMENT FOR SMALL URBAN AREAS: A CASE STUDY, TOMPKINS COUNTY, NEW YORK. REPORT ON FIRST YEAR. The report presents transportation planning methodology for small urban areas, and establishes a complete inventory of data on travel patterns and preferences on transportation services and facilities, on land-use, employment and socio-economic characteristics of the population of Tompkins County, New York. The conduct and the results of an extensive household travel and origin-destination survey are reported. Mass transit developments for small urban and rural areas, such as Tompkins County, are outlined in terms of the specifications of objectives for a county-wide system. An example of service area expansion for public transportation is presented.

Meyburg, AH Stopher, PR Ryan, JM Coulter, JW ; Cornell University, Department of Transportation Final Rpt. DOT/TST-75/48, Oct. 1974, 251 pp; Contract DOT-OS-40003; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242989/2ST

31 092175 AIRPORT SURFACE TRAFFIC CONTROL SYSTEMS DEVELOPMENT ANALYSIS -EXPANDED. A previous MITRE Technical Report, Airport Surface Traffic Control Systems Deployment Analysis, FAA-RD-74-6, presented an analysis of ASTC (Airport Surface Traffic Control) system requirements and developed estimates of the deployment potential of proposed ASTC system alternatives for 19 air carrier airports. The primary requirement was determined to be improved surveillance which resulted in an estimated deployment of one of two surveillance systems at 16 airports by 1980. This report presents an expansion of that deployment analysis to include a total of 39 air carrier airports. The methods and assumptions for the deployment analysis of the 20 airports presented in this report are essentially the same as in the initial report. The overall result of the analysis is that by the initial deployment date (1976-1980) of the two alternative surveillance systems, the total potential market will be for 20-25 systems. By the end of the century, the total potential market for ASTC surveillance systems will exceed 30.

Bales, RA Koetsch, JF ; Mitre Corporation, Federal Aviation Administration, Transportation Systems Center Final Rpt. FAA-RD-75-51, Mar. 1975, 115 pp; See also report dated Jan 74, AD-773 699; Contract DOT/TSC-RA-73-11; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A013579/8ST

31 092399 URBAN CORRIDOR DEMONSTRATION PROGRAM MANHATTAN CBD-NORTH JERSEY CORRIDOR. JOINT USE PARK-AND-RIDE. The report summarizes the work performed for one of the five projects conducted in the Manhattan CBD-North Jersey Corridor under the Urban Corridor Demonstration Program. Information is given concerning the methods used to attempt a successful demonstration of the concept of using parking lots used for other activities as park-and-ride sites. Types of facilities investigated include shopping centers, drive-in theatres, and factories. Requirements for joint use park-and-ride facilities were determined and are presented.

New Jersey Department of Transportation, Federal Highway Administration, New Jersey Turnpike Authority, Port Authority of New York and New Jersey, Tri-State Regional Planning Commission Final Rpt. Feb. 1975, 37 pp; Also pub. as Tri-State Regional Planning Commission, New York. Rept. no. TS-7910.; Contract DOT-FH-11-7778; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244475/0ST

31 093073 BICYCLE TRANSPORTATION. Some of the findings of the study are the following. America is experiencing an unprecedented boom in bicycle sales and uses. Although there are advantages to bicycling, major deterrents are high accident rates, bicycle theft, exposure to automotive air pollutants, insufficient support

facilities (i.e., lack of bikeways, secure parking facilities, showers at places of work), and bad weather conditions. The above problems could be greatly reduced through better support facilities, both segregated bikeways and secure parking arrangements. The Federal Government is beginning to recognize bicycles as a viable form of transportation. DOT has allowed states to fund bikeways along federally funded roads with money from the highway trust funds. Other significant Federal agency activities are also underway. Europe is currently experiencing a resurgence in bicycle use after a marked decline during the postwar years. Environmental concerns, urban congestion, and high fuel costs are contributing to the new bicycle boom. European countries—particularly Sweden, Denmark, Germany, and Holland—are actively promoting bicycle transportation by establishing separate rights-of-way, bicycle traffic lights, and pedestrian malls. Cyclists in Japan and China also enjoy nice facilities for bicycle transportation.

Dougherty, N Lawrence, W ; Environmental Protection Agency Dec. 1974, 79p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244938/7ST

31 093130 TOPICS ON TRANSPORTATION IN THE BALTIMORE REGION. The papers included in this volume are the results of the year-long study on transportation problems in the Baltimore Region. Areas of study include an analysis of the multi-level planning process in Maryland, a forecasting methodology for low frequency commuter rail service, alternatives for improvement of Baltimore's suburban transportation, including Dial-A-Ride feasibility, and bikeway planning for the central city.

McCready, R Kingham, I Flanagan, S Pripusich, J Warman, L ; George Washington University, National Science Foundation Final Rpt. ES-251-252-D, 1974, 256 pp; See also report dated Dec 73, PB-226 829.; Grant NSF-GZ-2605; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244341/4ST, DOTL NTIS

31 093414 AVIATION FORECASTS. FISCAL YEARS 1976-1987. This report contains the latest Federal Aviation Administration forecast of measures of workload and activity at towered airports, air route traffic control centers, and flight service stations for Fiscal Years 1976 to 1987. The forecasts were made for the four major users of the system; air carriers, air taxi, general aviation and the military. The report has been prepared to meet the budget and planning needs of the various offices and services of FAA for data concerning future trends in aviation activity. This report reflects the impact on aviation activity of a more rapid rate of price increase, especially for fuel, and a slower rate of real income growth than had been assumed in previous forecasts.

Federal Aviation Administration, Federal Highway Administration FAA-AVP-75-7, Sept. 1975, 76 pp, 10 Fig., 21 Tab., 2 App.; See also report dated Sep 74, AD-A002 618.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; AD-A017095/1ST

31 093620 I-35W URBAN CORRIDOR DEMONSTRATION PROJECT. The purpose of the I-35W Urban Corridor Demonstration Project is to implement and evaluate the Bus-on-Metered

Freeway System. The system includes the following elements: Metering of an urban radial freeway; a real-time surveillance, command and control system; extensive express bus service in the corridor; priority access to the freeway via express bus ramps; and provision of transit passenger amenities, i.e., bus shelters, signs, and park-and-ride facilities. The complete system, located in the Minneapolis-St. Paul area, became operational in April 1974. Goals of the Urban Corridor Demonstration Program include: demonstrating the impact of a coordinated use of FHWA and UMTA programs in alleviating peak hour congestion in heavily used traffic corridors; improving the efficiency of existing transportation facilities in terms of people moving capability; encouragement of urban areas to coordinate planning of highway and transit improvements to obtain maximum impact; and improvement of peak hour traffic flow in the project cities and documentation of results for national application.

Metropolitan Council of Twin Cities, Urban Mass Transportation Administration, Bather-Ringrose-Wolsfeld, Incorporated Final Rpt. UMTA-DC-06-0062-75-1, Aug. 1975, 445 pp; Prepared by Bather-Ringrose-Wolsfeld, Inc., Edina, Minn.; Contract DOT-FH-11-7953; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247663/8ST

31 093628 OVERVIEW OF EXPERIMENTAL BUS PRIORITY SYSTEMS. The bus priority strategies tested in eight different cities (Washington, D. C.; Leicester, England; Derby, England; Kent, Ohio; Louisville, Kentucky; Miami, Florida; Bern, Switzerland; Alkmaar, Netherlands) used a variety of signal control techniques to award priority to buses at traffic control intersections. The report results range from seven seconds reduction in average bus delay at one intersection in Leicester, to 24 seconds reduction at an intersection in Bern. More importantly, the range of travel time through an intersection in Derby was reduced by more than one half. Such reduction in range of travel time has a significant impact on reducing run time variation along a bus route. In Washington, 34 intersections were equipped with bus detectors which fed bus arrival information to the central Urban Traffic Control System/Bus Priority System computers. The U.S. and European approaches to BPS demonstrations differ. U.S. demonstrations range in size from three to 34 intersections and emphasize hardware and software development. In contrast, demonstrations outside of the U.S. typically include one intersection and stress studies of how the mean travel time and the range of travel time through the intersection have improved with priority as compared to buses operating without priority.

Lovett, CD ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0027) Final Rpt. MTR-6873-Rev-1, UMTA-VA-06-0027-75-1, Mar. 1975, 69 pp; Contract DOT-UT-0027; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247742/0ST

31 093633 SIMPLIFIED ESTIMATORS FOR BENEFIT ASSESSMENT OF BUS PRIORITY SYSTEMS. Simulation studies indicate that a Bus Priority System (BPS) that guarantees a green traffic signal to buses approaching an instrumented intersection provides substantial

benefits to buses with little detriment to other traffic. Simplified estimators that correlate well with many aspects of the simulation results provide a better understanding of the BPS process and a means of analyzing the effects of BPS in applications other than that simulated. A bus travel time estimator predicts values within 10 percent for local buses, although the accuracy is less for buses with less frequent stops. An intersection capacity estimator reflects how certain conditions lead to greatly increased travel times for other vehicles in the simulation network and how far-side bus stops are superior to near-side bus stops at short bus headways.

Ludwick, JSJ ; Urban Mass Transportation Administration, Administration, Washington, D.C., (UMTA-VA-06-0026) MTR-7041, UMTA-VA-06-0026-75-2, Aug. 1975, 48 pp; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247795/8ST

31 093938 UNCONDITIONALLY PREEMPTIVE BUS PRIORITY SYSTEM: SUMMARY OF SIMULATION RESULTS. A large number of simulation runs of an urban network traffic model have been used to evaluate a Bus Priority System (BPS) algorithm that automatically grants a green signal to buses as they approach an intersection. BPS was found to provide substantial travel time improvements (20 to 30 percent) to buses in local service (frequent stops) at all headways, to buses in limited service (infrequent bus stops), and to express service (no bus stops) at headways of one minute and less. The disrupting effect of BPS on cross-street traffic is much less when far-side bus stops instead of near-side bus stops are used. The use of BPS also reduced the delaying effect of buses on other bus-street traffic. For all conditions tested, total passenger travel time per hour of system operation improved when BPS was used.

Ludwick, JC Jr ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0026) MTR-6986, UMTA-VA-06-0026-75-1, July 1975, 39 pp; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247976/4ST

31 094014 URBAN TRANSPORTATION INFORMATION HANDBOOK. This handbook is intended to provide a ready reference tool which offers an initial orientation to the sources of information in the field of urban transportation. It concentrates on sources of information rather than a listing of published research. These sources include: (1) Basic books and reports; (2) bibliography, directories and services; (3) statistics and fact books; (4) periodicals; (5) research organizations, university programs and transportation libraries; (6) industry and professional organizations; (7) conferences; and (8) the government role, a section which contains an overview of the structure and organization of the U.S. Department of Transportation as well as a review of key legislation and legislative processes that operate to develop national transportation policy. A glossary of acronyms is provided.

Fletcher, WS Davis, S ; Atlanta University, Urban Mass Transportation Administration, (UMTA-GA-11-0003) Res. Rept. UMTA-GA-11-0003-75-1, Oct. 1975, 202 pp; Contract GA-11-0003; ACKNOWLEDGMENT: NTIS, Federal Highway Administration;

ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-248391/OST

31 094161 ENGINEERING INVESTIGATION OF MARINE ALTERNATIVES FOR RAPID TRANSIT IN OAHU, HAWAII [Technical rept]. The report covers the preliminary study of the Marine alternative to the land-based rapid transit system for the city and county of Honolulu to be operational by 1979. The objective of this study is to determine, particularly from engineering viewpoints, the feasibility of the inland waterways system which will convert the existing canals and drainage streams into navigable channels. Major efforts under this study include study of: The hydrological and oceanographic constraints; dredging requirements; canal feeder boat requirements; and preliminary cost data involving initial construction, operation, and maintenance of the waterway potential of four selected drainageways on Oahu--Ala Wai Canal and Manoa-Palolo Stream, Nuuanu Stream, Kapalama Drainage Channel, and Kalihi Stream. These waterways will be related to four local route systems, namely Hawaii Kai, Kahala, Ala Wai, and Moanalua-Kapalama-Nuuanu. It was concluded that the construction, operation, and maintenance of the four selected waterways seem to be technically feasible; but their economic feasibility cannot be determined until the entire Oceanic Express System is thoroughly analyzed.

Lee, TT Nicinski, SA ; Hawaii Univ., Honolulu. Sea Grant, Program.*National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea, Grant. -04
UNIHI-SEAGRANT-TR-75, NOAA-75120201, Aug. 1975, 77p; Grant NOAA-2-35243; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-248373/3ST

31 094168 FULL COSTS OF URBAN TRANSPORT. PART III. AUTOMOBILE COSTS AND FINAL INTERMODAL COST COMPARISONS. Contents: Costs, peakload pricing, and optimal service levels for urban expressways; the full costs of an urban work trip--auto versus bus and rail transit. Portions of this document are not fully legible.

Keeler, TE Merewitz, LA Fisher, P Small, KA ; California University, Berkeley, National Science Foundation Monograph-21, NSF/RA/S-75-069C, July 1975, 167 pp; See also PB-248145; Grant NSF-GI-37181; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248147/1ST, DOTL NTIS

31 094293 SHIRLEY HIGHWAY BUS-ON-FREEWAY PROJECT EVALUATION STUDY. The Shirley Highway Bus-on-Freeway Demonstration Project seeks to ease traffic congestion and shorten travel times for bus and auto travelers commuting during rush hour periods via the Shirley Highway Corridor from Northern Virginia suburbs to employment centers in Washington, D. C. This and other project goals, which include reducing vehicle-caused air pollution and improving bus service, can be attained by effecting an auto-to-bus modal shift by persons commuting via the Corridor area. Three project elements--(1) an exclusive bus lane on the Shirley Highway and bus priority lanes within the District of Columbia; (2) improved bus service including new-look/new-feature buses; and (3)

park-and-ride facilities will, according to the premise under which the project was conceived, effect this modal shift and achieve a substantially increased bus market share. The Technical Analysis Division, National Bureau of Standards, is evaluating project performance with emphasis on the effectiveness of the three project elements. This paper describes evaluation procedures used during the first year and identifies difficulties encountered with various monitoring procedures, as well as presenting preliminary conclusions and plans for future activities.

Miller, GK ; National Bureau of Standards, (NBS-4314552) Final Rpt. 1974, 14 pp; Pub. in Proceedings of Social Experiments and Social Program Evaluation Symposium, Gaithersburg, Md. 22 May 72 p40-53 1974; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, ilable NTI; PB-247039/1ST

31 095042 TECHNICAL REPORT FOR COTA TRANSIT DEVELOPMENT PROGRAM. The purpose of the study of which this report is part is to evaluate and to set before the Central Ohio Transit Authority all meaningful short-term (five year) options to be used in its transit development program. While the primary purpose of this report is to recommend new transit service, it considers the many related services that are essential in achieving quality service and in developing strong consumer response. The first three chapters present a background on the existing service with a summary of recommendations. The present Columbus Transit Company routes are thoroughly evaluated with a revenue/cost analysis as a basis for suggesting adjustments to existing lines. Chapter four discusses new bus service in which twenty-nine new routes and extensions are studied and set according to priority. Chapter five points out ways to achieve faster transit service on existing streets and freeways and recommends a new concept--the reverse direction freeway bus lane. Chapter six reviews existing neighborhood service provided in the Model Cities area and in other areas by crosstown routes. COTA's relationship to the other two local private carriers is discussed in Chapter seven. Chapter eight outlines capital equipment needs including bus stop shelters, a radio system, information system and a centralized maintenance facility. Chapter nine recommends an evaluation to rapid transit beginning with fringe parking, through acquisition of space along rail right-of-way for busways, culminating in the development of a separate right-of-way new technology system. There is much documentation in the form of tables, maps of the system, and a bibliography.

Mid-Ohio Regional Planning Commission Intrm Rpt. Feb. 1973, 95 pp; Prepared for the Central Ohio Transit Authority; Contract OH-09-0011; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche

31 095381 RAILWAY SERVICES COVERING THE NEW TOWN OF EVRY [Desserte ferroviaire de la ville nouvelle d'Evry]. This detailed memorandum explains the stage reached in the infrastructure work for construction of the line from Grigny to Corbeil via Evry. Electrified with 1500 V direct current, this 10.7 km line, which is a diversion from the main Paris-Corbeil route, is designed to serve 14 localities through 4 stations.

The report includes numerous statistical data on the geological studies covering the site, the constraints imposed by urbanization of the region served and various details relating to the civil engineering work and the buildings intended for passengers and operation of the line. [French]

Gambart, H *Informations Techn SNCF-Direction de l'Equipement* No. 13, June 1974, pp 3-18, 16 Fig.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: Societe Nationale des Chemins de Fer Francais, Paris, France Repr. PC

31 096322 TEMPORARY CAR POOL LANE IN THE EL MONTE BUSWAY. Transportation planners had a unique opportunity to study the operation of a car pool lane during the recent bus strike in Los Angeles. Drivers and mechanics for the Southern California Rapid Transit District (SCRTD) went off the job on August 12, 1974 in a strike that lasted ten weeks. The impact of the strike on the travelling public was most pronounced on the San Bernardino Freeway, where the added numbers of automobiles, primarily from passengers of the El Monte Busway, resulted in additional travel delays of 10 to 15 minutes. To relieve congestion, the Busway lanes were opened for carpools of three or more persons beginning with the second week of the strike. Some of the important observations and conclusions from the study of the car pool lane follow: the bus strike caused 10 to 15 minutes additional delay in the morning (Westbound) and 5 minutes in the evening (Eastbound); carpools of 3 or more persons were allowed to use the Busway lanes if they obtained and displayed a permit-1,620 permits were issued; opening of the busway lanes to car pools caused an improvement of about 6 minutes travel time on the regular freeway lanes in the morning, but none in the afternoon; with the heavier traffic in Autumn, car pools using the special lane were able to save up to 20-30 minutes one-way; a level of usage of 700 car pools (about 2,300 persons) per peak period was attained; an average of 33 or 5.7% of those using the lane were violators; less than one-fourth of bus commuters regularly used the exclusive lanes during the strike and almost one-half drove alone; at the time of the survey almost one-half of the car pool lane users had been in car pools before the strike; busway signing and striping was adequate for its safe and efficient operation; only one accident was recorded by the California Highway patrol on the exclusive lanes during peak period operation.

Gallagher, MP ; California Department of Transportation Feb. 1975, 43 pp, 41 Fig., 4 Tab., Photos., 3 App.

31 096717 PASSENGER TRANSPORT INTERCHANGES ON MERSEYSIDE: RESULTS AND CONCLUSIONS. The article discusses the results of a package of car/rail and bus/rail experiments carried out on Merseyside, levels of patronage, modal changes and financial results are shown and the role which such facilities can play in the overall transport system is described. Resulting recommendations are discussed and their overall impact is estimated. Finally, recommended plans for future studies and implementation on Merseyside are described. /Author/TRRL/

Millward, C Coletian, AH Dunford, JE *Traffic Engineering and Control* Vol. 15 No. 16/1, Aug. 1974, pp 744-748, 2 Fig., 6 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 211623)

31 096725 TRAFFIC PROBLEMS IN A LARGE CITY [Problemi di una Grande Citta. La Circolazione Veicolare]. This article discusses the pedestrian precinct of Milan's city centre. It is pointed out that whilst the experiment has appreciably reduced traffic congestion in the area, it does not by any means solve the traffic problems of the city as a whole. Milan's population has doubled since 1925 and the built up area has exceeded the city boundaries. In social and community costs, traffic congestion accounted for 160 billion lira in 1970. The author suggests that the solution to the traffic problem would be a financial plan for the whole urban area, to finance the construction of roads, over-and under-passes, and underground railways. /TRRL/ [Italian]

Pastorino, S *Strade* No. 5, May 1974, pp 261-267, 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 211592)

31 096745 THE ECONOMIC, FUNCTIONAL AND TECHNICAL DEMARCATION OF THE RAILWAY, ITS LINK WITH OTHER TRANSPORT SYSTEMS, AND THE CO-OPERATION BETWEEN INDIVIDUAL TRANSPORT UNDERTAKINGS IN CITY REGIONS. The author begins by sketching the growth of large conurbations in West Germany and links this to the development of the transport infrastructure. Future increases in car ownership and trip-making will, it is postulated, lead to considerable increases in congestion which can only be avoided by greater usage of public transport. This requires improvements in comfort, speed, convenience and cost, if people are to be attracted. The desirable qualities of such a system must include low headway involving few interchanges, with high capacity, flexibility for fluctuating demand, low environmental impact and high degrees of automation and safety. Different modes are compared for their capacity and roles in urban travel, particular attention being paid to the S-Bahn, which is for short distance rail travel. Transport communities have been established in Munich and Hamburg to provide comprehensive planning and co-ordinated routes and decide on fares policy and revenue distribution. Revenue from the joint tariff is distributed to the different operating companies according to operating cost, but with an allowance for performance. Deficits are covered at the Federal, regional and local level. /TRRL/

Wolf, W Stertkamp, W *Rail International* No. 1, Jan. 1973, 10 pp, 2 Fig., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 211580)

31 097202 FINANCIAL PLANNING FOR THE CONSTRUCTION OF A REGIONAL AIRPORT. This paper describes a key implementation tool for financial planning applied to a major expansion of the metropolitan airport system in Louisville, Kentucky. The tool is a financial model including detailed forecasts and regional and national economic assumptions. The methodology developed airport facility requirements, implementation phasing, activity forecasts, and facility requirements in response to the defined need. A cash flow model was developed, and consideration was given to land acquisition, relocation, a passenger terminal, parking facility, runway and taxiway construction, and other project development costs. A technique for scheduling capital costs consistent with annual

assessment of demand was developed. Revenues and costs anticipated for airport operation were defined, and the contributions to project revenues of the Federal Aviation Administration through the Airport Development Aid Program and the Federal Highway Administration were analyzed and projected. The model places major emphasis on inputs, outputs, and mathematical logic. Pessimistic, likely, and optimistic ranges of parametric values input to the cash flow model were used to treat conditions of uncertainty. The final results of the fiscal planning exercise became an input to the site selection process.

Schimpeler, CC Corradino, JC (Schimpler-Corradino, Associates) Unger, VE Jarvis, JJ (Georgia Institute of Technology) Connors, WJ (Louisville & Jefferson County Air Board, Kentucky) *Transportation Research Record* No. 529, 1975, pp 17-23, 1 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

31 097471 INTEGRATION OF TRANSIT SYSTEMS. SUMMARY. This summary volume contains conclusions reached in the three main volumes of the report, "Intergration of Transit Systems." The objective of the report is to assess the potential for interagency and intermodal intergration of transit systems in U.S. urban areas, drawing on an analysis of the successful experience of European transit systems. Vol. I documents the need for transit intergration in U.S. urban areas, presents the conceptual and evaluative framework, and reviews current transit intergration efforts by Federal, State, and local governments. Vol. II describes in detail four major European transit systems (London, Hamburg, Paris, Munich); gives brief descriptions of six others; and summarizes and appraises the applicability to U.S. systems of European successes. Vol. III deals with the application of these techniques to Philadelphia, San Francisco and Seattle, to an archetypal smaller urban area, and makes a brief assessment of the potential for application in six other U.S. cities. This summary volume serves as a guide to the location of detailed factual information upon which conclusions presented here are based, as well as a summary of the study's findings. An outline of the study and the steps in its execution are presented. The salient points of each volume are brought together, including definition of the forms which intergration may take, evaluation of U.S. deficiencies, an approach to identifying systems ready for intergration and estimates of costs of U.S. expansion and improvement.

Krzyczkowski, R Vuchic, V Remak, R Henne-man, S ; INTERPLAN Corporation, (7123 R) UMTA-RI-06-0005-73-4, Oct. 1973, 6 pp; Three volume set available through NTIS, PB-241269, \$25.00; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. Pc, Microfiche; PB241-273/AS

31 097472 INTEGRATION OF TRANSIT SYSTEMS. VOLUME III-TRANSIT INTEGRATION IN THE U.S. URBAN AREAS. This is the third of a three volume report designed to assess the potential for interagency and intermodal integration of transit systems in U.S. urban areas, drawing on an analysis of the successful experience of European systems. This volume deals with the application of techniques which have contributed to the success of European systems to three major U.S. cities: Philadelphia,

San Francisco, and Seattle. This application of techniques was also tested in an archetypal smaller urban area, "Middletown." The procedure is described by which a selection was made of representative areas for investigation from the 243 SMSA'S in the U.S. Also described is a preliminary investigation of 30 major metropolitan areas and the further investigation of 17 others by means of literature searches, questionnaires, wish lists, and field investigations. The report then reviews the final selection of three areas where different European approaches to intergration could be applied. The report contains a number of profiles and includes an assessment of the transit intergration potential in Baltimore, Cleveland, Los Angeles, Miami, New Orleans, and San Diego. Suggested programs for transit intergration are presented for the three major U.S. cities and "Middletown." Discussions present descriptions of area characteristics, existing public transit services, Local transportation planning and efforts at transit intergration, and a program outline to integrate the metropolitan area public transit services. Appendices are included.

Krzyczkowski, R Remak, R ; INTERPLAN Corporation, (RI-06-0005) UMTA-RI-06-0005-73-3, June 1973, 343pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB241-272/AS

31 097484 BUS ONLY STREETS IN CENTRAL TOWN AREAS [Bussgator i Centrala Stadsomraaden]. The study is intended to examine the effects of the introduction of bus only streets on different groups of the population and is being carried out through a survey of reports and other material from municipal authorities etc, and by means of specific studies, in eight Swedish towns. Several of the streets being examined are transfer points for bus routes in the town centres and have heavy bus traffic. Other motor traffic has been reduced by 70-90% in the bus only streets. Ease of thoroughfare has increased for buses but not changed appreciably for other motor vehicles. The number of accidents has been reduced by 20-40%. Traffic noise has been reduced. Air pollution has not changed consistently; in one case only has a reduction in carbon monoxide been noticed. In all other cases no significant changes have appeared for carbon monoxide, sulphur dioxide and soot content. Retail trade seems to have declined somewhat in towns where comparatively great changes in traffic regulations have appeared. An attitude survey shows that the majority of those interviewed are in favour of bus only streets. /TRRL/ [Swedish]

Holmberg, B ; Nordiska Institutet foer Samhaellsplanering R&D Rept. No. 1974:3, 1974, 60 pp, 15 Fig., 4 Tab., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD 211698)

31 097876 ROLE OF PSYCHOLOGICAL NEEDS IN MASS TRANSIT. This paper discusses the need for the use of psychological considerations in the planning of mass transit. The authors develop a set of basic psychological human needs and discuss how they might be applied to improve the image and quality of mass transit. These needs are also used to evaluate present-day bus operations as well as two modes

of personal rapid transit vehicles. A section is also devoted to discussing how such a psychologically-oriented approach might influence transit marketing in order to achieve maximum effectiveness. (Author)

Tehan, C Wachs, M *High Speed Ground Transportation Journal* Vol. 9 No. 2, 1975, pp 35-50; ORDER FROM: California University, Los Angeles, School of Architecture and Urban Planning, Los Angeles, California, Repr. PC

31 098117 AREA TRAFFIC CONTROL IN LEICESTERSHIRE. This article describes the wide area traffic control system which has been installed in Leicester to control the complete city's traffic flow from one central office. The objects of the system are to minimize journey time by co-ordinating traffic signals (but still allowing for alternative plans favouring public transport or special vehicles) and the provision of a continuous and automatic signal fault monitoring system. An outline of the method of operation is given which uses a Honeywell computer and the Transyt program. Automatically selected plans (each junction can have as many as 20) will cater for the majority of traffic patterns, but the operator can over-ride the automatic system if necessary or can alter the timings at junctions. Special detector units are used to monitor traffic supplemented by 12 closed circuit television systems. The article includes a summary of contract details (the overall cost was 524,000 pounds) & future developments are discussed. /TRRL/

Highways and Road Construction Vol. 42 No. 1779, Nov. 1974, p 16, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 212061)

31 098480 THE ROLE OF REGIONAL TRANSPORT TODAY AND IN THE FUTURE. Regional transport is defined (as all transport which does not form part of the major urban transport system of intermeshing areas or of long-distance transport) and categorized into public road and rail passenger transport, and rail freight services. The development of these undertakings is considered in some detail, and the role of regional transport and its ability to fulfill it is examined. The traffic in each of the above areas of regional transport is reviewed. Employment figures are examined, and operating ratios are considered. The question is discussed whether transport undertakings are in a financial position to meet requirements imposed on them. The results of a questionnaire survey on this subject are analyzed. Reasons for the unsatisfactory financial situation of regional transport are listed and discussed, and the present and future tasks of regional transport are outlined. Measures to improve regional transport (collaboration with public authorities; horizontal cooperation, complementary cooperation and vertical cooperation; and internal measures by regional transport) are detailed. Regional transport policies and the basis for a positive future for regional transport are also discussed.

Schlagelbauer, V ; International Union of Public Transport No. 2, 1975, pp 3-25, 15 Fig., 19 Ref.

Presented at the 41st International Congress Nice, France, 1975. Also available in French and German.

31 098668 BUS USE OF HIGHWAYS: PLANNING AND DESIGN GUIDELINES. Over 200 bus priority treatments in the U.S. and abroad

were reviewed in the preparation of these guidelines for efficient bus utilization of urban highway facilities. This report which complements an intensive report on the state of the art of bus use of highways, presents the principal findings of 10 study tasks and contains significant bus design parameters, concept and criteria, planning and design guidelines for principal bus priority measures, and measures of effectiveness associated with bus highway facilities. The dimensions of bus use are reviewed, the types of priority treatments are categorized (relating to freeways, arterials and terminals), characteristics of successful treatments are described, and the policy perspective is discussed. The selection and application of appropriate types of treatment of specific urban situations calls for realistic assessment of demands, costs and impact. Factors implicit in the selection process are listed. Factors which contribute to achieving bus priority objectives are discussed, and the general sequence of bus priority treatments are set forth. The principals in formulating warrants and the measurement of effectiveness and impacts are discussed. Freeway, arterial, and terminal planning guidelines are detailed. The overall research program of this study included 10 basic studies segregated into four principal phases: orientation; review analysis of current treatments, experiments, and proposals; concept and guideline formulation; and final report preparation. This report recognizes that bus priority facilities become important when (1) economic or environmental conditions make it infeasible to provide additional highway capacity, and (2) there is an expressed desire to encourage public transport use.

Levinson, HS Adams, CL Hoey, WF (Smith (Wilbur) and Associates) *NCHRP Report* No. 155, 1975, 161 pp, 105 Fig., 45 Tab., 52 Ref., 3 App.; This research was sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration.; ORDER FROM: TRB Publications Off

31 099130 ALTERNATIVES TO THE AUTO. Detroit photographer Ernest Werts documents the effect of a devastated auto industry on his home town. Other features in this special issue report on Holland's new electric Witkar, the bus as the present answer to U.S. public transit needs, bikeways in this country and in Europe, and Victor Gruen's pedestrian plan for Vienna. The entire issue is devoted to bicycle/pedestrian planning in recognition of MAUDEP's (Metropolitan Association of Urban Designers and Environmental Planners) second international seminar on this subject held in Amsterdam, May 1975.

Ferebee, A *Design and Environment* Vol. 6 No. 1, Mar. 1975, pp 11-15

31 099151 THE BRADFORD BUS STUDY. 1. PROPOSALS AND PROGRESS. Arising from the decision many years ago to build a transport interchange in Bradford, the Bradford bus study has been designed to fulfil a much wider need. The purpose of this article is to outline the basic form of the study and the progress up to the middle of 1974. A discussion of the background to the study design is given. From the outset it was considered that the planning of public transport should not be based solely upon the assumption of restraints on the use of cars. The study is being carried out

in four parts; bus role study; bus costing study; bus routing study; and bus promotion study. The inter-relationship between these studies is shown and a description of their objectives and progress is given. By this detailed examination of the many facets of bus operations, costs and use, the study is expected to produce results useful not only to Bradford, but also to West Yorkshire and the nation. /TRRL/

Parker, GB (Travers Morgan (R) and Partners) *Traffic Engineering and Control* Vol. 15 No. 19, Nov. 1974, 4 pp, 3 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 212117)

31 099284 TRANSPORTATION FACILITIES WORKSHOP: PASSENGER, FREIGHT AND PARKING. Papers and reports presented at the three-day workshop on Transportation Facilities are published here. The papers which examine policies in conflict, present the government and industry perspectives on the subject of transportation, energy and the environment. The workshop papers cover transit station planning and design; the freight industry response to the transportation energy crisis; transportation control plans and their impacts upon urban parking; air terminal planning and design; freight consolidation; and the development of parking programs for tomorrow's environment.

Kraft, WH Fruin, JJ ; American Society of Civil Engineers 1975, 558 pp; The Transportation Facilities Workshop was held in New York from May 22-24, 1974. Co-sponsored by the American Society of Civil Engineers, Carnegie-Mellon University, Transportation Research Institute and the Metropolitan Association of Urban Designers and Environmental Planners.; ORDER FROM: ASCE

31 099521 AIRPORT GROUND ACCESS: AN OVERVIEW OF CURRENT MODES. Airport access systems are defined in four categories: distribution within airports; circulation within airport complexes and environs; access to the airport complex from remote points in the urban area; and regional high speed systems. The concept of airport access, and difficulties associated with special purpose solutions outside the general urban transportation problem are addressed. Systems that are available, or are under development, for each category are discussed, and the status of development of more advanced systems is described. Some of the systems reported include moving walks, high speed moving walks, loops shuttles, remote parking links, special purpose access links, and high speed regional systems. /GMRL/

Ross, HR (Ross (Howard R) Associates) ; Society of Automotive Engineers, (SASI-75-1086) SAE #750622, Apr. 1975, 14 pp; ORDER FROM: ESL

31 099697 SIMULATION OF A METROPOLITAN BUS SYSTEM. This paper discusses the use of a GPSS/360 simulation model to analyze the bus service of the metropolitan bus system in Madras, India. The system has been unable to obtain enough buses to keep pace with demand and has waged a constant battle to keep its existing buses rolling. The factors contributing to the system's major operational problems have been identified and incorporated in the model. A comparison of the model's output with historical data shows that it is suitable for analyzing

operational problems, and it is expected to be useful for tactical planning and for improving future operations. /Author/

Veerapandian, M Ramani, S *Simulation* Vol. 24 No. 6, June 1975, pp 133-136

31 099720 BUS DEMONSTRATION PROJECT. SUMMARY REPORT NO. 6 FORMBY, BUS FEEDER SERVICE TO THE LOCAL RAILWAY STATION. This report describes a bus feeder service introduced at Formby in November 1970, to provide commuters with a bus service to the local railway station. The service initially connected with four morning trains to Liverpool and four returning trains in the evening and was designed to minimise, within reason, the interchange times between the bus and train. The purpose of the scheme was to test, firstly, the willingness of the public to accept a bus-rail transfer during their journey and, secondly, the attractiveness of an integrated bus-rail mode to car commuters. It was also intended to measure the net costs and benefits that might accrue to the overall public transport system. The service, which was launched after market research surveys had estimated the potential demand, was monitored to determine patronage and the modes previously used by passengers. It has been evaluated in terms of the net gains and benefits to the public transport network; attitudes to the service were also studied. Detailed attention was given to marketing; many of the pricing and promotional strategies in particular have included innovative features. Passenger volumes have been increasing steadily since inauguration and the forecast demand was achieved in the second full year of operation. A sufficient number of car commuters have been attracted to the service for there to be a net financial gain, although the bus feeder revenue taken alone does not cover the operating costs. The scheme has indicated the value of market research, which forecast adequate demand in an estate which might have seemed too close to the station to justify such a service. Three more detailed reports under the series title 'The Formby Bus-Rail Demonstration Project' have been prepared by the school of business studies, Liverpool University and are available from the Transport and Road Research Laboratory. (a). For abstracts of the 3 reports in the series "the formby bus-rail demonstration project", see IRRD abstracts nos 58583, 210664, and 203548. /TRRL/

Department of the Environment, England R&D Rept. No Date, 15 pp, 4 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 211976)

31 125102 GREATER LONDON TRANSPORTATION SURVEY (GLTS). A STUDY OF TAXI TRIPS. This memorandum reports on investigation into characteristics of taxi trips as part of GLTS. It details sources of data, method used to prepare data for analysis, validation against Thames screenline counts and expansion to 1972 traffic levels. It presents results of analysis of trips with origin to destination (o-d) matrices for taxi-cabs and passengers, with additional matrices for British Rail termini in the central area. It gives trip length distribution by time and distance, distribution of trips during the day, variations in passenger occupancy by time of day and length of trip, and the distribution of shift working hours. Results are compared with those

from lts in terms of total trips, distribution within the day and distribution between areas of London. /TRRL/

Talbot, MF ; Greater London Council R&D Rept. Research Memo 307, 1974, 61 pp, Figs., Tabs., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212715)

31 125220 KINGSWAY ISLAND PEDESTRIAN SUBWAYS. This article gives an outline of the design and construction of a subway system which has been constructed at the junction of the Kingsway with Princess Way and other streets. It consists of a sunken island linked with five radial subways and two perimeter subways, designed to provide for a flow of 3400 pedestrians per hour. The author gives a brief account of the main construction work. The first stage of this work, commenced in 1972, involved excavation of the outer grass verges, cutting of the existing concrete road and excavation of the radial subways and placing of 3.1m by 2.4m by 1.2m precast concrete subway units, each weighing 8 tons. The author follows this with an outline of the joining of the radial and peripheral subways, the excavation of the central island and the construction of the ramps and steps. He then gives an outline of the accommodation works and finishing. This involved lining the walls with tiles, the provision of adequate drainage and lighting, the provision of a wall to prevent exhaust gases entering the pedestrian area; the use of coloured paving slabs, trees, bushes and shingle to improve its appearance, and the provision of seats for weary pedestrians. The author reports that good use is being made of the subways, which were opened in 1973. /TRRL/

Lawrence, C *Institution of Municipal Engineers, Journal of* Vol. 102 No. 2, Feb. 1975, pp 29-30, 1 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 212992)

31 125629 STEVENAGE SUPERBUS EXPERIMENT. SUMMARY REPORT. A cost benefit study made in 1969 concluded that if a sufficient proportion of the working population of Stevenage who used cars for their work journey could be attracted to bus travel, then a community benefit would be gained by avoiding the need for increased road capacity at major intersections. An experiment was carried out in Stevenage to test the conclusions of the study by improvements in bus services and fare reductions, and in particular to investigate the possibility of attracting car users to improved public transport. This report is based primarily on results recorded between March 1971 and the end of July 1972. The experiment continues and notes on the service since July 1972 are appended. The phased changes made in the service between March 1971 and February 1972 and their effect upon patronage, are summarized. These changes included introduction of one-man operated single deck buses improvement in service frequency during both off-peak and peak periods, and further reductions in fares. Household interviews before and after the service changes showed that of the people working in areas directly served by superbus, 10% fewer were driving to work after the improvements. In other areas not served by superbus there was an increase in the number of people driving cars to work during the same period. The financial deficit on the services in the summer of 1972 was ,660 per week, which was approximately

30% of the running costs of the service (including an allocation for overheads). In summer 1973 the deficit was ,738. In monetary terms, the benefit to bus travellers due to reduced waiting time and increased travel is estimated at ,2,000 per week, assuming current department of the environment values. /TRRL/

Department of the Environment, England, University College, London R&D Rept. No Date, 24 pp, 2 Fig., 7 Tab., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 213007)

31 125857 HUMAN FACTORS... PUBLIC TRANSPORTATION. Four papers are included in this section of the Proceedings: Human factors research in urban transportation; Psychological design factors in urban public transportation vehicles; human factors involved in current public attitudes toward public transit concepts; and Bus modification to improve safety, comfort and human reliability.

Human Factors Society 1974, pp 1-17; Proceedings of the 18th Annual Meeting.; ACKNOWLEDGMENT: British Railways; ORDER FROM: Human Factors Society, 1134 Montana, Santa Monica, California, 90403 Repr. PC

31 125896 THE RAPID BUSWAY OR THE RAPID TRANSIT RAILROAD? The author counters the recent arguments favoring the busway as an economical alternative to full-scale rapid rail transit. It is argued that bus operation introduces high labor costs and a subway-type busway in a center city could actually cost more than a rail subway in the same site. The costs of the Lindenwold line are analyzed and a fully equivalent busway operation is estimated.

Holden, WHT *Third Rail* Vol. 1 No. 4, Apr. 1975, pp 44-45; ORDER FROM: Third Rail Press, P.O. Box 79, Babylon, New York, 11702 Repr. PC

31 126059 MUCH WE CAN LEARN FROM U.S. ON TRANSPORTATION. The author describes one rail-based, and one bus rapid transit system, as seen on a visit to North America in 1974. He first outlines the scope of American transport problems, as seen by the Federal Secretary of Transportation. Poor coordination of transportation planning and management are blamed. Peak-hour capacity creates the greatest operational difficulties; fewer than 25% of seat-miles are used. Responsibility for administration is shared among federal, state, county, city and town councils, which are often at odds. Recent progress has been made, with the unified transportation assistance programme (\$19.3 billion). This is a six-year plan, coordinating highway and urban mass transit expenditure, under each state Governor's control. Progress on the 98-mile Washington Metro is described. It is proving more expensive than planned, but is proceeding on schedule. Automated service every 2 minutes, in peak hours, is planned. Generous park-and-ride provision is planned, but coordinated bus feeders should provide 2/3 of riders. The automated fare collection system, using magnetic cards, and the design of stations, vehicles, and a novel railbed, are described. Also discussed is the Shirley Highway metrobus service. This collects from Virginia suburbs, and runs on special way up the central reservation of a very congested dual carriageway, 19 miles into

Washington. Ridership has increased 450% since the first year of operation. The average passenger load is 50, and the service is generally very successful. /TRRL/

Mustow, SN *Municipal Engineering* Vol. 152 No. 5, Jan. 1975, pp 207-10, 1 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 213506); ORDER FROM: ESL, Repr. PC, Microfilm

31 126061 A TYPOLOGICAL APPROACH TO INDIVIDUAL URBAN TRAVEL BEHAVIOR PREDICTION. With the use of cluster analysis a sample of 1018 residents of the San Francisco bay area was classified into eleven types of urban residents on the basis of overall similarity of personal and environmental characteristics, and independently into nine types of travel behavior. The relations between the two typologies, and the comparative travel behavior of the types of urban resident were investigated in an attempt to gain insight into the determinants of urban travel. The probability of the correct assignment of a travel behavior type to an urban resident type was of the order of 0.30. Monte Carlo simulation methods were used to test empirically whether the value of a given travel behavior characteristic for a given urban resident type can be assumed to be higher (or lower) than the value in the general population, thus testing the predictability of the travel behavior of the various urban resident types. Conversely, the prediction of the urban traveler's personal characteristics his travel behavior type was also evaluated. This typological approach made the prediction of the usage of the San Francisco Bay Area rapid transit system (for going to work, for going to shop, for going out for leisure, or for some other purpose) possible, in about 15% of the cases, from the knowledge of the urban resident type and, in about 25% of the cases, from the knowledge of the travel behavior type. /Author/TRRL/

Oppenheim, N (Texas A&M University) *Environment and Planning* Vol. 7 No. 2, 1975, pp 141-52, 11 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213495); ORDER FROM: Pion Limited, 207 Brondesbury Park, London NW2 5JN, England Repr. PC

31 126197 THE INFLUENCE OF SERVICE FREQUENCY ON TRAFFIC VOLUMES IN MASS TRANSIT [Turtaethetens Inverkan paa Trafikmaengden i Kollektiv Lokaltrafik]. This paper deals with the problems of separating the influence of frequency from a great number of other parameters which also affect traffic volume. The investigation area is close to the central business district of Stockholm with an underground line which had its time table intervals changed from 10 to 15 and from 15 to 7.5 minutes. This area is compared with similar areas served by other underground lines with no change in frequency. Similarity and constancy or co-variation of most parameters whose influence cannot be correctly compensated for or avoided by the layout of this investigation is checked for all areas. After 2 years there is an increase in traffic with at least 16% during 0900-1500 hours and at least 10% during late evening traffic. /TRRL/ [Swedish]

Grindahl, T ; Royal Institute of Technology, Sweden R&D Rept. No. 1, 1974, 73 pp, 7 Fig., 16 Tab., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-213453);

ORDER FROM: Royal Institute of Technology, Sweden, Fack S-10044, Stockholm 70, Sweden Repr. PC

31 126479 WASHINGTON METRO ACCESS FACILITIES. The 98 mile (158 km) Metro system will have 82 stations. There will be an off-street bus terminal at 54 of the stations with an average of six modified saw-tooth off-street bus bays at each terminal. There will be 26,000 parking spaces located at 32 stations. Forty-six stations will have kiss and ride spaces. Each of the 1,650 flow-through kiss and ride spaces will be designed so that the auto will not have to back up while picking up or discharging a passenger. Sixty-six of the stations will have rental bicycle lockers and free chain-rack type facilities for locking the frame and wheels. Access to the Washington Metro rail system is the key to its success. Parking is an integral portion of the entire access design. /CE-ASCE/

Akins, MM *ASCE Civil Engineering* Vol. 45 No. 7, July 1975, pp 63-65, 3 Fig., 1 Phot.; ORDER FROM: ESL

31 126517 NATIONAL MARKET FOR URBAN TRANSIT VEHICLES. This report is based on a survey of transit operators in Canada and generally reflects current policies and conventional operating practices and does not consider the possibility of new transit concepts. It details the 1978 and 1983 markets for minibuses, buses, trolley coaches, streetcars, rapid transit cars, and light rail transit vehicles.

Kates, Peat, Marwick and Company 11 pp, 8 Tab.; Study conducted for Transportation Development Agency, Canada.; ORDER FROM: Kates, Peat, Marwick and Company, P.O. Box 31, Commerce Court Postal Station, Toronto, Ontario, Canada Orig. PC

31 126855 ARCO'S SEARCH FOR IDEAS ON PUBLIC TRANSPORTATION. An attempt is made to distill conclusions from over 30,000 responses (from 50 states and 21 foreign countries) to the Atlantic Richfield Company's public call for ideas on public transportation. The responses were categorized into 29 classes and tabulated according to ideas and cities (chosen to reflect a number of important dimensions such as age of city, existing facilities etc.). Fare structure attracted more attention in Chicago, New York and Philadelphia, and a significant number of letters discussed limitation of automobile traffic. The design of new systems, and transit union's role was more important in Los Angeles. The responses were again categorized in terms of basic approach to improve public transportation: quality of service, finance and organization, and technology. Comparison of the relative frequency of the 3 basic approaches indicates that a high degree of conflict will be generated by any proposed improvement. Few people understand the complexities and many "trafe-offs" that have to be made in planning public transportation. The study leads to the conclusion that the general public is relatively uninformed on many aspects of public transportation.

Kriste, GV (Atlantic Richfield Company) Klett, FR (California University, Los Angeles) *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 21-28, 3 Tab.

31 127381 1970 TRAVEL CHARACTERISTICS: TRIP LENGTH. This report is one of a series summarizing 1970 Travel Characteristics in the Chicago-Northwestern Indiana Region. One of the most important characteristics of urban travel is trip length. A knowledge of current trip lengths, as well as an understanding of how trip lengths may be altered by changing urban travel environment, are vital to the travel forecasting process. While most trips tend to be short, the longer ones have the greatest impact on transportation facilities. Trips over 5 miles in length constitute less than 30 percent of all trips but account for 75 percent of all passenger miles of travel.

Northwestern Indiana Regional Planning Commission, Chicago Area Transportation Study CATS 372-49, Feb. 1975, 43 pp, 10 Fig., 11 Tab., 8 Ref.; ORDER FROM: Northwestern Indiana Regional Planning Commission, 8149 Kennedy Avenue, Highland, Indiana, 46322 Repr. PC, Chicago Area Transportation Study, 300 West Adams Street, Chicago, Illinois, 60606 Repr. PC

31 127764 TRAFFIC IN GENERAL IMPROVEMENT AREAS. This document acts as a guide for local authorities in resolving conflicts of traffic and the environment in general improvement areas. It begins by discussing the general nature of G.I.A.'s and their relationship to the road hierarchy. Various surveys concerning noise, traffic and the street pattern are suggested to provide information for improving the area. A number of principles governing design are listed and these emphasize the need to share benefits across the area and to have self-regulating traffic controls. Design is examined under the headings of "roads on the perimeter of the G.I.A." and "local distributors" and the different problems of each situation are analysed in detail. Consideration is given to entry restrictions, speed control, bus operations, the maintenance of access for residents, parking, pedestrians, cyclists and goods vehicles. Short sections are added on the consultative processes, the sequence of the implementation of proposals and the methods used for monitoring results. Appendices on the road hierarchy and statutory powers are included along with an extensive bibliography. /TRRL/

Her Majesty's Stationery Office, Department of the Environment, England R&D Rept. AR Note 9, 1974, 45 pp, 24 Fig., 46 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-214349)

31 127976 PROVISIONS FOR CYCLISTS AND MOPED-RIDERS [Voorzieningen voor Fietzers en Bromfietzers]. The traffic department of the Royal Dutch Touring Club has made an investigation into the presence and planning of provisions for bicycle and moped riders in Dutch municipalities. The results, published in this article, relate to 538 municipalities (the response was 81%) with a total of 10.7 million inhabitants. The results are given per group of municipalities, on the basis of a classification by population. It appears that there are hardly any regional differences. Adjacent side paths for cyclists and moped riders are often found, especially in larger municipalities, and are still being designed as a new provision; however separate paths are more popular in all groups of municipalities. This is obvious from the number of existing as well as from the number of planned provisions of this kind. Bike-ways are much in evidence, especially in larger

towns, and are planned in many towns (for the coming five years). Special routes are found in all municipalities. There is no special preference for a certain combination of cyclists, moped riders and/or pedestrians. Attention is paid to traffic control systems which can be actuated by cyclists and moped riders. Cycle parks at shopping centers and at train, underground and bus stations are available. At bus and mass transit stops the possibilities for parking a cycle or moped are very small. In 18% of the municipalities there is a scheme for cycle routes or cycle paths. /TRRL/ [Dutch]

Verkeerskunde Vol. 26 No. 6, June 1975, pp 289-295, 13 Tab., 11 Phot. ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD-214753)

31 128158 1974 UTRECHT TRAFFIC MANAGEMENT PLAN [Verkeerscirculatieplan Utrecht 1974]. The deficiencies in the quality of the traffic system can be accounted for by the existence of discrepancies between land use, road network, traffic control, traffic volume and composition and behaviour of traffic. This short-term plan is meant to remove these deficiencies by means of an evaluation of the current situation as regards traffic flow and safety as well as its "tolerability". Much value is attached to the maintenance of the general level of accessibility. The proposed measures relate mainly to bicycle traffic and public transport. /TRRL/ [Dutch]

Slop, M *Verkeerskunde* Vol. 26 No. 4, Apr. 1975, pp 162-169, 8 Fig., 1 Tab., 2 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD-213413)

31 128564 EXCLUSIVE BUS LANES FOR CLEANER AIR. Many benefits have been identified in planning for the exclusive bus lanes (EBL) and other transportation proposals for Seattle's central business district. The contraflow dual EBL will improve bus service, reduce pollution and save energy by swifter traffic flow in the high volume areas. Bus stops could be relocated so that buses could load simultaneously with the red signal. It is estimated that with the new contraflow EBL system, the average transit speeds of all buses in the CBD will increase from 4.48 to 10.40 mph in peak hours. Travel times will also improve. The average speed of with-flow buses would be improved by over 2 minutes. Dual contra flow lanes can have a capacity of 180 buses per hour. Acceptable levels of service, savings in time, added revenue due to increase in modal split for transit and reduction in personal travel cost are other benefits of the new EBL system.

Carr, DH (Seattle, City of, Washington) *Traffic Engineering* Vol. 45 No. 7, July 1975, pp 26-29, 5 Fig., 4 Tab.

31 128565 A PROGRAM FOR SAFE CYCLOMUTING. In an effort to cut pollution and to reduce parking requirements, the city of Seattle has started construction of about 20 miles of bikeways on existing roadway and has come up with some unique design features. A Demonstration Bikeway Program was initiated which tested nationally used and new techniques of bikeway design. A Bicycle Spot-Safety Improvement Program has also been initiated. The novel bikeway design features include the placement of the bikeway adjacent to the median; this placement

moved the point of conflict closer to the intersection where the motorists attention would normally be concentrated. Bikeway placement must minimize the impediment to left-turning motorists. Where the possibility of a designated bicycle lane is eliminated, signing is used to establish the bicycle as having preference to motor vehicles on the entire roadway. Strong yellow/green boundary line paint was chosen to draw the attention of motorists.

Theisen, RD (Seattle Engineering Department, Washington) *Traffic Engineering* Vol. 45 No. 7, July 1975, pp 30-31, Figs.

31 128702 TRAFFIC LANES RESERVED FOR BUSES [Vias exclusivas para buses]. A study is presented of the congestion in the centre of the town of Bogota and of the resulting number of accidents. The author suggests a system of traffic segregation as a solution to the problem. This could take the form of traffic lanes exclusively reserved for buses, or roads, avenues or motorways exclusively used by buses. The implementation of such systems would be justified, and examples are given of towns already successfully operating a traffic segregation system. /TRRL/ [Spanish]

Cajiao, JG *Anales de Ingenieria* Vol. 81 No. 777, Jan. 1973, pp 60-63; ACKNOWLEDGMENT: Transportation & Soil Mechanics Laboratory, Spain, Central and Regional Labs of Bridges & Highways, Fr, TRRL (IRRD 102147)

31 128882 PROCESS CONTROL IN DIRECTING TRAFFIC [Prozessrechner in der Verkehrslenkung]. Application of computerized control for the railroad in Saarbrücken, for the buses and streetcars in Hannover and as an aid in waterways traffic is described. [German]

Elektrotechnische Zeitschrift, Ausgabe B Vol. 27 No. 14, June 1975, p 377 ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

31 129129 STATION PLANNING AND DESIGN: WHERE TO START. The paper discusses Chicago's approach to meeting the needs of consumers by expanding the rapid transit system wherever possible, and making it conveniently accessible to a greater number of riders without compromising its high average speed. This has been accomplished by changing or instituting bus routes to act as feeders to the rail lines from as many tributary areas as possible. There exists a need to improve the interface between the bus and rail modes and to bring them both up to the highest standards possible to encourage patronage. However, closely spaced stations provide a convenience for nearby users but reduce the speed of operation. Other considerations include the security of passengers and station employees, and the economics of station spacing. Criteria are included for station design and bus interchange facilities.

Misek, FJ ; American Society of Civil Engineers Proc Paper 1975, pp 150-162; Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE, Repr. PC

31 129130 SOME ASPECTS OF RAPID TRANSIT STATION DESIGN. The careful consideration of the various interfaces with other

modes of transportation in rapid transit station design, is an important aspect in increasing the attractiveness of public transit. Station stops increase the overall travel time and should occur only at points of significant passenger demand as indicated by the transit planning processes. Stations may also be used as a generative factor, located purposely to force development in specific areas as related to land use planning. The types of interfaces include pedestrian, surface public transit vehicles, private automobile, and bicycle. The complexity and layout of a rapid transit station and the nature and efficiency of its interfaces depends to a great extent on several nonengineering factors: the operating philosophy; the fare policy, and the location of the station.

Harvey, JT (Toronto Transportation Commission); American Society of Civil Engineers Proc Paper 1975, pp 100-118; Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE, Repr. PC

31 129132 TRANSIT STATION PLANNING AND DESIGN METHODOLOGY. Station facilities may range from various kinds of bus stops to bus stations, rail transit stations, complex interline transit terminals, and station complexes integrated in varying degrees with other developments and functions. The planning and design of transit stations is intimately linked in space with the planning and design of line-haul, storage-maintenance, and other fixed transit facilities, with the vehicles and trains providing the moving elements of the service, and with the neighborhoods in which such stations are located. In the scheduled sequence of transit system development, the planning and design of transit stations occupy a certain place, generally following on early or preliminary overall planning and before construction of designed facilities.

Quinby, HD (Parsons, Brinckerhoff, Quade and Douglas, Inc) ; American Society of Civil Engineers Proc Paper 1975, pp 77-90, 33 Ref.; Presented at the Transportation Facilities Workshop: Passenger, Freight and Parking, New York, N.Y., May 22-24, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE, Repr. PC

31 129160 UNDERGROUND IN LIVERPOOL. Liverpool has had an underground railway for almost 90 years, joining two densely-populated areas on either side of a wide estuary. The whole system is now being greatly expanded, and services linked, stations rebuilt, etc. to meet modern needs.

Edwards-May, D *Modern Railways* Vol. 32 No. 327, Dec. 1975, 7 pp, 4 Fig., 9 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: XUM, Repr. PC

31 129269 CURRENT PROBLEMS IN SHORT-DISTANCE TRAFFIC [Aktuelle Fragen der Nahverkehrspolitik]. Short-distance transport modes have a limited ability to adapt to market fluctuations, there are fewer possibilities for increasing capacity and they must cooperate with other transport modes. One of the aims of the German Federal Republic's Ministry of Transport is to find new sources for financing projects by levying special taxes on regional or inter-community groups. To reach these aims, the

financial capacity of transport bodies should be combined, public transport should be given full support and priority and towns with a population of more than 1,000,000 should be encouraged to build underground transport systems. [German]

Ingelbrecht, P. *Verkehr und Technik* Vol. 28 No. 5, 1975, pp 167-170; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Schmidt (Erich) Verlag, Herforder Strasse 10, 4800 Bielefeld, West Germany Repr. PC

31 129343 REGIONAL PLAN OF PREFERENTIAL FACILITIES FOR HIGH-OCCUPANCY VEHICLES. Research and planning were undertaken to identify opportunities and potential demand for the development of preferential facilities for high-occupancy vehicles in Southern California. Preferential facilities include normal or contraflow preferential lanes on existing freeways; exclusive curb, median, contraflow, or reversible lanes on arterials; freeway ramp metering; and associated park-and-ride sites. The treatments were evaluated according to time and cost savings for bus and car-pool users; service deterioration of vehicles with low occupancy; highway agency benefits of capacity improvements and added costs; transit operator patronage, reliability benefits, and increased costs; and community benefits in vehicle mile (vehicle kilometer) and person-minute reductions. Additional objectives were to prepare a comprehensive plan and to supply guidelines for design implementation. A short-range demand forecasting procedure is described, focusing on travel market segmentation and time savings estimates. Results of an impact measurement procedure for a detailed preferential treatment are shown to support recommendations for pilot implementation of a total plan covering 28 service areas, 16 preferential lane treatments, and 485 additional buses.

Brothers, BT Benson, DE Sheppard, WV (Smith (Wilbur) and Associates) *Transportation Research Record* No. 546, 1975, pp 1-12, 3 Fig., 2 Tab., 6 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

31 129344 PUBLIC TRANSIT RIGHT-OF-WAY. This paper deals basically with when, where, and how priority treatment for transit should be provided. It is suggested that total people delay be used as the criterion for developing standards. Several examples are cited of exclusive transit rights-of-way, particularly in Europe and western Canada. In addition, some examples are given of exclusive signals used in Europe and in Edmonton, Alberta. The Edmonton experience is described including public participation before and after an exclusive lane was implemented. The paper concludes that there is a need in transportation agencies for a more uniform basis of data collection before and after implementation so that better standards can be developed.

Bakker, JJ (Alberta University) *Transportation Research Record* No. 546, 1975, pp 13-21, 5 Fig., 4 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

31 129514 URBAN BUS TRANSIT: A PLANNING GUIDE. This planning guide is a result of a course/conference held in the University of Waterloo in March 1974. At the course an attempt was made to draw together people from the university, the government, consultants and

most importantly the transit industry to prepare a set of notes on the basic elements of planning urban bus systems. The Publication includes chapters on Transit Planning and Characteristics of Ontario Transit Operations, Demand for Transit Operating Philosophies, Costs in the Transit Industry, Example of Functional Design and Constraining of Transit Routes, Retailed Planning for Transit Routes, Integrating Dial-a-Bus into Fixed Route Bus Systems, Reserved Bus Lane Case Study, Automatic Vehicle Monitoring and Control System, Marketing Urban Bus Transit and Future Outlook. /RTAC/

Shortreed, JH, Editor ; Waterloo University, Canada June 1974, 356 pp, 97 Fig., 52 Tab., 19 Ref.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada Repr. PC

31 129522 BUS PRIORITY AND MODAL SPLIT. To maintain an acceptable level of mobility in our cities many potential and actual car users must use public transport. Therefore it must be axiomatic that a main aim of the provision of bus priorities is to make public transport more attractive to car users. How well bus priorities achieve this objective is examined in this article. The behavioural or generalised cost of a journey is used to understand the choice of mode of travel. This cost relates the actual cost of travel with the time taken on the journey and then these in turn are related to the income of the traveller. The 'cost' of making a journey is then expressed in compatible units, which are dequivalent minutes. If a typical commuter journey-to-work is examined using this method it is found that the 'cost' for bus travel always exceeds that for car travel. Priorities for buses in the form of exemptions at traffic signals will reduce this cost by, at best, fourteen per cent. This, however, is unlikely to influence car users to use public transport and other measures would be necessary. /TRRL/

Lesley, LJS (Durham County Engineers Department, England) *Traffic Engineering and Control* Vol. 16 No. 3, Mar. 1975, pp 127-129, 1 Fig., 1 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213511)

31 129621 INNOVATION IN TRANSIT IN MEDIUM SIZE CANADIAN CITIES. The state of transit is studied in twelve medium sized Canadian cities. Two trends are discussed. The first, the decline in transit since world war two, particularly since 1960, was self-perpetuating. As ridership decreased so did service, thus encouraging further decreases in ridership. There is a correlation with this increase and a decrease in automobile ownership. Also the cities have begun to study and improve their transit systems since 1970 and hence attract new riders. Transit in medium size cities, despite problems of financing and administration is improving. Technological innovations are also discussed.

Levy, D (York University, Canada) ; Toronto-York University Joint Program in Transp, (31) Res. Rept. ISSN 0316-9456, Jan. 1976, 62 pp, 45 Ref.

31 129686 AUTOMATIC TRAFFIC CONTROL SYSTEM APPLIED TO URBAN ELECTRIC TRANSPORT. In the cities of the USSR, electric transport (tram, trolleybus) is one of the principal means of passenger transportation. The control of its functioning is complicated by a number of factors such as the existence of tram tracks, a contact wire network, etc. The synthesis of the control system is performed on the basis of the object of control analysis, including: passenger flows, electric vehicles, route networks. From the point of view of its functioning the automated traffic control system solves problems of two types: 1. Distribution by routes of limited resources of vehicles and drawing up of their service timetables; 2. Operational control of vehicles movement on routes, elaboration of recommendations for the operator in case of service disturbances and communication of the operator's orders to vehicle drivers. The matter under discussion is the control of vehicles running according to A timetable or to service schedules, that is according to intervals between vehicles. As a criterion for the choice of one or another method a minimum passenger waiting time is taken. In conclusion certain considerations of the economic efficiency of the system are given. (a) the covering abstract for the conference is IRRD no. 215903. /TRRL/

Nicolaev, MI Kalney, GI ; North-Holland Publishing Company Conf Paper 1974, 8 pp; Presented at "Traffic Control and Transportation Systems"; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 215918)

31 129810 LIGHT RAIL AND RAPID TRANSIT. Light rail transit can be considered as an advanced form of the conventional streetcar. Its tracks lie primarily on separated rights-of-way. In areas where there is heavy congestion, they are often in tunnels. Like rapid transit, which is independent from surface traffic on its entire length, light rail transit with modern vehicles can undertake the role of the primary transit carrier in medium and large urban areas, supplemented by and coordinated with a secondary feeder system. The most common application of light rail is in medium-sized cities. Rapid transit serves large cities. With respect to its service quality, capacity, productivity, and efficiency, rapid transit is superior to light rail transit in various degrees. However, a particularly important advantage of light rail transit is that its network can be constructed with lower investment costs and in a shorter period of time than can a rapid transit network. Moreover, individual sections can be used immediately after completion. When light rail transit has under ground sections in central urban areas, it can be a transitional system to later rapid transit as long as adequate alignment standards are applied in construction. The requirement for an integration of transportation and urban design is particularly important for light rail and rapid transit. Their radial lines from the central cities should form the axes of residential corridors. Thus they perform 2 roles: To the corridor residents and commuters from the region, through park-and-ride, they represent an attractive alternative to the private automobile; at the same time, they reduce traffic loads on urban arterials and streets.

Lehner, F *Transportation Research Board Special Reports* No. 161, 1975, pp 37-49, 5 Tab., 5 Ref. ; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted

by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off, Repr. PC

31 129811 COMPARISON OF BUSWAY AND LIGHT RAIL MODES. Much has been offered to convince decision makers that busways are the least costly of fixed-guideway services in medium-density urban corridors. Until recently, these claims could be questioned but not refuted because a thorough analysis of comparable busway and light rail transit (LRT) systems did not exist. However, such a work was completed in late 1974. The Rochester, New York, Charlotte-Henrietta corridor studies are a detailed busway-versus-LRT mode comparison for a specific corridor. The studies show that, although LRT and busway investment costs are similar for equal facilities, LRT exhibits substantial operating costs, operation, and service advantages.

Morris, WH, Jr (Rochester-Genesee Regional Transportation Auth) *Transportation Research Board Special Reports* No. 161, 1975, pp 50-61, 3 Fig., 4 Tab., 5 Ref.; This article is extracted from Light Rail Transit, Proceedings of a National Conference conducted by TRB and Sponsored by UMTA, Am Public Transit Assoc and U Penn, 23-25 June 1975. Payment in advance is requested. For handling charges add 5% for domestic and 10% for foreign orders.; ORDER FROM: TRB Publications Off

31 130414 RAIL TRANSIT-CHARACTERISTICS, INNOVATIONS, AND TRENDS. Rail transit, including streetcar, light rail, rapid transit, and regional rail, is a family of transportation modes with a broad range of service, operational, and cost characteristics. Consequently, these modes may be used efficiently for various conditions. As a result of numerous technological and operational innovations of rail systems during the last two decades, rail transit can be highly automated, reliable, and comfortable and can operate with minimal environmental intrusion. Although several U.S. systems (e.g., Lindenwold Line and Bay Area Rapid Transit) have some advanced features, general knowledge and understanding of rail systems in this country lag behind those of some western European countries and Japan. Based on a comparison of the population characteristics of selected European and U.S. cities, this paper shows that, among cities with similar population size and density, European cities generally have a much greater application of rail transit. Despite extensive research into new technologies, no new mode has emerged with performance and cost characteristics superior or comparable to rail technology. Thus, to achieve more efficient and economical transit systems, information about rail modes must be increased and these modes must be included among the alternatives considered in transit planning.

Vuchic, VR Day, FB (Pennsylvania University, Philadelphia) Stanger, RM (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 552, 1975, pp 1-18, 8 Fig., 2 Tab., 23 Ref.; ORDER FROM: TRB Publications Off

31 130427 REPORT ON THE FEASIBILITY OF A TRANSIT SYSTEM TRRAMM. This report is a summary of the main conclusions of a study into the feasibility, planning and implementation of a public transportation system for airport and regional service between Montreal and Mirabel in the early 1980's. The proposals submitted in this document are part of a series of steps undertaken by the Quebec and Canadian governments following the federal government's decision to build the new Montreal International Airport at Ste. Scholastique (now Mirabel), 55 kilometres (35) miles from downtown Montreal. /RTAC/

Quebec Ministry of Transport, Canada Sept. 1974, 104 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada Repr. PC

31 130428 MIRABEL. This publication is comprised of a number of papers dealing with Mirabel Airport, problems, impact and future. Each paper has been written by a separate specialist in the field. The topics covered include: Mirabel as the nerve centre of international air transport in Canada, the long walks to the planes, buses in use now but a rapid transit system is coming, the land, the impact, cargo handling, the airport's perimeter as the Industrial Park and the future of Mirabel. Pictures, maps, charts and diagrams are included. /RTAC/

Masse, D Patterson, M (Presse, Montreal) Gray, AD (Gazette Montreal) Fraser, J (Devoir a Montreal); Southam Press Limited Sept. 1975, 72 pp, Figs., Photos.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

31 130858 RESERVED BUS LANES IN DALLAS, TEXAS. In March 1974, the City of Dallas implemented a reserved bus lane strategy on two major thoroughfares. This information was collected in order to evaluate the impact of this strategy on public transportation, vehicular traffic, and other parameters. This paper: (1) Examines the evaluation methodology; and (2) the results and conclusions of the study. The statistical evaluation is accomplished by collecting before and after data and using the Student's t-test to determine whether or not there is a significant difference. It was found that the bus lane strategy was beneficial in that it has no negative impacts on any parameter and it does have positive effects on some parameters.

Cox, M (Dallas Traffic Control Department, Texas) *ASCE Journal of Transportation Engineering* Proceeding Vol. 101 No. TE4, ASCE #11720, Nov. 1975, pp 691-706, 5 Fig., 11 Tab., 5 Ref., 2 App.

31 130987 URBAN EXPRESS BUS AND RAILROAD PERFORMANCE. The relative performance of traditional local transport modes with a proposed investment in a commuter railroad or in express bus operations was appraised by a computer simulation which determined travel time, waiting time, walking time and monetary costs involved for each mode for complete trips from a suburban area to the central

business district four miles away. In this rather narrow situation the commuter railroad is completely dominated in cost and time performance by express bus systems. If the distance between the suburban and downtown areas were increased, relative performance by buses would decline. The author suggests the express bus must be considered as a rail alternative and in any commuter system an integrated downtown distribution with several stops can greatly enhance system performance.

Deweese, DN (Toronto University, Canada) *Journal of Transport Economics and Policy* Vol. 10 No. 1, Jan. 1976, pp 16-25, 1 Fig., 4 Tab., 6 Ref.; ACKNOWLEDGMENT: Journal of Transport Economics and Policy; ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England Repr. PC

31 131161 PLANNING DESIGNING AND CONSTRUCTING AIRPORTS IN MEXICO. In the design and planning of airports, Mexico gives primary consideration to the maintenance and operating costs of the proposed facility. The airport is considered an assembly of systems, with the total capacity being not the sum of the individual capacities, but the capacity of that system that has the least capacity. The five systems of the airport, each of which affects capacity, are the air space, the taxiways and aeronautical portion of the apron, the terminal complex formed by the airside and landside of the apron, the access road, and the installation (facilities, mechanical installation, baggage delivery belts). It has been the goal in Mexico to coordinate these systems in such a manner that they can grow separately, depending on demand. So far this appears to be accomplishing Mexico's objectives in regard to meeting airside and landside capacity.

Dovali, F (Ministry of Public Works, Mexico) *Transportation Research Board Special Reports* No. 159, 1975, pp 68-71; Proceedings of a conference held in Tampa, Florida, April 28-May 2, 1975, and sponsored by the Transportation Systems Center and Federal Aviation Administration, U.S. Department of Transportation.; ORDER FROM: TRB Publications Off

31 131167 PROVIDING AIRPORT LANDSIDE CAPACITY. The capacity of the airport landside (which is the entire airport except runways, taxiways, and parking aprons) generally has not been determined by any set of criteria. Acceptable criteria have had reasonable use in determining capacity requirements for that portion of landside that comprises passenger terminal, cargo terminal, on-airport roadway systems, and automobile parking. Among factors that have contributed to unsatisfactory landside capacity conditions are (a) lack of appropriate business and economic factors; (b) failure to consider landside as a whole and to establish priority of use for available land; (c) unreliability of forecasting; (d) absence of economic justification and cost parameters that result in burdensome costs and do not correlate useful life and investment amortization; (e) escalation of "gamesmanship" and acrimony between airport managements and airline representatives; and (f) lack of nontechnical criteria sufficiently comprehensive to provide coverage of pertinent areas of

consideration, including geographical location priorities, economic justifications, effective costing, reasonable forecasting, fixing of responsibilities, and management objectives. /Author/

Callahan, RH (Arnold Thompson Associates, Incorporated) *Transportation Research Board Special Reports* No. 159, 1975, pp 143-152, 2 Fig., 3 Ref.; Proceedings of a conference held in Tampa, Florida, April 28-May 2, 1975, and sponsored by the Transportation Systems Center and Federal Aviation Administration, U.S. Department of Transportation.; ORDER FROM: TRB Publications Off

31 131225 THE INTERNATIONAL UITP COMPENDIUM OF PUBLIC TRANSPORT. This UITP handbook contains extensive statistical data on the mass transport systems in over 300 cities and is intended to serve as a basic reference work for operators, engineers, town planners, political leaders, consultants, manufacturers and all others concerned with providing passenger transportation services. The two volumes incorporate three sections: Metropolitan Railways/-Rapid Transit; Surface Transport, including buses, streetcars, light rail and trolley-buses; and Motorbuses.

International Union of Public Transport 722 pp; ACKNOWLEDGMENT: International Union of Public Transport; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PC

31 131260 TRANSPORT [Les transports]. After an introduction on the evolution of transport modes in Canada and on the various forms of state subsidy, this number features four articles covering:-the use of models in urban transport planning;-competition between and complementarity of ports in Quebec Province;-the rationalisation of the student transport networks;-the new Montreal international airport at Mirabel and its economic implications.

Ingenieur, Canada No. 309, Sept. 1975, p 2-38, Figs., Tabs., Refs. ACKNOWLEDGMENT: UIC; ORDER FROM: ESL, Repr. PC, Microfilm

31 131261 REPORT ON THE INTRODUCTION OF A RAPID REGIONAL TRANSIT SYSTEM TO SERVE MONTREAL'S MIRABEL AIRPORT (TRRAMM) [Rapport sur l'implantation d'un système de TRRAMM (Transport Rapide Regional Aeroportuaire Montreal Mirabel)]. No Abstract. [French]

Ministry of Transport, Canada 1974, 106 pp, Figs.; ACKNOWLEDGMENT: UIC; ORDER FROM: Ministry of Transport, Canada, 1000 Sherbrooke Street, West, Montreal, Quebec H3A 2R3, Canada

31 131318 PUBLIC TRANSPORTATION IN JAPAN: CONTRASTS AND CONCLUSIONS. Emphasis on the rail mode in Japan is examined. The Japanese National Railways is a dominant factor in both the intercity and commuter passenger services. Japan has subways in seven urban areas, several of which are also served by privately owned suburban railways. The author discusses ticketing, service and control, and travel habits of the Japanese. Convenience, comfort, safety and dependability of trains are seen as a reason for the popularity of public transport in Japan.

Krambles, G *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 29-38; ORDER FROM: American Public Transit Association, 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

31 131487 SEVENTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRANSPORT OCTOBER 16TH-18TH 1973, HOLLY RAYDE COLLEGE, MANCHESTER. This volume contains the papers presented at the symposium, together with summaries of the group discussions. The titles of the papers were as follows: Amsterdam Metro Blan and its Possible Social Implications: de Groot, A; Problems of Conurbation Transport in the Master Plan of Prague, Lang, P; An Intermediate Capacity Rapid Transit System-Baker, RC; The Personal Rapid Transit System Cabintaxi, Demag and Becker, K; Traffic Control and Enforcement-Buxton, RN; Buses Must Go-A Traffic Engineer's (Post Prandial) View of Urban Passenger Transport-Parker, GB; The Conventional Bus-Today and Tomorrow-Taylor, H; Railway Versus Bus Systems: A Critical Review-Truelove, P. /TRRL/

Manchester University, England Conf Paper No Date, 105 pp, 2 Fig., 3 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-213634)

31 131552 PARK-AND-RIDE FACILITIES PRELIMINARY PLANNING GUIDELINES.

This report presents a preliminary evaluation of park-and-ride facilities. A literature review was conducted and, from this, characteristics of park-and-ride service in the United States were documented. Also, each Texas city providing park-and-ride service was surveyed, and the existing or projected park-and-ride operations in five Texas cities are documented. Based on the review of these data, preliminary guidelines that can be used in planning park-and-ride facilities are discussed.

Christiansen, DL Grady, DS Holder, RW; Texas Transportation Institute, (Research Rept. 205-2) Intrm Rpt. TTI-2-10-74-205-2, Aug. 1975, 64 pp, 11 Fig., 19 Tab., 15 Ref.; Study No. 2-10-74-205; ORDER FROM: NTIS, Repr. PC, Microfiche

31 131716 AN EVALUATION OF A DOWNTOWN CIRCULATOR BUS SERVICE.

A circulator service in Kansas City, Missouri is described, the need for such a service in a downtown area is discussed, and the Kansas City service is evaluated. The Dime-A-Time circulator service was introduced in Kansas City on a single route and designed to move people throughout the downtown area. Two new routes were introduced later in the year and bus headways were changed to 7 minutes in the 8:00 a.m. to 5:00 p.m. period. An initial free service promotion period was subsidized by an organization of downtown business interests. Arguments in favor of a downtown circulator service are briefly reviewed and possible alternatives to such a service are outlined. The study indicates that cost is only one element in Dime-A-Time decision making; revenue and costs together must control decisions. The lowest-cost method of providing downtown circulator service is by offering a low zone fare on regular route transit buses. Comments are made on the disadvantages of such a downtown service, and the opinion is expressed that a downtown circulator service provides a significant improvement in transit service at modest cost.

Veatch, JF (Missouri University, St Louis) *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 615-629, 2 Tab.

31 132293 EVALUATION OF ORGANISED BUS PLATOONING IN AN URBAN AREA-RESULTS OF AN EXPERIMENT IN ROCHESTER, NEW YORK. This paper discusses the results of an experiment involving organized platooning of buses to facilitate flow through a central business district during peak hours. The mechanisation used in the "real world" environment of Rochester, N.Y., is described. It was found that when the input of buses exceeded the output flow of buses the system could handle 100 bus/h using three-bus platoons. The speed of the buses (including entry waiting time and passenger boarding time) was 3.7 km/h (2.3 mile/h). Computer simulations demonstrate that four-bus platoons given traffic signal priority could facilitate flows of 126 bus/h. In surveying bus patrons the attitudes toward the system were positive in that 79 per cent perceived the advance information provided by the system as "helpful". (A) /TRRL/

Bauer, HJ White, RA Tobin, RL (General Motors Research Laboratories) *Traffic Engineering and Control* Vol. 16 No. 7, July 1975, pp 314-316, 2 Fig., 1 Phot., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216227)

31 132303 ASSESSING BUS LANE BENEFITS. The increasing cost of fuel and congestion in town centres have caused greater attention to be paid to the role of public transport in urban areas. This has led to the development of bus-lanes which are simple to design and quick to implement. The article considers the use of traffic management in the design of bus lanes and the benefits that may be gained from their use. Bus stops must be located with care on both with-flow and contra-flow systems to avoid the use of bus-lanes by other road users. Barriers should be used where fast moving buses near to the kerb are an increased danger to pedestrians; existing crossings should be replaced by pelican crossings. Benefits from bus priority measures are difficult to assess, but it was estimated that 77 per cent of the savings in London were in passenger-time, 14 per cent in over-time and 8 per cent in operating costs. Bus-lanes are not the complete solution to public transport problems in towns, and by themselves are not sufficient to supply an attractive alternative to private transport. /TRRL/

Surveyor - Public Authority Technology Vol. 146 No. 4342, Aug. 1975, pp 11-13, 3 Phot. ACKNOWLEDGMENT: TRRL (IRRD-215429)

31 132333 PUBLIC TRANSPORT IN URBAN AREAS IN SWEDEN [KOLLEKTIVTRAFIK I TAETORT]. The aim was to study the possibilities of improving the conditions of public urban traffic and propose measures and forms of planning aimed at promoting the improvement. The report is based on a number of expert reports and data from model and test urban areas in Sweden. It is stressed that A national economical approach should be adopted as a basis for future decisions aiming at improving public urban transport. It is shown that town building in many places leads to an increased standard difference between car travel and public transport. The resources of the individual should be considered

in traffic planning. The organizational and administrative forms of planning and management of the traffic system are dealt with. Proposals are discussed regarding changes in legislation. Organizational, technical and economic measures are suggested. It is suggested that counties help representatives of public transport to effect town planning at an early stage, and that counties make a traffic plan for public transport. An increased government support for investments in public transport is suggested. Improvements in the existing public transport are suggested. R&D needs are described. This report is in two parts. /TRRL/ [Swedish]

Kommunikations Departmentet R&D Rpt. SOU 1975: 47-48, 1975, 568 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 215386)

31 132613 PAPERS PRESENTED AT A CONCRETE SOCIETY SYMPOSIUM ON DESIGNS FOR URBAN TRANSPORTATION. The following papers were presented at the symposium: Looking forward, Twigg, DJ; The basic construction, rolling stock and operational features of the Heathrow extension, Victoria and fleet lines of the London transport executive, Lowe, TE; Tyne and wear metro, Howard, DF; Minitrans, Baker, RC; The dunlop s-type speedway, a high speed passenger conveyor, Todd, JK; Streets for people; radical changes for London's shopping areas, Jones, RD. /TRRL/

London Concrete Society Conf Paper No Date, 65 pp, Figs., Tabs., Photos., Refs.; From a Symposium held at the London Press Centre, 11 March 1975.; ACKNOWLEDGMENT: TRRL (IRRD-215998)

31 133207 SMALL CITY TRANSIT: AMHERST, MASSACHUSETTS FREE FARE, STUDENT OPERATED TRANSIT IN A UNIVERSITY COMMUNITY. Amherst, Massachusetts, is an illustration of a free-fare transit service serving a university campus. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Casey, R Michener, W ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-2, UMTA-MA-06-0049-76-2, Mar. 1976, 20 pp; See also PB-251 503.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251502/1ST

31 133209 SMALL CITY TRANSIT: BREMERTON, WASHINGTON: PRIVATELY OPERATED SUBSCRIPTION BUS SERVICE TO AN INDUSTRIAL SITE. Bremerton, Washington, is an illustration of a privately operated, profitmaking subscription bus service. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Kendall, D Misner, J ;

Transportation Systems Center, Urban Mass Transportation Administration, (DOT-TSC-UMTA-76-5-4) Final Rpt. DOT-TSC-UMTA-76-75, UMTA-MA-06-0049-76-4, Mar. 1976, 10 pp; See also PB-251 505.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251504/7ST

31 133210 SMALL CITY TRANSIT: CHAPEL HILL, NORTH CAROLINA. PUBLIC TRANSIT SERVING A UNIVERSITY AND TOWN. Chapel Hill, North Carolina, is an illustration of a public transit service providing a high level of service for a town its size and a good example of a cooperative arrangement between a town and a resident university. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local content is stressed.

Casey, R ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-5, UMTA-MA-06-0049-76-5, Mar. 1976, 20 pp; See also PB-251 506.; Contract MA-06-0049; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-251505/4ST

31 133211 SMALL CITY TRANSIT: EAST CHICAGO, INDIANA. FREE-FARE TRANSIT IN A HIGH DENSITY, INDUSTRIALIZED AREA. East Chicago, Indiana, is an illustration of a free-fare transit service operating in a high density area. The transit service was devised with a minimum of help from professional consultants, and without sophisticated routing, scheduling, or marketing plans. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local content is stressed.

Misner, J ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-6, UMTA-MA-06-0049-76-6, Mar. 1976, 12 pp; See also PB-251 507.; Contract MA-06-0049; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-251506/2ST

31 133214 SMALL CITY TRANSIT: EVANSVILLE, INDIANA: A LOW SUBSIDY TRANSIT SERVICE. Evansville, Indiana, is an illustration of a transit service in which a large percentage of operating costs are obtained from fare-box revenues. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local content is stressed.

Misner, J ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-9, UMTA-MA-06-0049-76-9, Mar. 1976, 15 pp; See also PB-251 510.; Contract MA-06-0049; ACKNOWLEDG-

MENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251509/6ST

31 133217 SMALL CITY TRANSIT: SUDBURY, MASSACHUSETTS. A SHORT-LIVED SUBURBAN TRANSIT SERVICE. Sudbury, Massachusetts, is an illustration of a over-extended fixed-route transit service which was rather short-lived. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Mergel, J ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 2 DOT-TSC-UMTA-76-5-12, UMTA-MA-06-0049-76-1, Mar. 1976, 14 pp; See also PB-251 513.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251512/0ST

31 133218 SMALL CITY TRANSIT: WESTPORT, CONNECTICUT. COMPREHENSIVE TRANSIT SERVICE IN AN AFFLUENT SUBURBAN COMMUNITY. Westport, Connecticut is an illustration of a fixed-route transit service operating in an affluent suburban community. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local content is stressed.

Misner, J ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 3 DOT-TSC-UMTA-76-5-13, UMTA-MA-06-0049-76-1, Mar. 1976, 23 pp; See also PB-251 514.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251513/8ST

31 133635 THE INTERCHANGE PROBLEM IN PUBLIC TRANSPORT [Omstigningsproblematiken]. Travel in a large area such as the Stockholm region exhibits great variations. Public transport must either cover a very great number of routes, or travellers must accept interchanges between routes. Only the latter solution is practicable. The most economical system is based on feeder buses which take travellers to rail or tube stations. Evaluations suggest that the discomfort of an interchange is considered, on average, to be equivalent in sacrifice to an extra journey of 8 minutes. In the Swedish climate, provision of waiting rooms is essential. This is possible on rail and tube stations, but not at bus stops. Shelters at these and covered ways between bus stops, and between stations and stops, must be provided. Traffic safety is enhanced by the provision of bridges and underpasses, but this creates difficulties for the handicapped and for people with prams. Another way is the provision of signals or routing of passenger flows, but this may increase waiting times. Outlying areas have parking spaces adjacent to rail or tube stations. More may be needed if restrictions are introduced on cars in inner Stockholm, but this may result in fewer passengers for buses. /TRRL/ [Swedish]

Stockholms Laens Landstings Kollektivtrafikutredni No. 18, 1975, 101 pp, Figs., 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 216969); ORDER FROM: Stockholms Laens Landstings Kollektivtrafikutredni, Fack, Stockholm 22, Sweden

31 133736 THE TILBURG-PEOPLE ON BIKES [Tilburgers op de fiets]. Announcing the 1976 budget the Dutch minister of transport introduced two so-called demonstration projects, especially concerning bicycles and mopeds. In Tilburg, an industrial town in the south of the country with about 155,000 inhabitants, a special east-west right of way will be established for exclusive use by these two means of transport, which are very popular in Holland. As the Dutch government endeavours to restrict car usage in favour of public transport and bicycles further investigations should be made into the choice pattern of road users. The article describes the various aspects of the Tilburg plan, which will have to be completed in 1976. /TRRL/ [Dutch]

Vangurp, PB Sangen, RA *Verkeerskunde* Vol. 26 No. 11, Nov. 1975, pp 550-556, 15 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 216544)

31 134026 TRAM AND BUS PRIORITY AT ROAD CROSSINGS. PART 1: MOTIVES AND DEVELOPMENT. Methods are discussed which ensure adequate priority for trams and buses at intersections without imposing noticeable aggregate (the sum of the individual delays to every vehicle using an intersection; its magnitud is a measure of the "impact" of that intersection on the traffic flow) prime losses for other traffic. Examples in Belgium and England are described where the priority facility is not built into conventional traffic light regulated crossings, and ordinary traffic lights are used to secure a clear passage across what would otherwise be an unregulated crossing. Operations in Powell Street, San Francisco, and plough-operated switches in conduits in London are also described. Various aspects of priority and aggregate delay are considered, and it is noted that although considerable time savings are possible for public transport vehicles at most crossings, considerably better results for public transportation may be achieved if a slight increase in the aggregate delay to other traffic is permitted. The detection of approaching public transport vehicles by a loop mechanism, and a system that allows specific identification of vehicles are described.

Van Dam, F *Modern Tramway and Rapid Transit Review* Vol. 39 No. 457, Jan. 1976, pp 1-8, 1 App.

31 134058 A NEW ORBIT FOR GLASGOW'S VETERAN UNDERGROUND. The article describes the projected modernisation of the Glasgow underground system where 18M is to be spent on work to be completed by July 1978. This work includes rebuilding five stations with flank platforms, and installing ramps to the surface at the Broomload depot. Bored piling will be installed to provide permanent ground support around the new or enlarged chambers. Eleven of the fifteen stations are to become interchanges with bus or British rail transport. The old permanent way is to be removed and replaced with continuously welded track laid on precast concrete slab sleepers later infilled with in-situ precast concrete. Modern cabling and signalling will also be installed. Work will start on the outer of the twin tunnels and should be completed by

autumn 1977 when traffic will be switched and the track relaid in the inner tunnel. The present rolling stock, which has been used since the opening in 1896, will be replaced by thirty-three new power cars ordered from Metro-Cammell, Birmingham. Each car is designed for automatic operation responding to track signals accommodating 36 seated and 54 standing passengers. /TRRL/

Wade, S *New Civil Engineer* No. 173, Dec. 1975, pp 26-27, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 217081); ORDER FROM: Institution of Civil Engineers, 26-34 Old Street, London EC1V 9AD, England

31 134229 SELECTION OF URBAN TRANSIT SYSTEMS IN CITIES WITH LESS THAN 500,000 POPULATION. In this paper, a procedure is described for the evaluation and choice of urban transit systems in cities with less than 500,000 population. Three major objectives, which satisfy the desires of three groups (the users, the operator, and the community) are considered in the analysis. The purpose of the study is to search for and identify a proposal which provides maximum effectiveness for the three groups. Since there is usually a definite budget assigned to the urban transit system, the capital costs of the chosen proposal should also fall within the limits of the budget. (A) /TRRL/

Sargious, M Salinas, JJ (Calgary University, Canada) *Logistics and Transportation Review* Vol. 11 No. 2, 1975, pp 129-145, 4 Fig., 6 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217372)

31 134254 TRAFFIC ENGINEERING MEASURES IN FAVOUR OF PUBLIC TRANSPORT. MEASUREMENTS OF BUS JOURNEY TIME IN KARLSTAD [Trafiktek-niska aatgaerder till foermaan foer kollektivtrafiken. Maetningar av bussars framkomlighet i Karlstad]. This report examines the effect of road alignment on bus journey times, and concludes that irregularities give rise to variations in these. The effects of unsatisfactory alignment on bus passengers should be investigated. In present traffic conditions, bus mobility can be enhanced by the provision of separate bus lanes. The report examines the different ways in which these can be made available. It is shown that bus lanes enable public transport to attain higher speeds and better regularity, as long as the traffic load is below capacity. With the traffic signal strategies used at present, buses are generally delayed at signals by 10-20% of total journey time in metropolitan areas. This delay depends on the number of signals along the route but also on the time of day, the synchronisation of signals, etc. By proper planning and cooperation between the road authority and the bus undertaking, delays at signals can be reduced by passive or active priority measures. Passive measures are the provision of separate bus lanes and phasing of signals, while active measures entail the provision of detector units on buses which actuate the signals. /TRRL/ [Swedish]

Utredningen om Kollektivtrafik I laertor 1975, 123 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-216988)

31 134257 BUS DEMONSTRATION PROJECT. SUMMARY REPORT NO. 7, THE E3 ROUTE. THE SELECTIVE APPLICATION OF PARKING RESTRICTIONS ALONG A BUS ROUTE. This report describes a project which took place in the London boroughs of Ealing and Hounslow. The purpose of the scheme was to test the improvement in bus operation that could be achieved by removing parking at critical locations along a bus route. The project consisted of the introduction of parking restrictions at those points along the e3 bus route where congestion was causing delays and fatigue to drivers. At points where parking controls already existed, enforcement was increased. The roadway at two junctions was widened so that buses could turn more easily. The performance of the bus service was monitored and changes in terms of journey times and reliability are described alongside the effectiveness of the parking restrictions. Bus drivers were also interviewed during the project and their attitudes and opinions are reported. A computer simulation program for use as a management tool to predict the effect of a proposed change on the service was developed and evaluated. The conclusions which can be drawn from this work are listed towards the end of the report and a short appendix, amplifying some additional work on the reliability of the bus service over different sections of the route, is also included. The assessment of the project indicated that as a result of the reduced parking fewer buses now take an excessive time to complete the route and there has been a small improvement in bus reliability. There was some evidence that bus running times were the most variable on those sections of the route which are on the approach to junctions with major roads and that some action will have to be taken on these sections if further improvements are to be obtained. Bus stop clearways or 'bus cages' proved to be effective in preventing long term parking at bus stops but some possible changes to them have been highlighted. This project was not ideally suited for fully testing the value of computer simulation as a management tool but much useful experience has been gained on this technique. /TRRL/

Her Majesty's Stationery Office No. 7, 1975, 21 pp, 11 Fig., 1 Tab., 5 Phot., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-217109)

31 134303 ALL CHANGE AT BRADFORD INTERCHANGE. The construction of the Bradford bus/rail interchange is described. The requirement was for a complex in the city centre which would combine the new railway station with a bus terminus both using the same facilities. The plan also included a garage and workshop for local bus services, housing for British rail staff and an eight storey office building for various uses. Facilities including shops, refreshments and underfloor heating are provided for passengers awaiting buses and trains. A number of ground problems were encountered which made alterations to the original design necessary and details are given. Other delays included serious materials shortages, three-day week, and a change in client, but it is expected that the interchange will be completed by the summer of 1976. /TRRL/

Heaves, N *Contract Journal* Vol. 269 No. 5031, Feb. 1976, pp 30-31, 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 218169); ORDER FROM: IPC Building and Contract Journals, Limited, 32 Southwark Bridge, London SE1, England

31 134399 SPEEDBUS PROGRESSES AT A SNAIL'S PACE. This article describes the bus priority measures which have been officially approved by the Greater London Council Transport Committee and will be implemented over the next three years between Parliament Hill (Camden) and Peckham Rye (Lewisham). On the southbound side three will be 11 with-flow bus lanes, two of them double-width, and six contra-flow lanes. Northbound buses will use 18 or 19 with-flow lanes, and either one or two contra-flow. There will be approximately a dozen new pelican crossings, some new signal systems and bus-only right turns, and a large number of one-way schemes. The Tottenham Court road changes alone will mean some 28 revisions of the traffic management orders. One result of the scheme will be the closure of London's prime shopping and sightseeing streets to all traffic except buses. Costs are quoted together with some operational problems. /TRRL/

Greenfield, M *Municipal Engineering* Vol. 156N Feb. 1976, p 191, 1 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 218202)

31 134673 PREFERENTIAL LANES FOR HIGH-OCCUPANCY VEHICLES. The efforts are described and the results are presented of projects experimenting with preferential freeway lanes for high-occupancy vehicles (buses and carpools). The projects are designed to determine if such measures can, indeed, promote traffic flow, increase reliance on bus transit, encourage carpools, better serve the needs of the transit dependent, improve air quality and conserve energy. The San Bernardino Freeway Express Busway, the Marine County Bus Lanes, and the San Diego Busway are described, and the details are outlined of the trip purpose and frequency, economic and time savings, the vehicle miles saved, the effects on traffic and user reaction, violations, safety, and cost effectiveness. The combination bus and carpool projects at the San Francisco-Oakland Bay Bridge, the toll free lanes on the San Mateo-Hayward and Dumbarton Bridges, and preferential lanes in other freeways are reviewed. The results of the study indicate that properly-planned preferential treatment facilities can increase the people-carrying capacity of existing highways; decrease travel times for users; promote efficient bus operations and schedule reliability which, in turn, encourages patronage; and reduce individual commuting costs. Such preferential treatment can also provide better transportation for the transit dependent, be an aid to improving air quality and help in energy conservations.

California Department of Transportation Dec. 1975, 47 pp, Photos., 4 App.

31 134682 PASSENGER BEHAVIOR STUDIES FOR AUTOMATIC TRANSIT SYSTEMS. This paper reports on part of the coordinated Minitram research program in the United Kingdom being carried out by various groups under the direction of the Transport and Road Research Laboratory. The section of work discussed relates to tests carried out in full-scale simulations of passenger behaviour on vehicles and stations to determine the effects on dwell and clearance times of changes in station and vehicle configuration, door sizes and opening times, and directional barriers. The tests were carried out

with passengers stratified into commuters, non-commuters, and handicapped populations.

Ashford, N Feeney, RJ Richardson, J Kirk, NS Stroud, PG (Loughborough University of Technology, England) *Transportation Research Record* No. 559, 1976, pp 63-72, 8 Fig., 1 Tab., 8 Ref.; ORDER FROM: TRB Publications Off

31 135204 A MODEL FOR SNCF TRAFFIC FORECASTS FOR THE PARIS SUBURBS [Un modele d'affectation pour des previsions de trafic SNCF de la banlieue parisienne]. A mathematical model for a study of commuter traffic in the Paris area is outlined here. The model is applied on a repetitive basis with fixed values, e.g. behaviour of commuters, journey time, etc., and the level of saturation, and the various routes taken are adjusted according to expressions of quantity. The model takes account of geographical zones, the present situation and possible developments; it can be used for planning purposes (investments, preparation of transport plans). [French]

Pige, JC Berducou, J *Revue Generale des Chemins de Fer* Nov. 1975, pp 639-646, 4 Fig., 3 Tab., 1 Ref.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL, Repr. PC, Microfilm

31 135216 SOUTH STATION REVIVAL. ANTIQUATED RAILROADS STATION TO BECOME DYNAMIC TRANSPORTATION CENTER. Boston's South Station, built at the turn of the century, is being reconstructed under auspices of the Boston Redevelopment Agency into an intermodal transportation center. The participation of engineers, planners and architects in the various phases of this is described.

Notes pp 1-5, Figs., Photos. ORDER FROM: Parsons, Brinckerhoff, Quade and Douglas, Inc, One Penn Plaza, 250 West 34th Street, New York, New York, 10001

31 135405 AIRPORT USER TRAFFIC CHARACTERISTICS FOR GROUND TRANSPORTATION PLANNING. This report which is intended as a reference and guide for traffic engineers and others dealing with airport ground transportation, covers key traffic characteristics of air passengers, airport employees and air cargo, and examines aspects of airport access. The work which is intended to serve as a basis for more comprehensive studies of current design practices and supply input for development of improved analytic and design procedures, highlights significant data concerning airport user characteristics and considers resultant demands for ground transportation and terminal facilities. Some of the most significant findings relate to: the annual growth forecast for air travel; the variation in the proportion of "through" and "transfer" air passengers (and corresponding the variation in ground transport demand); transport to airport; passenger-related trips; air-cargo generated traffic; rail rapid transit airport access; transport by mass transit; airport highway access capacity; airport public parking; and on-airport transit systems on exclusive rights of way.

Traffic Engineering Vol. 46 No. 5, May 1976, p 46 ORDER FROM: ESL

31 136423 PEDESTRIAN/BICYCLE FACILITIES FOR SAN FRANCISCO BAY AREA RAPID TRANSIT OPERATIONS. In addition to the pedestrian-orientation which was planned, designed and built into the Bart-system, increasing emphasis is being placed on accommodating the cyclists. Where possible, close-in bicycle parking is under the surveillance of the information-attendant. Recommendations have been made for the relocation of racks for security reasons at certain stations. Bicycle racks are provided free of charge at 27 stations, with rental lockers at 7 of them. Recommendations are given to provide secure and effective bicycle rack parking. /TRRL/

Lavigne, HH (Tudor Engineering Company, San Diego); International Federation of Pedestrian Assoc 1975, pp 232-241, 2 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 218620), Institute for Road Safety Research; ORDER FROM: International Federation of Pedestrian Assoc, Passage 61 III, S-Gravenhage, Netherlands

31 136425 A COMPARISON OF TRANSPORT IN TOKYO AND NEW YORK-COLOQUIA ON THE CITY. The article is a summary of the main conclusions of A conference held in New York in May 1975. In many respects the problems are similar but a larger proportion of people use public transport in Japan. Railway and subway transport is used in Tokyo, the motor vehicle is more popular in New York. Less urban land is used for streets in Tokyo. The emphasis of countermeasures introduced in both cities recently has shifted from providing better facilities to controlling and limiting access. Measures being implemented or considered include restrictions on parking, the introduction of bus lanes, the giving of preferential treatment to pedestrians and the introduction of tolls to congested areas. Environmental effects of road traffic are of great concern in both cities, car and truck effluents are greater in New York than in Tokyo. The fundamental difference between the two cities is that in Tokyo the government discourages further employment in the central area, in New York the government is concerned about the loss of employment in the centre and does not promote company relocation. /TRRL/

Wheel Extended Vol. 5 No. 1, 1975, pp 18-19, 2 Tab., 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD-218831); ORDER FROM: Toyota Motor Sales Company, Limited, #3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

31 136443 PLANNING FOR FULTON ARCADE. Fulton arcade, a covered pedestrian transitway in Brooklyn, is not an isolated planning concept or project. It exists in the context of the problems of a specific locality with A particular history and experience in planning and development. The Fulton arcade plan will create a two-lane two-way transitway 24 feet wide in Fulton street for buses and emergency vehicles only. Other traffic will be rerouted. Up to 64 buses will travel in each direction during the peak hour. A major feature will be a free standing Plexiglas and steel frame canopy system. It will be designed to provide protection from severe weather for shoppers and bus users. /TRRL/

Kahan, JM Adasko, HH; International Federation of Pedestrian Assoc Conf Paper 1975, pp 27-44, 4 Fig., 2 Phot.; ACKNOWLEDGMENT: Norwegian State Highway Laboratory, TRRL (IRRD 218607)

31 136444 PLANNING FOR THE PEDESTRIAN AND CYCLIST: NEW YORK'S WATERBORNE TRANSPORTATION SERVICE. New York city is planning a major re-emphasis of the usage of waterborne passenger transportation for both commuter and recreation services. Waterborne service presents many cost savings in both capital construction and operations over land-based modes such as bus and rail transit. The planning and design of waterborne transportation terminal facilities have changed a lot recently. More and more emphasis is laid now on pedestrian and cyclist facilities. /TRRL/

Fossella, VJ (New York City Department of Marine and Aviation); International Federation of Pedestrian Assoc Conf Paper 1975, pp 45-52; ACKNOWLEDGMENT: Norwegian State Highway Laboratory, TRRL (IRRD 218608)

31 136695 BALTIMORE TRANSPORTATION CENTER. CONCEPT STUDY. The report established the basic justification for preserving the Baltimore Rail Station as the nucleus in an intermodal transportation center. The proposed transportation center will provide an interface for high-speed intercity rail service, intercity and regional motorcoach service, regional commuter rail service, rapid transit service, local bus service, helicopter service, and the automobile. Two concepts of the intermodal facility are illustrated in this report for further consideration: concept one provides a total comprehensive solution to an expanded transportation center; concept two modifies the direction of concept one by providing a less expensive solution for an expanded complex.

Baltimore Planning Commission, Regional Planning Council, Cochran, Stephenson and Donkervoet, Incorporated Final Rpt. BCDP-BTC-75-101, Oct. 1975, 162 pp; Prepared by Cochran, Stephenson and Donkervoet, Inc., Baltimore, Md. Prepared for Regional Planning Council, Baltimore, Md.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-248626/4ST, DOTL NTIS

31 136912 THE SHIRLEY HIGHWAY EXPRESS BUS-ON-FREEWAY DEMONSTRATION PROJECT/A STUDY OF PARK-AND-RIDING [Interim rept. no. 6]. The market for fixed route transit operations is not limited to travelers within walking distance of transit stops. This was demonstrated by the Shirley Highway Express-Bus-on-Freeway Project as project promoted park-and-ride operations led to sizable increases in bus patronage: Park-and-riders, commuters who traveled by auto to a bus stop and then by bus to work, greatly expanded the market for the fixed route bus service in the Shirley Highway Corridor area. This report presents results of a study of the successful park-and-ride operation within the Shirley Highway Corridor area: suburban fringe parking lots coupled with the high speed buses of the Shirley Highway Express-Bus-on-Freeway Project. Demographic characteristics of the park-and-riders as well as characteristics of their present park-and-ride and previous commute trips are examined. Factors important in the commuters' decisions to park-and-ride are identified. The report also describes the survey procedures used in the study.

McQueen, JT Miller, GK Harrison, C; National Bureau of Standards, Washington, D.C., Techni-

cal Analysis Div.*Urban Mass Transportation, Administration, Washington, D.C., (NBS-4314552) NBSIR-75-689, UMTA-IT-06-0024-75-1, Mar. 1975, 52p; See also report dated Dec 74, COM-75-10412.; Contract DOT-AT-40018; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-253123/4ST

31 137276 TERMINAL AREA FORECAST-1977-1987. The report contains forecasts for air carrier and air taxi enplanements, air carrier and air taxi aircraft operations, itinerant, total and instrument aircraft operations, and instrument approaches at 872 airports throughout the United States. The airports in this publication include all those with Federal Aviation Administration air traffic control towers and those with air carrier service. The report is intended as an aid for anticipating future manpower and equipment needs at terminal areas.

Federal Aviation Administration FAA-AVP-76-5, Jan. 1976, 335 pp; See also report dated Sep 75, AD-A017 095.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A026753/4ST

31 137340 ALLOCATION OF RESOURCES FOR TERMINAL IMPROVEMENT. The report describes the development of a resource-allocation model developed for the improvement of the internal environment of transport terminals. It incorporates considerations of comfort, cost, and patron opinion to allocate resources for maximum effect and efficiency.

Cantilli, EJ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0009) UMTA-NY-11-0009-75-2, Dec. 1975, 118 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254811/3ST, DOTL NTIS

31 137423 CITY OF NAPA LOCAL NEEDS AND PLANNING STUDY. The transit objectives of the city of Napa, California, as defined in this report, are: (1) To increase the transit mobility of all persons, including those especially dependent on transit--the poor, the handicapped, the young and senior citizens; (2) to increase transit service, particularly to the downtown area where most trips converge and to South Napa where many work and school trips converge; (3) to promote transit as a more important factor in achieving an improved environment, and a generally better community in which to live; and (4) to insure that Napa Transit System complements the transportation systems existing and envisioned for the County and Region. The primary goal of this particular study is to design a transit system which meets the transit objectives as stated above. Chapters address data collection, evaluation criteria, three alternatives, evaluation and recommendations, and implementation. System requirements and phasing over five years are discussed.

Voorhees (Alan M.), and Associates, Inc., Berkeley, Calif.*Urban Mass Transportation, Administration, Washington, D.C., (UMTA-CA-09-0025) UMTA-CA-09-0025-74-1, May 1974, 147p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255451/7ST

31 137455 THE POTENTIAL RELATIONSHIP OF THE BICYCLE TO MASS TRANSIT SYSTEMS. The studies executed by the Denver planning office and the regional transportation district clearly show a significant number of present bicycle commuters and a still larger percentage of potential bicycle commuters if properly designed bikeways and parking facilities are made available. The bicycle is a legitimate and practical addition to a balanced transportation system with no negative consequences. Bicycle riding is not only beneficial to our environment but also for the commuter himself. The bicycle is a clean, efficient, economical alternative means of transportation for commuters living within a five mile radius of their employment destination. With the completion of the PRT-system and the upgrading of the existing bus systems, the bicycle can play a new role as a feeder mode to these more rapid forms of transport. The combination of the bicycle with mass transit modes is realistic and practical. Proper bicycle facility planning that is sensitive to the bicyclist's need will encourage more people to enjoy their journey to work. /TRRL/

Wolfe, FL (Denver Regional Council of Governments); International Federation of Pedestrian Assoc 1975, 20 pp, 10 Fig., 2 Tab., 4 Phot.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 218619)

31 137456 BICYCLE PLANNING AT THE LOCAL LEVEL. THE LONDON EXPERIENCE. Bicycle use and bicycle planning in London are examined. The main thesis is that the level of use is now extremely low, at about 2% of all journeys, and that one factor which has contributed to the decline of bicycle use is the activity of transport planners and highway engineers. If this decline is to be halted, this will depend on numerous small and inexpensive works on and off the highway. Recommendations are given for bicycle use in London. A programme of bicycle-orientated improvements to the road network should be started, consisting of: (1) positive signing of existing cycle facilities, combined with protection of existing bicycle facilities, where appropriate, from abuse by other motor vehicles; (2) ensuring that bicycle movement is facilitated, or at least, not discouraged, through existing, or newly created environmental areas. /TRRL/

Trevelyan, P; International Federation of Pedestrian Assoc 1975, 12 pp, 6 Fig., 2 Tab., 11 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 218621)

31 137515 RECENT DEVELOPMENTS IN URBAN TRANSPORTATION. A LOOK AT NEW TRANSPORT COUNTERMEASURES IN JAPAN. The article describes measures being taken in Japan to conserve energy and curtail pollution. These countermeasures are aimed at reducing transport energy use, automobile exhaust pollution, and traffic volumes. Public transport is being reviewed, and new transport technologies are being examined. The author explains the background that led to the setting up of emission standards and describes the political significance. Tokyo police have introduced measures to control truck and motorcycle noise. New forms of bus transit schemes are being evaluated; these include zone and demand bus schemes, residential demand buses, and rapid transit streetcars. Mention is made of research into computer

controlled vehicle systems and a dual-mode bus scheme. Walking is being encouraged by the construction of 'pedestrianised streets'. /TRRL/

Oka, N *Wheel Extended* Vol. 5 No. 1, 1975, pp 20-28, 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 218833)

31 137533 A SET COVERING APPROACH TO BUS STOP LOCATION. This paper considers the problem of locating bus stops in the context of a set covering problem. Zero-one integer programming models are suggested for use in the location of bus stops on new routes and for use in the location of express bus stops on current routes. The models may be used to locate the minimum number of (express) bus stops required to ensure that no passenger need walk more than a specified distance to reach an (express) bus stop. A modified version of the model is presented which enables the router to locate a specified number of (express) bus stops in such a manner that the total distance walked by all boarders is minimized. /TRRL/

Gleason, JM (Texas Tech University) *Omega* Vol. 3 N Oct. 1975, pp 605-608, 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219004)

31 137597 OPTIMUM DISTANCE BETWEEN PUBLIC TRANSPORT STOPS [La distancia optima entre paradas en los transportes publicos]. A theoretical and experimental study is conducted of the optimum distance between public transport stops with a view to reducing to its minimum the total journey time of public transport users. A mathematical model is derived to obtain this distance, which should have economic, sociological and financial repercussions. /TRRL/ [Spanish]

Conde, M *Revista de Obras Publicas* No. 3091, 7211, pp 837-56, 7 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-102539)

31 137783 THE PERFORMANCE OF BUS BAYS. The report compares three options for bus bays at an urban bus stop: (I) the provision of the standard design of Ministry of Transport (doe) bay; (II) the provision of a novel and deeper asymmetric bay; (III) no bus bay i.e. a roadside bus stop. An experiment was undertaken at a site on a 30 ft road in Peterborough where each type of bay was established and observed in turn. A film analysis gave bus manoeuvre details and delays, and traffic flows were also recorded. These observations gave times of buses to enter, unload, load and leave the bay in each case and the relationship of exit times to traffic flow. Record was also made of times to go through a standard length of road with and without the bus present. The results were used in a cost-benefit-analysis exercise which took into account the costs of construction and the values of time of passengers, crews, and occupants of passing vehicles which had been obstructed. The views of bus crews were obtained by interviews. The conclusions are that the deeper, asymmetric bay gave rise to greater difficulties in the exit manoeuvre, and hence greater delays, than did the standard bay which in turn was worse in these respects than having no bay at all. It is also concluded that if a bus bay is used it should be as long and shallow as feasible. /TRRL/

Richards, MJ (Cranfield Centre for Transport Studies, England) *Cranfield CTS Report* CTS

Rpt. No. 9, Jan. 1976, 53 pp, 9 Fig., 15 Tab., 4 Phot., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219194)

31 137785 MERSEYSIDE INTERCHANGE EXPERIMENTS. PASSENGER TRANSPORT INTERCHANGES ON MERSEYSIDE. DEMONSTRATION PROGRAMME RESULTS AND CONCLUSIONS. This report describes a programme of 28 experiments carried out in the Merseyside area from late 1971 to mid-1973. The purposes of these experiments were to gain experience in the setting up and running of improved car parking facilities at railway stations and bus services to stations to provide a complete service for commuters to central Liverpool, to assess public response to these services and to evaluate their potential benefit to the area as a whole. The parking improvements consisted of the provision of 300 new car parking spaces and reducing or removing parking charges at seven suburban railway stations. The bus/rail services included special new bus routes, some modification of existing bus services to provide better train connections and the issue of combined bus/rail tickets. The car/rail experiments were adjudged generally successful in that they resulted in a net gain to the public transport purse, one of the conclusions was that free car parks should be constructed or extended at stations more than four miles from the centre of Liverpool. The conclusions on the bus/rail experiments are more complex. Their value is that they should lead to lower running costs by the modification or elimination of duplicate through bus services and the results show that the experimental services have proved sufficiently popular for this to be possible. However, much depends on whether existing through bus services can, in fact, be modified in view of their use for intermediate, non-central area journeys. The report therefore recommends a further study in which interchange bus services are planned throughout an entire corridor, so that the full scope for operating economies can be thoroughly explored. Apart from this, the report lays down guidelines for planning and operating interchange bus services. /Author/TRRL/

Merseyside Passenger Transport Executive, (7604011) 1975, 31 pp, 10 Fig., 10 Tab., 3 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219210); ORDER FROM: 7604011

31 137942 RESERVED BUS LANES IN QUEBEC CITY-PART 2. After a major cordon study undertaken by the transit commission in December 1973, and a feasibility study by consultants, the city of Quebec decided to install "reserved bus lanes". This paper reviews some of the particular problems that had to be considered before initiating the project in Quebec. The purpose of this report is simply to give a broad overview of the problems and not to discuss any particular problem in detail. /TRRL/

Robinson, ES (Quebec Urban Community Transit Commission, Canada) ; Canadian Urban Transit Association, (0316-7933) Monograph June 1975, pp 64-69; ACKNOWLEDGMENT: Roads and Transportation Association of Canada (RTAC02079E), TRRL (IRRD 219499)

31 138149 TRAVEL PATTERNS ON A NEW REGIONAL RAPID TRANSIT SYSTEM: CLUES FROM THE EARLY STAGES OF OPERATIONS ON BART. This paper reports on some of the traffic patterns that developed on the Bay Area Rapid Transit (BART) System from November 1973 to August 1974, when only portions of the BART network were open to traffic. Data from fare gates at stations, counts on trains, transfer tickets, and highway traffic counts were compared to BART estimates made in 1971. Indications are that BART will attract far fewer short trips (less than 6 miles or 10 km) in San Francisco and Oakland than had been anticipated. Short trips in some outer areas with less surface transit and trips greater than 10 miles (16 km) long may have been underestimated. This suggests that the forecast inaccurately evaluated submodal split between rail and bus transit over short distances and may have weighted cost differentials too highly for long trips. On peak shopping days, BART attracts shoppers to downtown areas and to regional shopping centers near BART stations, BART is quite successful in attracting those who commute to industrial and commercial areas and to universities outside downtown areas who use feeder buses at their trip ends. In one corridor BART appears to have caused an increase in total transit use, partly by diverting travelers from the automobile and partly by generating new trips. When a surface transit system in BART territory ceases to operate, some additional short trips are made on BART, but there is a loss of longer trips that used feeder buses.

Homburger, WS (California University, Berkeley) *Transportation Research Record* No. 563, 1976, pp 38-52, 1 Fig., 8 Tab., 3 Ref.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

31 138310 MATCHING THE MODES. Ridership and service of mass transit systems can be markedly increased by efficient interfaces with other modes. Examples from Chicago, Toronto, Philadelphia, and San Francisco are given in support of this view. It is shown that interfacing must be designed to meet the special needs of each city.

Myers, ET *Modern Railroads/Rail Transport* Vol. 31 No. 3, Mar. 1976, pp 62-65, 1 Fig., 1 Tab., 3 Phot.; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, Watson Publications, 5 South Wabash Avenue, Chicago, Illinois, 60603

31 138961 THE BUS IN URBAN SWEDEN. Policies carried out in Sweden, reflecting extensive bus priority measures and a relatively low fare structure, are intended to offer all social groups the opportunity to travel in a manner least disturbing to the environment. The greater Stockholm Urban Transport Authority has introduced an integrated transport system in which suburban bus services provide local services and also connect with city-centre rail links. Similarly, in Gothenburg, buses connect with a tramway network so eliminating the need for buses in the city centre. In a move towards direct bus connections, transport authorities have introduced limited-stop services linking housing areas with industrial centres directly. Extensive bus priority

measures in Swedish cities are designed to allow the passage of buses with as little traffic conflict as possible. In conclusion, it is recognised that the introduction of progressive policies has resulted in a higher level of service and a marked increase in passengers carried. /TRRL/

Poole, SC *Buses* Vol. 27 No. 255, June 1976, 4 pp, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-220486)

31 138989 URBAN PUBLIC TRANSPORT. In predicting the future of public transport over the next 25 years the author identifies the five main factors which will affect transport development and the quality of life in general. These are: (a) increased urbanisation; (b) growing environmental awareness; (c) financial constraints; (d) the energy crisis and (e) new technology. The history of public transport over the last 25 years is examined and the reason for the decline up to the late 1960s identified. Future public transport is examined on two counts, systems and organisation. It is not felt that personalised rapid transit or "people movers" will play any significant part in the public transport network up to the end of the century but that the emphasis should be placed on development of appropriate bus and rail systems, coupled with the increasing use of electric traction and the provision of more priorities in highway networks. Greater detail is given on the integrated transport system based on bus and metro now being built in Tyne and Wear Counties. As regards organisation there is an anomaly between some public transport being publicly-owned locally while the rest of it is virtually publicly-owned on a national basis. There is a need for more logical control of what is very much a local facility and regional transport organisation is called for. For abstracts of other papers to the 1975 National Conference of the Institution of Highway Engineers, see IRRD abstract nos 220234-38. /TRRL/

Howard, DF (Tyndale Passenger Transport Executive, England) *Highway Engineer* Vol. 23 No. 5, May 1976, pp 35-42, 1 Fig., 3 Phot., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220236)

31 139037 COMPUTER AIDED ROUTE-BOUND TRANSPORT PLANNING (Planering av Linjetrafik med Datorns Hjälp). Since the route-bound transport systems are labour intensive, planning must be made more efficient. Factors to be taken into account are present and expected travel patterns, desirable travelling standard, existing installations, town plans, available finance, overall economy in planning, first costs and operation. In an interface system developed by Volvo, (1) route network and traffic density are proposed; (2) this is evaluated by computer in view of travel pattern; (3) modifications are made accordingly; (4) new evaluation is made, etc. a description is given of methods available for analysis of travel patterns and service details. The print-outs contain, for each route, running times and passenger density between stops, service density and capacity in each direction; for each pair of routes, number and location of interchanges; for each stop, numbers getting on and off, etc; for each route, summaries of traffic density, loading and costs; for each pair of areas, number of journeys and travelling standard; for each area, number and standard of journeys starting or finishing in area; histograms for

journey times and lengths; summaries of travelling standard, traffic density, loading, productivity and costs. Extreme values are pinpointed. To make for ease of understanding, selected results can be presented graphically. /TRRL/ [Swedish]

Andreasson, I *Svensk Lokaltrafik* No. 1, 1976, pp 7-11, 6 Fig., 2 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN33005E), TRRL; ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

31 139127 INTERNATIONAL SYMPOSIUM ON MAN AND TRANSPORT. SESSION 4. The following papers were presented in session 4: Man and transport. Future aspects. The social and economical concept, Carballo, M; The future mode of transportation. The Morgan Town-West Virginia University personal rapid transit system, Ellis, SEG; Report on the demand bus system adopted for nose town, Tanizawa, T; The traffic zone system in Gothenburg and some aspects on transport programs for the future, Sylven, E; The shopping park in Asahikawa City, Igarashi, K; Public transport-public opinion, Fitzpatrick, JR. /TRRL/

International Symposium on Man and Transport No Date, Figs., Photos. ACKNOWLEDGMENT: TRRL (IRRD 219760)

31 139128 INTERNATIONAL SYMPOSIUM ON MAN AND TRANSPORT. SESSION 3. The following papers were presented at session 3: Why do cities need new transportation systems, Laborie, JA; Background for the new transportation system, Ishii, T; Mass transportation and distribution in urban and regional areas, Lindahl, H; Can the new transport systems save urban transportation, Okano, Y; Urban transportation applications of a TACV system, Merritt, HW. /TRRL/

International Symposium on Man and Transport No Date, Figs., Tabs., Refs. ACKNOWLEDGMENT: TRRL (IRRD 219759)

31 139219 DESIGN AND CONTROL OF FREEWAY OFF-RAMP TERMINALS. This report presents the results of a comprehensive review and assessment of design and operating practices used at freeway exit-ramp terminals, especially terminals with surface streets. Information is presented on such matters as compatibility of design elements, traffic control device applications, impact of access to adjacent development, accommodation of pedestrians and bicycles within the interchange area, safety, capacity, wrong-way movements, and provisions for public transportation vehicles. Research needs are pointed out.

NCHRP Synthesis of Highway Practice No. 35, 1976, 61 pp, Figs., Tabs., Refs. ORDER FROM: TRB Publications Off

31 139241 PROBLEMS IN INTEGRATING BICYCLE TRAVEL INTO THE URBAN TRANSPORTATION PLANNING PROCESS. With bicycle sales increasing rapidly and with attitudes that regard the bicycle as a toy declining, bicycle travel must be integrated into the urban transportation planning process. The bicycle is being recognized more and more as a viable means of urban transportation, but rational planning for the bicycle requires detailed

information concerning the nature of intraurban bicycle travel, information that currently does not exist for U.S. cities. This paper uses detailed travel data gathered recently in Sweden to demonstrate that bicycle travel closely resembles motor vehicle travel. The data show that, when bicycle ownership is high and when planners treat the bicycle as a viable means of transportation, the bike is used extensively in daily travel for a variety of trip purposes. In planning for bicycle facilities in U.S. cities, transportation planners must recognize that viewing the bicycle primarily as a recreational vehicle will not meet the needs of most cyclists. The bicycle must be integrated into the urban transportation planning process like any other urban transportation mode. /Author/

Hanson, S Hanson, P (State University of New York, Buffalo) Markve, K, Discussor *Transportation Research Record* No. 570, 1976, pp 24-30, 20 Ref.; Reports prepared for the Annual Meeting of the Transportation Research Board. Discussion of paper included.; ORDER FROM: TRB Publications Off

31 139356 URBAN AND SUBURBAN RAILWAYS. This report describes and discusses the current situation and technical characteristics of different types of railways. The railway network is defined, and the importance of diagonal lines running through the city is pointed out. The standards for walking distances, travelling time, frequencies, interchange facilities and feeder lines are formulated. The planning is described of tramways, surface suburban railways and metro systems with particular attention to track arrangement and layout. Characteristic solutions are examined for network and curvature, and the details are described of the underground and surface parts of the lines. Stations with 3 and 4 tracks are discussed, as are double-tracked stations with 3 platforms. The suburban rapid transit operated by the state railways is discussed, and data for calculating the capacity of platforms, stairs, escalators and passages are compiled. Unconventional systems of urban transportation, namely, cars on pneumatic tire wheels, suspension systems, the Alweg type and cab taxis are also discussed. Examples from urban and suburban railways in a series of towns and conurbations are quoted.

Svennar, O ; Norwegian Institute of Technology No. 12, Mar. 1975, 127 pp, Figs., 23 Ref.

31 139832 SERVICE POLICY FOR SURFACE PUBLIC TRANSPORTATION. This Service Policy which is intended to guide the operation and improvement of all conventional bus, trackless trolley and surface streetcar services within the Massachusetts Bay Transportation Authority (MBTA), will eventually be integrated into a comprehensive policy covering surface transit, rapid transit and commuter rail operations as well as specialized transport services for special markets. The policy presented here covers MBTA services as well as private carrier and community based services. Prospective uses of the policy are listed, and the state and federal laws which provide the legal basis and impetus for this statement are summarized. Service goals and objectives are set forth, and the standards against which services will be evaluated are described. These standards relate to service design, operating performance, and economic/social/ environ-

mental standards. Planning and evaluation procedures are described which are based on community involvement, and cost-effectiveness. Service warrants are described which are used to answer questions relating to discontinuation of operation, the assumption of responsibility for operation of a service that is currently being provided by a private enterprise, and the turning over of a MBTA service to private enterprise. Procedures are also presented for amendment of the policy statement which will keep it responsive to the environment.

Hazeltine Corporation Dec. 1975, 64 pp

31 141103 EXTENSION OF THE PICCADILLY LINE FROM HOUNSLOW WEST TO HEATHROW CENTRAL. The paper gives a history of events leading up to the authorization of the construction of the extension. Three separate contracts were involved, and a description of the design and method of construction in each case is given. The paper discusses the reasons for adopting a particular method of construction, and comments on problems encountered on each of the three contracts and the effectiveness of the various measures taken to overcome them. The particular difficulties of working under an operational airfield are detailed.

Jobling, DG Lyons, AC *Institution of Civil Engineers, Proceedings* Vol. 60 No. 1, May 1976, pp 191-218, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 141258 BUS PRIORITY SYSTEMS. Information is presented on the various ways being used in other countries as well as the U.S. of giving priority treatment to buses and carpools. The types of bus priority considered include with flow bus lanes, contra-flow bus lanes, reserved bus lanes on freeways (sometimes reversible for tidal flow operation). Priority access to freeways and other facilities (eg. toll booths) and bus only streets, busways (segregated roads for buses only), priority at traffic signals (eg. adjustment of signal phasing to ease passage for buses etc.) other priority measures including traffic regulations giving priority to buses, etc, and comprehensive schemes incorporating bus priority with town and traffic planning measures. The recommendations to emerge from the study stress the movement of people rather than vehicles by freeing buses from the effects of congestion. Recommendations are presented regarding the bus priority and passenger time and operating costs, the effective utilization of road space, the integration of bus priority with town and transport planning, and the assessment of priority schemes.

Webster, FV Bly, PH ; Transport and Road Research Laboratory CCMS 45, 1976, 223 pp, Figs., Tabs., Photos., 96 Ref., 4 App.; Published on behalf of the NATO Committee on the Challenges of Modern Society.

31 141302 LA VILLE DE QUEBEC REVIVING PUBLIC TRANSIT. The government of Quebec set up a special commission in 1966 to study the transportation needs of the city of Quebec. For years public transit had been operated by seven private companies. The study established a transit commission (QUCTC) that would provide unified transit on a cost shared basis. In 1970-71, the routes, vehicles, and manpower were consolidated, and a new fare structure was created. Political and labor battles

characterized the first few years of the commission, and the city of Quebec showed a ridership loss between 1970 and 1974. A 1972 survey showed that public transit was accounting for only 1 percent of the total daily trips. This and other studies brought about improved service and route changes. There has always been opponents of public transit in Quebec, and when a large operating deficit resulted, there were more complaints. Besides the lack of adequate financing, there were complaints about such things as lack of bus shelters and bus priority schemes. In 1974, the Province of Quebec finally granted the commission a \$900,000 subsidy. Plans for future improvement of the QUCTC's service include intermodal planning, streetcars, and light rail transit. It appears that a new attitude is developing toward public transit. Priority must be accorded it in the future since continued emphasis on highways will only destroy cities and bring pollution. To be successful, public transit must be useful, and the QUCTC has many improvements lying ahead.

Transit Canada Magazine Vol. 12 No. 4, Aug. 1976, pp 6-17, Figs., Tabs., Photos.

31 141530 DETERMINATION OF ACCESS TIMES TO RAIL RAPID TRANSIT STATIONS WITHIN THE CITY OF CHICAGO. This paper addresses the question of access mode and travel time to rapid transit stations within the City of Chicago. An analysis of an existing disaggregate data set was undertaken to determine: (1) the distance from a rapid station at which people walk, as opposed to ride the bus, to the station; and (2) the travel time in both unfactored and equivalent time (with unequal weightings of trip components) by the bus for people traveling a given distance. An indifference distance of one-half mile was determined, and models which express travel time, in both unfactored and equivalent time, as a function of distance developed.

Lee, I Permut, H ; Northwestern Illinois Regional Transportation Auth TR-75-04, Dec. 1975, 8 pp, 3 Fig., 1 Tab.

31 141554 WHERE TRANSIT WORKS: URBAN DENSITIES FOR PUBLIC TRANSPORTATION. A summary of a two year study addresses the problem of increasing the mobility of those who cannot drive, strengthening urban centers and reducing their need for highways, reducing pollution, and conserving energy. The study demonstrates that only changes in the nation's urban development pattern will effectively solve these problems. The study further addresses the question of the pattern of location and density of support, required for transit in areas of new urban facilities and housing; also, the various types of transit service which can be supported, and at what cost. Land-use policies are correlated with an analysis of the following individual modes of transportation: Dial-a-bus; light guideway transit; express buses; rapid transit systems; light rail systems; and commuter rail.

Regional Plan News No. 99, Aug. 1976, 23 pp, Figs., Tabs., Photos.

31 141647 RAIL LINKS TO AIRPORTS THROUGHOUT THE WORLD [Les liaisons rail-aerports dans le monde]. No Abstract. [French]

Rolland, P *La Vie du Rail* No. 1545, 760530, pp 42-49, 7 Fig., 4 Tab.; ACKNOWLEDGMENT: UIC; ORDER FROM: French National Railways, 610 Fifth Avenue, New York, New York, 10020

31 141662 SAMPLE SIZE DETERMINATION FOR TRAVEL TIME AND DELAY STUDIES. Based on the central-limit theorem, sample means of travel times are assumed to have a normal distribution, regardless of the actual distribution of the population of travel times along a study route. Using this assumption, the techniques of statistical quality control are applied to provide a procedure for sample size determination. This procedure is applicable for both the license-plate and the test car techniques; it is also used for estimation of sample sizes for travel time and delay studies that involve either general travel conditions for all vehicles along a study route, or for only public transportation vehicles on scheduled routes.

Oppenlander, JC *Traffic Engineering* Vol. 46 No. 9, Sept. 1976, pp 25-28, 5 Tab., 1 Phot., 2 Ref.

31 141684 SKIP-STOP OPERATION: HIGH SPEED WITH GOOD AREA COVERAGE. Increase of transit speeds is one of the most effective ways for increasing the attractiveness of transit for urban travel. For longer trips, particularly where there is a competing freeway, the requirement for speed is rather high. With frequent stations, high operating speeds cannot be achieved. This article describes the main alternative solutions to this problem and then focuses on the skip-stop operation, presenting a methodology for its analysis and evaluation. The article refers to rail services, but the basic aspects of the problem are common for any technology. Light rail and bus services for which skip-stop service could be considered could use the methodology developed.

Vuchic, VR (Pennsylvania University, Philadelphia) *Union Internationale des Transports Publics, Revue* Vol. 25 No. 2, 1976, pp 114-120, 2 Tab., 6 Ref., 1 App.; The article is a revision of that published in *Traffic Quarterly*, Vol. 27, No. 2 (April 1973); research was partially funded by UMTA, DOT; ACKNOWLEDGMENT; ORDER FROM: International Union of Public Transport, Avenue de l'Uruguay 19, B-1050 Brussels, Belgium

31 141685 METROPOLITAN TRANSPORTATION IN TOKYO. After three decades of rapid population growth, Tokyo's metropolitan area seems to be stabilizing. However the opportunity to implement positive policies to solve housing and transportation problems has been lost and travel congestion is a fact of life. The decline in population and decrease in employment are in part a result of inadequate regional planning. The article describes modal split, the role of rapid transit and commuter trains, and the role and control of motor transportation are discussed. One area studied is dispersion of population beyond the present metropolitan area, utilizing ultra-high-speed trains for commuter services.

Kakumoto, R (Japan Transport Economics Research Center, Tokyo) *Union Internationale des Transports Publics, Revue* Vol. 25 No. 2, 1976, pp 84-93, 13 Tab.; ORDER FROM: International Union of Public Transport, Avenue de l'Uruguay 19,

B-1050 Brussels, Belgium

31 142044 EXCLUSIVE BUS LANE EXPERIMENT. A study was made in Baltimore to assess the impact of an exclusive bus lane on traffic. The site of the route was a two-directional urban arterial with a two-lane width in each direction. Four test cars were used for the evaluation, and observers were stationed on the buses. The data collection process was divided into four phases and included both peak and off-peak periods. Data indicated that for both a A.M. and P.M. peak, on both the summer and winter schedules, the exclusive bus lane and more detrimental than beneficial to automobile travel. The difference between bus and automobile to bus usage cannot be expected as a result of exclusive bus lanes. The ultimate conclusion of the study is that the imposition of such lanes does not improve transit operations and will increase emissions and congestion. In order to verify the conclusions, statistical tests were made which correlated with the results.

Erdman, JW Panuska, EJ, Jr (Baltimore City Department of Transit and Traffic) *Traffic Engineering* Vol. 46 No. 7, July 1976, 4 pp, 4 Tab., Photos., 7 Ref.

31 142136 A STUDY OF TRAVEL-TIMES OF BUSES IN THE CENTRE OF A LARGE PROVINCIAL CITY. A study is presented of the effects on the operation of part of an urban bus system resulting from changes in operating conditions. Such changes include the introduction of a city centre bus lane, a route alteration, and the replacement of several sets of traffic lights by mini-roundabouts. Mean running times and variability of running times on various sections of route before and after these changes are compared for different periods of the day, using data collected by on-bus observers. The results and their possible interpretation are discussed. Considering these results, and the results of a limited survey carried out later by stationary observers and involving large numbers of observations, various limitations in design and execution of the study are pointed out. Based on the experience gained, several recommendations are made for the conduct of future similar studies. (A) /TRRL/ Charlesworth, JA ; Newcastle-Upon-Tyne University, England Monograph Torg Paper 15, Feb. 1976, 28 pp, 7 Fig., 9 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220723); ORDER FROM: 7605343

31 142955 BUS-CARPOOL FWY LANES IN SAN FRANCISCO AREA. Operational characteristics of four types of relatively low cost preferential treatment for high occupancy vehicles are described. They include a contraflow bus lane, a with-flow bus lane, a with-flow bus-car-pool lane, and preferential access to a metered freeway. The projects are described in terms of their physical configuration, safety experience, violation experience, and enforcement experience. All are practical treatments and a choice of a particular type depends on traffic characteristics, types of bus service, and freeway configurations.

Newman, L (California Department of Transportation) *ASCE Journal of Transportation Engineering* Conf Paper Vol. 102 No. TE4, Nov. 1976, pp 625-636, 11 Fig., 1 Ref., 1 App.; Presented at the ASCE National Water Resources & Ocean Engineering Convention in San Diego, California,

April 5-8, 1976.

31 143018 A TRANSIT CONCEPT FOR PINELLAS COUNTY. The report examines the transit needs in Pinellas County, Florida. It deals with local and County-wide transit operating concepts, demand prediction, system sizing and costing, financing and system management. It is concerned with transit needs over the five-year period from 1974 through 1978, and defines the equipment and facilities that will be required during each of these years. The focus of the study is on the definitions and evaluation of broad transit system concepts for the County. Estimates are generated for the number and types of transit vehicles that will be required, the supporting facilities needed, the total and equivalent annual capital investment and operating costs that will be incurred, and probable levels of transit revenue.

Tampa Bay Regional Planning Council, Community Sciences, Incorporated, Urban Mass Transportation Administration. (UMTA-FL-09-0009) UMTA-FL-09-0009-74-2, Apr. 1974, 102 pp; Prepared by Community Sciences, Inc., St. Petersburg, Fla.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255640/5ST

31 143045 TEXAS TRANSIT DEVELOPMENT PLAN 1975-1990. Contents: History of urban transportation development; Urban transportation development in Texas; The role of transit in Texas; Policy, goals, and objectives for transit in Texas; Future transit travel in Texas; Transit cost-revenue projections for 1980 and 1990; Financing Texas transit programs; Intercity passenger transportation.

Texas Mass Transportation Commission, Texas Transportation Institute, Smith (Wilbur) and Associates, Urban Mass Transportation Administration, (UMTA-TX-09-8001) UMTA-TX-09-8001-74-1, Dec. 1974, 205 pp; Prepared in cooperation with Texas Transportation Inst., College Station, and Smith (Wilbur) and Associates, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256116/5ST, DOTL NTIS

31 143204 TEXAS MASS TRANSPORTATION COMMISSION FINAL REPORT [Final rept]. Three programs were organized--administration, planning, and development. Each program is explained in the report. The following accomplishments are among those cited--the 1975-1990 Texas Transit Development Plan provided the foundation for the comprehensive master plan for public mass transportation development in Texas; establishment of the agency newsletter, Texas Transit Topics, allowed for improved communication channels between the TMTC and the state, Federal, and local political subdivisions, transit operators and interested private citizens; the Third Annual Transit Conference was held March 10 and 11, 1975 in Austin; and, statewide transit operating statistics were aggregated and analyzed for CY 1975, and were then published in the first such report on Texas' total transit operation.

Texas Mass Transportation Commission., Austin.*Urban Mass Transportation Administration., Washington, D.C., (UMTA-TX-09-8001) UMTA-TX-09-8001-75-2, June 1975, 14p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256285/8ST

31 143207 TEXAS TRANSIT OPERATIONS (1974) (STATISTICS AND ANALYSIS). Charged with the responsibility to develop and plan for urban transit in Texas, the Texas Mass Transportation Commission (TMTC) began gathering operational information early in 1974. Tables present data on the number of transit passengers in 1975, statewide operating statistics, finances, calculated indicators for transit, financial assistance to Texas from UMTA, estimated effect of employee strikes on transit, statewide transit ridership for 1973 and 1974, estimated growth of statewide transit ridership, calculated transit indicators for urbanized areas in Texas, and transit passengers and vehicle miles per capita in Texas urbanized areas (1974). The distribution of statewide transit characteristics, 1974 transit patronage by quarter and city category, and the effect of 1974 strikes on statewide transit ridership trends are represented on graphs. General conclusions are given.

Texas Mass Transportation Commission., Austin.*Urban Mass Transportation Administration., Washington, D.C., (UMTA-TX-09-8001) UMTA-TX-09-8001-75-1, May 1975, 31p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256308/8ST

31 143208 BART (BAY AREA RAPID TRANSIT) MULTI-MODAL TERMINAL PLAN, CITY OF WALNUT CREEK, CALIFORNIA. As a basis for evaluating alternative designs to correct the deficiencies of the existing station and to deal with demands from anticipated changes, the following goals were developed: Maximize the value of the public investment in the BART system and encourage use of the system by maintaining and improving the accessibility of the station to all modes of transportation; conserve fuel and reduce pollution by encouraging use of public feeder transit service to the BART station; improve patron comfort and safety in the station area; encourage development in the station area that will relate to and enhance the value of the BART station as a multi-modal transportation terminal.

Duncan and Jones, Sanders Associates, Incorporated, Metropolitan Transportation Commission, Urban Mass Transportation Administration, D.C., (UMTA-CA-09-0025) UMTA-CA-09-0025-74-2, Mar. 1974, 102 pp; Prepared in cooperation with Bay Area Rapid District, Oakland, Calif., and Metropolitan Transportation Commission, Berkeley, Calif.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256312/0ST

31 143255 NEW JERSEY PUBLIC TRANSPORTATION STUDY. PHASE A. IT-09-0023 TS F110 (7350). IMMEDIATE ACTION PLAN. The study examined the existing public transportation characteristics and following extensive analysis the Immediate Action Plan recommends appropriate action for the preservation and extension of bus services. The study recommendations are designed to lead to improved coordination, operation and regulation of essential bus services in New Jersey and will guide the most effective use of state and federal assistance for the bus industry.

New Jersey Department of Transportation, New Jersey Department of Community Affairs, Tri-State Transportation Commission, Delaware Valley Regional Planning Commission, Urban

Mass Transportation Administration, (UMTA-IT-09-0023) UMTA-IT-09-0023-74-3, Mar. 1974, 227 pp; Prepared in cooperation with New Jersey Dept. of Community Affairs, Trenton, Tri-State Regional Planning Commission, New York, and Delaware Valley Regional Planning Commission, Philadelphia, Pa.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255641/3ST

31 143262 IMPACT OF ARTERIAL BUS PRIORITY TREATMENTS ON BUS OPERATING COSTS. A study was conducted to ascertain whether or not an arterial bus priority treatment affects the cost of bus operations. Arterial priority treatments were evaluated for the effectiveness of operations within the Central Business District. Bus operating costs affected by the benefits of an arterial priority treatment were discussed. A case study using the Benning Line of the Washington Metropolitan Area Transit Auth. Metrobus System was then undertaken to illustrate the impact of the arterial priority treatment upon bus operating costs. The results indicate a potential for significant savings in bus operating costs. Briefly, the results show an annual savings of approximately \$8,800 due to the implementation of a priority treatment along one mile of an arterial in downtown Washington, D.C. This compared to an arterial priority treatment capital cost of about \$10,000 per mile.

Hirsh, MS ; Transit Development Corporation, Incorporated, Urban Mass Transportation Administration Final Rpt. TDC-BUS-75-1, Sept. 1975, 67 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256900/2ST

31 144016 COMMUNITY MONITORING. The environment project's community monitoring program served as a source for substantive findings on response to impacts, and as an aid in overall research design. It functioned through a variety of non-random, qualitative techniques to gain information on the general nature of community concerns for and responses to BART. Also, it provided a base for verification that all major physical impacts, at least those perceived by persons affected, were being studied. Additionally, it provided indications of the kinds of questions, language and direction the Phase 2 survey of response to impact should employ for the most meaningful results.

Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Gruen Associates, Incorporated, Curtis Associates Work Paper DOT-BIP-WP-22-4-76, Mar. 1976, 46 pp

Prepared by Gruen Associates, Los Angeles, Calif., and Curtis Associates. Report on BART Impact Program Environment Project.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258369/8ST, DOTL NTIS

31 144077 TALK IS CHEAPER. Telecommuting, moving the work to the worker, may have considerable impact on the planning of the cities of the future. It is particularly suited to industries primarily engaged in the collection, storage and manipulation of information. The decentralization decision of a major insurance company in Los Angeles provided a practical illustration of the concept. Productivity increased at satellite offices. The effect this could have on mass transportation systems is discussed.

Nilles, JM (University of Southern California) *IEEE Spectrum* Vol. 13 No. 7, July 1976, pp 91-93; ORDER FROM: ESL

31 144208 CITY OF WINNIPEG PUBLIC TRANSIT STUDY. APPENDIX A BACKGROUND MATERIAL. The City's adopted policy on public transit states that "the City supports the principle of emphasizing the role of public transport for the movement of persons to and from the downtown area and other centres which attract large concentrations of people." Therefore, the major areas of employment concentration were identified, and this report discusses the mode of travel to the major employment areas including the existing transit travel speeds to downtown, modal the other major employment areas.

Winnipeg, City of, Canada Report Jan. 1974, 8 Fig.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

31 144209 CITY OF WINNIPEG PUBLIC TRANSIT STUDY. PROGRESS REPORT-5 YEAR PROGRAM. Prior to the development of an improved system of public transportation for the City, studies were carried out to investigate the operational characteristics and utilization (or lack thereof) of the present system. As a result of these studies, the administration developed a 5 year plan for the improvement of public transit service for the City of Winnipeg. This report comments on the progress of the 5 year plan following the Guidelines and policy statements in developing plans for the growth and provision of related services for the City of Winnipeg.

Winnipeg, City of, Canada Report Jan. 1974, Figs.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

31 144356 BUS PRIORITY AT TRAFFIC SIGNALS. The recent increase in the importance of public transportation and the enlarging deficits that have accompanied growing patronage have led to many attempts to increase the speed and efficiency of bus operations. One measure, priority to buses at traffic signals, has been discussed at great length but implemented in only a few instances. The author looks at the advantages and disadvantages of two such systems, Real Time and Fixed Time Bus Priority.

Whitehead, D Beere, DM ; Roads and Transportation Association of Canada Proceeding 1976, pp 135-149, 8 Fig., 3 Ref.; This paper was published as part of the Proceedings of the 1975 Annual Conference held in Calgary.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

31 144445 THE METRO IN MOSCOW. The historical background to the Moscow Metro is briefly reviewed, route characteristics are discussed, and observations are made on the operational and financial management of the system. Comments are made relating to cars and train scheduling, automated operations, and the interface between the metro and surface feeders and distributors. The major elements of the transportation plans for the city is examined with special reference to system expansion, planning criteria, and implementation, and the similarities of problems at the technical and professional level between large cities of the Soviet Union and the

United States is noted. The Moscow system is a series of diagonals that cross the city core. The longest radial line is 30.4 kilometers in length with a total trip time of 41 minutes 50 seconds. Of particular interest is the circle line that ties all of them together. In time of technological progress, the most interesting is the newest radial line which is equipped with automatic controls.

Grave, S *Traffic Quarterly* Vol. 30 No. 2, Apr. 1976, pp 241-267, 4 Fig., 2 Tab., Photos., Refs.

31 145319 PUBLIC TRANSPORT BY BUS INSIDE AND OUTSIDE BUILT-UP AREAS [Ipenbaar busvervoer buiten en binnen de bebouwde kom]. Inside built-up areas priority regulations for public transport are already of frequent occurrence. The space for traffic outside built-up areas is now also becoming crowded, and priority regulations for public bus transport are appearing. Regulations which can be used, the space necessary and the benefits which arise are discussed. /TRRL/ [Dutch]

Bragt, PM ; Dutch Touring Club ANWB Proceeding 1975, pp 65-83, 8 Fig., 20 Phot.; This paper is included in the conference proceedings of the Verkeerstechnische Leergang 1975.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV58073E), TRRL (IRRD 223196)

31 145331 PARAMETRIC ACCESS NETWORK MODEL. Parametric models are calibrated for the access portions of rail and bus trips. The models are designed to predict average zonal travel times as a function of the transportation system, zone size, and volume-related characteristics of a zone. The calibrated models are access walking, driving, and bus-riding time for rail trips and walking time to a stop for bus trips. Corresponding models are developed for the within-zone variance of the access time. These models provide input to the existing travel demand forecasting process by systematizing the way in which the access times are currently obtained for network coding. The importance of these values for travel forecasting has been repeatedly demonstrated in the past. These models also enable the use of large zones to help simplifying and speed up the transportation plan analysis and evaluation process. The predictive accuracy of the final models is evaluated in terms of standard indexes of forecasting accuracy. The results show that the coefficients of determination are high and that the coefficients of variation are low for all the models. Thus, the models should find an immediate use in transportation planning. /Author/

Talvitie, A (California University, Los Angeles) Leung, T (Oklahoma University) *Transportation Research Record* No. 592, 1976, pp 45-49, 9 Ref.; ORDER FROM: TRB Publications Off

31 145537 URBAN CORRIDOR DEMONSTRATION PROGRAM, MANHATTAN CBD-NORTH JERSEY CORRIDOR. EVALUATION OF FRINGE PARKING. The fringe parking program in New Jersey is used as a means of transferring and diverting auto users to transit on the periphery to the Manhattan CBD. Its effectiveness as a system can be measured in that 5300 parking spaces with occupancy of 77 percent of capacity can reduce commuting vehicle miles of travel by 40 million annually. Over the past 20 years a fringe parking system for auto-bus transfers has grown and expanded away from the CBD following the path of urban emigration. The six

park-and-ride facilities examined in this report range from those immediately adjacent to the Manhattan CBD to as far away as 36 miles. The facilities consist of Port Authority Bus Terminal and parking lots in New Jersey at Weehawken, North Bergen, Ridgefield, East Brunswick, and Willowbrook.

Blue, V ; Tri-State Regional Planning Commission, Federal Highway Administration, (TSRPC-R-519-1) Final Rpt. DOT-FH-11-7778TS7910, Mar. 1976, 15 pp; Contract DOT-FH-11-7778; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258380/5ST

31 145580 TRANSIT DEVELOPMENT PROGRAM FOR THE LOWER PENINSULA AREA OF VIRGINIA. VOLUME I. MAIN REPORT. This program is a detailed analysis and five-year operations plan for mass transit in the Lower Peninsula area of Virginia which includes James City County, York County, Williamsburg, Newport News, Poquoson, and Hampton. The report examines the characteristics and adequacy of existing transit service and community attitudes toward public transportation. A recommended transit system is outlined, describing route alignments and frequency of service; the capital investment needed to sustain the system is defined; the five-year revenue/cost implications of the program are described. In addition, a marketing program aimed at making transit more attractive to all residents is defined. Finally, a plan for activities required to monitor, maintain and update the Transit Development Program is set forth.

Simpson and Curtin Incorporated, Urban Mass Transportation Administration, (UMTA-VA-09-0007) SIMCUR-375-F, UMTA-VA-09-0007-74-1, May 1974, 156 pp; Also available in set of 2 reports as PB-258 200-SET, PC\$10.75/MF\$5.00.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-258201/3ST

31 145581 TRANSIT DEVELOPMENT PROGRAM FOR THE LOWER PENINSULA AREA OF VIRGINIA. VOLUME II. APPENDIX. This Transit Development Program is a detailed analysis and five-year operations plan for mass transit in the Lower Peninsula Area of Virginia, which includes James City County, York County, Williamsburg, Newport News, Poquoson, and Hampton. The appendices volume contains route profiles, a resident attitude survey, and a research review.

Simpson and Curtin Incorporated, Urban Mass Transportation Administration, (UMTA-VA-09-0007) SIMCUR-375, UMTA-VA-09-0007-2, May 1974, 95 pp; Also available in set of 2 reports as PB-258 200-SET, PC\$10.75/MF\$5.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258202/1ST

31 146444 THE BUS IN THE URBAN TRAFFIC NETWORK [BUSSEN I STADENS TRAFIKNAET]. This report is intended primarily for local authorities, and illustrates the demands which physical planning may have to satisfy with regard to bus transport. The report begins with a brief description of the present state and development of bus transport. The chapters on planning describe how the design and location of new urban areas can be adapted to bus route layout, and the advantages and drawbacks of bus traffic

on different types of streets are also discussed. Detailed design of streets is considered, and examples are given of the design of intersections, bus stops and turning places. The chapter on laws and regulations includes current regulations for bus transport and the development controls which are relevant to the planning of urban bus traffic, etc. The report ends with an example of the procedure employed in planning a bus route network, which describes how alternative networks or routes can be compared and evaluated. This chapter also discusses how provision can be made for future bus routes when development plans are drawn up. /TRRL/ [Swedish]

National Swedish Board of Urban Planning Monograph Report 33 Vol 2, 1976, 92 pp, Figs., Photos., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN38012E), TRRL (IRRD 222429)

31 146446 OPTIMISATION OF BUS TRAFFIC: SOME PROBLEMS AND METHODS [Optimering av linjetrafik-naagra problem och metoder]. This article describes computer programs used for the analysis of public transport networks. It is possible, for instance, to minimise the number of interchanges and the number of vehicles. Service frequency can be optimised, as well as utilisation of vehicles and drivers for a given timetable. The various computerised methods are used in combination for the overall optimisation of a public transport system. /TRRL/ [Swedish]

Hasselstroem, D (Volvo (AB)) *Svensk Lokalfabrik* Analytic No. 4, 1976, pp 2-4, 5 Fig., 3 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (IRRD 222433), TRRL .

31 146448 IS THE BUS A TRAFFIC HAZARD? [AER BUSSEN TRAFIKFARLIG?]. The risks of being killed or seriously injured are 10 times as great for car passengers as for bus passengers, and 60-150 times as great for pedestrians as for bus passengers. If lighter injuries are also included, corresponding figures are 5-15 and 10-50 respectively. If the whole journey from door to door is considered, it is found that the proportion of accidents for cars and buses is far greater. According to a survey, it is about 5 times as dangerous to travel by public transport as by car. This is due to the inclusion of accidents on the way to and from bus stops, such as falling, which are not included in official accident statistics. Traffic safety would be enhanced by shortening and improving routes to bus stops. Since cars are involved in far more accidents in which other road users are injured than buses, a reduction in car journeys and an increase in public transport journeys would improve traffic safety. /TRRL/ [Swedish]

Holmberg, B *Vag-Och Vattenbyggaren* Analytic No. 5, 1976, pp 37-39, 1 Fig., 4 Tab., 1 Phot., 3 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN38019E), TRRL (IRRD 222436)

31 147044 COURSES ES 251-252-TRANSPORTATION, PROJECT E. TOPICS ON AIRPORT ACCESS IN THE WASHINGTON METROPOLITAN AREA, 1976. This document contains four articles concerned with planning and engineering concepts related to airport access. Section A analyzes the impact of the

Washington National Airport Metro Stop on the entire system. Section B presents a staged recommendation for providing access to Dulles airport, employing several modes. Section C surveys the state-of-the-art of rapid rail vehicles and examines them for their applicability to airport access in the Washington Metropolitan Area. Section D presents three approaches to solving the problem of providing pedestrian access between National Airport Metro Stop and the Airport itself. The design parameters and costs of each component of the system are explored in brief, and recommendations for staging are coordinated with estimated demand.

Cooper, T Cuming, D Siftar, R Stangas, P ; George Washington University, National Science Foundation Final Rpt. ES-251-252-E, Apr. 1976, 171 pp; See also PB-220074, PB-226829, and PB-244341. (PC A08/MF A01); Grant NSF-HES72-07726; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258900/0ST

31 147384 SURVEY OF GROUND TRANSPORTATION PATTERNS AT THE DALLAS/FORT WORTH REGIONAL AIRPORT. PART I. DESCRIPTION OF STUDY. A survey of ground transportation at the Dallas/Fort Worth Regional Airport was conducted to obtain data for calibrating models of airport trip generation, at the airport. Due to the special nature of the data required for this purpose, significant modifications had to be made to the usual procedures of conducting access surveys described in previous studies. A separate survey was made of each of the three principal components of ground traffic at the airport: (1) air passengers and visitors riding in automobiles; (2) air passengers and visitors riding on public transportation (Surtran); and (3) airport employees. In addition, counts of passengers and vehicles were obtained for use in determining and expanding the sample. Detailed descriptions of the instruments and procedures used in each type of survey are contained in the report.

Dunlay, WJ, Jr Caffery, TG Henry, L Wiersig, DW ; Texas University, Austin, Department of Transportation Res Rpt. RR-15, DOT/TST-76/78, Aug. 1975, 91 pp; Prepared in cooperation with Department of Transportation, Washington, D.C. Office of Univ. Research.; Contract DOT-OS-30093; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261352/9ST

31 147488 THE DEVELOPMENT OF LOCAL TRANSPORT INTERCHANGES. The article describes the use of interchange demonstration schemes on Merseyside to plan interchange development in West Yorkshire. Results, from the initial experiments in Merseyside which ended in 1973, show that improved feeder bus services to suburban stations attracted over 600 additional daily bus/rail journeys in each direction. Improved or free station car parks are also shown to be successful in attracting more passengers. Questionnaire studies revealed that passengers regarded reliability as the most important factor. The studies confirmed that the concept of local interchange facilities is only practical from distances between about 4 and 10 miles from the city centre. The two studies show how interchange development differs according to the functions and characteristics of the local rail services. The author suggests that savings in overall operating

costs could only be achieved in conurbations by restructuring the public transport system around the interchange concept. The advantages of rail systems outside conurbations must be extended to those beyond walking distance of their local station to give maximum utilization of their services. /TRRL/

Robertson, DM (Peat, Marwick, Mitchell and Company) *Traffic Engineering and Control* Analytic Vol. 17 No. 6, June 1976, pp 242-248, 2 Fig., 3 Tab., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-222368)

31 147920 PRIORITY OF PEDESTRIANS AND PUBLIC TRANSPORT BY COMPUTER CONTROLLED SIGNALIZATION [Prioritering av fatgaengare och kollektiv trafik genom datastyrd signalreglering]. Tests were made on computer control of traffic lights with the special aim of improving pedestrian and bus mobility without appreciably reducing mobility of other traffic. The tests compared relay-controlled central equipment using traffic-controlled programmes with computer controlled equipment. In relay control detectors at signal approaches report intensity, whereupon central equipment selects the appropriate programme. Some local control can also be incorporated. When signals are controlled by computer, the same programmes are used, but selection logic is different. Increased local control incorporating improvements for pedestrians was also tested. Tests were also made on giving priority to buses. The green period for pedestrians increased by 15-40% at some crossings, and bus waiting times during low traffic periods were cut by half. In the relay system the decision functions are located at the crossings, and the central control equipment has only a coordinatory function. This can lead to conflicting decisions. In computer control the local units are simple and only perform orders from the central equipment which receives information from detectors and optimises control over the whole area covered. In computer control the main costs lie in central equipment and cables, in relay control in the local control apparatus. /TRRL/ [Swedish]

Stockholms Gatukontor, Utnedningsavdelningen Monograph 1976, 65 pp, Figs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN37002E), TRRL (IRRD-222199)

31 147966 PEDESTRIAN TRANSPORTATION IN CITIES OF DEVELOPED AND DEVELOPING COUNTRIES. The paper calls for an essential reevaluation of transport planning methodologies and techniques to introduce non-motorized transport as a major component of a three-mode transport system (private transport, public transport, non-motorized transport) and to be carried throughout the transport analysis sequence from data acquisition to transport strategic planning and finally to preparation of short-term traffic improvement schemes. It is suggested that the overall goal of non-motorized transport planning be the increase of the desirability of these forms of transport in order to reduce energy consumption and to improve environmental qualities. Specific planning objectives of non-motorized transport planning should be: increased safety, improvement of network continuity and connection with the public transport system, capacity upgrading, enhanced desirability

through higher levels of service, and better urban design strategies promoting land use mixes around urban activity centers. /TRRL/

Bovy, PH (Swiss Federal Institute of Technology, Switzerland); International Federation of Pedestrian Association Analytic No Date, pp 97-140, 2 Fig., 4 Tab., 43 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (SVOV58045E), TRRL (IRRD-223168)

31 147970 BIKEWAY PLANNING, THE NEW YORK EXPERIENCE. Multi-related factors prerequisite to a viable bikeway development program must be innovative, creative, imaginative, while being cognizant and responsive to related human factors and funding availability. Within the bikeway development process, there are two major dimensions considered (1) the human dimension and (2) the retooling technology dimension. In New York a three stage bikeway planning program is being developed: (1) upgrade existing bikeway facilities, (2) connect existing bikeway facilities into a system, and (3) include bikeway facilities, as part of new federal transportation program. /TRRL/

Berkowitz, C; International Federation of Pedestrian Association Analytic No Date, pp 159-168, 2 Fig.; ACKNOWLEDGMENT: Institute for Road Safety Research (SVOV58047E), TRRL (IRRD-223170)

31 147971 THE THEORY OF VELOUROUTE DESIGN. The purpose of this paper is to constitute the design and construction of bicycle routes as a pure art or science. That is, to enhance its use as a function in the development of the art and practice of bicycling. To differentiate clearly from the generally accepted concept of bikeways, a new term, called "veloroutes", is defined. Veloroutes, meaning swift roads, can be defined as those bicycle routes which are especially designed to incorporate all the knowledge of the principles of the art and science of bicycling. If the objective of bicycling is to go further, faster with less energy, then the objective of veloroute design would be a facility design in which the energy to cover a given distance by bicycle would be an established minimum. /TRRL/

Konski, JL; International Federation of Pedestrian Association Analytic No Date, pp 169-87, 1 Fig.; ACKNOWLEDGMENT: Institute for Road Safety Research (SVOV58048E), TRRL (IRRD-223171)

31 148005 METROPOLITAN PUBLIC TRANSPORT EXPERIMENT. In the metropolitan area of Espoo, Helsinki, Kaunianen and Vantaa, a public transport experiment was conducted in 1974 at the initiation of the parliamentary transportation committee under the direction of the ministry of communications. The experiment reported was one of four conducted in different regions of Finland, and includes the following types of investigation: lane and road arrangements for public transport; priorities at intersections; traffic signals timed for public transport; re-routing of bus services in low density areas; feeder bus experiments at railway areas; ring route bus experiment; and park and ride areas. /TRRL/

Helsinki Metropolitan Area Co-operative Council, (951-798-035-3) Monograph Report No. C20, Aug. 1975, 65 pp, Figs.; ACKNOWLEDG-

MENT: TRRL (IRRD 222963); ORDER FROM: TRRL

31 148218 TRANSPORTATION SYSTEM MANAGEMENT IN PERSPECTIVE. Transportation System Management (TSM) is a planning concept which views existing streets and highways, rail trackage, parking and pedestrian facilities and transportation vehicles-private and public-as elements of a single urban transportation system. The development of the concept has been guided by certain considerations: the need to make better and more efficient use of existing transportation facilities; the focus of attention on operational strategies so that benefits can be realized from transportation programs; the promotion of a more rational organization of public transportation and a more intelligent and socially responsible use of the private automobile. Current achievements such as increasing the people-carrying capacity of highways are briefly reviewed.

Orski, CK (Urban Mass Transportation Administration) *Traffic Engineering* Vol. 46 No. 11, Nov. 1976, pp 36-37

31 148239 PATH PASSENGER SURVEY 1974. The results are summarized here of a survey of the travel characteristics of the New Jersey boarding passengers of the Port Authority Trans-Hudson (PATH) system (a rail rapid system which connects downtown Manhattan with certain New Jersey communities). Both rail transference and local boarders were considered in the study. Details are given of the passenger volumes, origins and destinations, station to station movements, trip characteristics, passenger characteristics, and characteristics at individual stations. The studies revealed such aspects as: on a typical weekday 75,630 passengers boarded PATH at 7 New Jersey stations. Forty seven percent of the riders took a railroad to the PATH station; three out of 4 disembarkers walked to their final destination; the trips were predominately work-related; and nearly 60% of the passengers began using PATH before 1971, and 24% before 1963.

Port Authority of New York and New Jersey 1976, 83 pp, 24 Tab., 1 App.

31 148247 INTERSOCIETY CONFERENCE ON TRANSPORTATION 4TH ANNUAL, PROCEEDINGS, 1976. The Proceedings contain 100 papers and 69 abstracts of paper presented at the Conference. Broad topic areas covered include policy and planning, design and operation, total environment, energy and fuels, command and control, regulation and legislation. Each of these topic areas provides the background against which various aspects of every form of transportation is discussed, including demand forecasting, mass transit, bicycle transportation, group and personal rapid transit, capital costs, freight handling, energy conservation, vehicle design, pavements, noise, traffic engineering, and others. Selected papers are indexed separately.

American Society of Mechanical Engineers Proceeding 1976; The conference, sponsored by the Intersociety Committee on Transportation, was held in Los Angeles, California, July 18-23, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

31 148259 MEDIUM CAPACITY TRANSIT SYSTEM ALTERNATIVES FOR THE LOS ANGELES REGION. A study of medium capacity transit system alternatives was carried out for the Southern California Rapid Transit District (SCRTD). The study provided SCRTD with information needed to complement earlier studies which dealt with conventional rail and bus alternatives. It was concluded that, on balance, a light rail vehicle system constituted a viable option for rapid transit service on some corridors in the Los Angeles Metropolitan Area. For a variety of reasons, an automated small vehicle group rapid transit (GRT) system does not appear to be well-suited for immediate adoption.

Kudlick, W (De Leuw, Cather and Company) ; American Society of Mechanical Engineers Conf Paper P&P-29, 1976, 5 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

31 148671 MEASURING THE ECONOMIC VALUE OF EXERCISE IN LABOR-INTENSIVE URBAN TRANSPORTATION SYSTEMS (ABRIDGMENT). Recent studies show that labor-intensive transportation modes such as bicycling and walking play an essential role in providing needed exercise in an otherwise sedentary society. Transportation planners have not incorporated the value of exercise in benefit-cost analyses partly because of the measurement difficulties. The present analysis attacks these problems by: 1) Ranging the value of the health benefits of threshold exercise by a 0 to 80 percent reduction in premature coronary heart disease (CHD), mortality, and morbidity; and 2) Ranging the economic benefits of reducing CHD based on the following methods: (a) the present value per 1-h exercise session of \$0 to \$2.30, and (b) the consumer surplus value of bicycling exercise, which ranged from 35 to 78 cents/km (56 cents to \$1.25/mile) for a sample of university students. These data show that the exercise benefits compose one of the major sources of benefits for bicycle and pedestrian systems. Computer simulated techniques for decision making (or benefit-cost analysis) under uncertainty can compare these (plus other) ranges of benefits with ranges of costs for bicycling facilities to generate distributions of probable benefit-cost ratios.

Everett, M (University of Southern Mississippi) *Transportation Research Record* No. 599, 1976, p 66, 2 Ref.; Sponsored by Committee on Bicycling and Bicycle Facilities.; ORDER FROM: TRB Publications Off

31 148727 GOLDEN GATE COORDINATED SYSTEM: COMMUTING BY LAND AND BY SEA. This paper describes the growing automobile congestion within the Golden Gate Corridor and reviews an alternative means of public transportation through the use of buses and ferries. The paper outlines the planning and design criteria used in the selection of an optimum vessel and related terminal facilities. Three new Spaulding Class 165 foot, 750 passenger, vessels are presently under construction. These vessels will be all aluminum with a 25 knot power package consisting of gas turbine engines and waterjet pumps. Two modern marine passenger terminals have also been designed, with construction of one already completed. /GMRL/

Kowleski, SM (Golden Gate Bridge, Highway and Transport District) ; Society of Automotive Engineers SAE #760625, Aug. 1976, 5 pp; This paper was presented at the West Coast Meeting, August 9-12, 1976.

31 149065 OPTIMUM BUS-STOP SPACING. The article considers the results of manipulating two models constructed to describe the effect of bus-stop spacing on the generalised cost of a bus passenger's journey and on the total community cost of providing an urban bus service. Optimisation functions are derived by differentiation. Data representing typical urban bus operating conditions for both the peak and off-peak periods are used in the optimisation functions. Sensitivity analysis identifies those variables which significantly affect the optimum conditions. The optimum values for bus stop spacing appear to be between 50 and 200 metres, which are considerably less than presently found on most urban bus routes. Variables found to be the most important in optimising generalised costs in the peak period are: the trip generation rate, the bus boarding time of passengers and the frequency of service. In the off-peak the most important variable is the maximum speed attained by buses. (A) /TRRL/ [French]

Lesley, LJS (Liverpool Polytechnic) *Traffic Engineering and Control Analytic* Vol. 17 No. 101, Oct. 1976, 4 pp, 9 Fig., 3 Tab., 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 223363)

31 149159 LOCATING AND SIZING PARK-RIDE LOTS WITH INTERACTIVE COMPUTER GRAPHS. Two alternative methods for conducting a preliminary analysis of the problem of locating and sizing park-ride lots for an urban bus transit system are examined. These alternative methods are tested using a large and complex street network representing the northern half of the City of Seattle, Washington. Four design criteria are identified and an overall measure of system performance is devised. The problem is to determine the size and location of three park-ride lots that will maximize the performance of the system. The first method utilizes a computing system called LOCATOR II in an interactive graphic mode. In an experimental setting, five students use LOCATOR II to locate three park-ride lots and their solutions are found to exhibit a very high average level of performance. The second method does not involve a direct interaction with the computing system but does use LOCATOR II in a batch mode. Several students participate in three rounds of the batch mode experiment and the performance of their designs is somewhat poorer than the designs found in the interactive graphics experiment. Overall, the experimental results show that relatively inexperienced persons can find a high performance design for a reasonably complex problem quickly and inexpensively. These designs can provide a good starting point for the detailed consideration of many of the other aspects of the problem of providing a high performance bus transit service in an urban area. /Author/

Schneider, JB Miller, DG Friedman, TW (Washington University, Seattle) *Transportation (Netherlands)* Vol. 5 No. 4, Dec. 1976, pp 389-406, 8 Fig., 7 Ref.

31 149377 JOINT USE OF RAILWAY FACILITIES BY FREIGHT AND METROPOLITAN TRANSIT SERVICES. The use of existing railway trackage by prospective metropolitan rail transit services involves a much lower construction cost than required when the public transportation services are to be operated on new trackage, even when the new rail transit trackage occupies the right-of-way on which the existing trackage is situated. Several operational problems associated with joint usage of existing railway trackage on the San Francisco Peninsula by both freight and public transportation services are identified. The procedures that are suggested for their resolution could be applied in other metropolitan areas as well.

Bergmann, DR *ASCE Journal of Transportation Engineering* Vol. 103 No. TE1, Proc. Paper 12686, Jan. 1977, pp 157-171; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL

31 149393 ACCESSIBILITY TO A RAIL NETWORK FOR SHORT AND MEDIUM DISTANCE TRAVEL: RESULTS AND EXPERIENCES IN THE TURIN BUILT-UP AREA. The article demonstrates a method of calculation for assessing, under certain conditions, improved accessibility to a rail network, following a series of technical measures to improve the level of service of the network in question. Accessibility, in this case, is regarded as a form of seeking the maximum distance from the access station, with effect from which the passenger wishing to reach a certain destination point will no longer find it an advantage to utilize the railroad.

Del Viscovo, M (Rome University, Italy) Sciarone, G *Rail International* Vol. 7 No. 8, Aug. 1976, pp 431-442, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 149500 COMPUTERIZED TRANSIT NETWORK DEVELOPMENT MANUAL FOR THE STATE OF RHODE ISLAND. The actual mapping is described as well as the coding, building and calibrating of a computerized transit network using UTPS (UMTA Transportation Planning System—a battery of computer programs distributed by the Urban Mass Transportation Administration) procedures. The study area and mapping is briefly described. Mapping was followed by centroid location and the tying of centroid connectors to the bus routes. The bus routes were all node numbered. Details are outlined of the link data, line data, routes and modes, as well as the building of the transit networks using the program UNET. Transit network paths were then built using program UPATH. The loadings of the network with transit trip was accomplished by using program ULOAD. Appendices provide information on the traffic zone and external centroid numbering system, and codes for municipality, transit company, mode and CBD areas.

Rhode Island Statewide Planning Program Tech. Paper 65, Oct. 1976, 26 pp, 1 Fig., 9 App.

31 149941 SPECTRA, A PUBLIC TRANSPORT SYSTEM FOR TOWNS AND REGIONAL AREAS (PART 1) [Spectra, openbaar vervoersysteem voor stad en streek]. Because of the discrepancy between the admitted value of public transport of good quality and the degree to which modern public transport can in fact meet

today's expectation patterns the Dutch firms Daf-Holding and Ogem, together with the Netherlands railways, developed a new concept for transport in towns and regional areas called Spectra. The system is based on a considerable acceleration of trunk services by means of trams or (trolley)-buses with an average speed of 30 km/h, and halting every 800-1000 metres. Radiating from these stops of special design, small vehicles run frequently into the very heart of the residential areas, permitting a maximum interchange time of only two minutes at the connecting points of the two systems. /TRRL/ [Dutch]

Van, HLH *Verkeerskunde* Vol. 27 No. 11, Nov. 1976, pp 544-549, 7 Fig., 1 Phot.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV60002E), TRRL (IRRD 224112); ORDER FROM: Dutch Touring Club ANWB, Wassenaar-seweg 220, Box 2200, The Hague, Netherlands

31 150449 THE BICYCLE IN THE URBAN TRAFFIC NETWORK. The purpose of the report is to present the current state-of-the-art of bicycle traffic planning and thereby assemble a body of information which can provide a basis for improving conditions for bicycle traffic. The report is primarily aided at the municipal bodies. The following major topics are examined in this report: The current situation and problems of bicycle traffic; planning for bicycle traffic; design and construction of an urban route network; classification scheme for intersections; laws and regulations; and, technical design. The importance of the connection between bicycle traffic planning and community planning is emphasized. In order to take into account the demands of bicycle traffic in physical planning, a comprehensive inventory is often required to clarify the current situation and problems of bicycle traffic. It is also essential that goals for bicycle traffic be specified.

Kjellin, B (K-Konsult) ; Institute of Transportation Engineers, Inc Proceeding 1976, pp 88-93, 15 Fig., 1 Phot.; Proceedings of the 46th Annual Meeting, Baltimore, Maryland, August 15-19, 1976.

31 150467 INFORMATION EXCHANGE ON TRANSIT ISSUES. This report provides an overview of major issues involved in the compilation and dissemination of experience on transit issues. The increasing deficit and added complexity of transit options open make sharing of transit information even more critical. Participants in the sharing process can include federal agencies, regional planning bodies, and general-purpose and functional program officials of state, county, and local government. Mechanisms open include direct consultation, tailored documents and seminars, needs determination exercises, special user mechanisms, training courses, and demonstrations. A list of general considerations for the design of information exchange programs is also included.

Paulhus, NG, Jr Linhares, AB ; Department of Transportation Final Rpt. DOT-TST-77-13, Nov. 1976, 23 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261909/6ST, DOTL NTIS

31 150830 AVIATION FORECASTS-FISCAL YEARS 1977-1988. This report contains the latest Federal Aviation Administration forecast

of measures of workload and activity at towered airports, air route traffic control centers, and flight service stations for Fiscal Years 1977 to 1988. The forecasts were made for the four major users of the system; air carriers, air taxi, general aviation and the military. The report has been prepared to meet the budget and planning needs of the various offices and services of FAA for data concerning future trends in aviation activity.

Federal Aviation Administration FAA-AVP-76-17, Sept. 1976, 108 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A032728/8ST

31 151950 THE CASES FOR AND AGAINST BUS-CARPOOL LANES IN PENNSYLVANIA. This study presents a summary of the analysis and evaluation of exclusive bus-carpool lanes on several Philadelphia and Pittsburgh, Pennsylvania, expressways and arterials. The study was initiated by a November 1973, promulgation from the Environmental Protection Agency regarding final Transportation Control Strategies for Philadelphia and Pittsburgh. The paper presents a summary of the analysis of the traffic operational and safety problems associated with exclusive lane operations. The major difficulties with implementation, as well as advantages and disadvantages of the bus-carpool lanes are identified and discussed. Major conclusions of the analyses and recommendations for each corridor analyzed are presented also. Some of the major difficulties and disadvantages of bus-carpool lanes identified include: the reduction of overall capacity of the expressways; removal of business parking within abutting local municipalities; decreased travel speeds for nonexclusive lane operation resulting in increased air pollution, accidents, etc.; large diversion of nonexclusive vehicles to alternate arterial routes causing increased congestion; hazardous weaving operations; difficulty in policy enforcement of exclusive lane; large capital expenditures for minimal or no benefit; undesirable diversion from parallel rail routes if carpool service is improved; and increased potential for accidents. Some of the major advantages of exclusive bus-carpool lanes identified include: high volume occupancy vehicles are given priority and are able to expedite travel; auto trips are eliminated and people are diverted to buses and carpools with a resulting reduction in the number of vehicles in the CBD; provision of a direct connection to the CBD from various suburbs; travel times for exclusive vehicles may be reduced in certain corridors; and reduced fuel consumption due to the reduction in vehicles traveling into the CBD. /Author/

Ebersole, G, Jr (Pennsylvania Department of Transportation) ; Institute of Transportation Engineers, Inc Proceeding 1976, p 115; Proceedings of the 46th Annual Meeting, Baltimore, Maryland, August 15-19, 1976.

31 152882 VANCOUVER'S ANSWER TO THE RUSH HOUR-BURRARD BEAVER AND BURRARD OTTER. A description is given of the Burrard Beaver and the Burrard Otter, the first two of a series of catamaran waterbus passenger ferries for service on Vancouver's Burrard Inlet. The double-ended vessels, designed by Case Existological Laboratories, allow maximum capacity for a given length and good resistance to heel without the need to turn round at the terminals. The ferries have six pairs

of power-operated doors port and starboard and the time taken to embark a full load of passengers is minimal.

Canadian Shipping and Marine Engineering Vol. 48 Oct. 1976, 3 pp; ACKNOWLEDGMENT: BSRA; ORDER FROM: BSRA; BSRA No. 45,257

31 152914 OPTIMAL NETWORK GEOMETRY. Suppose that we are given a hypothetical origin-destination table of trips (but no network); we know the costs (per mile) of building various facilities and the cost (per mile) of travel per trip as a function of the flow and the facility type. For any assignment procedure for assigning trips to routes, we wish to select a network of various facilities which will accommodate the o-d flows and minimize the sum of construction cost plus travel cost. If the assignment principle is to minimize total travel cost (for any given network), the choice of the optimal network can be formulated as a programming problem abstractly of the same form as the usual assignment problem, except that the objective function is not convex, in fact it is (in some sense) approximately concave. As a result of this concavity, which is due to an economy of scale in construction, one finds that most idealized problems with high degrees of symmetry in the o-d table lead to optimal networks that do not display the symmetries of the o-d table. In particular, for an o-d table invariant to 90 degrees rotations, a square grid of roads or transit lines is, generally, the most expensive network as compared with other rectangular grids. /TRRL/

Newell, GF Buckley, D (California University, Berkeley) ; Elsevier Scientific Publishing Company, (44195327) Proceeding 1974, pp 561-580, 2 Fig., 18 Ref.; Transportation and Traffic Theory. Proceedings of the Sixth International Symposium on Transportation and Traffic Theory. University of New South Wales, Sydney, Australia, August 26-28, 1974.; ACKNOWLEDGMENT: TRRL (IRRD 224478)

31 154045 EVALUATION OF RAIL RAPID TRANSIT AND EXPRESS BUS SERVICE IN THE URBAN COMMUTER MARKET. The study analyzes and evaluates public transportation alternatives for serving the commuter market. The two main alternatives, rail rapid transit and integrated express bus service, are analyzed from the standpoint of full costs (both supplier and user time costs). User time costs of the two alternatives are roughly equal; however, the supplier costs of the integrated bus service are much lower than those of rail rapid transit. Quantitative data on fuel consumption and emissions are presented, and the effects of political, regulatory, and institutional constraints are discussed.

Boyd, JH Asher, NJ Wetzler, ES ; Institute for Defense Analyses, Office of Policy, Plans and International Affairs Final Rpt. DOT/TPI/10-77/11, Oct. 1973, 267 pp; Contract DOT-OS-20019; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265236/OST, DOTL NTIS

31 155477 THE APPLICATION OF LOCATION MODELS TO OFF-AIRPORT TERMINALS. This paper attempts to extend the approach proposed by Kanafani to optimize travel time savings obtainable from terminals located in an idealized linear city and to apply the resulting models to a case study. Only the

location problem is dealt with in this paper and, for that, only travel-time savings obtained by connecting the terminal to the airport with an exclusive mass transit system are considered. The models developed here are intended to assist in the design of such a system by responding to the following questions: At what speed should the transit links connecting the airport and the terminals be operated? What is a good location for each terminal? Need we be concerned with precise terminal locations as long as they are reasonable? If the terminals are located on the basis of a particular link speed, will the locations still be good if the link speed is changed? Must we be concerned with possible future expansion of the number of terminals in the system when making present locational decisions? How many terminals should there be in an off-airport terminal system? A model strategy using idealized representations of the off-airport terminal systems and the cities they serve was adopted. A small number of variables are considered and some continuum approximations that permit the use of simple differential calculus in arriving at optimal locations are adopted. The advantage of this approach is that the influence of each factor considered in the model is readily discernible. The disadvantage is that the model is inevitably a highly stylized representation of any practical case to which it is applied. In the model the assumption is made that benefits accrue only as time savings to users and that the amount of time spent at a terminal is the same for each user. It is also assumed that a terminal may be located anywhere within the city, that the speed of travel on the system transit links is uniform, that the link routes must follow the orientation of the city transportation route network, and that the speed of travel on this city network is also uniform.

Poulton, MC (British Columbia University, Canada) Kanafani, A (California University, Berkeley) *Transportation Science* Vol. 9 No. 3, Aug. 1975, pp 224-247; ACKNOWLEDGMENT: Massachusetts Institute of Technology; ORDER FROM: ESL

31 155533 DULLES AIRPORT RAPID TRANSIT. STUDY. The papers collected in this volume explore various aspects of the feasibility of a high-speed transit service between downtown Washington, D.C. and Dulles Airport, with the following objectives and constraints: (a) Travel Time and interfacing should be such as to give Dulles a level of accessibility comparable to that of National. (b) Longitudinal accelerations should not exceed about 0.1g, and sensed transversal accelerations should be minimal. (c) The guideway must be enclosed, to protect the vehicle from flying objects, from vandalism, and from the elements, and to shield the environment from noise. (d) Adverse environmental impacts of the system along its entire route must be minimized. (e) The system should lend itself to some utilization for cargo movement. (f) Interference between passenger and cargo movements at the airport should be minimized. The route selected is one that utilizes, for the most part, existing rights of way, and the calculated velocity schedule provides a 10-minute total travel time.

Claveloux, BA ; George Washington University 1973, 267 pp; ACKNOWLEDGMENT: Port Authority of New York and New Jersey

31 155548 RAPID TRANSIT AND THE PUBLIC INTEREST: A CASE STUDY OF THE SAN FRANCISCO PENINSULA. The original BART system was developed to encourage land development, but advertised to the public as a means of reducing auto congestion. During the construction of BART, its administration has been unable to successfully control costs or respond effectively to criticism or to local concerns. The methods used to subsidize BART (sales and property tax) are considered to be among the most regressive taxes. BART expansion on the Peninsula was conceived in order to facilitate BART extension to the San Francisco Airport. While serious questions remain to be answered before BART is extended to the airport, even more problems exist in the current plan to extend BART to Palo Alto. The San Mateo County Transit Development Project which studied transit improvements on the Peninsula eliminated the possibility of exploring options other than BART extension and then failed in its attempts to involve citizen participation. The resulting plan was developed to maximize its development potential, which would result in the destruction of low-income housing and small businesses along the system's path. New development would reverse a zero population growth trend in San Mateo county. The cost of BART in San Mateo county is not only underestimated, but cannot be met even given the most optimistic predictions of federal assistance. BART expansion to Palo Alto could not be completed before 1984. Present plans would result in abandonment of Southern Pacific service south of BART, thereby reducing transit service in Santa Clara County.

Lewin, G ; Stanford University 1974, 78 pp; ACKNOWLEDGMENT: Massachusetts Institute of Technology

31 155556 A MASS TRANSIT MAN LOOKS AT THE FUTURE OF AIRPORT ACCESS. Alternatives to the private automobile are discussed and the advantages of buses and aircraft are considered. The advantage of using any system of public transportation is noted and the potential for reducing the trend towards permanent public subsidy is pointed out. Comments are made on the fixed guideway system, and the principal advantage of buses and aircraft over other means of airport access is that little or no new construction is required to occur. Where additional facilities are needed, such as downtown terminals or facilities at outlying airports, the additional construction is limited to the terminals itself and much of the work could be supported by the airlines which use the facility. An advantage of using any system of public transportation, is the distribution of the traffic load associated with well-wishes and welcomes. The promotion of adequate economical public transportation to the airport is urged.

Fowler, WK (Florida Department of Transportation) *Airport Services Management* Vol. 16 No. 2, Feb. 1975, pp 16-18; ACKNOWLEDGMENT: Massachusetts Institute of Technology

31 155601 AIRPORT ACCESS AND CIRCULATION. Factors associated with environmental constraints in airport systems planning have led to an emphasis on airport ground access and intra-airport transit planning. The choice between highways and mass transit and the advantages

and disadvantages of each are considered. Rapid transit links which are unable to generate patronage are discussed with reference to the airport rapid transit connector in Cleveland, Ohio. A program to construct a TACV system between Dallas and Fort Worth connecting both cities with the new regional airport is noted. In Houston, private developers have built 4 satellite terminals on major transportation corridors in the metropolitan area. Transit service between the airport and the terminals is provided on 30-minute headways during 11 hours of the days. A number of innovative intra-airport circulation systems have been developed to shuttle passengers between remote parking areas and terminal buildings. The system operating in Tampa airport which is comparable to the system under development at the Seattle-Tacoma International Airport is described. A pace setter in airport development is the Houston International's underground transit system to connect the ground access parking facilities with 2 satellite terminals. The system provides service on 2-minute headways to 6 stations through the terminal area. The AIR-TRANS system at Dallas/Fort Worth airport is also described.

Corradino, JC Schimpeler, CC (Schimpeler-Corradino, Associates) *Airport World* Vol. 6 N June 1973, pp 40-43; ACKNOWLEDGMENT: Federal Aviation Administration Library

31 155664 A REVIEW OF TECHNIQUES FOR ESTIMATING AIRPORT LANDSIDE CAPACITY. Methods of analyzing capacity and delay are categorized (rules of thumb, analytical models, simulation models) and discussed with special reference to the elements and sub-elements (runway, taxiway, gates, terminal, curb, roadway, parking lots) of the airport system. Simulation methods of a proprietary nature tailored to a specific airport are used on taxiway, and terminal building elements. These methods which require good data inputs and are difficult to validate, do not estimate capacity but show how facilities might operate under predicted future usage or layout changes. Airport master plans which show a phased expansion of both the landside and airside for the airport, should contain estimates of the capacity of all of the landside elements for these various phases.

Simpson, RW ; Massachusetts Institute of Technology · FTL Memo 74-11, 1974, 22 pp; ACKNOWLEDGMENT: Massachusetts Institute of Technology; ORDER FROM: Massachusetts Institute of Technology, Flight Transportation Laboratory, Cambridge, Massachusetts, 02139

31 155677 GROUND TRANSPORTATION TO AIRPORTS. The subject of ground transportation to and at major air carrier airports has attracted much attention of transportation planners and airport authorities. In spite of many interesting studies few, if any, new or innovative airport access systems have been developed. There are various modes available for the transportation of people and goods to and from airports and within the airport terminal complex. Presently, the most widely used vehicle for airport travel in the United States is the private automobile. However, energy and resource constraints may very well, in the long range future, improve the viability of public transportation and rapid transit facilities as a means of airport access. The

optimum ground transportation system for a particular airport will depend primarily on characteristics of the airport market area and of air travelers, an airport layout and on the type and level of ground and air transportation services offered. Modern planning practices once the programs of federal agencies favor into-modal approaches to the solution of transportation problems. They will ultimately result in better utilization of advanced public transportation systems by people and goods for airport and air service access.

Kurz, JW (Boeing Company) *High Speed Ground Transportation Journal* Vol. 9 No. 1, Apr. 1975, pp 503-513, 1 Tab., 14 Ref.; ACKNOWLEDGMENT: Massachusetts Institute of Technology; ORDER FROM: ESL

31 155707 PIPE-A NEW AIRPORT CONCEPT. At the heart of the new concept pipe is a simple, closed viaduct, a kind of traffic ring, round which all the important airport functions are grouped. The key word PIPE is intended to indicate that everything—passengers, aircraft crews, personnel, baggage, freight, supplies, waste etc.—converges on or diverges from this ring on several levels, by either conventional or automated transport systems. It is stressed that the system could be applied both the new airports and to airports that are being remodelled. All activities could be planned step by step. In the final account a reduction of at least 20 per cent could be expected in operating costs and capital expenditure. The concept involves better technical cooperation between the airlines, with the object of maintaining special services on a joint basis and thus saving personnel, time and money. All the basic elements would be treated in the same way, the various aircraft types, runways and taxiways, aprons and aircraft parking areas, passenger and freight terminal, control tower, air crew building, maintenance and personnel facilities, workshops, security and emergency systems, access roads and car parks. The apron is rectangular in shape and contains no areas that are difficult to use. Its size depends on aircraft movements on the ground, not on peculiar terminal shapes. Aircraft, grouped by categories, are all parked noise-in along the PIPE, with bridge connections. All separate aprons, taxiways or duplicate handling equipment. When the airport has a parallel runway system, the PIPE ring encloses all the elements. With other runway configurations the passenger terminal and car park lie outside the ring. Since there is today no justification for locating the freight terminal away from the passenger terminal, this building is situated within the operations area, at the point where wide-body aircraft dock. An internal transit system links all points of the operations area with one another. On the airside, taxiways laid out in a double ring, with one-way traffic, make for simple, safe aircraft movements. The grouping of aircraft into size categories reduces the amount of specialized ground operations personnel and the technical services required. And because all equipment is also centralized by sector, aircraft turn-around times should be shorter. A reduction in capital expenditure is obtained primarily by providing a single-level terminal building which can be extended step by step in the form of small modules. Costly baggage conveyor systems would be unnecessary. The apron could manage with a minimum of concrete area. Since the

airbridges are used only for specific aircraft types, considerable savings could also be made in this area. Another advantage of the linear aircraft positioning is to be found in the simpler fuelling and airfield lighting installations.

Airport Forum Vol. 6 No. 2, Apr. 1976, pp 26-28, 6 Fig. ACKNOWLEDGMENT: Massachusetts Institute of Technology

31 155761 THE CUSTOMER AND THE SURFACE PHASE OF AIR TRANSPORT. The ground aspects of air travel are considered along with the ground handling of air freight, the surface phase of air transport from the customer's point of view, questions of surface access to the airport, airport transit systems, airport ground speed, the balance of time and cost, the rationalization of ground services, and the relations between the airport and the charter passenger. Attention is also given to a user's analysis of airline ground problems, the interface problem as it affects the customer, the analysis and control of departing and arriving aircraft, and the organization of international airports.

Royal Aeronautical Society Proceeding May 1975, 206 pp; Proceedings of the Spring Convention, London, England, 14-15 May 1975.; ACKNOWLEDGMENT: International Aerospace Abstracts; ORDER FROM: American Inst of Aero & Astro Tech Info Service, 750 Third Avenue, New York, New York, 10017; A76-35710

31 155762 RAIL ACCESS TO MAJOR AIRPORTS. One of the most difficult problems faced by major airports in the future is likely to be the provision of adequate surface access and the interface with other transport systems. In this paper the need is examined to the increasingly to public transport to meet the requirements of surface transport in the future. It is shown that rail links have both attractions and drawbacks. The general worldwide aspects of the surface transport problem are illustrated by a discussion of the piccadilly underground extension to be opened in 1977 to the Heathrow Airport.

Maxwell, WW Rockwell, EL (London Transport); Institution of Civil Engineers Proceeding 1976, 7 pp; From the Challenging Future. Proceedings of the 5th World Airports Conference, Brighton, England, 5-7 May 1976.; ACKNOWLEDGMENT: International Aerospace Abstracts; ORDER FROM: American Inst of Aero & Astro Tech Info Service, 750 Third Avenue, New York, New York, 10017; A76-46539

31 155910 MAPLIN-PLANNING ASPECTS AND THEIR INFLUENCE ON AIRPORT DESIGN. The paper deals first with the specific problems that are a direct outcome of the site choice, in particular the problems of access to the airport. Land-use planning for the reclaimed site is discussed, including the way in which the airport will develop in stages to its ultimate four runway configuration. The strategic planning of the terminal zone is dealt with in some detail, in particular the influence that rail access will have on the development of passenger facilities and vice versa. Inter-terminal movements and other communication requirements are discussed, showing how an integrated public transport system serving the airport link to principal areas of new urbanization and the seaport create both an opportunity and a challenge for the future.

Walter, KB (British Airports Authority, London); Institution of Civil Engineers Proceeding 1973, pp 115-118; From Airports for the 80's. Proceedings of the 4th World Airport Conference, London, England 3-5 April 1973.; ACKNOWLEDGMENT: International Aerospace Abstracts

31 155925 AIR PASSENGER TERMINAL PLANNING AND DESIGN. The primary function of a terminal is the transfer of passengers and their baggage between aircraft and ground transportation. Methods for planning and design of such terminals are discussed in this paper. Studies are now being made in Canada and elsewhere, considering airport access and passenger procedures as an integrated sequence of events from the home or office to the aircraft for departing and vice versa for arriving. Such considerations introduce the possibilities of off-site terminals or "in-city terminals", at which some passenger procedures could be conducted, with transit systems then accessing the terminal at the airport and the aircraft. Off-site terminals integrated with transit systems are also discussed.

Beinhaker, P (Peat, Marwick and Partners); American Society of Civil Engineers Proceeding 1975, pp 284-307; From Passengers, Freight and Parking, Transportation Facilities workshop Proceedings.; ACKNOWLEDGMENT: Massachusetts Institute of Technology; ORDER FROM: ESL

31 155927 SEA-TAC INTERNATIONAL AIRPORT: SITE CONSTRAINTS DETERMINE TRANSIT SYSTEM AND STATION DESIGN. An airport is a system of elements all interacting on one another at various levels. It is not a service of discrete elements assembled on one site. The terminal design evolves from an analysis of the many aspects of passenger demand, site conditions, parking conditions, airline and other operational requirements, etc., and recognition of the extent to which these forces interact. This paper discusses the site constraints and physical requirements of the transit system as they interacted with the other airport requirements in the shaping of the design of the terminal area facilities and in the process shaped the transit system and station themselves.

McCagg, EK (Richardson Associates); American Society of Civil Engineers Proceeding 1975, pp 308-322; From Passengers, Freight and Parking, Transportation Facilities Workshop Proceedings.; ACKNOWLEDGMENT: Massachusetts Institute of Technology; ORDER FROM: ESL

31 156091 TRANSIT OPERATING STRATEGIES AND LEVELS OF SERVICE. This paper discusses strategies of transit operation, differentiating between the all-day service function and the peak-hour operations of providing traffic and parking relief. A general mode split formula in which the disutility of the car is equated to the disutility of transit is used to evaluate the relevant factors in the individual choice of transit mode. Various types of networks are examined. For cities with low densities of development the timed transfer system is shown to give maximum destination opportunity. The concept of levels of service is discussed from the point of view of the passenger. It is recommended that levels of service be studied in greater depth so that these factors could also be considered. /Author/

Bakker, JJ (Alberta University, Canada) *Transportation Research Record* No. 606, 1976, pp 1-5, 9 Fig., 6 Ref.; ORDER FROM: TRB Publications Off

31 156095 PARK-AND-RIDE IN THE SHIRLEY HIGHWAY CORRIDOR. The market for fixed-route transit operations is not limited to travelers living within walking distance of transit stops. As demonstrated by the Shirley Highway Express-Bus-on-Freeway Project, well-planned park-and-ride operations can lead to sizeable increases in bus patronage. Park-and-riders, commuters who travel by automobile to a bus stop and then by bus to work, greatly expanded the market for the fixed-route bus service in the Shirley Highway corridor. After briefly describing the park-and-ride arrangements in this suburban corridor, this paper presents the results of an investigation of the perceptions and mode choice influences of the park-and-riders at two new lots. On-board surveys were used to determine the importance of 12 factors in the commuter's decision to switch from automobile to park-and-ride bus service. The users' subjective satisfaction assessments for these factors and their reported travel-time and costs savings (or losses) were also obtained. These results suggest that several factors in addition to time and cost should be considered in planning park-and-ride facilities. /Author/

Miller, GK (Urban Institute) McQueen, JT (Department of Transportation) *Transportation Research Record* No. 606, 1976, pp 23-29, 2 Fig., 6 Tab., 4 Ref.; ORDER FROM: TRB Publications Off

31 156112 SPECIAL TRANSIT NEEDS PROGRAM IN THE DENVER METROPOLITAN AREA. The special transportation needs of people within Denver's Regional Transportation District who have limited mobility are being served by a program that includes special equipment for the handicapped, special midday shopper service for the elderly, and a plan to make regular service more accessible to these groups. The special equipment for vehicles that provide subscription service to handicapped patrons includes wheelchair lifts, lower-step entry, side destination signing, and several other special features. The needs of the elderly are met in part by special midday shopper service on a weekly schedule. A program to make the entire fleet of buses more accessible by retrofitting certain items, such as extendable steps, grabrails, and side destination signing, is under evaluation. The entire special-needs program is continually being reviewed, modified, and upgraded. /Author/

Williamson, B Osterhoudt, S (Regional Transportation District) *Transportation Research Record* No. 608, 1976, pp 70-75, 2 Tab., 1 Ref.; ORDER FROM: TRB Publications Off

31 156139 BICYCLES FOR TRANSPORTATION. Surveys of travel characteristics for the surrounding areas of Chicago and Minneapolis/St. Paul, were conducted to determine the differences in commuting time and distances between the bicycle and the car. Although the bicycle averaged an extra 15 minutes to travel the 6.9 miles, average enroute times and door-to-door times differed more widely for the motorist than the cyclist. It is argued that the time spent

warming up the engine, locating a parking place at one's destination, and the walking distance to work could easily consume the motorists' 15 minute advantage. The author concludes that although the car provides a degree of freedom over mass transit, the bicyclist enjoys a further degree of freedom over the driver such as the freedom to travel a variety of routes, freedom from slow moving traffic on backups, and greater range of speeds to choose from.

Chiesl, D *Bicycling* Vol. 18 No. 3, Mar. 1977, pp 59-62, 8 Phot.

31 156316 ANALYSIS AND DESIGN OF A PUBLIC URBAN TRANSPORTATION SYSTEM. The paper reports on studies made in France for short, mid- and long-term development of urban transportation, which integrate four main transportation means: public transport, private vehicles, cycles, and walking. All new infrastructure studies concern both the thoroughfares and public transportation. Described in the paper are the various methods and models used, as well as the applications of these to planning for the city of Nice.

Saracino, P Hanton, E Bel, G Westfried, F ; International Federation of Automatic Control Proceeding 1976, pp 133-142; Proceedings of the International Federation of Automatic Control/International Foundation for Information Process/International Federation of Oper Research Society International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976; ACKNOWLEDGMENT: EI (EIX770400456); ORDER FROM: ESL

31 156318 ANALYTICAL PROCEDURE FOR THE LOCATION PROBLEM AND THE DETERMINATION OF A TRANSPORTATION LINE. Based on a nonlinear model of user's behavior, this paper presents an optimizing procedure applied to location, distribution and transportation problems. The objectives are both to locate points and lines in an urban area, the transportation needs of which are supposed known.

Diverrez, JC (Univ des Sci et Tech de Lille, Cent d'Autom, Ville) Staroswiecki, M ; International Federation of Automatic Control Proceeding 1976, pp 237-244; Proceedings of the International Federation of Automatic Control/International Foundation for Information Process/International Federation of Oper Research Society International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976; ACKNOWLEDGMENT: EI (EIX770400435); ORDER FROM: ESL

31 156332 INSTITUTE OF TRANSPORTATION ENGINEERS (ITE) ANNUAL MEETING, 46TH, COMPENDIUM OF TECHNICAL PAPERS, 1976. Proceedings include 24 papers that present discussions of the following topics: maintaining acceptable service and safety levels with budget constraints; the effect of rail reorganization on transportation planning; impact of recent federal transportation policies and requirements on local transportation planning; residential traffic controls; maintenance management techniques and the effective use of traffic technicians; the bicycle in the urban traffic network; capacity requirements for local bus terminals; improvement on traffic flow to reduce energy use--the New York State experience; and highway and safety 1976, and beyond.

Institute of Transportation Engineers Proceeding 1976, 139 pp; Proceedings of the Institute of Transportation Engineers, 46th Annual Meeting, Baltimore, Maryland, August 15-19, 1976.; ACKNOWLEDGMENT: EI (EIX770400219); ORDER FROM: ESL

31 156444 THE GOP-1 METHOD AND ITS USE IN THE TIME-TABLE PREPARATION. The gop-1 (graphic optimization) method is proposed for timetable calculation. If the probabilistic properties of the random running times between the pairs of neighbouring stations are known, the timetable of the given train (or bus, ship, aeroplane, etc) can be determined. The gop-1 method utilizes a very simple mathematical model. Results of gop-1 calculations are compared with ones obtained using the method of uniform distribution of the time reserve. /TRRL/

Cerny, J Vasicek, R (Transportation Research Institute, Czechoslovakia) *Rail International Analytic* No. 2, Feb. 1977, pp 97-102, 2 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-225502)

31 156451 THE BRADFORD BUS STUDY 2. THE RESULTS: ROLE OF BUSES, ROUTING AND COSTING. Buses play an important role in Bradford, and on a typical weekday some 300000 passenger journeys are made in the greater Bradford area. The average passenger travels about 3 km and is aboard a bus for about nine minutes. The object of the study is to examine public transport services in the Bradford area and to consider how the bus services might be improved to provide reliable and attractive services more directly related to travel needs, with particular regard to the distribution of passengers in and adjacent to the central area. In discussing the results of this study the author places emphasis on the three main functions of the bus system--commercial, social and civic, and discusses the influence that the opening (early 1977) of the new Bradford transport interchange will have on rerouting. This interchange, located on the south side of the city centre, is described. It comprises a railway station, a bus station with six platforms and some 70 stands, and a bus depot. The costing of bus operations is reviewed against the background of the movement from a break-even position in the early 1970's to a 1.7 M deficit in 1974-75. The three main components of operating costs are described as crew costs, direct costs (fuel, oil, tyres etc.) and other costs such as management, vehicle maintenance, inspectors, etc. Each of these components is discussed in detail, and recommendations made concerning operational routines which it is suggested could facilitate updating and development of basic cost and revenue models. /TRRL/

Parker, GB *Traffic Engineering and Control Analytic* Vol. 18 No. 1, Jan. 1977, pp 22-25, 4 Fig., 3 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225324)

31 157236 JAPAN'S URBAN TRANSPORTATION SYSTEM IN THE MAJOR TRANSPORT SPHERES. The urban areas in Japan have undergone rapid changes in the last two and one-half decades. At the same time, the urban transportation system has been faced with numerous problems which need to be solved urgently. This paper presents the development stage and

problems in the three largest metropolitan areas, designated as transport spheres, in Japan. Japan's problems in urban transportation are similar to those of most Western nations with regard to such issues as rapid urbanization, growth in travel, increasing auto ownership, growing transit operating deficits, rising wages and air pollution. The differences are the large modal split of transit from automobile trips, major expansion of the rail transit network, and the large number of transit operators in each urban area in Japan. In addition, governmental policies to help solve the urban transport problems are briefly described. In order to make the policies effective, coordination among government agencies is required. The establishment of a unified government agency is regarded as the first priority in dealing with the urban transport problem. It is expected that the government will offer bold new countermeasures to cope with urban transportation problems.

Noguchi, T (Washington University, Seattle) *Transportation (Netherlands)* Vol. 6 No. 2, June 1977, pp 171-190, 12 Fig., 3 Tab., Refs.; ACKNOWLEDGMENT: *Transportation (Netherlands)*, TRRL (IRRD 233295); ORDER FROM: ESL

31 157255 A TRANSIT PLANNING METHODOLOGY FOR SMALL CITIES. This article, which describes a conceptual systems approach framework, describes the type and range of transit most effective in a small city and outlines a regression model which can be a starting point for ridership estimation. The transit system must possess flexibility and capability of expansion to accommodate the additional ridership which will be generated after a period of operation. Travel forecasts and continuous monitoring of the operation are essential. A route selection process is discussed and comments are made on scheduling. The fare structure and fare plans are considered and it is noted that they should be: demand oriented, logical and based on rational criteria, easy to remember, simple and preferably with a unistructure, and with minimum or preferably no transfer charge. Factors affecting the fleet size determination are discussed. Practical aspects of transit planning methodology are reviewed, and the use of a successive overlay technique for examining proposed route configuration is outlined. Selection of the final transit system is based on the evaluation of various elements such as fleet size, vehicle mix, scheduling, fare structure, and fare plans as well as economic analysis. Community goals are also important to the evaluation process.

Chadda, HS (Anne Arundel County Department of Public Works) Mulinazzi, TE (Maryland University, College Park) *Transit Journal* Vol. 3 No. 2, 1977, pp 19-40, 10 Fig., 1 Tab.

31 157274 BICYCLES AND MASS TRANSIT. Bicycle parking facilities presently supplied by transit agencies in the U.S. and Canada are reviewed. Two aspects of the parking problem are discussed: storage, and protection from theft, vandalism and weather. Three basic types of facilities are currently supplied by transit systems: bicycle rack, hitching post, and the key-operated locker. The most common type of facility is the rack. Racks offered by the Lindenwold Line (Philadelphia-New Jersey), the Shaker Heights Rapid Transit System (Ohio), and the Toronto Transit Commission are discussed. The hitching post (steel or wood post with a 4-to 5-foot case

hardened steel chain) shows great promise. BART has installed 232 single and 610 double hitching posts. Similar facilities offered by MARTA and the Oregon State Highway Division are described. Lockers (fiberglass or steel made in a wedge shape) are offered by the Port Authority Transit Corporation and BART. Lockers offer protection from theft and vandalism. Some agencies (New Jersey-New York Path system and BART) are experimenting with allowing cyclists to bring their bicycles onboard the transit vehicle.

Wheeler, WL *Traffic Engineering* Vol. 47 No. 3, Mar. 1977, pp 32-35, 3 Fig., 3 Phot., 21 Ref

31 157420 PROJECT CONCERNING THE REINTRODUCTION OF TRAMWAYS IN THE CENTRAL BUSINESS DISTRICT IN SYDNEY [Project de tramway pour le centre d'affaires de sydney]. The last tramway ran in Sydney in 1961. It was replaced by diesel-engined buses. However the bus network has many disadvantages and a project is afoot to reintroduce tramways in the town. It is planned to do so in Pitt Street, a commercial street which would become a tramway/pedestrian precinct. It is envisaged that 20 tramways, two being reserve vehicles, would replace 45 buses and would do the return journey through Sydney in 28 minutes. /TRRL/

Caldwell, JR (New South Wales Plan and Env Comm, Australia) *UITP Revue Analytic* Vol. 24 Mar. 1975, pp 237-243, 3 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 103848)

31 157488 A SURVEY AND REVIEW OF THE EXETER-BARNSTABLE RAILWAY SERVICE. The report is based on a survey of the Exeter-Barnstable railway line and shows that feeder-line traffic to an inter-city network can be sufficient to justify its retention. It is shown that revenue generated over the inter-city network as a result of the existence of such feeder-lines is often in excess of the operating loss assigned to the minor route. The study illustrates the dangers of passenger revenue reduction resulting from short-term cost savings being enforced in the form of local rail service closures. Recommendations are made for improvement of rural public transport services by retiming bus services to provide connections with train services. Suggestions are also made concerning the management and planning of a possible coach replacement for the feeder-line should the railway link be closed. /TRRL/

Williams, SR Heels, P ; Polytechnic of Central London Monog Rpt. Discussion Paper 3, Feb. 1976, 60 pp, 10 Fig., 6 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-224812); ORDER FROM: Polytechnic of Central London, 35 Marylebone Road, London, England

31 157836 PARKING REVENUE CONTROL. This report which describes some of the fundamentals of equipment and procedures in planning a new parking facility or establishing a good system of control in an existing one, also covers parking meter revenue security and control. The basic elements of revenue control are listed, and general security concepts are noted. The operation of the ticket issue machine is described. The induction loop detector, treadles, the rubber road tube (for secondary locations), parking gates,

time clocks, master clock, fee indicator, and differential counters are also described. Audit procedures are discussed, and the planning of revenue control systems for airport, event parking, and retail/business parking is outlined. Comments are made with regard to security, vandalism, meter housing, the coin collection system, parking meter standard, maintenance, the keeping of records, and surveillance.

Transportation Research Circular No. 184, June 1977, 19 pp, 8 Fig. ORDER FROM: TRB Publications Off

31 157895 PLANNING CONSIDERATIONS FOR ALTERNATIVE TRANSIT ROUTE STRUCTURES. Planners wishing to achieve higher overall transit ridership should develop route structures oriented to larger and increasing segments of the spectrum of travel within a region rather than on those focusing on travel to the central business district. Examples are quoted in support of this theory. Network design configurations oriented to this objective include the grid and timed transfer system concepts. These multidestination systems with a significantly smaller deficit per passenger trip can theoretically attract more passengers than alternative radical systems. Models are used to illustrate four routing schemes: the radial method designed to connect all points in a metropolitan area with the downtown; the ubiquitous method; the grid method; and time transfer system which relies on schedules connections between routes and does not require the grid system's frequent service on most routes. The relative passenger appeal of the different systems, the relative costs, and the related land use considerations are discussed.

Thompson, GL (San Diego Metropolitan Development Board) *American Institute of Planners, Journal of* Vol. 43 No. 2, Apr. 1977, pp 158-168, 4 Fig., 3 Tab., Refs.

31 157939 THE LINK BETWEEN THE NEW MUNICH AIRPORT AND THE S-BAHN NETWORK [Der Anschluss des neuen Verkehrsflughafens Muenchen an das S-Bahnnetz Muenchen]. No Abstract. [German]

Werler, R *Die Bundesbahn* Vol. 53 No. 1, Jan. 1977, pp 15-24, 1 Fig., 1 Tab., 1 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

31 158296 OPTIMIZATION MODEL FOR DETERMINING HEADWAYS FOR TRANSIT ROUTES. The paper presents a technique for determining headways for transit routes. Based on an optimization approach, a chance constrained programming model is developed. The scope of using vehicles of different sizes and operating costs is built into the model, which attempts to minimize the total operating cost. The uncertainty associated with demand forecasts is expressed as a chance constraint that specifies the desired level of reliability with respect to the satisfaction of demand. The model also includes a constraint related to the management policy regarding the minimum service to be provided on a transit route. The deterministic equivalent of the model is solved by linear programming and its application is demonstrated with an example problem.

Lingaraj, BP Chatterjee, A Sinha, KC *Transportation Planning and Technology* Vol. 3 No. 2, 1976, pp 81-90, 16 Ref.; ACKNOWLEDGMENT: EI, TRRL (IRRD 220953); ORDER FROM: ESL

31 158300 PROCEEDINGS OF THE NATIONAL SEMINAR ON PLANNING DESIGN AND IMPLEMENTATION OF BICYCLE AND PEDESTRIAN FACILITIES, 4TH. Proceedings of the seminar include 43 papers. Subjects discussed cover the use of city streets for people and bicycle traffic, implementation planning and development of bicycle facilities, planning of the successful pedestrian mall, environmental mall design, current research in design and evaluation of bicycle facilities, security and operation of pedestrian facilities, and education of bicycle riders.

American Society of Civil Engineers Proceeding 1976, 610 pp; 4th Seminar was held in New Orleans, Louisiana, December 4-6, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 158301 RECENT DEVELOPMENTS IN URBAN BUS TRANSIT. Problems associated with replacing street cars with buses, improving bus transit by preferential treatment, ramp and land metering, and reserved freeway lanes are discussed. Comparison is made between rail and bus rapid transit. Examples of priority bus lanes on arterial streets are presented. Terminals, special services and technology are covered.

Hoel, LA (Virginia University) *Transportation Planning and Technology* Vol. 3 No. 4, 1977, pp 257-266, 18 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 158703 ANNUAL REPORT, 1976 [Rept. for 1 Jan-31 Dec 76]. The document contains highlights of the year's accomplishments on: opening of Metro's first 4.6 miles, rerouting bus service to serve Rhode Island Avenue Station, opening of Gallery Place Station in December 1976, improvements in bus maintenance, renovations of garages, installation of two-way radios in all buses. 145 new buses were received from Flexible and placed in service to replace buses 14 years old or older. At the end of the year, the cost of building Metro had risen to \$5 billion. U.S. Urban Mass Transportation Administrator Robert Patricelli directed that certain Metro routes be analysed anew to determine if changes in circumstances made changes in plans, such as substitution of buses, or other transit service, advisable.

Washington Metropolitan Area Transit Authority, D.C. WMAT-77/1, Jan. 1976, 31p; See also report dated Feb 75, PB-240 164.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265899/5ST

31 158941 PUBLIC TRANSPORTATION: PROBLEMS AND OPPORTUNITIES. The report is a collection of papers on urban transportation solutions that have been tried or are being proposed in North American cities and the specific urban transportation problems which they address. It is designed as a general overview on public transportation issues. The first article examines deficiencies in existing systems, relative use of urban transportation modes, characteristics of transit riders, the peaking problem, and categories of alternatives for improvement. Three other articles examine options for meeting urban

transportation needs: rail rapid transit, bus rapid transit, and para-transit. Emphasis is placed on defining the role in urban transportation each option can play and on summarizing system experiences with them.

Hoel, LA ; Virginia University, Department of Transportation DOT/TST-77/39, Mar. 1977, 93 pp; Contract DOT-OS-50233; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267304/4ST, DOTL NTIS

31 158981 BART IMPACTS ON HIGHWAY TRAFFIC AND TRANSIT RIDERSHIP. The 71-mile Bay Area Rapid Transit (BART) System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. The report documents what changes in aggregate highway traffic volumes, traffic congestion, bus ridership, and bus services have taken place in the four years since BART started service; and assesses the extent to which these changes may be attributable to BART. (Color illustrations reproduced in black and white.)

Sherret, A Fan, H ; Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Metropolitan Transportation Commission, Department of Housing and Urban Development, (UMTA-CA-09-0025) Tech Memo DOT-BIP-TM-20-3-76, May 1977, 165p
Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267675/7ST

31 159353 MASS TRANSIT DEVELOPMENT FOR SMALL URBAN AREAS: A CASE STUDY, TOMPKINS COUNTY, NEW YORK. REPORT ON SECOND YEAR. The report presents the results of the second-year effort within a three-year research project to develop a transportation planning methodology for small urban areas concerned with the provision of public transportation service. This phase of the research concentrates on problems of access to health services, transportation service for the disadvantaged, potential coordination and integration of existing transportation systems, alternative systems designs and their evaluation, and suitable marketing and monitoring programs for public transportation service in small urban areas. This effort, will culminate in the preparation of a transit planning manual suitable for use by the transportation planner in small to medium-size urban areas.

Meyburg, AH ; Cornell University, Department of Transportation Final Rpt. DOT/TST-77/29, Oct. 1975, 342 pp; See also Report on first year effort dated Oct 74, PB-242 989.; Contract DOT-OS-40003; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269227/5ST

31 159480 REACTION OF THE PUBLIC TO FULLY AUTOMATED URBAN TRANSPORTATION SYSTEMS. The experience gained with the automatic systems developed by Matra for the city of Lille (VAL light subway) and for the RATP of Paris (ARAMIS system), allows conclusions to be drawn on the studies made, arrangements taken and tested on operating sites,

and the results of psychological polls carried out. In particular, detailed data is given on the proposed means of informing the public about the Lille subway and also on the arrangements to be taken for the construction of stations.

Felix, B (Engins Matra, France) ; International Federation of Automatic Control Conf Paper 1976, pp 229-236; Presented at the INFAC-IFIP/IFORS International Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976. Also available from ESL.; ACKNOWLEDGMENT: EI (EIX770400464); ORDER FROM: Instrument Society of America, 400 Stanwix Street, Pittsburgh, Pennsylvania, 15222

31 159597 IMPROVING PEDESTRIAN ACCESS TO TRAIN PLATFORMS AT GRAND CENTRAL TERMINAL. A technical study of the feasibility of providing northern access for train passengers to the upper and lower level platform at Grand Central Terminal in Manhattan is reported. At present, access is available at the southern ends of the platforms only. The purposes of the study were to identify (a) the functions of Grand Central Terminal, (b) the best location for northern access pedestrian facilities, (c) the passageway widths required to handle peak volumes, and (d) the impacts of the recommended design on the movement of people and trains. Four types of surveys, an on-board rail passenger survey; a pedestrian interview survey; pedestrian volume counts; and special studies on pedestrian walking speeds; platform and train discharge times, and the number of encumbered persons, were conducted. Grand Central Terminal functions as an intermodal transfer facility, a link in the midtown pedestrian network, a commercial center, and an extension of the subway stations. The recommended improvement concept includes two east-west and two north-south passageways to serve both the upper and lower level platforms. The impacts of 25 and 50 percent increases in passengers on the widths required for the proposed passageways were estimated, based on evaluation criteria related to congestion, walking distances, travel times, railroad operations, handicapped persons, orientation, and capital and operating costs.

Hocking, RJ (Barton-Aschman Associates, Incorporated) Kuner, R (New Alternatives, Incorporated) *Transportation Research Record* No. 614, 1976, pp 6-13, 10 Fig., 2 Tab., 2 Ref.; This article appeared in TRB Research Record No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

31 159601 MEASURING SERVICE DELIVERED BY TRANSPORTATION TERMINALS. A procedure for deriving an index of the adequacy of a design to provide a particular service is introduced and applied to the evaluation of passenger transportation terminal designs. The concept of the service rendered by a transportation terminal or facility is defined as the rendering of assistance to the users of the facility to satisfy their needs and purposes. The index presented here takes account of all the movements of a passenger from the moment of arrival at the terminal to his departure. All of the design features and impacts on service flow and organization are reflected in the index. The index combines all these occurrences in a logically and intuitively satisfactory way that may be tested against user valuations and refined until index

and valuations consistently agree. The determination of the ratio of number active and number helped, and the calculation of the index of service is detailed.

Perilla, O (Port Authority of New York and New Jersey) *Transportation Research Record* No. 614, 1976, pp 32-34, 2 Tab., 2 Ref.; This article appeared in TRB Research Record No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

31 159784 PEDESTRIANISATION-THE PRINCIPLES AND PRACTICE. This paper discusses pedestrian areas created as a result of restricting vehicle access in previously all-purpose trafficked streets to certain times of the day. There are three main elements in the creation of pedestrian-dominated areas: strategic transportation, tactical traffic management and detailed design. The city of Leeds is used as an example to describe how problems of congestion caused by commuter and business traffic can be eased by a modal transfer from car to bus, achieving a more efficient use of highway capacity and space. However, buses and their services must be made more attractive. The recently completed scheme in Wakefield is given as an example of the form of traffic management often required before pedestrian-dominated areas can be created. A complete assessment of traffic conditions was needed. The author discusses factors deciding which order should be used to implement the pedestrianisation. All interested bodies should be consulted before any decisions are made. Details are given of several types of construction of paved areas that can be used. Future developments are indicated. /TRRL/

Nye, C (West Yorkshire Metro County Council, England) *Institution of Municipal Engineers, Journal of Analytic* Vol. 104 No. 2, Feb. 1977, pp 19-23, 5 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-225669)

31 162972 THE RAILROAD AND THE CITY...A TECHNOLOGICAL AND URBANISTIC HISTORY OF CINCINNATI. This study assumes three stages in the evolution of the city with respect to urban circulation; they are, the horse-and-pedestrian phase, the railroad phase and the automotive phase. This book looks at the second phase in which technology was to become the primary determinant of the particular urban form and growth configuration that characterize the modern industrial city; and the railroad was to play a crucial and decisive role in this development. The very plan and network of the rails, the physical and geographical position of the tracks on the land and in the area came to dictate the surrounding urban fabric and the pattern of land use. Though the general history of the railway industry has been extensively treated, railroad technology has received only scant attention from serious historians. The role of civil engineering as it has applied specifically to railroads in the construction of right-of-ways, tracks, bridges, tunnels, sheds and towers, has been largely ignored.

Condit, CW ; Ohio State University Press Monograph 1977, 335 pp; Reviewed in ASCE Civil Engineering, June 1977, p 40.; ACKNOWLEDGMENT: ASCE Civil Engineering; ORDER FROM: Ohio State University Press, 2070 Neill Avenue, Columbus, Ohio, 43310

31 163023 GEOGRAPHICAL PATTERNS OF RESIDENCE AND WORKPLACE SEPARATION. This paper analyzes the geographic patterns of residence and workplace separation in Knoxville, Tennessee that were determined from the implementation of a comprehensive computerized car-pool program. The information necessary to match individuals who have the same travel routes was found to be an excellent source of untapped geographic data. A complete sample of the commuting public was obtained by an employer-based survey procedure and machine-readable survey forms. A computer-mapping program was used to graphically portray the degree of residential work-force concentration in several disparate firms. These data were used to identify clusters of employees who had similar travel patterns that were sufficient to support a proposed van-pool system. Because the degree of labor-force dispersion varies among the firms analyzed, a policy toward plant location and mass transportation is developed. A tax structure is proposed that would penalize firms that contribute significantly to the costs to the community for congestion, pollution, and energy consumption. Similarly, firms that attempt to reduce the total vehicle-kilometers traveled by their employees are rewarded. Reductions can be induced by either relocating a plant or developing a successful ride-sharing program. /Author/

Bell, TL (Tennessee University, Knoxville) *Transportation Research Record* No. 617, 1976, pp 50-54, 3 Fig., 10 Ref.; This article appeared in Transportation Research Record No. 617, Social and Economic Factors in Transportation Planning.; ORDER FROM: TRB Publications Off

31 163173 PASSENGER REQUIREMENTS AT INTERCHANGES. Two aspects of interchanges are important to the passenger. The time spent there-transfer time and the standard of amenity within the interchange. Transfer time can be split into three sections: walk time, wait time and service time (ticket purchase, information collection etc.). Attitudinal studies have demonstrated that the passenger values wait time to be approximately 2.5 times in-vehicle time, walk time to be 1.5 times in-vehicle time and service time to have a similar value as in-vehicle time. An important reason for these high valuations is that the time spent in these activities is perceived by the passenger to be greater than the actual time involved. The disincentive of interchange can be reduced by minimising actual transfer times. Provision of a high standard of amenity may reduce the perceived nuisance of interchange. A pleasant interchange environment is also important in helping to create a favourable image for public transport. /Author/TRRL/

Taylor, DH ; Warwick University, England Monograph Working Paper 31, Oct. 1976, 14 pp, 1 Fig., 5 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 225926)

31 163291 STOCHASTIC SIMULATION OF PASSENGER FLOW AT STATIONS [Stochastische Simulation des Fahrgastflusses in Haltestellen]. Present methods for station planning are based on averaged empirical data. For optimizing stations with random configurations and dimensions, a stochastic simulation is described which enables all determinative parameters of passenger flow to be realistically calculated. Taking an urban rapid transit station

as an example, it is shown that simulation can furnish new and important data for the layout of such stations. [German]

Hejj, E Sigl, D Zimek, D *Krupp Tech Mitteilungen, Forschungsber u Werksber* Vol. 35 No. 1, Jan. 1977, pp 73-82, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 163877 MERSEYRAIL: LINK AND LOOP IN OPERATION. Brief details are given of the new Merseyrail link and loop underground railway system. British Rail's proposals envisaged the extension of the Mersey/Wirral lines in a loop under Liverpool city centre and the southerly extension of the existing Southport/Ormskirk lines under the city to link exchange and central stations. The effect of these two relatively simple underground lines would be to knit a number of unrelated radial routes together to form a basic integrated rapid-transit system with much improved interchange facilities. The loop and link lines are being brought into full use in stages during 1977. To achieve the north-south link the lines from Southport/Ormskirk have been diverted north of the exchange terminal into a new double track tunnel, through a station at Moorfields, providing an interchange with the loop, to continue into central low level station. Future plans for further extensions to the system are described. /TRRL/

Modern Railways Analytic Vol. 24 No. 245, June 1977, pp 213-214, 1 Fig., 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD 226928); ORDER FROM: University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan, 48103

31 163962 PASSENGER TRANSPORT INTERCHANGE BETWEEN INLAND SURFACE MODES--A STATE OF THE ART REVIEW. This critical review covers over 100 reports and describes the state of the art in 1975 regarding passenger transport interchange between inland surface modes. The research findings of various investigators are compared and contrasted to gain an understanding of the role of interchange in a journey, and the stages of a journey in which interchange occurs. The criteria for interchange design and planning are discussed. The studies of interchange between private and public transport modes- park and ride (bus), park and ride (rail), and kiss and ride-and between public modes (bus-bus, bus-rail, and rail-rail) are reported, and the research techniques used in them are assessed. /Author/TRRL/

Bell, MC ; Newcastle-Upon-Tyne University, England Monograph Report No. 10, Oct. 1976, 152 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-226727)

31 163970 METRO TRAVEL INTERCHANGE, BRADFORD. Bradford City Interchange brings into one area all the out of town bus services, over 50 per cent of the local services, and all the railway services (except for services to Ilkley and Keighley). The development follows from decisions made by the City Council and British railway, and the planning considerations, architectural considerations and the provision of facilities within the interchange are described in this article. The interchange, as described, includes an underground car park for 48 cars; a bus station with six passenger islands and an overall roof, providing up to 62 bus stands of which 25

are for two buses each; a railway station with four passenger platforms, travel centre, red star parcel facilities and rail lost property; a coach park; a bus depot and maintenance workshops for 180 buses; offices and ancillary accommodation; a passenger concourse with associated amenities. In an appraisal of the facilities provided the author presents background information on the history of the development, which was completed at a cost of 16M and which is now owned and run by Metro, West Yorkshire's passenger transport executive. Details are provided on element costs, finishes and fittings, services, and the contractors involved in the construction of the project. /TRRL/

Architects Journal Analytic Vol. 165 No. 21, May 1975, pp 975-987, Figs., Tabs., Photos. ACKNOWLEDGMENT: TRRL (IRRD-227219)

31 164150 IMPROVING STREET PUBLIC TRANSPORT--SOME POSSIBLE SOLUTIONS. The services provided by trams and buses are currently being adversely affected by increasing motor traffic congestion. The attractiveness of the service to passengers is reduced as traffic delays cause uneven headways and reduced travel speeds. Significant increases in public transport operating costs also occur. The extent of these delays, the various causes and effects, particularly in terms of 'pairing' and 'bunching' of vehicles, are discussed. Various means by which improvements could be brought about are discussed in terms of costs, effectiveness and impact on other road users. Particular reference is made to measures which have been implemented or investigated in Melbourne. /TRRL/

Vanselow, RG Sinclair, RB (Melbourne and Metropolitan Tramways Board, Austr) *Australian Road Research Board Conference Proc* Proceeding Vol. 8 1976, pp 33-46, 7 Fig., Refs.

This paper was presented at the 8th Conference of the Australian Road Research Board, Perth, Australia, August 23-27, 1976.; ACKNOWLEDGMENT: TRRL (IRRD-226313), Australian Road Research Board

31 164268 OPTIMUM AIRPORT TERMINAL LAYOUT PLANNING. This paper reports on the development of an heuristic algorithm for designing airport terminal layouts. Current practice of generating layouts depends heavily on past designs and intuition. No formal design method exists. This algorithm was devised to assist the designer quantitatively. The airport terminal is represented by a set of four types of components connected by a set of links. The components in turn are represented by equations of circles which are manipulated in accordance with the principles of analytic geometry. The result is a physical layout of each floor of the terminal building. Each layout is optimal in that total passenger movement is minimized.(a) /TRRL/

Braaksma, JP *Engineering Optimization* Analytic Vol. 3 No. 1, 1977, pp 1-15, 7 Fig., 5 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227428)

31 164271 PASSENGER EVALUATION OF UNDERGROUND IMPROVEMENTS. This paper summarises the methods and results of three surveys undertaken by opinion research centre on behalf of London transport in 1973, 1974 and 1975. The surveys were carried out to estimate the relative value for money of projects

affecting the quality of underground travel.(a) /TRRL/

Maw, J Bradley, J (London Transport, England) *Greater London Intelligence Quarterly* Analytic No. 37, June 1977, pp 28-31, 1 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227413); ORDER FROM: Greater London Council, County Hall, London SE1 7PB, England

31 164347 BUS PRIORITY EVALUATION. The role of public transport in urban areas has recently received considerable attention. Bus priority measures as a means of improving the operation and efficiency of public transport have only recently come of age in the Australian scene despite extensive overseas experience. This paper examines the case for bus priority schemes and outlines some of the factors, both qualitative and quantitative, which must be considered when contemplating the introduction of bus priority schemes. /Author/TRRL/

Howie, DJ (Keogh Wood and Partners) Thomas, IG (Scott and Furphy Engineers, Prosperity, Limited) *Australian Road Research* Analytic Vol. 6 No. 4, Dec. 1976, pp 3-7, 1 Fig., 1 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 227282), Avions Marcel Dassault

31 165567 BICYCLE FACILITIES FOR AUSTRALIAN CAPITAL CITIES. A case for providing bicycle facilities to encourage cycling can be made in terms of: transport efficiency, equity, amenity and reduction in cyclists road accident trauma. Facilities are currently inadequate for both safe movement and secure storage, thus deterring the greater use of bicycles. A low cost solution, to the provision of facilities for movement, is to base the network on existing quiet residential streets. To develop a continuous network however, it would be necessary to 'breach' discontinuities such as public reserves and private property with bike path easements. Bicycle networks should be developed to serve local travel to schools, work places, recreation facilities, shop and public transport terminals with secure storage facilities provided at these activity centres. Preliminary costing indicates that the proposed system of routes, paths and storage facilities, would cost just over \$77 million. Operating cost savings that would accrue to current private motor vehicle users alone, predicted to transfer from car to bicycle for some short local trips, is calculated at just over \$44 million per year. Accordingly it is concluded that a strong case exists for public investment in bicycle facilities. /Author/TRRL/

Pattinson, WH (Commonwealth Bureau of Roads, Australia) ; Victoria Ministry of Transport, Australia Proceeding May 1977, 23 pp, 12 Tab., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use from the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227892), Australian Road Research Board

31 165568 BUS PRIORITY PLANNING IN ADELAIDE. A review is made of some features which can be used to improve the capacity of the urban road transport system, particularly during peak periods, to carry larger volumes of people, with only small capital investments. The review considers work done in Adelaide on ways of

improving bus operations in that city. Features which are expected to reduce the length and variance of bus travel times, such as traffic signal modifications and reserved lanes are described and discussed. /TRRL/

Bray, DJ (South Australia Department of Transport) ; Victoria Ministry of Transport, Australia Proceeding May 1977, 15 pp, 2 Fig., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use From the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227889), Australian Road Research Board

31 165576 PEDESTRIAN NETWORK IN THE ADELAIDE CORE AREA. A major step in providing a pedestrian network throughout the Adelaide core area occurred when Rundle street was converted to a pedestrian mall last October. This had the effect of creating a pedestrian precinct of 14 hectares in the most highly developed part of the city. Although detailed studies aimed at converting Rundle street to a mall were only commenced in 1972 the project was the logical outcome of a series of other studies, dealing largely with transportation and parking, which began in the early 1960'S. The policies developed and the action taken as a result of the studies are described. In brief the policies have been directed towards improving the accessibility of the core area. This has resulted in a unique and extensive off street parking system which is now a fundamental component of the pedestrian precinct. The priorities for extending the pedestrian network throughout the core area have been established and are described. /TRRL/

Madigan, JF (Adelaide City Council, Australia) ; Victoria Ministry of Transport, Australia Proceeding May 1977, 13 pp, Figs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use From the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227888), Australian Road Research Board

31 165686 ON DAVIDSON'S FLOW RATE-TRAVEL TIME RELATIONSHIP. Davidson's flow rate-travel time relationship has often been cited as a simple and convenient model for traffic flows on urban roads. However, only limited quantitative application of the model has been reported. One possible explanation for this observation could be the apparent difficulty in obtaining values for the model parameters. This paper gives a method for the simultaneous analytical determination of least squares estimates of the parameters. The method yields a surprisingly simple result. An application of Davidson's relationship to a short section of arterial road with centre tram lines, and containing a tram stop, is described. This application yields results which support a common assumption that the traffic capacity of an arterial road with trams is significantly less than an equivalent arterial road without trams. Under 'clearway' conditions, a maximum possible one-way flow rate of about 2600 veh/h is suggested for the arterial road shared by trams and motor vehicles. The test section studied was a single carriageway road, pavement width 13.4 M, and had centre tram lines. /Author/TRRL/

Taylor, MAP *Australian Road Research Analytic* Vol. 7 N June 1977, pp 3-13, 4 Fig., 3 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 227914)

31 165737 BUS/CARPOOL LANES ROUTE 101 MARIN COUNTY EVALUATION REPORT, DECEMBER 1974-DECEMBER 1976. This report evaluates the operation of the High Occupancy Vehicle (HOV) lanes on Route 101 between the Richardson Bay Bridge and Greenbrae in Marin County. It covers the operation of the HOV lanes while operated as exclusive bus lanes only as lanes reserved for buses and carpools of three or more occupants. The report discusses the HOV lanes impact on travel, modal shift, highway operation, bus transit operation, safety, air quality, energy consumption, and public reaction to the HOV lanes. /FHWA/

California Department of Transportation Intrm Rpt. FHWA/PL/77/1021, Mar. 1977, 72 pp; ACKNOWLEDGMENT: Federal Highway Administration, NTIS; ORDER FROM: NTIS; PB-272501/8ST

31 165805 EVALUATION OF ALTERNATIVE CONCEPTS FOR PRIORITY USE OF URBAN FREEWAYS IN TEXAS. This report presents an evaluation of priority techniques for Texas freeways, including exclusive lanes, contraflow reserved lanes, concurrent flow reserved lanes, priority entry and priority treatment on frontage roads. A literature review was conducted, and from this, characteristics of priority techniques on U. S. freeways were documented. Based on analysis of these data, an evaluation of techniques was made for Texas freeways. /Author/

Urbanik, T, II ; Texas Transportation Institute, (Res Rpt 205-1) Intrm Rpt. TTI-2-10-74-205-1, Mar. 1977, 47 pp, 4 Fig., 16 Tab., 13 Ref.; Sponsored by Texas State Department of Highways and Public Transportation.; Contract Study No. 2-10-74-20 (5); ORDER FROM: NTIS

31 167193 THE POTENTIAL FOR HELICOPTER PASSENGER SERVICE IN MAJOR URBAN AREAS. An interurban helicopter cost model having the capability of selecting an efficient helicopter network for a given city in terms of service and total operating costs was developed. This model which is based upon the relationship between total and direct operating costs and the number of block hours of helicopter operation is compiled in terms of a computer program which simulates the operation of an intracity helicopter fleet over a given network. When applied to specific urban areas, the model produces results in terms of a break-even air passenger market penetration rate, which is the percent of the air travelers in each of those areas that must patronize the helicopter network to make it break even commercially. A total of twenty major metropolitan areas are analyzed and are ranked initially according to cost per seat mile and then according to break-even penetration rate.

Dajani, JS Stortstrom, RG Warner, DB ; Duke University NASA-CR-145224, Mar. 1977, 94 pp; Grant NSG-1121; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N77-27087/4ST

31 167308 SUMMARY REPORT: WORKSHOP ON VEHICLE RIDE QUALITY HELD AT WILLIAMSBURG, VIRGINIA ON AUGUST 13-15, 1975. The workshops were conducted to review the information presented at the 1975 Ride Quality Symposium held during August 11-12, and to assess the state of the art in ride quality as surmised by various workshop participants. The proceedings are organized according to the main topics discussed by the four workshop groups: accomplishments in ride quality research, needs of the transportation community, ride quality research techniques, and ride and environment control techniques. In addition, an appendix on scaling techniques and a list of workshop participants are included.

Kuhlthau, AR Wichansky, AM ; Transportation Systems Center, Virginia University, National Aeronautics and Space Administration Final Rpt. DOT-TSC-OST-77-44, NASA-CP-2103, July 1977, 168 pp; See also N76-16754. Prepared in cooperation with Virginia Univ., Charlottesville. Dept. of Engineering Science and Systems.; Grant NGR-47-005-81; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272471/4ST

31 167336 URBAN CORRIDOR DEMONSTRATION PROGRAM. CORRIDOR EVALUATION [Final rept.]. Manhattan CBD-North Jersey Corridorwide Improvements have been significant. Over the course of the Urban Corridor Demonstration Program in the Manhattan CBD-North Jersey Corridor millions of vehicle miles have been saved per year by fringe parking, 25-37 million passenger hours per year have been saved by the exclusive bus lane, and approximately 625,000 passengers annually enjoy a more direct and faster trip into the CBD because of the bus reroutes. Other projects include I-495 bus priority traffic management system, Route 3 BPTMS and traffic control demonstrations, and automatic bus identification. Coordination among numerous agencies was involved with each project. Fringe parking, exclusive bus lanes, and the rerouting of buses in Midtown Manhattan CBD to better distribute travelers to and from the Port Authority Bus Terminal amounted to a successful experiment in bus passenger carrying effectiveness.

Blue, V Adler, B ; Tri-State Regional Planning Commission, New, York.**Port Authority of New York and New, Jersey.**New Jersey Dept. of Transportation., Trenton.**New Jersey Turnpike Authority, New, Brunswick.*Federal Highway Administration., Washington, D.C.*Urban Mass Transportation, Administration, Washington, D.C. TS-7940-CE, DOT/FH-11-7778-TS-79, Mar. 1977, 33p; See also report dated Jun 74, PB-235 061. Prepared in cooperation with Port Authority of New York and New Jersey, New Jersey Turnpike Authority, New Brunswick and New Jersey Dept. of Transportation, Trenton.; Contract DOT-FH-11-7778; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272520/8ST

31 167854 EVALUATION OF PRIORITY TECHNIQUES FOR HIGH OCCUPANCY VEHICLES ON ARTERIAL STREETS. This report presents an evaluation of the priority techniques for high-occupancy vehicles (buses and carpools) relative to arterial streets. The techniques considered include contraflow lanes, concurrent flow lanes, reversible lanes and prior-

ity at traffic signals. The report is aimed at an overall evaluation of the relative merits of each of the four techniques rather than an extensive documentation of the many implemented projects. /Author/

Urbanik, T, II Holder, RW Fitzgerald, AV ; Texas Transportation Institute Research Rpt. 205-5, July 1977, 38 pp, 5 Fig., 4 Tab., 9 Ref., 1 App.; Sponsored by the Texas State Department of Highways and Public Transportation.; Contract Study 2-10-74-205

31 168058 SEA-BUS UNJAMS VANCOUVER'S TRAFFIC. An innovative high-speed ferry system that links the city of Vancouver to the residential area of North Vancouver to the north across Burrard Inlet is taking motorists off jammed city streets and freeing commuter buses to work in other sections of the metropolitan area. This successful project showed that Canadian consumers would use public conveyances if the services were attractive. The design of the vessels and terminals follows rapid transit principles in order that passengers may board and alight quickly. Because the ferries are faster than the bus for many North Vancouver residents, a certain number of transit vehicles have been reassigned to improve local bus services and provide additional bridge services where needed. The relation of the waterborne system with the bus system and the planned development of the entire Vancouver transportation pattern have been carefully thought out. The integrated bus and ferry transit services were planned by a tripartite group consisting of the British Columbia Hydro, the Municipal Affairs and Housing Department, and the Greater Vancouver Regional District. Based on the one-way trip, present projections for one year after service start-up are for 7,500 passengers to be carried on a typical weekday, at a peak-period frequency of 10 minutes. This represents about one-seventh of the ultimate system capacity. During the two hour peak period, the ferry can transport 1,500 people, the equivalent of 1,000 automobiles carrying 1.5 travelers each.

Transportation Research News No. 73, Dec. 1977, pp 5-6, 1 Phot. ORDER FROM: TRB Publications Off

31 168072 ROLE OF SIMULATION MODELS IN THE TRANSIT-STATION DESIGN PROCESS. This paper summarizes the ways in which a transit-station simulation model could be developed to function as a more integral part of the design process. It examines in detail the interface of the user with the model. Specific problems dealing with network and spatial representation are discussed, and the model output is matched with the information needs of the designer at the appropriate stages in the design process. The paper concludes with a discussion of the cost-effectiveness of station-simulation models. /Author/

Lutin, JM Kornhauser, AL (Princeton University) *Transportation Research Record* No. 625, 1977, pp 53-57, 1 Fig., 5 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

31 168904 TRAVEL IN THE BART SERVICE AREA. BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland,

Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. The report analyzes the results of two travel surveys: (1) the May 1976 BART Passenger Profile Survey, an on-route self-completion questionnaire survey of 8,000 BART riders, and (2) the BART Impact Program May 1975 Areawide Travel Survey, a telephone interview survey of 1,000 individuals in the BART service area. The report presents information on the socioeconomic characteristics of BART, bus, and automobile travelers, the purposes and other characteristics of their trips, and the shares of areawide travel carried by the modes.

Etkin, SA Sherret, A ; Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Department of Housing and Urban Development, (UMTA-CA-09-0025) DOT-BIP-WP-35-3-77, Sept. 1977, 86 pp; Prepared by Peat, Marwick, Mitchell and Co., San Francisco, Calif. See also report dated Apr 76, PB-261 017. Report on BART Impact Program.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273393/9ST, DOTL NTIS

31 169193 MONITORING THE EFFECTS OF THE DALLAS/FORT WORTH REGIONAL AIRPORT. VOLUME I. GROUND TRANSPORTATION IMPACTS. The report presents new conceptual and methodological approaches to developing models to interrelate airline schedules, airport-based employee work-shift schedules, and airport access ground traffic volumes in any time period for a given report. The results of a survey of ground travel at the Dallas/Fort Worth Regional Airport are presented and analyzed. Specific ground transportation impacts of the installation of this relatively new airport are assessed. Models are described which (1) express volumes of automobiles carrying airline passengers and visitors as a function of airline schedules and (2) transform existing or future employee work-shift schedules into estimates of incoming and outgoing employee vehicle volumes in any time interval. Preliminary research toward the development of a model to estimate public transit passenger volumes as a function of airline passenger volumes is also described.

Dunlay, WJ, Jr Henry, L Caffery, TG Wiersig, DW Zambrano, WA ; Texas University, Austin, Department of Transportation Res. Rpt. DOT-RSPD-DPB-50-7703, RR-36, Dec. 1976, 203 pp; Contract DOT-OS-30093; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274117/1ST

31 169450 TERMINAL AREA FORECAST 1978-1988. This report contains forecasts for air carrier and air taxi enplanements, air carrier and air taxi aircraft operations, itinerant, total and instrument aircraft operations, and instrument approaches at 894 airports throughout the United States. The airports in this publication include all those with Federal Aviation Administration air traffic control towers and those with air carrier service. The report is intended as an aid for anticipating future manpower and equipment needs at terminal areas. (Author)

Federal Aviation Administration FAA-AVP-77-17, Jan. 1977, 353 pp; See also report dated Jan 76, AD-A026 753. Availability: Microfiche copies only.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A046543/5ST

31 170264 THE FORGOTTEN RESOURCE..-URBAN WATERBORNE TRANSPORTATION. This paper proposes a system, including high-speed ferries, feeder barges and satellite terminals, which would be integrated into the existing transportation patterns and result in many benefits at a relatively low cost. Making use of right-of-ways, which would require practically no cost to establish and maintain, the ferries could provide many time-saving shortcuts for the public. Also commuters could travel in more pleasant, less crowded surroundings. These ferries, in some instances, could be used to relieve the pressure on existing transportation systems, and thereby ease the need for costly expansions. Cargo movements between the major marine terminals and strategically located, satellite terminals could reduce the truck traffic through the cities by using self-propelled barges, or barge tows, to deliver cargo (preferably containerized). Trucking of the cargo could then be confined to the local regions served by the satellite terminals. Besides the cost saving features, other benefits of using these waterways would include reductions of city traffic, accidents, road maintenance, air pollution and possibly hijackings. These benefits should not be overlooked in planning urban transportation systems.

Colleran, RJ Funge, WJ (Dravo Van Houten, Incorporated) ; American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170266 THE ROLE OF WATERBORNE TRANSIT IN THE NEW YORK METROPOLITAN AREA. Provides an estimate of what the author's company believes is needed to provide adequate commuter and recreational transportation between the North Jersey Coast and Lower Manhattan. With the present congested highways, the only reasonable alternative lies in the waterways. A current analysis indicates the need for an overall integration of ferry services so as to meet the weekly and seasonal variations in passenger travel patterns with the minimum capital investment. The economic realities of the current times compel an examination of the most cost effective means of waterborne transportation. Rather than employ high energy consumers such as SES and hydrofoils, it is believed that semi-planing displacement hull offer the best solution. Currently in the planning stage is the design of a 30 mph semi-planing catamaran ferry with a capacity of 1500 passengers. An alternate, more conventional design of equal capacity and speed based on the Nickum & Spaulding GOLDEN GATE high speed water-jet commuter boats is a serious candidate. In the future, consideration should be given to ferry boats that can handle up to 10,000 passengers and travel at a speed of 20 miles per hour. Some of the conceptual designs are presented so that one can

get a better picture of the types of ferries that the studies have produced to date.

Cox, AE (Henry (JJ) Company, Incorporated) ; American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170267 SEABUS. The passenger-catamarans "Burrard Otter" and "Burrard Beaver" are the focal point of an integrated land-marine transportation link across Burrard Inlet, British Columbia. The water route is 1.75 nautical miles and links North Vancouver, a bedroom community with some industry, to Vancouver, the business center of British Columbia. The surrounding population is approximately 1,179,000. The official population of North Vancouver is 60,000, and the population of Vancouver is 500,000. The North Vancouver marine terminal is also a land bus interchange, while the Vancouver side forms a land bus pick-up up-drop off point only. The Seabus system includes, besides an operating organization of 65 people; two 400-passenger ferries, two floating flow-through terminals, each of which is "E" shaped with two slips, an administration-maintenance building, and maintenance and overhaul berths. The system has been designed to expand to a total of 8 ferries when required. Average usage per day is approximately 14,000 with the expected morning and afternoon peaks and an unexpected evening peak. These usage figures are based on two months of initial service which commenced on June 17, 1977. A private ferry operation closed down 19 years previously and the cross inlet traffic has been handled by two bridges until this point in time. Design of the system and hardware, by Case Existological Laboratories Ltd., began in October of 1974. Operation of the system began 32 months later. Seven contracts worth \$35,000,000, and the organizing and training of the personnel occurred during this intense 32-month period. Even more interesting during this period was a radical change of government half way through the design and construction phase and three months of construction strikes. Public acceptance has been excellent, and an attractive marine option to the automobile has been firmly established in the North Vancouver-Vancouver area.

Case, JN (Case Existological Laboratories Limited) ; American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170270 TUG AND BARGE COMBINATIONS FOR MARINE PASSENGER TRANSPORTATION. The development of large scale recreation complexes on the nation's waterfronts portends a return to waterborne transit as a means of access. In the New York City Metropolitan Region, Gateway, Liberty Park and the Palisades Interstate Park systems exemplify these sizable recreation/open space resources with waterborne Transit potential. Reinforcing the concept of barges for passenger transporta-

tion is the emergence of new technology barge/tug linkage systems. At least five or six of these systems have a direct application to passenger movement. Because of the relative slow speed (10-15 knots), the barge/tug system is acceptable for recreation trips; but not for journey to work. Cost savings are achievable over comparable sized conventional self-propelled excursion boats. Cost savings are estimated in the magnitude of 20% for operating costs and 12% for capital costs. Scenarios have been prepared for a fleet of 3 tugs and 4 barges providing transit capacity of some 10,000 daily person trips. Regulatory, safety, operating and capital cost estimates and a host of other considerations and criteria point to the use of barge/tug combinations for large scale waterborne access. The paper recommends that this concept be demonstrated.

Phraner, SD (Tri-State Regional Planning Commission); American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170272 JETFOILS. The JETFOIL is a second generation hydrofoil which employs gas turbine driven waterjets for propulsion, fully submerged hydrofoils to develop lift, and an automatic stabilization and control system to produce an excellent ride quality in rough water. In commercial passenger service throughout the world, the JETFOILS have carried two million passengers approximately 100 million passenger miles reliably and dependably. Passenger acceptance of the wide body comfort, smooth ride and cruise speed of 50 miles an hour has been extremely high and load factors have continued to increase. The JETFOIL is environmentally clean, it is quiet and it can be used in congested areas safely and without imposing itself in any way on other users of the marine environment either pleasure or commercial. The primary emphasis of this presentation is to describe the in-service experience of this relatively new and highly advanced marine vehicle and to show how the craft could be used in Metropolitan transit operations. Several specific analyses of operations presently under consideration are shown and the economic aspects discussed. The presentation also deals with some of the key technical considerations which are likely to determine the economic viability of any advanced marine system and therefore determine the ultimate success or failure of the system. (Extensive use was made of films and slides.)

Shultz, WM; American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170276 FERRY BUS/TRANSIT SYSTEM. The presentation describes the growing automobile congestion within the Golden Gate Corridor, which is located across the Golden Gate bridge to the north of San Francisco, and reviews the innovative approach undertaken by the Golden

Gate Bridge, Highway and Transportation District to solve the problem with a mass transit system consisting of a combination of ferries and buses. A brief review is given of the planning and design criteria used in the selection of vessel type and related terminal facilities. Three new high-speed, 165-foot, 750-passenger, vessels are presently in operation between San Francisco and central Marin County. These vessels are of aluminum construction, with a 28-knot power package consisting of gas turbine engines coupled to water jet pumps. Two new modern marine passenger terminals are also discussed, one of which is now in operation, and the other to be completed in the Spring of 1978.

Kowleski, SM (Golden Gate Bridge, Highway and Trans Division); American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170277 HOVERMARINES--THE DEVELOPMENT AND STATUS OF THE HM.2 AND HM.5. The paper describes the development of the sidewall hovercraft or surface effect ship as a commercial high-speed passenger hoverferry or "Hovermarine". Early work in the U.K. and U.S. is traced to the introduction in 1968 of the first Hovermarine--the 60 passenger HM.2. That prototype craft with limited sea state capacity developed through eight years of passenger service and two distinct "model changeovers" into the current 84-92 passenger Mark 4 waterbus with greatly improved passenger comfort and system reliability, while maintaining the initially conceived high-speed operational efficiency. This HM.2 development in increased payload, extended sea state capability and improved ride quality is reviewed and quantified. The now standard 40 mph HM.2 has an 18,000 disposable load capability which lends itself readily to roles other than pure passenger carrying. Designs using the standard hull but configured for crew boat, survey and firefighting missions are presented. The 200 million in-service passenger miles experience gained on the 28 ton HM.2 served as the principal development background to the 220 passenger, 80 ton HM.5 Hovermarine, the prototype of which is now in construction. The characteristics of the HM.5 are presented, and the Hovermarine series craft are reviewed on basic parametric terms with other types of high-speed marine vehicles. This review extends the Hovermarine concept to the 500 ton region. Hovermarines are finally discussed in regard to their capability as "waterbuses" in alleviating the currently favored, but tremendously expensive land-based roadway and fixed guideway solutions to the U.S. mass transit problem in spite of the fact that waterways serving most large cities remain underutilized.

Davison, EF (Hovermarine Corporation); American Society of Civil Engineers Proceeding 1977 Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages, Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170786 THE ECONOMICS OF WATER TRANSPORTATION FOR SOUTH SHORE WORK TRIP COMMUTERS TO BOSTON. In this paper an economic analysis is undertaken to examine the feasibility of utilizing two-HM. 2 Hoverferry(s) or an S-120 displacement vessel in order to satisfy the travel demand of work trip commuters between Hingham and Boston, Mass. Level-of-service, system costs, cost and demand curves, financing arrangements and potential risks are discussed. It is indicated that the implementation of either one of the watercraft solely for work trip commuters to Boston is a high risk venture.

Curtis, F (Queen's University, Canada); American Society of Civil Engineers Proceeding 1977 Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages. Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170794 WATERBORNE TRANSPORTATION FOR RECREATION. Waterborne transport is often environmentally preferable to other travel modes. Such systems are becoming necessary because use of surface transit, especially the private auto, is being discouraged in many seashore recreation areas including the Fire Island National Seashore. A recently completed transportation study of ferry transport to Fire Island from alternative embarkation points on Long Island is discussed. Three public recreation areas are to be developed on Fire Island for 5,000 daily visitors. Existing ferry service will be expanded requiring the acquisition of mainland property for visitor parking, reception facilities, and ferry loading docks. Several sites along the shoreline were identified and evaluated for possible use. The primary criteria in the final site selection were environmental suitability and public acceptance. Alternative vessel types were considered but environmental constraints suggested moderate-sized, slow-speed conventional hull crafts. Round-trip costs per passenger are estimated to be \$1.60 to \$3.75, depending on the route, for the most cost-effective system. The National Park Service is now finalizing the plan and will soon initiate its development.

Monte, PC (Vollmer Associates); American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages. Cost: to ASCE members \$15.00; non-members \$30.00.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170800 SES PROGRAMS, CIVILIAN APPLICATION. Waterborne transportation has long played an important role in the United States. It has not, however, taken advantage of technical advancements achieved in the past 20 years in the development of amphibious air cushion vehicles (ACV) and surface effect ships (SES). These craft employ the air cushion principle where a volume of pressurized air is contained beneath the structure of a craft and the water surface thereby reducing resistance, improving ride quality and passenger comfort, and enabling higher speed. The amphibious fully-skirted air cushion vehicles have evolved in both England and the United States. The United States, how-

ever, has clearly led in the development of the partially-skirted, solid-sidewall surface effect ship, primarily oriented to military requirements. This paper examines the implications of this type vessel for civil applications. The fundamental characteristics of SESs are examined in comparison to planing hulls and hydrofoils. Those characteristics of the SES that should be of interest to owners and operators are reviewed and commented upon. Specific performance capabilities of SES boats of 65, 85, 110, and 133 feet are presented, as well as discussions regarding the associated machinery. Fundamental information regarding hull material selection for SESs is also presented.

Kelly, JJ (Bell-Halter); American Society of Civil Engineers Proceeding 1977; Proceedings of Second International Waterborne Transportation Conference, October 5-7, 1977, New York City. Available April, 1978, approximately 750 pages. Cost: to ASCE members \$15.00; non-members \$30.00. Also available from NTIS, PB-273672/6ST.; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE

31 170836 GENERATION OF 1995 INTRA-URBAN PERSON TRAVEL DEMAND FOR AIR CARRIER AIRPORTS. A brief outline of a method for the long term estimation of the total number of ground journeys generated by a major airport is presented. Ground trips made by airline passengers and by associated staff necessary to service the airport are both included. The method is applied in the article to forecasts for the years 1985 and 1995 for two airports in the Chicago area--Midway and O'Hare. Such a method can be used in planning future highway and mass transit provision for airports as part of a total transportation system for an urban area.

Halagera, R Newmyer, D Seibert, C *CATS Research News* Vol. 16 No. 2, Oct. 1974, pp 1-6, Tabs., Refs.; ACKNOWLEDGMENT: European Conference of Ministers of Transport; ORDER FROM: Chicago Area Transportation Study, 300 West Adams Street, Chicago, Illinois, 60606

31 170878 THE SANTA MONICA FREEWAY DIAMOND LANES VOLUME I: SUMMARY. The Santa Monica Freeway Diamond Lanes, a pair of concurrent-flow preferential lanes for buses and carpools linking the City of Santa Monica, California, with the Los Angeles CBD, operated amid much controversy for 21 weeks until the U.S. District Court halted the project. The project marked the first time preferential lanes had been created by taking busy freeway lanes out of existing service and dedicating them to the exclusive use of high-occupancy vehicles. This report which summarizes the findings of the official evaluation of the project, addresses a broad range of project impacts in the following major areas: Traffic speeds and travel times; traffic volumes and carpool information; bus operations and ridership-safety and enforcement; energy and air quality; and public attitudes and response. Analysis shows that the project succeeded in increasing carpool ridership by 65% and the increased bus service accompanying the Diamond Lanes caused bus ridership to more than triple. Nonetheless, energy savings and air quality improvements were insignificant, freeway accidents increased significantly, noncarpoolers lost far more time than carpools gained, and a

heated public outcry developed which has delayed the implementation of other preferential treatment projects in S. California.

Bilheimer, JW Bullemer, RJ Fratessa, C; SYSTAN, Incorporated, (D148-8) inal Rpt.7 Vol. 1 UMTA-A06-0049-77-12F, Sept. 1977, 111 pp; This report was sponsored by DOT, Transportation Systems Center, Cambridge, Massachusetts. Volume II, the Technical Report is also available from NTIS: UMTA-MA-06-0049-77-13.; Contract DOT-TSC-1084; ORDER FROM: NTIS; PB-286567/3ST

31 173690 A STUDY OF GENERAL AVIATION IN THE SOUTH EAST OF ENGLAND. The purpose of this study was to collect facts concerning general aviation (GA) in the South East, to present forecasts of potential demand arising within the study area in the period 1985, and to review these forecasts in the light of volume and type of ground facilities available to general aviation users. The report analyses the demand for GA facilities, the rational of recreational and business flying, the need of the user, the available facilities, and future prospects. The report indicates that both exclusive business and air taxi operations are likely to continue to grow; fuel price increases are not expected to have a major effect on this particular type of flying; and, some growth is forecast for third level services and other fixed wing GA operations. It is noted that although the requirements of the different users vary considerably, there is still a shared use of certain facilities. Finally a comparison is made between the magnitude of precast demand and the size and capacity in aviation terms of the 67 airfields classified in this report showing which airfield, could in principle accept the different classes of traffic.

Standing Conf on London and SE Regional Planning Nov. 1974, 85 pp, Tabs., Apps.; ACKNOWLEDGMENT: Standing Conf on London and SE Regional Planning; ORDER FROM: Standing Conf on London and SE Regional Planning, 26 Old Queen Street, London SW1H 9HP, England

31 174509 FAA AVIATION FORECASTS. FISCAL YEARS 1978-1989. This report contains the fiscal years 1978 to 1989 Federal Aviation Administration (FAA) forecasts of aviation activity and measures of workload at FAA facilities. These include airports with FAA control towers, air route traffic control centers, and flight service stations. Detailed forecasts were made for the four major users of the national aviation system: air carriers, air taxi, general aviation and the military. This report also contains for the first time a specific forecast for commuter airlines. The forecasts have been prepared to meet the budget and manpower planning needs of the constituent units of FAA and to provide information that can be used by state and local authorities, by the aviation industry and the general public. The overall outlook throughout the forecast period is for moderate economic growth, declining unemployment, and decreasing inflation. Based on these assumptions, aviation activity is forecast to increase by Fiscal Year 1982 by 29 percent at towered airports, 32 percent at air route traffic control centers and 49 percent in flight services performed. The corresponding percentage increases for Fiscal Year 1989 are 49, 64 and 104, respectively. General aviation and air

taxi (including commuters) will account for most of the growth in activity at FAA facilities. (Author)

Federal Aviation Administration FAA-AVP-77-32, Sept. 1977, 85 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A047657/2ST

31 174673 SAN BERNARDINO FREEWAY EXPRESS BUSWAY EVALUATION OF MIXED-MODE OPERATIONS INTERIM REPORT-STAGE 1. The report evaluates mixed mode operations on the San Bernardino Freeway Express Busway. Carpools having three or more occupants, and vanpools began sharing the Busway with buses in October 1976. Preliminary findings for the first eight months of operation using the easterly seven mile segment of the Busway are documented. Carpool volumes have grown to about 900 cars per peak four hour period and have an observed occupancy of 3.3 persons per car, or about 3000 daily carpools. Bus ridership has not been noticeably affected, and total person-volumes over the 4-hour peak now slightly exceed the average volume on one adjacent freeway lane. During the one-hour peak, it is about double the person-volume and is still well below capacity. About 30 percent of carpools surveyed felt that their carpool formed because the busway opened for carpool use.

Crain, J Glazer, LJ; Southern California Association of Governments., Los Angeles.**Crain and Associates, Menlo Park., Calif.*Urban Mass Transportation Administration., Washington, D.C. (UMTA-CA-09-0053) Aug. 1977, 97p; Prepared by Crain and Associates, Menlo Park, Calif.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274883/8ST

31 175061 EVALUATION OF TRANSPORTATION OPERATIONAL IMPROVEMENTS [Transportation research record]. Contents: Development and application of traffic-management models; County evaluation of traffic engineering activities; Evaluating urban highway service; Methodology for evaluating bus-actuated, signal-preemption systems; Estimation of delay at traffic-actuated signals; Cost-effectiveness of runcost evaluation procedure; Methods for field evaluation of roadway-delineation treatments; Critique of the traffic-conflict technique; Determining hazardousness of spot locations; Evaluation of freeway-merging safety as influenced by ramp-metering control.

May, AD; Transportation Research Board, Washington, D.C. TRB/TRR-630, 1977, 58p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275302/8ST

31 175894 URBAN TRAVEL DEMAND FORECASTING PROJECT PHASE I FINAL REPORT SERIES, VOLUME V. DEMAND MODEL ESTIMATION AND VALIDATION. The project attempts to provide transportation engineers and planners with the information necessary to select and use policy-oriented disaggregate behavioral travel demand models, and to assess the applicability and limits of specific alternative models. This volume is devoted to the investigations of demand, forming the core of this project. Data are collected on a sample of individual commuters in the San Francisco Bay Area before the initiation of Bay Area Rapid

Transit (BART) service. BART patronage is predicted from demand models fitted to the pre-BART data. The predictions are compared with actual BART patronage, using a second survey taken after BART was in service. Attention is concentrated on work mode-choice. These studies demonstrate disaggregate travel demand forecasting to be a practical policy analysis tool. The limitations of the current generation of these models are spelled out, and suggest that considerable care is needed in their application to new mode forecasting, and in transferring models across populations.

McFadden, DL Talvitie, A Cosslett, S Hasan, I Reid, FA ; California University, Berkeley, National Science Foundation, Alfred P Sloan Foundation UCB-ITS-SR-77-9, NSF/RA-770328, June 1977, 590 pp; Sponsored in part by Alfred P. Sloan Foundation, New York. See also Volume 3, PB-270 930. Grant--NSF-GI-43740, NSF-APR74-20392.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-277381/OST

31 176768 PARKING GARAGE PLANNING AND OPERATION. This monograph discusses parking structure planning, functional design, and operation. Emphasis is placed on current parking garage practice; however, trends are noted and parking issues are overviewed in national perspective. An attempt is made to show how parking garage, design, and operation relate to people and the urban environment. Chapter II discusses the role of parking in the total urban transportation system as it relates the growing concern over social and environmental consequences, and energy conservation implications in urban motor travel. It also outlines the key studies and analyses relating to identifying needs, evaluating usage, and determining feasibility. Chapter III presents planning and development guides, design factors, and general parameters. Chapters IV and V deal with the functional design of parking garages and alternative types of interfloor travel systems, while Chapter VI present pedestrian considerations. Operational practices are related in Chapter VII to economic efficiency and characteristics of demand.

Weant, RA ; Eno Foundation for Transportation, Incorporated 1978, 169 pp, 60 Fig., 15 Tab.

31 177004 OPERATIONS INSPECTION AND SURVEILLANCE PROCEDURES, AIR TAXI OPERATORS AND COMMERCIAL OPERATORS OF SMALL AIRCRAFT: COMMUTER AND V/STOL AIR CARRIER HANDBOOK. No Abstract.

Federal Aviation Administration Reprint 1977, 200 pp; ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO; ORDER FROM: Federal Aviation Administration, 800 Independence Avenue, SW, Washington, D.C., 20591; FAA 8430.1A

31 177388 AIRLINES OF THE WORLD. This book is an attempt to compile a thorough listing of scheduled commercial airlines for passenger travel. General information, statistical facts, histories and route maps are given for the major air lines. An additional listing of U.S. intrastate, commuter, mail and taxi services, as well as foreign air carriers with offices in the United States is included.

Phillips, LK ;

Gordon Press Aviation Series, 1977, 133 pp; ORDER FROM: Gordon Press, P.O. Box 459, Bowling Green Station, New York, New York, 10004

31 178516 BICYCLES IN MARYLAND: LEGAL ISSUES. The purpose of this report is to examine the inadequacies in the existing state laws as they affect the growing number of people owning and using bicycles for transportation. Issues in the areas of bicycle operation, bikeway and bicycle facility construction and maintenance, and bicycle registration are discussed. This report is intended to supplement and support the work of the Citizens Bicycle Study Committee which was organized for the purpose of reviewing bicycle concerns and making recommendations to the General Assembly. The report notes that legislative and policy reform can do much to promote bicycle use. By providing more bikeways and parking facilities, making provisions for cyclists in mass transit stations and on mass transit vehicles, revising inadequate rules of the road, and improving bikeway construction standards and maintenance, legislation can be used not only to improve conditions for present cyclists, but also to encourage others to begin cycling or to cycle more often.

Deltart, G Ostrowski, M Sokal, D ; Maryland Department of Transportation, Maryland Regional Planning Council Bicycle Report 1, Feb. 1978, 25 pp

31 178734 NARITA: CONTROVERSIAL OPENING ONLY THE START OF DIFFICULTIES. Besides the physically violent opposition from extremist groups that has delayed its opening for years, Tokyo's new international airport faces other problems as well, and, in fact, serves as an admonition to others on the need for long-term planning in the construction of major termini. Narita is extremely far from the city it serves (It is second only to Sao Paulo International in this respect), being 40 miles from downtown Tokyo and relatively inaccessible. The only means of public transport to the airport from Tokyo are a train to Narita City followed by a 20 minute bus ride or a direct bus route which can take anywhere from 70 minutes to an hour and one half. Furthermore, there is local opposition to a proposed fuel pipeline from Chiba, thus leaving Narita's ever having a suitable fuel supply system in doubt. Among the problems regarding flight operations at Narita is that of restricted air space, what with its being surrounded by three major facilities (Haneda Airport plus two air force bases-one American, one Japanese). It is feared that the intricate procedures required in such a complex environment could lead to pilot error, especially by foreign crews. Although most international flights currently at Haneda will move to Narita, the airport will be obliged to limit the number of flights far below its capacity because of fuel supply, air space, and curfew problems. Narita has also come under fire from the airlines for its high landing fees and its severely limiting the number of additional airlines that can use the airport.

Interavia Vol. 33 May 1978, pp 570-571; ACKNOWLEDGMENT: Interavia; ORDER FROM: Interavia, 86 Avenue Louis Casai, 1216 Cointrin-Geneva, Switzerland

31 178746 A STUDY OF PASSENGER TRANSFER FACILITIES (ABRIDGMENT). Throughout the country, a considerable effort is being made to improve public transit. However, one element of the total transit system which has not been studied at any level of detail and which has not improved to any great extent is the passenger transfer facility. The success of transit is going to depend on improvements made to all segments of the system, including safe, convenient transfer facilities. This study includes an inventory of facilities in some larger communities in New England, and a classification of facilities by size of area served and extent of system. According to an attitude survey, transit operators see a need for improved transfer facilities, minimized transfer times, and provision of shelters. The survey showed that pulsating systems had the highest number of transfers, averaging 27 percent; while transfers on non-pulsating systems generally averaged about 6 percent. The study concludes that transfer facilities must be improved to make transit more efficient and to encourage usage. /Author/

Bates, EG, Jr (Urban Transportation Systems Associates) *Transportation Research Record* No. 662, 1978, pp 23-25, 1 Tab.; This article appeared in the *Transportation Research Record* No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

31 178756 SOUTHEAST EXPRESSWAY RESERVED LANE FOR BUSES AND CARPOOLS. The northbound left lane of the heavily congested Expressway was reserved on a voluntary, unenforced basis, for buses and 3-or-more-occupant carpools during the morning peak period 6:30-9:30 A.M. This was Phase 1 of an effort to raise the vehicle occupancy of the highest volume roadway in Massachusetts in anticipation of several years of reconstruction of all bridge decks on and over the Expressway. Phase 2 of Reserved Lane operation began by carrying the Reserved Lane through a three-lane construction bottleneck and detour at its northern end. In Phase 3, the 3-or-more-occupant per vehicle requirement was enforced. The operation of the voluntary lane in Phase 1 increased carpooling on the Expressway by 38 and 72 percent in the 3 hour A.M. peak period and peak hour respectively. In the peak hour, 184 more people were carried in 429 fewer vehicles. Fifty percent of the peak hour persons using the Expressway during Phase 2 were carried in the free flowing Reserved Lane. The entire Expressway operated in Phases 1 and 2 with less congestion than before, no increase in accidents and no measurable impact on alternate surface street traffic attributable to the Lane itself. During the Phase 1 peak period, over 50 percent of the reduction in autos on the Expressway was accounted for by increased vehicle occupancy on the Expressway itself. Rail transit ridership in the corridor increased. Indicating the complementarity of alternative high occupancy modes in a high volume corridor. Express bus ridership increased only slightly. During the only two weeks of operation of Phase 3, travel times in the general-purpose lanes increased and varied from day to day. Despite continually increasing shifts to alternate modes the public outcry and concern of public officials regarding the deteriorated travel conditions in the general-purpose travel lanes led to a decision to terminate the project after two weeks of enforced

operation. Phase 3 results are presented in the paper, but are not felt to represent equilibrium results. /Author/

Brand, D (Charles River Associates Incorporated) Attanucci, J Morris, H (Massachusetts Executive Office of Transp & Constr) Kalas, C (Boston Central Transportation Planning Staff) *Transportation Research Record* No. 663, 1978, pp 29-40, 4 Tab., 4 Ref.; This article appeared in *Transportation Research Record* No. 663, Recent Developments in Bus Transportation.; ORDER FROM: TRB Publications Off

31 178770 EVALUATION OF ALTERNATIVE TRAFFIC OPERATIONS PLANS FOR THE COMMUTER LANES ON SHIRLEY HIGHWAY IN VIRGINIA. The report presents the results of a study to evaluate the impact of an exclusive reversible roadway for preferential treatment of high occupancy vehicles. The objective of the study was to evaluate and document the impacts of implementing operational changes on the Shirley Highway express lanes on the transportation system in Northern Virginia. The study documented the magnitude of the changes which have occurred to the number of persons using the express lanes, the impact on the use of the regular lanes, vehicular and person miles of travel, and occupancy levels of both bus and auto. It was determined that the provision of an exclusive roadway for use by high occupancy vehicles has proved to be a successful incentive for formation of carpools and vanpools; the high minimum size carpool (4 or more) has not proven to be a drawback in the increased use of carpools; and when there is demonstrated time savings, users of the facility will be attracted from zones outside the normal corridor area.

Allen, JC Rothenburg, MJ ; JHK and Associates Final Rpt. FHWA-RD-77-114, July 1977, 85 pp; SPONSORING AGENCY: RESPONSIBLE INDIVIDUAL: Bissell, HH (HRS-33); Contract DOT-FH-11-8242; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB-275233/AS

31 179071 TRAFFIC OPERATIONS IMPROVEMENTS TO MANAGE AND CONTROL THE FLOW OF VEHICLES. The conclusions of this workshop are as follows: Long-range (20-year) transportation planning is clearly necessary; however, those long-range plans must be flexible and subject to change since frequently they do not deal adequately with local transportation operations, funding cannot be secured to implement them, and transportation modes, methods, and attitudes change because of fluctuations in the economy, environmental concerns, and development. TSM does not mean that everybody travels by transit but that all forms of transportation are integrated to obtain optimum efficiency within the public right-of-way provided. TSM should not become overly complicated and cannot be tied up in red tape; Federal administrative requirements for acquiring and accounting of funds may render TSM inefficient and even impossible to accomplish. MPOs that are not properly structured should not approve federally funded programs. In some instances, the state department of transportation may provide more efficient transportation system programming, planning, and implementation in those states that are primarily nonurbanized. Lastly,

MPOs should not be given responsibility for implementing transportation programs. Instead, they should solicit and incorporate the recommendations of those who are responsible for transportation system operation.

Koski, DR (Minneapolis Traffic Engineering Division) *Transportation Research Board Special Report* No. 172, 1977, pp 6-7; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

31 179072 PREFERENTIAL TREATMENT FOR TRANSIT AND OTHER HIGH-OCCUPANCY VEHICLES. The workshop noted the critical importance of law enforcement, cooperation and compliance when implementing bus or carpool preferential lanes. Primarily because of safety considerations, a major current issue is whether to permit car pools in contraflow, high-occupancy vehicle lanes. Participants thought that carpools could be admitted to contraflow lanes on a permit basis, thus allowing some type of screening and education for potential operators in the lane. If there is no shoulder or buffer lane available for use as a breakdown area, then carpools, even with permit should not be admitted to contraflow lanes. Successful implementation of high-occupancy vehicle lanes is dependent on a carefully planned public information and education program. Preferential treatments should be used to develop new transit ridership in predominantly automobile-dominant territories as well as maintain existing ridership in areas where transit services are already established. It is noted that a preferential treatment that can be readily seen by motorists has a greater potential for automobile-to-transit diversion than a treatment that improves transit travel but is not too visible. The consensus of the workshop was that special facilities for high-occupancy vehicles should be considered for all highway-widening projects, particularly those that are radially oriented.

Goodman, L (Port Authority of New York and New Jersey) *Transportation Research Board Special Report* No. 172, 1977, pp 7-8; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

31 179073 MANAGEMENT AND CONTROL OF PARKING. Workshop discussion centered on an example of some problems that are encountered when attempts to manage parking are undertaken. An example is given that illustrates the pragmatic problems that urban areas face in seeking to gain some control over previously unchecked and unplanned parking construction. It is noted that dramatic changes in parking pricing and availability simply are not feasible in the majority of urban areas where sufficient

alternatives to single-occupancy vehicle travel are missing. The following solutions were explored as a means of achieving some controls over parking: Reserving some of the excess supply of convenient CBD parking for carpools; appeal to major employers to provide car-pooling and van-pooling services; and improved transit services, especially express service in the peak periods. A more long range solution involves changing present zoning laws which require a minimum number of parking per unit of development, to a zoning law that would place a maximum ceiling on the number of parking spaces per unit of development. Management of parking under TSM is transportation planning, and it should be a part of any regulation that purports to influence noncapital transportation improvements.

Twomey, EJ (Environmental Protection Agency) *Transportation Research Board Special Report* No. 172, 1977, pp 8-9; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

31 179086 PREFERENTIAL TREATMENT FOR HIGH-OCCUPANCY VEHICLES. Preferential treatment for buses and car pools is one of the transportation system management actions that can be applied in many areas to promote shifts by commuters from low-occupancy automobiles to carpools and buses. Although the concept is relatively new, the experience gained from projects undertaken in many cities with diverse conditions has shown that it does work. Dramatic results have been achieved on I-95 in northern Virginia where two bus and car-pool lanes handle 17,000 persons/lane during the peak hour with space capacity. There are many different ways that buses and car pools can be given preferential treatment depending on the type of highway facility. Traffic flow models are available to facilitate the simulation of various alternatives strategies, and projects are eligible for Federal Highway Administration and Urban Mass Transportation Administration program funds. With the increased attention on TSM and the expression of it in the transportation improvement programs, traffic engineering, transit operating, and enforcement agencies must work cooperatively with metropolitan planning organizations to develop and implement more preferential treatment projects. /Author/

Goodman, JM (Urban Mass Transportation Administration) Morin, DA (Federal Highway Administration) *Transportation Research Board Special Report* No. 172, 1977, pp 44-48; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

31 179181 CYCLISTS GET THEIR OWN WAY IN BEDFORD. The author describes the cycle network envisaged by the bedford urban

transportation study which proposes 24 km of cycle/pedestrian track, 15 km of cycle priority route and 19 signal-controlled crossings. The need for the system was proved by analysis of home interview survey data and figures are given. Various types of cycle priority routes are examined and interaction with pedestrians and buses briefly discussed. The use of signal-controlled crossings is explained and details are given of track widths, construction, lighting and carriage-way marking. Recommendations are made for the provision of parking and areas for further investigation outlined. /TRRL/

Snelson, P *Surveyor - Public Authority Technology* Vol. 150 No. 4457, Nov. 1977, pp 15-16, 2 Fig., 2 Tab., 1 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-232514)

31 179387 COORDINATING GROUND TRANSPORTATION--AN AIRPORT MANAGER'S VIEW. The coordination of ground transportation at a major airport includes such things as making a determination of the types of airport ground transportation to be provided to the public as well as a determination of the interface between the categories of ground transportation, the selection of ground transportation operators, and the type of operation best suited to the particular airport or community involved. Most airport ground transportation systems include taxis, limousines, and buses. In addition, most airports will have a variety of special types of transportation that include wheelchair vans, ambulances, hotel and motel courtesy cars, car rentals, and speciality buses. It is noted that the interface between these categories must receive special attention if the public is to receive proper service from each of them. The selection of ground transportation operators by bid or negotiation is discussed. Problem areas such as labor disputes level of service, and competing modes are also discussed. Solutions to these problems are made easier for the airport authority if there is only one responsible ground transportation operator. An effective coordination of airport ground transportation services cannot be accomplished without a close and cooperative relationship between the airport operator and the ground transportation operator. A poor relationship is to the disadvantage of both as well as to the public which is being served and must be avoided at all costs.

Wagener, LE *Airport Management Journal* Vol. 3 No. 2, July 1978, pp 21-23; ACKNOWLEDGMENT: Airport Management Journal; ORDER FROM: American Association of Airport Executives, 2029 K Street, NW, Washington, D.C., 20006

31 179390 AIRPORTS GROUND ACCESS: TRAFFIC MANAGEMENT CONCEPTS. This article presents a traffic management technique that would charge the motorists who enter the airport to pickup or discharge passengers. These motorists who use the airport roadways add to the overall traffic volume within the airport thereby contributing to traffic congestion during peak periods. The airport access fee would eliminate the movement of "thru" traffic which uses the airport roadways as a "short-cut" or to by pass traffic congestion or nearby arterial highways. This access toll operation is presently being used at such airports as Dallas-Fort Worth and at Naples, Florida. Several airports levy a user

charge on taxis by means of a coin-operated gate at the entrances to the taxi holding lots. The access charge, it is noted, should be a uniform toll. The toll is an untapped source of revenue for the airport agencies and could be used for needed improvements such as increasing the capacity of the internal roadways for better traffic circulation, and to offset increases in fees for other airport services. This toll could be used as a traffic management toll in terms of pricing, subsidize remote parking and shuttle bus operations, and as a revenue source to offset the escalating operating expenses of airport operations in general and the maintenance of ground transportation facilities in particular.

Goldberg, AH *Airport Services Management* Vol. 18 No. 6, June 1978, pp 22-24; ACKNOWLEDGMENT: Airport Services Management; ORDER FROM: Lakewood Publications, Incorporated, 700 South 4th Street, Reprint Services, Minneapolis, Minnesota, 55415

31 179823 MASS TRANSIT IN ATLANTA. Three major aspects of Atlanta's rapid transit system are examined: A description of the MARTA system and how it will differ from San Francisco's BART and Washington, D.C.'s Metro systems. The anticipated impact of the new transit system on traffic patterns and the metropolitan area's urban structure and the problems which transportation engineers will face in coping with construction detours. MARTA varies from other transit systems in a number of technical aspects and also reflects differences in operating philosophy, local economics and engineering preferences. Atlanta's train control will be flexible, permitting trains to be operated manually or automatically. A control computer will monitor the movement of every train on the network. MARTA's communication system will carry a continuous flow of train traffic information to the control complex, another will monitor every electrical operating device on the transit system. Telephones will be available for emergency maintenance, and administration. Closed-circuit television and a public address system in stations will also be included. The MARTA transit plan is expected to curb the "urban sprawl" by tying the entire region together by means of a dominant public transportation system and concentrating future high-rise housing and commercial development along MARTA lines. In an effort to increase transit ridership, MARTA has increased its service, increased the number of buses, and lowered its fares. During the next few years, construction of the system will require the closing of 200 streets and 60 of the closures require affected cities to plan new traffic patterns and manage traffic flows that are still unpredictable.

Salter, WO (Brinckerhoff, Quade and Douglas) *Transportation Engineering* Vol. 48 No. 1, Jan. 1978, pp 23-26, 1 Fig., 2 Phot.

31 180105 UNTANGLING THE DOWNTOWN SNARL. The author describes how street space can be arranged to give a more efficient traffic pattern if the snarl is unraveled systematically. Two basic approaches to modern urban traffic planning efforts are outlined.

Keith, RA (Voorhees (Alan M) and Associates, Incorporated) *Consulting Engineer* Vol. 50 No. 3, Mar. 1978, pp 89-93; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 180362 SYSTEM DESIGN FOR LIGHT RAIL TRANSIT IMPROVES INTERSECTION PERFORMANCE. At-grade light rail transit crossings represent not only a safety hazard but a roadway capacity constraint as well. An analysis of the problem of traffic control at such locations was undertaken in Edmonton, Alberta. It led to the objectives which in turn resulted in the implementation of control measures. Significant improvements have been achieved through the application of Transportation Management principles.

Schnablegger, J Teply, S *ITE Journal* Vol. 48 No. 6, June 1978, pp 36-39, Refs.; ORDER FROM: Institute of Transportation Engineers, 1815 North Fort Myer Drive, Arlington, Virginia, 22209

31 180364 THE IMPACT OF A NEW RAPID TRANSIT SYSTEM ON TRAFFIC ON PARALLEL HIGHWAY FACILITIES. Study analyzes data of traffic crossing San Francisco Bay and passing through the Berkeley Hills via Caldecott Tunnel to determine the effect of the opening in 1974 of the Bay Area Rapid Transit System (BART) transbay line.

Homburger, WS *Transportation Planning and Technology* Vol. 4 No. 3, May 1978, pp 187-201, Refs.; ORDER FROM: ESL

31 180375 OPTIMAL PARAMETERS FOR A COORDINATED RAIL AND BUS TRANSIT SYSTEM. To formulate a mathematical model of the system it is assumed that a radiocentric regional highway network centered at the central business district exists. Railroad lines are assumed to be radial. The demand for public transit is assumed to be deterministic and to vary slowly with location. The optimization is accomplished mainly by the use of basic calculus in conjunction with continuum approximations of certain discrete parameters. Approximate, but simple and explicit, formulations for the optimal railroad interstation spacings, feeder-bus zone boundary and train headways are determined.

Wirasinghe, SC (Calgary University, Canada) Hurdle, VF Newell, GF *Transportation Science* Vol. 11 No. 4, Nov. 1977, pp 359-374, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 180649 PUBLIC TRANSPORT IN SURABAYA, INDONESIA. This report surveys the operations and organization of the public transport system in Surabaya, the second city of Indonesia. The three main forms of public transport (cycle rickshaws, mini buses and conventional buses) are described and compared. The role of 'intermediate' public transport in Surabaya's transportation system is determined. This provides an example of the important position which intermediate public transport has in the transportation networks of many Third World cities. (Copyright (c) Crown Copyright 1978.)

Fouracre, PR Maunder, DAC ; Transport and Road Research Lab., Crowthorne, (England). 70 TRRL-SUPPLEMENTARY-3, 1978, 39p; Also pub. as ISSN 0305-1315; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279125/95T

31 180656 CYCLE ROUTES IN PORTSMOUTH. 1. PLANNING AND IMPLEMENTATION. TRRL is studying the use which is made of special facilities for cyclists and the effects of such provision on the behavior and attitudes of residents, cyclists, motorists and other groups of people affected. This report deals with work carried out up to the opening of the experimental cycle routes in Portsmouth on November 19th 1975. Detailed descriptions are given of the road signs and carriageway markings used to define the routes and of special junction layouts. Suggestions are made for methods of overcoming problems that appeared during the course of implementing the experimental routes. Arrangements for the assessment of the experiment are outlined.

Quenault, SW Head, TV ; Transport and Road Research Lab., Crowthorne, (England). 17 TRRL-SUPPLEMENTARY-3, 1977, 23p; Also Pub. as ISSN 0305-1315; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279118/4ST

31 181246 URBAN AUTOMATED TRAFFIC CONTROL (A BIBLIOGRAPHY WITH ABSTRACTS). The control of urban vehicular traffic movement by means of automatic synchronization of intersection and lane signals is covered. Studies on sensing and telemetry devices, computer programming, models, system development, and route guidance systems are included. (This updated bibliography contains 170 abstracts, 22 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Final Rpt. June 1978, 176 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0542/7ST

31 181333 COMPUTER-ASSISTED TRAFFIC ENGINEERING USING ASSIGNMENT, OPTIMAL SIGNAL SETTING, AND MODAL SPLIT. Methods of traffic assignment, traffic signal setting, and modal split analysis are combined in a set of computer-assisted traffic engineering programs. The system optimization and user optimization traffic assignments are described. Travel time functions are presented for freeways, freeway entrance ramps, and signalized streets. Both single-vehicle and multiple-vehicle class (cars, car pools, and buses) formulations are described. Energy optimization is treated, and gasoline consumption functions for cars and buses are shown. Modal split analysis is described and integrated with the assignments so that the effect of favoring buses and car pools with 'diamond lanes' can be measured. The procedures are described and numerical examples are presented. It is concluded that this approach to traffic engineering is practical and computer programs can be written to analyze major parts of the traffic networks of U.S. cities.

Gershwin, SB Little, JDC Gartner, N ; Massachusetts Institute of Technology, Transportation Systems Center Final Rpt. DOT-TSC-RSPA-78-10, May 1978, 101 pp; Contract DOT-TSC-849; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282931/5ST

31 181401 EXPERIMENTAL FIELD TEST OF THE MODEL ICE CREAM TRUCK ORDINANCE IN DETROIT. The Model Ice Cream Truck Ordinance (MICTO) is a legal countermeasure designed to prevent child pedestrian accidents from occurring near ice cream trucks. Among other things, the MICTO requires motorists to stop before passing an ice cream truck displaying the special swing arm and flashing lights which must be actuated when the truck is stopped to vend. The MICTO was enacted by the city of Detroit on 12 May 1976 and became fully effective on 10 June 1976. A two year field test of the safety-effectiveness of the MICTO was conducted. Results for 1976 show that radar measured average motorist speed abreast of vending ice cream trucks was reduced from 28.10 mph before the MICTO to 15.65 mph after the MICTO--a 44% reduction. During the 1 July-31 October 1976 period, vendor-related child pedestrian accidents were reduced from a prior three year average of 19.67 before the MICTO to 9 after the MICTO--a 54% reduction. In 1977 average motorist speed at the truck continued at a reduced level of 15.79 mph. However, vendor related child pedestrian accidents were lowered from a 1973-75 pre-MICTO average of 48.67 to 11 in 1977--a 77% reduction.

Hale, A Blomberg, RD Preusser, DV ; Dunlap and Associates, Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-410, ED-78-1, Apr. 1978, 109 p.; Contract DOT-HS-5-01144; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283419/OST

31 182023 A MODAL SPLIT MODEL FOR HIGH DENSITY URBAN CORRIDORS. The objective of the study was to develop a modal split model that would be relatively simple, require little lead time, use readily available data, and be sensitive to policy alternatives. The model is designed to contribute to the evaluation of such policy options as station closing, new route alternatives, addition of park and ride facilities, skip stop policies, and increasing capacity. This study produces modal split models specifically for high density urban corridors. In a two stage process splits are established between the automobile and public transportation, and then bus and rapid transit. The aggregate, trip interchange models are calibrated using weighted least squares, with modal disutility functions, service characteristics, and trip end densities as independent variables. The background for the modeling procedure is established by producing a multitude of computer generated maps displaying the modal split patterns and by graphing the socioeconomic correlates of modal split in the Chicago area. Special attention was given to a thorough application of the model to Howard Corridor with Chicago Transit Authority rail rapid transit service. The application estimated the effects of closing selected peak period reverse commuting platforms to expedite service. In the process the model was improved.

Soot, S Sen, A Pagitsas, E ; Illinois University, Chicago, Urban Mass Transportation Administration Res Rpt. UMTA-IL-11-0008-78-2, Mar. 1978, 146 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284745/7ST, DOTL NTIS

31 182666 TOWARD CRITERIA IN THE DEVELOPMENT OF URBAN TRANSPORTATION SYSTEMS. Improved criteria are necessary to aid in determining awards of federal funds for metropolitan transit projects. Commuting is the main use for public transit. Thus a primary objective of an urban transit system

should be to provide a flexible and balanced set of options to the workers in the metropolitan area for their journey to work. This paper discusses various facets of an appropriate balance among the three modes: rapid rail, bus, and automobile. Three cities are selected for further analysis: Baltimore, Kansas city, and Phoenix. These cities represent different stages in economic-transportation development, and also present different spatial patterns of residence and employment. The applicability of rapid rail transit to each city is examined in view of central city worker concentration and recent trends.(a) /TRRL/

Sagner, JS Barringer, RL (Southern Illinois University, Carbondale) *Transportation (Netherlands)* Vol. 7 No. 1, Mar. 1978, pp 87-96, 2 Tab., 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-233669)

31 182755 CYCLING IN URBAN AREAS. The bibliography contains a total of 107 references, from books, reports and journal articles, relating to cycling in urban areas. The references are presented in five sections: planning for the bicycle; cycle planning in London; cycle planning in specific areas; cycling and energy; and, cycling safety. /TRRL/

Murray, N ; Greater London Council, (7168 0985 0) Monograph No. 90, Jan. 1978, 22 pp; ACKNOWLEDGMENT: TRRL (IRRD 233259)

31 182786 CHARACTERISTICS OF JOURNEYS IN URBAN AREAS; PARKING IN TOWN CENTRES [Caracteristiques des déplacements en milieu urbain; Stationnement dans les zones centrales]. This study completes a series of door-to-door enquiries carried out in sixteen French towns concerning journeys in the course of an average weekday. The report, which is concerned only with parking in town centres, is intended for the estimation of the demand for parking at peak hour. The sections of the report deal successively with the following points: study of the general characteristics of parking in the town centre (mean duration, distribution according to motives for parking); estimation of the parking density at peak hour. /TRRL/ [French]

Ministere de L'equipement Monograph Jan. 1976, 187 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-105424), Institute of Transport Research, TRRL

31 183410 THE BICYCLE PLANNING BOOK. Based on a survey of practical options to suit local conditions, the book is intended to help local authorities to provide better facilities for cyclists in towns. In recognition of the role that the bicycle might play in transport policy, UK local authorities have been requested to submit plans for cycling facilities in their 1978-79 transport policies and programmes. The following chapters discuss the subject: (1) background; (2) bicycle usage; (3) bicycle safety; (4) bicycle law; (5) the state of bicycle planning abroad; (6) current provisions for cycling in the UK; and, (7) designing bicycle facilities. /TRRL/

Hudson, M (Friends Of The Earth) ; Open Books Publishing Limited Monograph 1978, 154 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 233400)

31 183459 PEDESTRIAN AND PUBLIC TRANSPORT PRIORITY TESTS BY USING COMPUTER CONTROLLED TRAFFIC SIGNALS [Prov med prioritering av fotgaengare och Kollektiv trafik genom datastyrd signalreglering]. During these tests the signal control strategies were partly directed towards transferring the rest capacity for vehicular traffic to pedestrian traffic and partly to improving the level of service for public transport through bus priority. Comparison tests were made between central equipment controlled by relays and computers. The relay system has its decision functions for traffic control decentralized to apparatus in the junctions and the central control equipment only coordinates information. The computer system has a central control equipment both co-ordinating information and controlling the local apparatus in the junctions. For the evaluation of the control methods, waiting times for vehicular traffic, green times for pedestrians, level of service for buses and journey times were measured in peak and low volume traffic. Improvements were noticed for pedestrians both in peak and low volume traffic and for public transport in low volume traffic for the computer system. These improvements could be obtained for the relay system by making some modifications and complementary measures. /TRRL/ [Swedish]

Stockholm Street Authority, Sweden Monograph No Date, 65 p., Figs.; ACKNOWLEDGMENT: TRRL (IRRD 234380), National Swedish Road & Traffic Research Institute

31 183689 BUS SERVICE IN SMALL TOWNS. A study is made of fixed route bus services operating in towns with populations in the range 5,000 to 30,000. Analysis of eight such services is carried out to identify and, where possible, quantify those factors which favour their operation. The study was undertaken to assess the potential for and advisability of extending this type of operation to other small towns. Quantitative assessment of the study services is based on the assumed objective of maximising the number of bus passengers, subject to financial constraint. The implications of this objective are analysed and it is thought to be compatible with the corporate aim of a public transport undertaking and the social aim of a local authority. It is concluded that, although in general such services are not profitable, their provision can be well justified provided that the selection of the town and the service design take sufficient account of the factors discussed. /Author/

Martin, PH ; Transport and Road Research Laboratory TRRL Lab Report 848, 1978, 16 pp, 8 Tab., 7 Ref.

31 184217 SURVEY OF GROUND TRANSPORTATION AT THE DALLAS-FORT WORTH REGIONAL AIRPORT (ABRIDGMENT). Three types of trips (those made by air passengers and visitors in private vehicles, those made on public transportation, and those made by employees) were investigated separately for the purposes of this survey, conducted on May 16 and 20, 1975. Data on private travel was obtained from roadside interviews conducted on outgoing lanes of the airport access roads, and passengers on the express bus service to the airport were given a questionnaire upon boarding, while the employee survey questionnaires were distributed via the employers. The over-all survey revealed

that the express bus service accounted for 4.2 percent of person trips but only 0.8 percent of the vehicular traffic due to the higher occupancy rates of buses. When employees (whose use of private vehicles account for 96.3 percent of their person trips) are excluded, it was found that the express bus service accounts for 10.9 percent of the air passenger trips and that all public transportation modes account for 25.7 percent of air passenger trips. The other 74.3 percent of air passenger trips were made via private vehicles. As a result of this project it is recommended that future travel surveys of this type meticulously screen survey forms for possible confusing formulations and give adequate attention to the recruiting, training, scheduling, and supervision of survey staff, with consideration, where feasible, of rotating staff among various tasks as to alleviate monotony and enhance efficiency.

Dunlay, WJ, Jr (Peat, Marwick, Mitchell and Company) Henry, L (Texas University, Austin) *Transportation Research Record* No. 655, 1977, pp 6-8, 1 Tab., 3 Ref.; This paper appeared in *Transportation Research Record* No. 655, Airport Capacity and Planning.

31 184235 PEDESTRIANISATION. The need for pedestrianisation is not always readily apparent and this note examines the reasons for and the background to, the concept. It also examines briefly some of the procedures and pitfalls and the benefits which can result from a properly planned scheme. /TRRL/

Nye, C (West Yorkshire Metropolitan County Council) *Highway Engineer* Vol. 25 No. 5, May 1978, 2 p.; ACKNOWLEDGMENT: TRRL (IRRD 233440)

31 184472 STEVENAGE NEW TOWN-ENGLAND. Stevenage was established as a new town in 1946 to assist the problems of London by providing a location for industry and workers wishing to move out of the city. The town is expected to grow to a population of about 90000 by 1990. The centre is broadly divided into two distinct parts by a north-south distributor road. To the east are the shops and stores, and to the west the offices and entertainment buildings. The shopping area is one of the earliest comprehensive pedestrian centres. Attention is paid in this paper to access, peripheral roads, service roads, car parks, cycle and pedestrian links, pedestrian aspects and the critical location of shopping car parks. /TRRL/

Lenthall, RB *Voice of the Pedestrian* 1977, pp 127-133; ACKNOWLEDGMENT: TRRL (IRRD 234853), Institute for Road Safety Research

31 184542 POSSIBILITIES FOR DEVELOPING FREEDOM FOR CYCLING IN SAFETY IN ESTABLISHED TOWNS AND CITIES. In seeking the optimum mix of travel modes it is necessary to consider a wide range of values in addition to environment, congestion, pollution and noise. Mobility, safety, freedom, health and convenience should be promoted and the cost of roads, cycleways, footways, crossings, vehicles, fuel and casualties should be considered. It seems probable that a larger proportion of cyclists, pedestrians and public transportation would prove economical and would reduce materially the volume of traffic and still accomplish the same journeys. Possibilities for developing freedom for

cycling in safety are presented. /TRRL/ 234836.

Claxton, EC ; International Federation of Pedestrians Conf Proc 1977, pp 4-9, 6 Fig., 2 Ref.; From the Conference Voice of the Pedestrian, VII.; ACKNOWLEDGMENT: TRRL (IRRD-234838), Institute for Road Safety Research

31 184947 BUS AND TRAM OPERATIONS IN MIXED TRAFFIC. This paper discusses (with particular reference to Melbourne) the problems that street public transport services are facing because of traffic congestion, their effect on operating costs and qualitative levels of service, and measures which have been, or could be, adopted to improved public transport operation. /Author/TRRL/

Grigg, JL ; Institution of Engineers, Australia June 1978, 22 p., 2 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-235070), Australian Road Research Board; ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

31 185593 PROFILES OF SCHEDULED AIR CARRIER DEPARTURE AND ARRIVAL OPERATIONS FOR TOP 100 U.S. AIRPORTS. This report provides data on total scheduled air carrier operations by hour of the day for Friday, August 5, 1977, for the top 100 airports within the 50 states, the District of Columbia, and Puerto Rico. The selection of the top 100 airports was based on the rank order of the number of air carrier passenger enplanements in domestic and international service in 1973. Two graphs are provided for each airport which visually depict (1) total number of arrivals and departures by hour, and (2) total aircraft operations by hour, detailed by the following types of service: Domestic trunk Pax, Local service Pax, Air taxi Pax, International Pax (U.S. and Foreign Flag), and All-cargo Operations. These profiles provide a clear visual presentation of aircraft operations at major airports for use in analyzing changes in workload throughout the day, for comparing and noting different hourly traffic patterns among these airports, and for establishing a base for readily identifying changes in traffic patterns over time.

Transportation Systems Center Aug. 1977, 307 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A058125/6ST

31 185722 PEDESTRIAN MOVEMENT AND SAFETY (A BIBLIOGRAPHY WITH ABSTRACTS). Reports on the movements of pedestrians and techniques for their protection in traffic systems are cited. Pedestrian safety standards, accidents involving pedestrians, and construction and traffic design related to pedestrian movement and safety are included. (This updated bibliography contains 173 abstracts, 25 of which are new entries to the previous edition.)

Young, ME ; National Technical Information Service Bibliog. Sept. 1978, 179 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/1022/9ST

31 186114 THE SANTA MONICA FREEWAY DIAMOND LANES. VOLUME II. TECHNICAL REPORT. The technical report contains the Executive Summary; Overviews of the Project, Site, and Evaluation; Freeway and Bus Operations; Safety, the Environment, and Public Re-

sponse; Survey of Other Preferential Lane Projects; and Appendices. (Portions of this document are not fully legible)

Billheimer, JW Bullemer, RJ Fratessa, C; Systan, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-MA06-0049-77-13, SYSTAN-D148-8-VOL-2, Sept. 1977, 525 p.; See also Volume 1, PB-286567.; Contract DOT-TSC-1084; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286568/1ST

31 186117 ON THE DEVELOPMENT OF A THEORY OF TRAVELER ATTITUDE-BEHAVIOR INTERRELATIONSHIPS: VOLUME II. THEORETICAL AND EMPIRICAL FINDINGS. The second volume of this final report presents conceptual and empirical findings which support the development of a theory of traveler attitude-behavior interrelationships. Such a theory will be useful in the design of transport systems and operating policies which satisfy passenger requirements. A brief consideration of theoretical concepts precedes the review of the empirical methodology. The structure of traveler attitude-behavior interrelationships is examined for two transport modes, buses and carpools, over three different datasets. Among the major findings are that traveler attitudes influence behavior toward transport alternatives and that traveler attitudes and behavior mutually affect each other. Various theoretical extensions of this work are described. A new quantitative procedure for assessing differences between travel market segments is developed and implemented. The relevance of the modeling orientation to transport system design and policy analysis is noted. Some implications of the modeling approach for data collection efforts are also noted.

Charles River Associates, Incorporated, Transportation Systems Center CRA-347-VOL-2, DOT-TSC-RSPA-78-14-V, Aug. 1978, 246 p.; See also Volume 1, PB-286663 and Volume 3, PB-286665. Also available in a set of 3 reports, PB-286662/SET.; Contract DOT-TSC-1326; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286664/8ST, DOTL NTIS

31 186149 A MANUAL FOR DESIGN AND CONSTRUCTION OF BICYCLE PATH PAVEMENTS. This report is a user's manual for design and construction of Class I bikepath pavements. The general design procedure described in this manual consists of (1) generation design inputs of soil properties, climatic conditions and loading conditions; (2) selecting potential pavement sections; (3) conducting cost analysis; (4) selecting an optimum pavement section; (5) characterization of material properties; (6) establishment of construction specifications. A simple design example is presented to illustrate the use of the design procedure proposed in this manual. (Portions of this document are not fully legible)

Lai, JS; Georgia Institute of Technology, Department of Transportation Final Rpt. DOT/RSPA/DPB50/77/18, Aug. 1977, 91 p.; Contract DOT-OS-50226; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286610/1ST

31 186707 BICYCLE STRATEGIES TO REDUCE AIR POLLUTION. EPA, the Department of Transportation (DOT) and Housing and Urban Development (HUD) are all seeking to

integrate the transportation/air quality planning and implementation required by the Clean Air Act into existing planning and programming procedures. Now is the time for bicycle activists, bicycle planners, transportation planners, and transportation engineers, to get bicycle programs into the planning process. One of the major plans is the three C's plan, The Continuing, Comprehensive transportation planning process carried on Cooperatively by states and local communities. Administered by DOT the three C's process includes the Unified Work Program, Transportation Plan which includes Transportation System Management (TSM) and the Transportation Improvement Program (TIP) and its annual elements. The report presents a preliminary list of elements to be included in a comprehensive bicycle plan and some alternative approaches. Included is a listing of cognizant personnel responsible for coordinating strategies for reducing pollution by use of bicycles.

Environmental Protection Agency EPA/400/9-78/008, June 1978, 20 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286173/OST

31 186843 FAA AVIATION FORECASTS FISCAL YEARS 1979-1990. This Federal Aviation Administration (FAA) report contains the official FAA forecasts of domestic aviation activity for Fiscal Years 1979 through 1990. It presents forecasts of aviation activity levels at FAA towered airports, air route traffic control centers, and flight service stations, as well as forecasts of aviation activity for air carriers, air taxis, general aviation, and the military--the four major users of the National Aviation System (NAS). In addition, this report presents the complete FAA aviation forecasting system, and describes the FAA's ongoing initiative to improve the decision-making utility of that system for the overall aviation community. It focuses on the FAA's interpretation of commentary received from the community, and on the agency's response to that commentary. (Author)

Federal Aviation Administration Washington DC, Office of Aviation Policy FAA-AVP-78-11, Sept. 1978, 93p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A060727/5ST

31 186871 SAN FRANCISCO MUNI TRANSPORTATION PLANNING OPERATIONS AND MARKETING STUDY. The report provides an overview of extensive inventories and evaluations of Municipal Railway (MUNI) services, and principal features of a recommended short-term improvement plan and program. The main thrust of the recommendations is aimed at more efficient use of existing public transportation resources. Recommendations include comprehensive modifications of MUNI routes and headways; a transit priority street program to facilitate transit vehicle movement on congested streets; an extension of the J streetcar line to improve operating efficiency; site plans and design criteria for a new bus maintenance facility needed to reduce operating costs; a set of basic goals, standards and criteria for MUNI service; and various management actions which would improve the quality of service. The work described represents only the first of several phases of a complete planning, operations and marketing program. (Color illustrations reproduced in black and white)

Smith (Wilbur) and Associates, Urban Mass Transportation Administration Summ Rpt. UMTA-CA-09-0025-78-1, Mar. 1978, 35 p.; Also available in 35 mm.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288582/OST

31 188003 BICYCLE FACILITIES IN THE NETHERLANDS. In the Netherlands of the present there are 250 cars, 150 mopeds and 500 bicycles per 1000 inhabitants. Despite a decline in the use of bicycle and moped, about 30 to 35% of trips are still made on these two modes of transport. To improve the relative safety of cyclists and moped-riders, efforts are being made to keep them separate from automobiles. This has led to the large-scale construction of separate paths for use by both cyclists and moped-riders. The position of dominance currently held by the private car in the Netherlands has created a number of problems particularly in the cities. The larger cities are now obliged to draw up a traffic management scheme in which encouragement has to be given to the use of the bicycle and moped as an alternative to the car, particularly for home-work and home-school traffic. One way of doing this is to expand the facilities that have always existed. Other methods are to construct special high-quality bicycle and moped routes from the residential areas to the city centres. Two demonstration routes have now been built and an extensive study program set up to examine the effects the two routes have.

Beukers, B (Ministry of Transport, Netherlands) Institute of Transportation Engineers 1977, pp 423-437; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 188013 OPERATIONAL TRANSIT PLANNING. EXPERIENCES IN OPORTO, PORTUGAL. In Oporto a sample of urban transportation problems typical for developed and developing countries is encountered. The paper shows that successful transit planning is contingent on three conditions: integration of all public agencies involved in transit problems such as city and regional authorities, public work department, bus and light-rail operators, and traffic police; permanent training of technical staff and information of users; an operational planning methodology for finding short-term improvements with low-cost investments. The methodology is based on a man-computer interactive process as a novel approach which allows transit operators to optimally match the supply of transit services to traveller demands.

Rapp, MH (WJ Rapp Consultant Engineers, Switzerland) Stohler, W; Institute of Transportation Engineers 1977, pp 206-226; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 188014 PROBLEMS DERIVED FROM OPERATING THE METRO IN SANTIAGO. This paper deals with the problems arisen once a section of the Metropolitan Rapid Transit System was put into operation, the provisions adopted to

solve them and the proposed general treatments. These problems are grouped into circulation problems, parking problems, and other problems. Circulation problems refer to congestion in the area of Salvador Station of the Metro system, and end of the section under operation which is working as a terminal-station due to car users' arrivals to commute and to the establishment of feeding lines. With regard to parking problems, there has been a control system based upon parking cards. With reference to other problems, emphasis has been placed on the need of realizing simultaneously the eastbound extension of the Metro (its construction was considered to be realized some years later) and on the opening of the new roadway under construction.

Alvarez, LE ; Institute of Transportation Engineers 1977, pp 197-205; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 188175 EVALUATION OF THE NW 7TH AVENUE EXPRESS BUS AND BUS PRIORITY SYSTEMS. REPORT 1. This report presents a summary of the evaluation of Phase I of the I-95/NW 7th Avenue Bus/Car Pool Systems Demonstration Project in Miami. The twenty-six month Phase I evaluation consisted of evaluation of several techniques for providing express buses with a priority service on an urban arterial street. Four bus priority systems were implemented and evaluated on NW 7th Avenue in Miami. These systems were: buses with traffic signal preemption capability in mixed mode operation; buses with traffic signal preemption capability in a reversible exclusive bus lane; buses in the exclusive lane with traffic signal progression; and buses with traffic signal preemption capability in the exclusive lane with traffic signal progression. For the traffic pattern and geometric configuration on NW 7th Avenue, it was found that the travel times for both buses and autos were reduced under each of the priority treatments. Auto accident rates were unaffected but the provision of the exclusive bus lane introduced some problems with bus accidents. Buses moved up to 25% of the passengers and represented less than 2% of the vehicles in the traffic stream. The express bus system achieved a modal split of 8.6% of the potential trips. Several inefficiencies in the transit system reduced the economic viability of the transit service. The report presents summaries of all of the studies that were conducted and presents a comprehensive economic viability analysis. /Author/

Wattleworth, JA Courage, KG Wallace, CE Wolfe, RS Reaves, DP ; Florida University, Gainesville Final Rpt. UMTA-FL-06-0006, Sept. 1978, 128 p., 24 Fig., 33 Tab., 15 Ref.; Sponsored by the Florida Department of Transportation in cooperation with U.S. Department of Transportation, Urban Mass Transportation Administration and Federal Highway Administration.; Contract B.I. 484192/193; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS

31 188767 AN INTRODUCTION TO AIRLINE ECONOMICS. This is a plain-English text that covers the entire range of airline economics. Topics include: the structure of the airline industry; government regulation of routes rates,

and services; entry and exit; marketing problems; air cargo economics; airports as a factor; financing; rate theory; labor relations; charters; air taxis and commuter lines; and the peculiar political complexities of international services. Foreign airlines that service the U.S. are also considered. Special sections on controversial issues examine the deregulation of airlines and their diversification into non-aviation fields. Geared to readers who may have only an elementary knowledge of economics, the text uses current airline problems to illustrate elementary economic theory pertinent to airlines. An appendix includes Titles I, II, IV, VIII, and X of the Federal Aviation Act of 1958, as amended through November 9, 1977.

O'Connor, WE (Embry-Riddle Aeronautical University) ; Holt, Rinehart and Winston, Incorporated ISBN 0-03-022416-0, 1978, 270 p.; ACKNOWLEDGMENT: Praeger Publishers Catalog; ORDER FROM: Holt, Rinehart and Winston, Incorporated, Order Fulfillment Department, 383 Madison Avenue, New York, New York, 10017

31 188772 ARIZONA STATE AIRPORT SYSTEM PLAN. TECHNICAL SUPPLEMENT. This Technical Supplement is part of the Arizona State Airport System Plan and provides a variety of information on the 59 airports included on the Primary State Airport System. These airports include five air carrier airports, two commuter airports, six reliever airports, and forty-six general aviation airports. Three types of information are presented in this Technical Supplement: (1) description of airport facilities, (2) description of associated communities, and (3) airport improvement needs. The description of each associated community includes information on weather, economic activities, total population, transportation services, and taxes. A list of potential improvement needs for each airport was derived through the application of development standards, comparisons of airport capacity and forecasts, an analysis of preservation needs, and a review of airport master plans and the five-year Airport Development Programs. The cost of the improvements were then calculated and reviewed for accuracy by local airport sponsors. These improvements were identified for the short term (1979-1983), intermediate term (1984-1990), and long term (1991-2000) plan periods. Needs considered include: Runways; Taxiways; Hangars and aircraft parking facilities; Lighting; Navigational aids; Airport services; Parking facilities; and Land acquisition.

Arizona Department of Transportation Sept. 1978, 472 p., Photos.; ACKNOWLEDGMENT: Arizona Department of Transportation; ORDER FROM: Arizona Department of Transportation, 206 South 17th Avenue MU-#11, Phoenix, Arizona, 85007

31 188821 VEHICLE WAITING TIMES AT FERRY TERMINALS. The B.C. Ferry Corporation is most interested in the time spent at ferry terminals by vehicles waiting times. Knowledge of vehicle waiting times provides a direct measure of the quality of service. Understanding the patterns and variations in waiting times provides important information for evaluating operating alternatives such as different sailing schedules. This study was undertaken to measure a representative sample of Route #1 and #2 vehicle waiting times at the four major terminals oper-

ated by the B.C. Ferry Corporation and to analyze them with a view to identifying underlying patterns, relationships and variations. Specific objectives were to determine: average waiting times of Route #1 and #2 vehicles at each of the four major terminals for a sample of days reflecting different traffic conditions; differences in waiting times at different times of the day and for different types of vehicles; variations in waiting times and the nature of the underlying statistical distributions; relationships which may exist between waiting times and other variables and which may be useful for estimating waiting times in future; whether it is possible to monitor waiting times on an on-going basis using a mechanical traffic recorder.

BC Research 5-03-655, Nov. 1978, n.p.; Prepared for British Columbia Ferry Corporation, Victoria, B.C.; ACKNOWLEDGMENT: BC Research; ORDER FROM: BC Research, Management Services Division, 3650 Westbrook Mall, Vancouver D2S 2L2, British Columbia, Canada

31 188822 THE BRITISH COLUMBIA FERRIES--A STUDY OF 1977 SUMMER TRAFFIC BETWEEN VANCOUVER ISLAND AND THE LOWER MAINLAND. This is a study to determine who uses the British Columbia Ferry service between Vancouver Island and the British Columbia Mainland, where they come from, where they are bound, and the purposes for which they travel. Information was gathered from all types of ferry users--those who came in private vehicles, those who came by bus, and those who came as foot passengers. The study made use of questionnaires which were distributed to the ferry users on the two main ferry routes: Route 1-Tsawwassen-Swartz Bay (Victoria); Route 2-Horseshoe Bay-Departure Bay (Nanaimo). The primary purpose of the study was to develop a data base which would provide such information as the numbers of people traveling, their origin and destination, purpose of the trip, duration of their stay, type of accommodation, and reasons for choosing one route rather than the other. The report summarizes the general findings and analyzes some of the relationships between the different types of users and their responses to various questions. Some suggestions for further analysis are also made.

British Columbia University, Canada 1978, n.p. A supplementary Study "Relocating a B.C. Ferry Terminal--The Impact on Travel Time, Route Choice, and Highway Congestion," by Stuart MacKay and W.G. Waters II.; ACKNOWLEDGMENT: British Columbia University, Canada; ORDER FROM: British Columbia University, Canada, Centre for Transportation Studies, Vancouver V6T 1W5, British Columbia, Canada

31 188823 INSTRUCTIONS FOR USING COMPUTER TAPES OF B.C. FERRIES USER CHARACTERISTICS. This pamphlet provides information to facilitate analysis of B.C. Ferries' user characteristics by using the computer tapes prepared for the Centre for Transportation Studies' report, "The British Columbia Ferries--A Study of 1977 Summer Traffic Between Vancouver Island and the Lower Mainland". It consists of a brief description of the data format and the meaning of the numeric codes, and illustrates a simple sample program using U.B.C.'s SPSS (Statistical Package for the Social

Sciences) Package. Further information may be obtained by referring to the above study, or the the CTS report, "Computer Cross Tabulations of B.C. Ferries User Characteristics, Summer 1977."

British Columbia University, Canada 78-0027, No Date, n.p.; Appendix B to the the Centre for Transportation Studies' Report, The British Columbia Ferries--Study of 1977 Summer Traffic Between Vancouver Island and the Lower Mainland.; ACKNOWLEDGMENT: British Columbia University, Canada; ORDER FROM: British Columbia University, Canada, Centre for Transportation Studies, Vancouver V6T 1W5, British Columbia, Canada

31 188824 CAPITAL AND OPERATIONAL NEEDS STUDY, SUMMARY REPORT. A description and evaluation of several alternative levels of development programs for the Ferry System are given. The study findings represent a substantial and comprehensive body of knowledge for the use of the Toll Bridge Authority, the State Legislature and other State and local policy makers in choosing a positive course of action for the future expansion and operation of the Washington State Ferry System.

Voorhees (Alan M) and Associates, Incorporated 77-0005, 1977, n.p.; ACKNOWLEDGMENT: Voorhees (Alan M) and Associates, Incorporated; ORDER FROM: Voorhees (Alan M) and Associates, Incorporated, 23 148th Avenue Southeast, Suite 3, Bellevue, Washington, 98008

31 188825 GULF ISLAND FERRY PASSENGER SURVEY. The British Columbia Ferry Corporation conducts periodic surveys of ferry passengers to obtain information on travel patterns and user characteristics which is essential for planning purposes. In the summer of 1977, surveys of ferry passengers were carried out on the two major routes between the Lower Mainland and Vancouver Island by the Centre for Transportation Studies at the University of British Columbia. In February, 1978, a winter survey of ferry passengers was conducted on these routes and the Gulf Island routes by B.C. Research. The present survey was undertaken to obtain comparable information on the summer travel patterns and characteristics of ferry passengers on the Gulf Island routes.

BC Research 5-08-654, Sept. 1978, n.p.; Prepared for British Columbia Ferry Corporation, Victoria, B.C.; ACKNOWLEDGMENT: BC Research; ORDER FROM: BC Research, Management Services Division, 3650 Westbrook Mall, Vancouver D2S 2L2, British Columbia, Canada

31 188826 B.C. FERRY ROUTE STUDY--FINAL REPORT. The B.C. Ferry Route Study involved two tasks: Data Analysis and Route Choice Model Development. Part one of this report presents the Data Analysis and Part two presents the Route Choice Model. The Data Analysis consisted of (1) removing bias from the August 1973 and May 1974 data, (2) reducing the origin/destination areas, (3) various origin/destination cross tabulations, (4) reviewing the extended questionnaire data, and (5) review and refine the travel time estimates. The Route Choice Model Development involved developing a choice model based on the August 1973 data concerning choices which have been made and applying the

model to proposed new route combinations. The development of a curve fitting model (Model 1) was required. A model based on variance of perceptions of travel time (Model 2) was also developed. The results of both parts of this study are to provide background material for another study. No interpretation of the meaning of the results was desired.

Doll, CL ; British Columbia University, Canada June 1975, n.p.; ACKNOWLEDGMENT: British Columbia University, Canada; ORDER FROM: British Columbia University, Canada, Centre For Transportation Studies, Vancouver V6T 1W5, British Columbia, Canada

31 188979 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT. UMTA PROJECT EVALUATION SERIES. PHASE I (REPORTS I-1 TO I-9). The UMTA Project Evaluation Series evaluates a three and a half year demonstration project in Miami, Florida, established in 1973 to develop more efficient people-moving capabilities in the I-95/NW 7th Avenue corridor. Phase I of this project involved the implementation and evaluation of several bus priority techniques on NW 7th Avenue; Phase II involved the implementation and evaluation of a reserved bus car pool lane in each direction of Interstate 95 (I-95). Phase I of this evaluation project consists of nine separate reports: Report I-1 "Evaluation of the NW 7th Avenue Express Bus System and Bus Priority Systems"; Report I-2 "Effects of NW/7th Avenue Bus Priority Systems on Bus Travel Times and Schedule Variability"; Report I-3 "Changes in Transit Operational Characteristics on the NW 7th Avenue Express Bus System"; Report I-4 "Modal Shift Achieved on the NW 7th Avenue Express Bus System"; Report I-5 "Effect of the Park'n'Ride Facility on Usage of the NW 7th Avenue Express Bus System"; Report I-6 "Effects of NW 7th Avenue Traffic Stream Flow and Passenger Movements"; Report I-7 "Evaluation of Characteristics of Users and Non-Users of the NW 7th Avenue Express Bus/Car Pool System"; Report I-8 "Effect of Bus Priority Systems Operation on Performance of Traffic Signal Control Equipment on NW 7th Avenue"; and Report I-9 "Economic Viability of the NW 7th Avenue Express Bus Operation." /UMTA/

Wattleworth, JA ; Florida University, Gainesville, (FL-06-0006) Final Rpt. UMTA-FL-06-0006-78, Sept. 1978, 1161 p.; Sponsored by the Urban Mass Transportation Administration. Phase I includes nine reports numbered consecutively UMTA-FL-06-0006-78-1 thru UMTA-FL-06-0006-78-9, and may be ordered through NTIS as PB-291137 thru PB-291145 respectively.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-291127-145

31 189082 GOLDEN GATE FERRY. In this report the story is told of the resurgence of ferry service on the Bay. It has been prepared to respond to the many, and continuing requests for information about development of the innovative Golden Gate Ferry System.

Golden Gate Bridge, Highway & Trans District Jan. 1979, 39 p.; ACKNOWLEDGMENT: Golden Gate Bridge, Highway & Trans District; ORDER FROM: Golden Gate Bridge, Highway & Trans District, P.O. Box 9000, Presidio Station, San Francisco, California, 94129

31 189349 A COMPARATIVE ANALYSIS OF RESULTS FROM THREE RECENT NON-SEPARATED CONCURRENT-FLOW HIGH OCCUPANCY FREEWAY LANE PROJECTS: BOSTON, SANTA MONICA AND MIAMI. In order to move more people in fewer vehicles with limited capital investment, priorities for High Occupancy Vehicles (HOV) have been developed and implemented over the past several years. This study focuses on one of the options of HOV: non-separated concurrent-flow high occupancy freeway lanes. One freeway lane with an average occupancy of 1.3 persons per car can carry 2600 persons per hour. When the occupancy is increased to 4 persons, the hourly person rises to 8000. However, the idealized outcomes have not been realized by reserved lane projects. Through a comparative analysis of results of the three most recent concurrent-flow projects: the Southeast Expressway in Boston, I-95 in Miami, and the Santa Monica Freeway in Los Angeles, this paper attempts to develop a better understanding of the issues that surround the reserved lane concept. These sites were chosen because they represent recent experiments with the concept and because of their substantial differences. The issues addressed in this report are: (1) changes in travel times on the freeways and in transit level of service; (2) modal shift to carpooling and transit; (3) capital and operating costs; (4) changes in accidents and incidents, violation rates, and enforcement; (5) the public's attitude towards the reserved lane concept, the effect of advertising and media, and the role of politics; and (6) the design and operating environment appropriate to the concept. The three projects met with differing degrees of success and failure, and those in Boston and Los Angeles have been terminated. Carpooling increased by about 70 percent and travel times for those using the lanes decreased. There were several weaknesses in the concept, which are discussed in the report. The study presents recommendations for future HOV priority projects. A Listing of References is contained herein. /UMTA/

Simkowitz, H ; Transportation Systems Center, (DOT-TSC-UMTA-78-22) Final Rpt. UMTA-MA-06-0049-78-2, June 1978, 52 p.; The reports related to this study are: The Santa Monica Freeway Diamond Lanes, Volume I: Summary (PB-286567); The Santa Monica Freeway Diamond Lanes, Volume II: Technical Report (PB-286568); and Southeast Expressway High Occupancy Vehicle Lane Evaluation Report (PB-285209); Contract DOT-UM827- (R8712); ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-289278/AS

31 189406 LIGHTWEIGHT BICYCLES OR MOTORCYCLES: SPECIFIC CHARACTER OF THIS MEANS OF TRANSPORT [Les deux-routes legers: specificite de ce moyen de transport]. The author deals with the specific character of the users who are of an extremely diverse nature, ranging from children and adolescents who are not of age and do not have the financial resources to own a car, to people to whom the bicycle or motorcycle constitutes a basic element in their mode of life. On the other hand, there is the question of the specific character of the uses: urban journeys, for door-to-door transport, for use in areas where houses are spread over a large area as a replacement for public transport, for the service of equipment.

The author discusses the specific behaviour character and the specific character of accidents. Finally problems of safety and the satisfaction which users may attain from this mode of transport are discussed. /TRRL/ [French]

Granger, V *Transport Environment Circulation* No. 20, Jan. 1977, pp 13-7, 2 Tab., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105305), Institute of Transport Research, Central Laboratory of Bridges & Highways, France

31 189606 PROCEEDINGS OF THE SEVENTH INTERNATIONAL SYMPOSIUM ON TRANSPORTATION AND TRAFFIC THEORY-SYMPOSIUM PAPERS. The following papers were among those presented at the Symposium on Transportation and Traffic Theory: Mathematical programming constraints in strategic land use/transport planning, Black, JA and Blunden, WR; Assignment of buses in a coordinated rail and bus transit system, Wirasinghe, SC; optimum location of stops on a bus route, Vaughan, RJ and Cousins, EA; An analysis of passenger queues at stations in series, Watanabe, M, Miyahara, H and Hasegawa, T; An approximate analytic model of many-to-one demand responsive transportation systems, Daganzo, CF, Hendrickson, CT and Wilson, NHM; Practical urban railway capacity-A world review, Rice, P; Allocation and pricing in public transportation and the free rider theorem, Beckman, MJ; Man-machine system for merchant fleet operation scheduling, Levy, VD, Lvov, SP and Lovetsky, SE; Statistical analysis of travel behaviour; Some methodological considerations, Hautzinger, H; The Newton-Kantorovich method for solving the gravity model in traffic planning, Erlander, S; Dynamic models of modal choice, Wigan, MR and Poulley, NJ; A quantified description of risky pedestrian behaviour at signalized intersections, Retzko, HG and Hackelmann, P; and, A distance parameter of the trip-chain process, Vidakovic, VS. /TRRL/ abstract no 236918. The covering abstract for the proceedings is IRRD no 236914.

Institute of Systems Science Research 1977, pp 649-940, Figs., Tabs., 4 Phot., Refs.; The proceedings of the Seventh International Symposium on Transportation and Traffic Theory, held August 14-17, 1977, Kyoto.; ACKNOWLEDGMENT: TRRL (IRRD 236917)

31 190101 IMPROVING URBAN TRANSIT. This article identifies typical operational problems experienced by urban transit and identifies some remedial measures. The success of a number of these measures in the Ottawa-Carleton region of Canada is given as evidence.

Bowes, RW (Waterloo University, Canada) *Traffic Quarterly* Vol. 32 No. 2, Apr. 1978, pp 273-288; ACKNOWLEDGMENT:

31 190284 SYSTEMS APPROACH TO THE DEVELOPMENT OF AN INTERMEDIATE CAPACITY TRANSIT SYSTEM. New urban land use goals have led to a requirement for intermediate capacity transit in large and medium-sized cities. Existing modes of transit do not economically meet this requirement and so the Urban Transportation Development Corporation (UTDC), together with its development contractor Canadair Services Ltd., has embarked on a program to develop a commercially viable intermediate Capacity Transit System (ICTS).

Giles, R (Urban Transportation Development Corporation) *Engineering Journal (Canada)* Vol. 61 No. 4, Oct. 1978, pp 13-16; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 190345 THREE-PHASE DRIVE FOR RAIL VEHICLES IN THE 80'S EVEN FOR PUBLIC SHORT-DISTANCE PASSENGER TRAFFIC [Drehstromantrieb fuer die Schienenfahrzeuge der 80er Jahre, auch im OEPNV]. No Abstract. [German]

Amler, J *Verkehr und Technik* Vol. 31 No. 10, Oct. 1978, pp 379-382, 5 Phot., 14 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Schmidt (Erich) Verlag, Herforder Strasse 10, 4800 Bielefeld, West Germany

31 191479 BICYCLE STRATEGIES TO REDUCE AIR POLLUTION, BICYCLE STRATEGIES TO REDUCE TRANSPORTATION AIR POLLUTION AS PART OF THE STATE IMPLEMENTATION PLANS. Bicycle Strategies to Reduce Air Pollution summarizes the requirements and opportunities under the Clean Air Act to promote bicycling; suggests strategies to increase bicycle use; delineates the advantages of a bicycle program; describes who bicycles and where; lists advantages to society with a greater bicycling public; lists changes which would encourage more people to bicycle and lists the regions, states, urbanized areas, and certified agencies responsible for developing and implementing strategies in the transportation component of their state implementation plans.

Rowe, ND ; Environmental Protection Agency EPA/400/9-78/010, Nov. 1978, 22 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291162/6ST

31 191928 URBAN PARKING (A BIBLIOGRAPHY WITH ABSTRACTS). The problems of parking in urban areas are presented in the reports cited. Aspects included are fringe or satellite parking for public transportation systems, airports, and parking in the central business district.

Kenton, E ; National Technical Information Service Bibliog. Mar. 1979, 186 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0132/5ST

31 192230 WORK TRAVEL SURVEY METHODS AND FINDINGS (1977). BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. It describes the methods and results of a survey of 8,400 persons employed in the areas most accessible by BART. The sample represents 506,000 daily work trips to the survey area. A novel sampling design was used in which self-completion questionnaires were distributed to workers at their workplaces. Detailed information was obtained on the travel mode choices available to workers, the characteristics of their journey-to-work alternatives, and the reasons for their mode choices. BART's share of journey-to-work trips into the survey area from residences in the primary BART service areas is

18%; bus, 16%; and automobile, 66%. The BART share varies greatly for specific origin-to-destination corridors and trip lengths; BART's highest share is for long-distance commute trips to downtown areas. Of all trips from residences in the primary service area, respondents considered 40% to be possible by BART; BART presently carries about 40% of these possible trips, which suggests a high potential for increased patronage. Typically, relative travel times and reliability of service are among the most important determinants of travelers' mode choices.

Sherret, A ; Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-58-3-78, Dec. 1978, 140 p.; Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Color illustrations reproduced in black and white.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293885/OST

31 193346 DULLES INTERNATIONAL AIRPORT ACCESS STUDY. An attempt has been made to study the feasibility of a demonstration program to improve the accessibility of Dulles International Airport through operational and capital improvements to the existing public mass transit system. The program proposed to meet this objective has two phases: a non-capital intensive, immediate action program to be implemented within one year; and a longer range capital intensive demonstration program to be implemented by 1980 and capable of satisfying the 1985 travel demand. The study is also designed to evaluate the potential for improving commuter travel within the Dulles-Washington, D.C., corridor through the use of the airport's mass transit access system, right-of-way, and/or vehicles. An immediate action program and a longer range demonstration program were also developed to carry out this objective.

Howard Needles Tammen & Bergendoff, Simat, Helliessen and Eichner, Incorporated June 1978, 75 p., 26 Fig., 12 Tab., Photos., 4 App.; Study prepared for Metropolitan Washington Council of Governments. The preparation of this report has been financed through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: Metropolitan Washington Council of Governments, 1875 Eye Street, NW, Suite 200, Washington, D.C., 20006

31 193539 URBAN CONGESTION SURVEY 1976: TRAFFIC FLOWS AND SPEEDS IN EIGHT TOWNS AND FIVE COMMUNITIES. In 1976, the Local Transportation and Roads Directorate of the Department of Transport organised a survey of journey speeds and flows on all main roads in the principal cities of five conurbations outside London (population range 300,000 to 1,100,000) and in eight towns (population range 80,000 to 560,000). The study was similar to those undertaken in 1963 (eight towns only), 1967 and 1971 to monitor long term trends in urban traffic characteristics. TRRL undertook the analysis of the survey results and this report outlines the survey techniques used, and presents summaries of measurements made

during the weekday daytime offpeak and peak periods. In 1976 the overall mean flow in the conurbation towns was 1360 pcu/h in the off-peak, rising to 1915 pcu/h in the peak. The flows were about 15 per cent higher than those observed during the same periods in the eight towns (1165 pcu/h and 1635 pcu/h respectively). Speeds in the conurbation towns as a whole (38.0 km/h, off-peak, and 33.7 km/h, peak) were on average 4 km/h higher than the corresponding eight towns' speeds. In the central areas, off-peak and peak traffic flows in the two groups were similar (about 1380 pcu/h and 1735 pcu/h respectively), as was the mean peak speed of around 20.6 km/h. The eight towns' average off-peak speed (25 km/h) was about 4 km/h higher than the conurbation value. Since the surveys began there has been very little growth in overall traffic flows, but a dramatic reduction has occurred in street parking on the main roads, particularly during off-peak periods in the central areas, where the parking density is now on average only about one third of what it was in 1967. Average speeds have shown a slow but steady increase, no doubt related to the reduction in parking and to other traffic management schemes. /Author/

Marlow, M Evans, R ; Transport and Road Research Laboratory, (0305-1315) Supp Rpt. SR 438, 1978, 21 p., 9 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL

31 193958 THE LOGIT MODAL SPLIT MODEL: SOME THEORETICAL CONSIDERATIONS. This paper discusses a theoretical basis for the logit function and demonstrates its theoretical connection with the discriminant function. Some consequences of the relationship between the discriminant function and the logit model, especially applications to fitting logit models are also presented. /Author/TRRL/

Sen, A Soot, S Pagitsas, E (Illinois University, Urbana) *Transportation Research* Vol. 12 No. 5, Oct. 1978, pp 321-324, 5 Fig., 2 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237576)

31 194195 ACCESS TO HOSPITALS: A LITERATURE REVIEW. Literature has been examined from the fields of transport, town planning and medical care, to determine the current pattern of hospital accessibility and the expected trends in hospital access and location. Staff and visitors comprise more than two-thirds of all those who travel to hospitals. Car and bus are the modes most often used for the hospital journey. The relative numbers of different users and the modal split vary according to the size and type of hospital and its catchment area. Inhabitants of rural areas experience travel difficulties because of long distances to hospital and poor public transport. Large hospitals which serve large catchment populations are likely to aggravate such difficulties. Other access problems are long journey times and high costs, where users do not have a car available; this deters some people (particularly visitors) from travelling. The future change in the hospital stock is likely to be limited; the potential for improvements in hospital access therefore lies in transport provision rather than in locational changes. Points suggested in the literature for further attention include the use of wider criteria for deciding hospital transport provision, improved coordination of existing public and hospi-

tal transport, and additional subsidy for certain travellers, when resources permit. /Author/

Rigby, JP ; Transport and Road Research Laboratory, (0305 1293) Lab. Report LR853, 1978, 36 p., 21 Tab., 72 Ref., 4 App.

31 194402 ARTIFICIAL ROAD HUMPS ON BUS ROUTES [Verkeersdrempels in busroutes]. In recent years artificial road humps have been introduced in an increasing number of municipalities within built-up areas, with the purpose of decreasing the speed of traffic. In some cases these road humps are built on roads which are bus routes. The Rotterdam Bus Company has made a study of the reaction of the bus when riding over such a road hump and its influence on the passenger; the technical state of the vehicle (maintenance) and the exploitation costs. The main result of the study is that road humps in roads which are bus routes are not acceptable. /TRRL/ [Dutch]

Openbaar Vervoer Vol. 11 No. 10, Oct. 1978, pp 296-297, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 238542), Institute for Road Safety Research

31 195514 PARKING IN THE CITY [Parkeren in de stad]. The aim of the study was to show the gaps in knowledge as regards the influence of the presence of absence of parking facilities on the functions of the town centres, and in particular the relation between the offer of parking facilities and the setting up of enterprises, shops and dwellings. The passenger flows which use the available parking infrastructure in a pre-war city have an essential effect on the functions of this area. Hindrances of these flows by a shortage of a parking infrastructure lead to consequences for the functions of the city, even if alternative transport modes are available and even if other transport modes are accepted for journeys into that area. /TRRL/ [Dutch]

Study & Information Center TNO for Applied Transp Monograph Oct. 1977, 28 p., 2 Fig., 8 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 240232), Institute for Road Safety Research

31 196130 US COMMUTER OPERATIONS CLIMATE CHANGING. Matters of concern to the commuter airline managements are discussed, and include the changed market place with the larger airlines tussling for a competitive edge, and the means of financing new aircraft and funding training and paperwork. Other areas of government and congressional concern are the implementation of joint fare schedules with certificated carriers, the development of subsidy and loan programs, formulation of new commuter aircraft certification rules, and the smooth transition of the industry into new FAR part 135 operating rules covering commuter and air taxi operations. Despite all problems, the US commuter airlines are expecting soaring growth this year and will probably be the fastest-growing segment of the total national air transportation system.

Davis, Lou *Interavia* Vol. 34 Mar. 1979, pp 252-254, 1 Tab., 4 Phot.; ORDER FROM: Interavia S.A., 86 Avenue Louis Casai, P.O. Box 162, 1216 Cointrin-Geneva, Switzerland

31 196280 CONTRAFLOW BUS PRIORITY LANE PERFORMANCE: A CASE STUDY. Analysis of the performance of a 1-mile (1.7-km)

contraflow bus lane in downtown Tel Aviv, Israel, showed that, compared to with-flow lanes, the contraflow lane demonstrated more reliable bus travel times and faster travel speeds during peak and off-peak hours. Improvements in reliability were identified using the coefficient of variation of travel times, the standard deviation of headways, and the pattern of travel-time change on successive bus runs during the peak period. An investigation of sources of delay showed that traffic-signal settings could be revised to provide significant travel-time reductions. Opportunities to improve contraflow service by limiting access to this lane by vehicles other than buses were also identified.

Polus, A (Technion - Israel Institute of Technology) Schofer, JL *ASCE Journal of Transportation Engineering* Vol. 105 No. 3, May 1979, pp 297-305, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 196595 ROLE OF PARKING IN TRANSPORTATION SYSTEM MANAGEMENT. The appropriateness is examined of including parking management strategies in the transportation system management (short-range) component of the transportation plan for an urban region. The probable effects of parking management schemes are described and evaluated with respect to short-range objectives to determine the compatibility between the two. A definition that applies to the total set of parking management options is given and tested against the results of a survey of 173 cities in the United States and a review of the literature. Parking-control strategies can be divided on various bases: (a) whether they are supply-or cost-related controls, (b) whether they are intended to reduce automobile travel in selected areas or to make the highway more efficient, or (c) whether they can be implemented within the short-range element or the long-range component of the transportation plan. Considerable public, political, and business opposition to restrictions on parking in urban areas was found. Public support for parking controls that alter travel behaviour must be developed gradually in association with areawide planning objectives. The majority of the parking measures were found to be long-range planning elements rather than transportation system management components. /Authors/

Demetsky, MJ Parker, MR, Jr (Virginia Highway & Transportation Research Council) *Transportation Research Record* Vol. N No. 82, 1978, pp 24-30, 4 Tab., 1 Ref.; This paper appeared in TRB Research Record No. 682, Urban System Operation and Freeways.; ORDER FROM: TRB Publications Off

31 196697 ARTERIAL BUS LANE WARRANTS. This note reviews and extends a set of recently developed bus priority lane warrants, for use under Australian conditions. The role of warrants in the pre-evaluation planning of priority schemes and current trends toward allowing car pools to use arterial priority facilities are also noted. It has been demonstrated in many countries that under certain conditions, priority lanes can cost-effectively yield significant benefits and improve urban mobility, particularly during peak periods. However, such lanes should be viewed in the context of a wide range of transport and related options (e.g. Keyani and Putnam,

1977) which attempt to manage travel demand, optimise transport system supply and generally make more efficient use of existing transport infrastructure. /TRRL/

Ritchie, SG ; Monash University, Australia, (0156 2126) Monograph Working Paper 78/9, Sept. 1978, 10 p., 1 Fig., 4 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237002), Australian Road Research Board

31 197334 PRIORITY TREATMENT FOR HIGH OCCUPANCY VEHICLES IN THE UNITED STATES: A REVIEW OF RECENT AND FORTHCOMING PROJECTS. The purposes of the report are to: (1) describe recent High Occupancy Vehicle (HOV) preferential projects in the United States; (2) summarize the results of these projects and draw implications; and (3) outline projects which are to be implemented over the next few years. The report describes each of the following approaches to preferential treatment: non-separated concurrent-flow freeway HOV lanes; contra-flow freeway lanes; metered-ramp bypass lanes and exclusive ramps; physically separated priority lanes; express bus service and park-and-ride lots; lanes on arterials and Central Business District (CBD) streets reserved for buses; bus priority signal systems on arterials and CBD streets; transit malls; and auto restricted zones. During the late 1960's and early 1970's, a variety of priority treatments were attempted. Both capital intensive projects and non-capital intensive projects were implemented during this period. By the middle of the 1970's, thinking within the transportation planning community had moved away from the costly capital intensive priority treatments that require extensive new construction to the more operationally oriented traffic management schemes that use existing facilities in a more efficient manner. Except for the non-separated concurrent flow projects, other non-capital intensive priority treatments on freeways have fared well. Nearly every HOV priority treatment on freeways has involved the use of new or expanded express bus service and the opening of new park-and-ride lots. Arterial and CBD street bus lanes have been implemented in many cities, transit malls have grown in popularity, and four auto restricted zones are to be built during the next few years.

Fisher, RJ Simkowitz, HJ ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 1 UMTA/TSC-78/37, UMTA-MA-06-0049-78-1, Aug. 1978, 37 p.; Grant DOT-UMTA-MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-294511/1ST

31 197341 PREFERENTIAL BUS LANES ON URBAN ARTERIALS, SELECTED STUDIES ON THEIR FEASIBILITY AND PERFORMANCE. The study seeks to identify possible impacts of priority techniques for buses on the different interest groups that may be affected. The discussion herein deals not only with those auto and transit travelers who directly use the road, but also with such groups as adjacent commercial interests and other land uses which may be affected by high-occupancy vehicle lanes (HOVL). The use of preferential bus lanes within urbanized areas has expanded tremendously over the past ten years under the combined focus of environmental concern, energy conservation, TSM requirements, and related transportation

factors. To assist in the evaluation of such schemes and associated transit decisions, three separate studies, each of which deals with either some general aspect of HOVL operations or with the potential implementation of a preferential lane in a specific location, was performed: (1) a survey of North American cities to determine methods used to assess the need for and the effectiveness and impacts of preferential bus lanes; (2) an analysis of a with-flow curb bus lane on Forty-second Street in Midtown Manhattan; and (3) a study of the causes of traffic delays for express buses in Midtown Manhattan, and the effectiveness of various methods (including existing and proposed bus lanes) in alleviating these problems. The city survey highlights the lack of analyses performed especially in economic impact areas. The Manhattan Studies show how some delays are unavoidable, but the combination of revised parking policies, bus lane identification systems and related actions could improve the situation considerably.

Crowell, WH ; Polytechnic Institute of New York, Urban Mass Transportation Administration Final Rpt. UMTA-NY-11-0014-79-2, Dec. 1978, 80 p.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-294673/9ST

31 197601 AN ANALYSIS OF THE FINANCIAL IMPACTS OF NON-CAPITAL ALTERNATIVES AT THE LARGE AIR TRANSPORTATION HUBS OF THE UNITED STATES. Because demands on the airport usually exceed existing capacity during a few periods of the day, investment to expand hub capacity is clearly an investment to accommodate these peaks in demand. Demands on airport capacity appear to be more highly peaked than necessary because of this ineffective allocation of costs. Because the peaks are higher, the investment requirement will be perceived to be higher. Also, the composition of demand, i.e., the mixture of air carrier, air commuter and general aviation, seems to consist of more general aviation than would be expected during peak periods. Planning investment for the large hubs requires prediction of future airport costs under alternate capacity expansion possibilities and then selecting the best course of action from among these alternatives. Alternative policies that alter the demand for capacity during peak periods seem to be ignored. Accomplishments of this analysis consist of: Application of a methodology for airport planning that explicitly deals with alternatives that alter the demand for airport capacity; Estimation of the costs of peak and non-peak period airport use by air carriers, air commuters and general aviation; Assessment of the financial impact of maintaining high demand peaks on investment in airport facilities at the large air transportation hubs of the U.S.; and Assessment of the costs imposed by private general aviation upon the air carrier sector at the large hubs.

Smith, DG Maxfield, DP Fromovitz, S ; Office of the Secretary of Transportation DOT/P-5010.9, Feb. 1977, 90 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296305/6ST

31 198210 BALTIMORE REGION BIKEWAYS, A DRAFT PLAN. The recent growth in bicycling has created a need to develop bikeways and other bicycle support facilities in the Baltimore region. Agencies and jurisdictions

within the region initially responded to this need by developing bikeway facilities on an individual basis. However, it soon became apparent that a more coordinated approach was necessary for effective bikeway planning. A regional bikeway study was initiated in September 1975 as part of the region's Unified Transportation Planning Program, and the study facilitated the development of the regional bikeways plan. The plan consists of a system of priority and future routes for Baltimore City, Anne Arundel County, Baltimore County and Harford County. The routes are designed to be continuous between jurisdictions and to provide a truly regional system. A set of guidelines for bikeway design and construction and recommendations for developing bicycle support facilities are also included.

Regional Planning Council, Maryland Department of Transportation, Federal Highway Administration BTL-RPC-77-003, June 1977, 48 p.

Sponsored in part by Maryland Dept. of Transportation, Baltimore, and Federal Highway Administration, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297053/1ST

31 198296 ENFORCEMENT REQUIREMENTS FOR HIGH-OCCUPANCY VEHICLE FACILITIES. Enforcement of high-occupancy vehicle (HOV) traffic restrictions forms an integral and sometimes critical element of HOV preferential treatment projects. This research (1) reviewed enforcement on HOV facilities, (2) identified effective HOV enforcement techniques, (3) developed model legislation for effective HOV enforcement and (4) prepared HOV enforcement guidelines. This report presents the findings of this research. Sixteen projects in the United States encompassing each type of freeway and arterial treatment, were visited to gain in-depth operational and enforcement data on each project. These projects exhibited varying enforcement programs, deficiencies and performance levels. Enforcement guidelines have been prepared for each type of freeway and arterial priority treatment of high-occupancy vehicles. In order to improve enforcement of HOV facilities, innovative techniques-involving photographic instrumentation, mailing of citations, tandem (team) patrol and para-professional officers-have been identified within the context of this research. For these innovative enforcement techniques to be effective, a compatible legal environment is necessary. This research conducted a legal review of six prominent legal issues posed by these techniques. Model legislation is drafted to provide the proper legal environment for effective HOV enforcement.

Miller, NC Deuser, RB ; Beiswenger, Hoch and Associates, Federal Highway Administration Final Rpt. FHWA-RD-79-15, Dec. 1978, 241 p.; Contract DOT-FH-11-9240; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297717/1ST

31 199002 MARKET STREET WEST TRANSPORTATION STUDY. The study investigated current transit service and usage patterns. Results revealed the need for improved transit access west of 18th Street. Several alternative transit improvement proposals were developed to meet this need. After a two-stage analysis of the various transit proposals, the Study concluded that a new rapid transit station should be built to serve Market

Street West on the Market/Frankford Line between the existing stations at 15th and 30th Streets. Various improvements to the subway-surface system, which is the only rail line that now penetrates the portion of the Study Area west of 18th Street, were also recommended.

Simpson and Curtin, Incorporated, Philadelphia Department of Public Property, Wallace, McHarg, Roberts and Todd, Urban Engineers, Incorporated Final Rpt. UMTA-IT-09-0050-79-1, Mar. 1978, 152 p.; Prepared for Philadelphia Dept. of Public Property, PA. Prepared in cooperation with Wallace, McHarg, Roberts and Todd, Philadelphia, PA., and Urban Engineers, Inc., Philadelphia, PA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298751/9ST

31 260128 TRAFFIC LIGHTS FOR PUBLIC TRANSPORT [Verkeerslichten Voor Openbaar Vervoer]. In this article a proposal is made for the introduction of a uniform traffic light for controlling tram/bus traffic on junctions. A specification of requirements is given. Attention is also paid to application and performance of this traffic light. /Author/ [Dutch]

Grotenhuis, DHA JM (Openbare Werken) *Verkeers-techniek* Vol. 24 No. 4, Apr. 1973, pp 178-182, 4 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 206045)

31 260129 INFLUENCE OF TRAFFIC ENGINEERING AND ORGANIZATIONAL MEASURES ON THE DEMAND FOR PUBLIC TRANSPORT [Verkeers-technische en Organisatorische Maatregelen Op de Vraag naar Openbaar vervoer]. As the first stage in the realization of "Lijnen Voor Morgen-Amsterdam" (routes for tomorrow-Amsterdam) in October 1971 the Public Transport Network Osdorp-Central Station has been radically altered. The article describes results of before-and after-inquiries into the demand for public transport in the relevant area. In one year the number of daily personal trips between Osdorp and Central Station V.V. increased by 66%. This growth can be fully ascribed to the measures taken. Between 12:00 and 16:00 p.m. the rise even reached 80%. [Dutch]

Smidt, BR (Gemeente Vervoerbedrijf) *Verkeers-techniek* Vol. 24 No. 4, Apr. 1973, pp 172-176, 5 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 206044)

31 260130 CLEAR THE WAY FOR PUBLIC TRANSPORT [Rium de Baan Voor Het Openbaar Vervoer]. Since October 1971 in Amsterdam trams on Route 1 are given priority through junctions in a so called flexible traffic control system. In April 1972 an inquiry was made into the difference in loss of time for tramways operation in this system and in a conventional fixed control system. Under similar conditions on the different sections the average loss of time per junction decreased by more than 60%, the average journey speed increased by about 80%. (The gross running speed even by almost 100%.) The dispersion in running times was reduced to almost one third and the disadvantageous effect on other traffic was restricted to a minimum. It was calculated that the application of flexible traffic control to the rest of the route will reduce the running time by an average of 8.5 minute. This is equal to a saving in the required number of trams

of three or four, or HFL 350,000-HFL 500,000 a year. [Dutch]

Hakkesteeg, P (Delft Technical University /Neth/) *Verkeers-techniek* Vol. 24 No. 4, Apr. 1973, pp 168-172, 9 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 206043)

31 260185 SUBURBANIZATION AND ITS IMPLICATIONS FOR URBAN TRANSPORTATION SYSTEM. The urban fringe in major metropolitan areas is changing in character, evolving from low density residential communities clustering around a well-defined central city to a collection of regional subcenters. These centers, generally linked by belt or arterial highways, may include concentrations of malls, high-rise office buildings, industrial parks, and apartment complexes. Many functions formerly served by the center city have migrated to the suburbs, resulting in the evolution of a multi-nucleated city form, with more diffuse travel patterns, and more trips in which one end is in low density suburbs and the other in a high density activity center. Cars are poor at the high density ends of the trip. Fixed route buses are poor at the low density end. The only alternative is a mix of systems: good low density systems (car, taxi, or other demand responsive), interfacing at some point with less land hungry systems that are good for high density traffic (PRT, bus, rail). Each element must be selected for and tailored to the area or neighborhood it serves, interfacing pleasantly and efficiently with other elements to provide good connectivity throughout the urban region.

Ward, JD Paulhus, NGJ; Department of Transportation Final Rpt. DOT-TST-74-8, Apr. 1974, 52 pp; Revision of report dated January, 74.; ACKNOWLEDGMENT: NTIS (PB-231819/4); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231819/4

31 260196 A PRELIMINARY ANALYSIS OF THE EFFECTS OF THE DALLAS/FORT WORTH REGIONAL AIRPORT ON SURFACE TRANSPORTATION AND LAND USE. This report examines some of the effects of the Dallas/Fort Worth Regional Airport upon the regional transportation system and upon land use in Denton, Dallas and Tarrant Counties. The study period extends from 1969 to 1985. The role of the new regional airport plays in the extension of the regional highway network and its effect upon public transit is examined in the first part of the paper; in the second part, the impact of the airport on industrial commercial and residential development is studied. Land use projects, land values and zoning restrictions in the airport environs are discussed. The paper concludes that the Dallas/Forth Worth Regional Airport has had and will continue to have substantial effects on the study area's urban and political development. /Author/

Wolfe, HP, Research Associate, Bureau of Business Research; Texas University, Austin Draft Rpt. DOT-OS-30093 111-3, Apr. 1974, 39 pp, 6 Fig., 6 Tab., 106 Ref.; Prepared for U.S. Department of Transportation.

31 260221 OPTIMIZING TRANSPORTATION FACILITY ARRANGEMENTS. This study is intended to develop an evaluation procedure for optimizing transportation facility arrangements for a given urban environment.

Economic models for balancing intermodal and interzonal travel are formulated for determining the desirability of transportation systems. A cost function incorporating various transportation facility characteristics is derived to indicate the level of service provided by specific transportation arrangements. The best arrangement for a set of alternatives being evaluated is assumed to be the one offering the lowest total community transportation costs. A computerized process, labeled TRANSFARE (Transportation Facility Arrangement Evaluation), is developed to permit easy application of the transportation facility evaluation. A sample urban transportation network is tested to illustrate how this computer model is practical in actual applications. The developed method applies only to a specialized auto-bus urban transportation system.

Yu, JC (Virginia Polytechnic Institute & State University) Giguere, RK (Federal Highway Administration) *ASCE Journal of Transportation Engineering* Vol. 99 No. TE4, Proc. Paper 10126, Nov. 1973, pp 725-740, 6 Fig., 4 Ref., Apps.

31 260287 PUBLIC TRANSPORT ON TYNESIDE. A PLAN FOR THE PEOPLE. This report describes and explains the steps taken by the passenger transport executive since its formation in 1969 towards the realization of a plan for the development of public transport. Based on the Tyne-wear plan, commitment has been made to rapid transit on Tyneside, a government grant of 75, has been secured, and the parliamentary bill has received royal assent. After an outline of the inherited transport situation, the role of public transport is discussed. Prime requirements are (I) access to centers of activity, (II) access to population, (III) direct alignments. Although rapid transit will form the backbone of public transport in the area, buses will continue to provide the greater part of total movement; the existing street system and bus services will be re-organized to integrate bus and transit services, and to give priority and privileged passage to buses where necessary. Investment for 1971-84 is planned to divide 62:38 between highways and public transport; none of this will be in new technology systems. The planned rapid transit system, benefiting from London transport expertise and continental experience of urban tramways, is fully described. Emphasis is laid on the research into marketing, publicity and fares policy carried out by the executive. The proposed investment in rapid transit is 65.5 million (at January 1972 prices). Construction will be spread over six years and must begin in earnest in 1974. The development of a modern public transport system is seen as crucial if the north east of Britain is not to become an economic backwater of the new Europe. /TRRL/

Tyneside Passenger Transport Executive R&D Rpt. Sept. 1973, 143 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 207906)

31 260290 WORLDWIDE INNOVATIONS IN URBAN PUBLIC TRANSPORT. This issue discusses the changes taking place in the transport field under the following headings: bringing back buses; guideway systems; getting around downtown; public-use private transport; personal rapid transit; dual-mode systems; walking a natural gait; institutional & software reforms; and two special problems. /TRRL/

Wheel Extended Vol. 2 No. 4, 1973, pp 2-37,

Figs., Photos., 13 Ref. ACKNOWLEDGMENT: TRRL (IRRD 207840)

31 260306 URBAN TRANSPORT INNOVATIONS: A BIBLIOGRAPHY. This bibliography consists of approximately 850 entries covering the period 1967-August 1972. Innovations have been restricted to modern forms of transport for use inside cities and from suburbs to the cities. The inner-city rapid transit services such as APT (The Advanced Passenger Train) and V/STOL Aircraft have not been included. The entries are primarily arranged under the names of individual systems. Within each heading the arrangement is by author and by title when no author is given. The bibliography is followed by a list of organizations concerned with urban transport innovations. /TRRL/

Hampshire Technical Research Indust Commerec Serv 1973, 71 pp, Refs.; ACKNOWLEDGMENT: TRRL (IRRD 207059)

31 260308 BUS PRIORITY IN GREATER LONDON. This article reviews the techniques used by the Greater London Council to provide an efficient bus service in Central London. A critical examination of the use of bus lanes and traffic signal priority is given. It is concluded that the cautious policy adopted by the GLC of selecting very short bus lanes such that other traffic is unaffected is likely to produce only a very insignificant benefit to public transport users. The only way to gain a significant benefit in journey time for buses would be to allocate about 25% of roadscape in Central London to a comprehensive system of bus lanes. /TRRL/

Lane, R (London Borough of Camden, England) *Traffic Engineering and Control* Vol. 15 No. 1, May 1973, pp 45-47, 3 Fig., 2 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 206033)

31 260398 PASSENGER TRANSPORT INTERCHANGES-THEORY PRACTICE ON MERSEYSIDE. BUS/RAIL and CAR/RAIL interchanges offer prospects of more competitive and viable public transport systems, at the same time relieving congestion in city centers. In the absence of practical experience in this country outside London, before committing heavy investment on these concepts, the Merseyside Passenger Transport Authority has initiated a demonstration program of interchange experiments. The article briefly reviews the Prima Facie Case for interchanges and discusses the factors considered and techniques adopted by MPTA consultants in selecting and designing the experiments. Altogether eight BUS/RAIL and eight CAR/RAIL schemes were planned, to be introduced in 33 sequential phases. Implementation during 1972/73 is discussed and practical problems encountered are highlighted. /Author/

Hillward, C Coleman, AH Dunford, JE *Traffic Engineering and Control* Vol. 14 No. 12, 1973, 6 pp, 6 Fig., 1 Tab., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 207366)

31 260792 AIRPORT AND AIR SERVICES ACCESS. The problems of airport and air service access are discussed. Airport access, primarily an urban transportation system problem, is investigated using data obtained from the Cleveland-Hopkins Airport Access Study and other surveys. The nature of airport access and of

passenger behavior with regard to it is studied to determine what governmental policies might be appropriate. Airport access is a subset of air service access; attention to problems of the latter can improve service for the air passenger. The study investigates two aspects of the air service access problem: air network configuration and the use of satellite airports. Using aggregate delay time as a measure of effectiveness, the most efficient network appears to be one in which traffic is concentrated, reducing network connectivity. Satellite or reliever fields will be used significantly by air carriers with some form of governmental control.

de Neufville, R Wilson, N Moore, H, III Gelerman, W Landau, U ; Massachusetts Institute of Technology Final Rpt. NR72-35, Mar. 1973, 155 pp; Contract DOT-TSC-309; ACKNOWLEDGMENT: NTIS (PB-220646/4); ORDER FROM: NTIS; PB-220646/4

31 261397 ELEVEN-MILE BUSWAY WILL SERVE LOS ANGELES REGION. The California Department of Transportation (CALTRANS) has come up with a handful of different solutions to the problem of moving people, not just moving cars. These include constructing the 11 mile, two lane San Bernardino Freeway Busway, car pool lanes on the Oakland Bay Bridge, a reverse or "contraflow" lane in Marin County north of the Golden Gate Bridge, and a car pool ramp on the San Diego Freeway near Long Beach. Details of these projects and experiments are included here as well as CALTRANS's philosophy: where a group of cities is as inter-laced as the Los Angeles area, with people going in all directions, using the existing highway and freeway networks, and giving a priority to buses on that network is the only way to provide anything for anywhere near an economical price, as well as in a reasonable time.

Moloney, JF *Public Works* Vol. 106 No. 8, Aug. 1974, pp 54-57

31 261539 A TRANSIT IMPROVEMENT PLAN FOR THE CITY OF MERIDIAN, MISSISSIPPI. The area encompassed by this report is the City of Meridian, Mississippi and its immediate environs. The purposes of the study were: (1) to evaluate the transit operation, make recommendations for service improvements, and identify financial needs (both operating and capital) in the short-term future; and (2) to examine alternative transit ownership and management options available to the city. The first phase of the study was designed to evaluate transit requirements for the next 5 year period and develop appropriate service improvements. The thrust of this phase was to analyze the operation of the Meridian City Lines, including financial status, maintenance facilities, equipment requirements, and bus routes and schedules. The second phase was directed to the future ownership and operation of the bus company. While it had been recognized that transit should become a publicly-operated service, there were several alternative structures for public management. The main segments of the report deal with the aspects of existing transit operations such as fares, public attitude surveys, the immediate action program, public involvement and program development. Tables and figures complement the text.

Gilman (WC) and Company Incorporated, (MS-09-0005) Tech Study UMTA-MS-09-0005-74-1, June 1974, 58 pp; ACKNOWLEDG-

MENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234737/AS

31 262101 RAPID TRANSIT IN FRENCH PROVINCIAL CITIES. So far only two cities in France have followed the pattern set by Paris in building a full-scale rubber-tired metro, but systems based on PRT technology are being considered in several places. SNCF's regional metro in Lorraine could well be the pattern for similar operations elsewhere, particularly in the Lille area where conventional suburban rail tramway and the automated VAL system cover the range of options for a unified metro.

Railway Gazette International Vol. 130 No. 7, July 1974, pp 273-276

31 262169 LOS ANGELES: WILL TRACKS BE BACK? The Los Angeles region of California is heavily reliant on automobiles. This article discusses the battles that have been going on to create a rapid transit system for the area. A delicate balance must be struck: a rapid transit system plan has to be extensive enough to be politically popular but not large enough to scare away Federal support. The discussion also touches on jurisdictional problems, as there are 78 cities within the county that must all cooperate in some kind of a system. The benefit cost analysis of rail versus bus transit and the advocates of each in the federal agencies and industry are crucial parts of the decision making process. The one point of agreement is that Los Angeles has a severe transportation problem and something must be done about it.

Kizzia, T *Railway Age* Vol. 175 No. 11, June 1974, pp 30-41, 3 Phot.

31 262170 ANALYSIS AND EVALUATION OF INTERMODAL TRANSFER. This methodology to quantitatively evaluate intermodal transfer delay time presents an analytical tool that will evaluate candidate alternative terminal configurations in terms of pedestrian related performance. The use of computerized modeling methods for the analysis of pedestrian flow represents an efficient technique for the solution of pedestrian related problems. The use of such techniques can assure the decision-maker that available resources are efficiently used in providing necessary public transportation services. This method of analysis is applicable to the evaluation and analysis of configurations developed by the variation of any system component(s) or the terminal plan.

Marks, GV, Jr ; Pittsburgh University 71-4, Apr. 1973, 193 pp

31 262314 A CONTROL SYSTEM GIVING PRIORITY TO TRAMS. Details are given of the computer-controlled signaling system introduced in Zurich, Switzerland, to optimize traffic flow in the main shopping and business area. The control system consists of a number of strategically located detector loops and antennae which identify trams and give them priority over other vehicles. Details are given of the computer programs used in the system. /TRRL/

Mertens, FH (GEC-Elliot Traffic Automation, West Germany) *Traffic Engineering and Control* Vol. 14 No. 11, 1973, pp 514-518, 8 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 207359)

31 262364 PARK AND RIDE: A RISING TIDE. Examples of successfully operating fringe parking lots for commuter Park/Ride bus and train passengers are examined. Experience has indicated that potential locations should be large enough to provide between 500 and 1,000 car spaces to insure economical operation of buses during peak hours. Commuters' parking and walking habits have been surveyed and criteria are included here to ensure safety and continued usage of these lots. Communications between riders and management of the lots and between riders and vehicle operators are features which enhance patronage.

Frost, M. *Public Works* Vol. 105 No. 9, Sept. 1974, pp 82-84

31 262508 TRANSIT IN THE U.S. AND TEXAS: PAST, PRESENT, AND FUTURE. The results are presented of a study of transit systems in the U.S. and Texas. Historical data are analyzed and factors contributing to the decline of transit are identified. Present and future needs in Texas are also identified. The characteristics of rail-rapid-transit and bus-rapid-transit systems are compared and their applicability to Texas cities is evaluated. Increasing fares, deteriorating service, increasing incomes, increasing automobile ownership, and decreasing population densities are seen as the reasons for the decline of transit. The current and future role of transit systems are categorized (into groups: public transportation, mass transportation, and circulation within concentrated developments) and discussed. The study concludes that some form of mass transportation is needed to supplement the automobile based urban transportation system in several Texas cities. Yet, none of the modes of mass transportation are directly applicable to low-density urban development characteristic of Texas cities. A relative study of rail-rapid-transit systems and bus-rapid-transit systems (relative costs, urban forms of Texan cities, types of mass transit service needed) indicates that bus-rapid-transit systems would be the more applicable.

Holder, RW ; Texas Transportation Institute, (2-8-72-143) Res. Rpt. #143-1, Mar. 1973, 57 pp, 15 Fig., 11 Tab., 38 Ref., 2 App.; Sponsored by Texas Highway Department. Presented at the Western Association of State Highway and Transportation Officials Conference, June 1974.

31 262608 PUBLIC TRANSPORT-C.M.B. ROUTE STUDIES-ROUTE INVENTORY AND CHARACTERISTICS-ROUTE NO. 7B. This report is one of a series which considers the level of service provided by the Franchised Public Bus Companies in Hong Kong. It surveys the routing, bus stop location and usage, and journey times of CMB route no. 7B. The 7 mile route is between Central and Wong Chuk Hang Estate Termini. Data were collected over a 16-hour period. One observer boarded every bus leaving either terminus and one observer was stationed at each terminus. Their detailed results are tabulated. Photographs of all bus stops are included and their location shown on a route plan. The findings of the survey are listed. Actual bus departures averaged 71% of scheduled departures. The average passenger trip length was 4.7 miles. The lowest journey speed was 5.6 m/hr, and the longest journey time was 38.4 minutes. Daily passenger volumes were 2348 in the Central to Wong Chuk Hank direction and 2219 in the

opposite direction. The average hourly occupancy exceeded 100% in two cases. Central terminus had the longest hourly layover time of 58.5 minutes. The survey concludes that a high proportion of commuters use this route causing over-loading of buses at peak times. A revised schedule of services is suggested. /TRRL/

Leung, YM ; China Motor Bus, Limited Tech Rpt. Number 130, Nov. 1973, 57 pp, 3 Fig., 9 Tab., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 209612)

31 262609 PUBLIC TRANSPORT-C.M.B. ROUTE STUDIES-ROUTE INVENTORY. This report is one of a series which consider the level of service provided by the Franchised Public Bus Companies in Hong Kong. It surveys the routing, bus stop location and usage, and journey times of CMB route No. 1. The 3.5 mile route is between Happy Valley and Cleverly Street Termini. Data were collected over a 16 hour period. One observer boarded every third bus leaving either terminus and one observer was stationed at each terminus. Their detailed results are tabulated. Photographs of all bus stops are included and their location shown on a route plan. The findings of the survey are listed. Actual bus departures were 54% of scheduled departures. The average passenger trip length was 2 miles, and the lowest journey speed was 3m/hr and the longest journey time was 29.9 minutes. Daily passenger volumes were 4092 in the Happy Valley to Cleverly Street direction and 5413 in the opposite direction. The average hourly occupancy exceeded 90% between 09.00 and 10.00. Cleverly Street Terminus had the longest hourly layover time of 44.1 minutes. The survey concludes that adherence to the official schedule was unsatisfactory. It suggests improvements to the location and spacing of bus stops. /TRRL/

Lyeng, YM ; China Motor Bus, Limited Tech. Rpt. Number 129, Nov. 1973, 45 pp, 8 Fig., 9 Tab., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 209611)

31 262615 PUBLIC TRANSPORT-C.M.B. ROUTE STUDIES-ROUTE INVENTORY & CHARACTERISTICS-ROUTE NO. 3. This report is one of a series which consider the level of service provided by the Franchised Public Bus Companies in Hong Kong. It surveys the routing, bus stop location and usage, and journey times of CMB route no. 3. The 3.5 mile route is between Cleverly Street and Pokfield Road Termini. Data were collected over a 16 hour period. One observer boarded every third bus leaving either terminus and one observer was stationed at each terminus. Their detailed results are tabulated. Photographs of all bus stops are included and their location shown on a route plan. The findings of the survey are listed. Actual bus departures averaged 52% of scheduled departures. The average passenger trip length was 1.8 miles, the lowest journey speed was 2.6 m/hr and the longest journey time was 37.2 minutes. Daily passenger volumes were 6870 in the Cleverly Street to Pokfield Road direction and 6287 in the opposite direction. The average hourly occupancy exceeded 90% between 07.00 and 08.00. Cleverly Street terminus had the longest hourly layover time-43.4 minutes. The survey concludes that adherence to the official schedule was poor and that during peak hours buses traveled below

walking speed along two streets. The need for shelters at some bus stops is indicated. /TRRL/ Leung, YM ; China Motor Bus, Limited R&D Rpt. No. 132, Tech Paper No. 132, Nov. 1973, 35 pp, 3 Fig., 8 Tab., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 209613)

31 262845 PARHAM EXPRESS BUS PROJECT. This project was initiated to determine whether commuters would use a fringe parking lot and ride express buses to their jobs in downtown Richmond. On the basis of a feasibility study, a parking lot was constructed and bus service provided. Today, hundreds of suburbanities make the one-dollar, 22-mile round trip on workdays, making a success of the undertaking, which will be repeated to other Virginia cities. /Author/

Corder, RG *Traffic Engineering* Vol. 44 No. 12, Sept. 1974, pp 14-17

31 262984 A REVIEW OF OPERATIONAL URBAN TRANSPORTATION PLANNING MODELS. Peat, Marwick, Mitchell & Co. (PMM & CO) study compares and evaluates operational or near operational urban transportation planning models to determine their purposes, effectiveness, scope, and cost. This report provides summaries and detailed descriptions of models suitable for a variety of analytical purposes. The categories of urban transportation planning models reviewed by PMM&Co. were demand, network, cost-benefit/impact, and land use. The classification of models into these categories is useful for a systematic presentation. A model may, however, fall into more than one classification, and all models interact with each other in the urban transportation planning process. The models reviewed are therefore discussed in two ways: the body of the report considers their interrelationships, and Appendixes A through D review the models individually. It was concluded that current urban transportation planning techniques usually require an extensive data base, coding of detailed networks, and use of a costly set of computer programs. Approximately 70 percent of urban planning funds are devoted to data and model preparation, with less than 20 percent devoted to plan evaluation and testing. Because of the onerous nature of the techniques, the analysis of an urban transportation plan requires from 12 to 24 calendar months. It was concluded that the most meaningful direction for analytical technique development would be to emphasize sketch planning models requiring less computational expenditure or data base development than current models. This would allow a faster analysis "turnaround" time, resulting in a planning procedure which is more responsive to issues and problems. More resources could then be apportioned to exploring and evaluating a large number of alternatives. PMM&Co. made the following recommendations: (1) An aggregate, instead of detailed, modeling approach would place less demand on excessive data bases or the coding of detailed networks, and in general would cut down on the analysis resources devoted to model preparation, (2) An interactive planning technique, such as use of graphic terminals, on which the aggregate models could be implemented, promises to be a far more effective means to interface between the analyst, the model, and the decision-maker than the batch-processing systems currently used. Examples of these ap-

proaches can be found in the development of the TRANS Model and the UMTA (Urban Mass Transportation Administration) Transportation Planning System, both of which are reviewed in this report.

Chen, Y ; Peat, Marwick, Mitchell and Company Final Rpt. DOT-TSC-496, Apr. 1973, 242 pp, 8 Fig., 7 Tab., Refs., 5 App.; Prepared For Department of Transportation, Transportation Systems Center, Transportation Systems Concept Directorate, 55 Broadway, Cambridge, Massachusetts 02142; ORDER FROM: NTIS, Repr. PC, Microfiche; P.B. 222109

31 263759 BUS PRIORITY MEASURES IN SHEFFIELD AND OSLO. The public transport policies in Sheffield, England and Oslo, Norway are compared, and the bus priority schemes proposed and implemented in the two cities are examined. The traffic problems encountered in the two cities differ slightly (in relation to their shapes and land use patterns) but the "traffic symptoms" are similar. The bus operation is at times very difficult and the buses suffer severe delays (5-15 minutes) at peak periods. The means of resolution of these problems, however, differ according to the transportation policy adopted and the differences in the grant system. In both cities the political attitude is against costly highway schemes. Several bus priority measures which have been introduced in Sheffield (in the last 3 years) are described, and particularly, a comprehensive scheme to improve the services in the central business district. The Oslo City Council plan to use the existing street network in the central area and differentiation of the street network according to the type of mode is described. A study was made of door to door public transport and the results are discussed particularly in relation to private car transport. Measures are indicated that can improve bus transport. Details are given of the town structure and transport facilities and of the priority measures in the two cities.

Granquist, TE ; Sheffield District Council, England #Q3, July 1974, 13 pp, 4 Fig., 1 Tab., 1 App.; Presented at PTRC Summer Annual Meeting, Warwick, England, 8-12 July 1974.

31 263760 THE BITTERNE BUS PRIORITY TRAFFIC MANAGEMENT SCHEME. A bus demonstration project is described which is aimed at increasing the attractiveness of public transport without necessarily increasing delays to general traffic. General traffic which formerly queued in the morning peak period on a radial route leading into the City of Southampton (Hampshire, England) and choked it, is now contained in side roads and approaches, and metered on to the main route by traffic signals, at a rate which is matched to traffic conditions at critical bottle necks. The level of existing and predicted congestion on the main route is determined by a small computer using information received from queue and volume detectors situated along the 3.25 mile route. Buses are afforded priority access on to the main route by the use of full-time and part-time 'bus only' streets and inbound turns which allow the bus services to bypass the general traffic queueing in the side roads. The conditions prior to the implementation of the scheme are described and details are given of the scheme and the bus priority control

aspects. The estimated benefits and the implementation of the scheme are discussed.

Gregory, WR ; Hampshire, County of, England #Q5, July 1974, 8 pp, 3 Fig.; Presented at PTRC Summer Annual Meeting, Warwick, England, 8-12 July 1974.

31 263776 CAR COMMUTER RESTRAINT IN NOTTINGHAM. This paper describes a zone and collar traffic control experiment scheduled to go into effect in Nottingham, England in mid-1975. "Zone control" signals would regulate the traffic leaving a "traffic zone" when necessary, so buses are not impeded on the surrounding and nearby main traffic routes. Buses and emergency vehicles would leave zones without delay as peak period "bus only" roads, bus lanes or bus detectors would be provided. The Collar Controls-completely encircling the two-and-one-half-mile wide inner city area-would limit the traffic entering this area so that traffic already within the area would flow freely without the need for "bus lanes." At the collar control signals, buses and emergency vehicles would have a reserved lane to enable them to pass the other traffic queueing in the outside lane. Queueing delays of two to seven minutes are anticipated which should discourage most "through" traffic. Park and ride sites at the approaches to the inner city area outside the traffic collar, will be served by buses at ten-minute intervals during the commuter peak periods.

Munnery, WFO ; Planning and Transport Res and Computation Co Ltd July 1974, 13 pp; Summer Annual Meeting Paper #021.

31 263956 FIVE-YEAR TRANSIT DEVELOPMENT PROGRAM FOR NORTHERN KENTUCKY. After a lengthy history of declining ridership, the Cincinnati, Newport and Covington Transportation Company (the Green Line) gave notice that transit service in Northern Kentucky would be permanently withdrawn on Nov. 4, 1972. In anticipation of the Green Line closure, The Transit Authority of Northern Kentucky (TANK) was created to assume responsibility for providing publicly owned mass transit in the area, subject to voter approval. This study presents an updated five-year transit development program specifically for TANK. The impact that loss of transit service in Northern Kentucky would have is also evaluated. Among the TANK improvements were that: all Green Line routes would continue to be operated, many with more frequent service; service to Cincinnati CBD would be improved by a downtown shuttle bus; and demand-actuated routing (dial-a-bus) would provide better service levels in several areas. Furthermore, a two zone fare system would be instituted and reduced fares would be available for school children and senior citizens. All intra-systems transfers would be free. Program costs are discussed. Figures and table complement the text. Appendices are "Bus Stop Shelter Location" and "1971 Valuation of Cincinnati, Newport and Covington Transportation Company (The Green Line)."

Voorhees (Alan M) and Associates, Incorporated, (KY-09-0005) UMTA-KY-09-0005-74-1, June 1974, 75 pp; Prepared for the Transit Authority of Northern Kentucky. Sponsored by Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236664

31 263994 PUBLIC TRANSPORT-SESSION 1: INTERCHANGE DESIGN. This session on interchange design contains the following papers: The Design And Location Of Urban Public Transport Interchanges, Wagon, DJ and Collins, PH; Passenger Transport Interchange On Merseyside-Some Practical Problems, Millward,C; Determining The Optimum Number Of Multi-Modal Interchange Stations For A City, Lesley, LJS; Interchange Design In The Selnecc Conurbation, Niblett,GH; The Capacity Of Passage Ways For Uni-directional And For Crossing Flows Of Pedestrians, Marshall,J and Weston,JG. /TRRL/

Wagon, DJ Collins, PH (London Transport Executive) Millward, C (Merseyside Passenger Transport Executive) Lesley, LJS (Newcastle University) Niblett, GH (De Leuw Chadwick O Heocha) Marshall, J Weston, JG (London Transport Executive); Planning and Transport Res and Computation Co. Ltd Conf Paper Figs., Tabs., 40 Ref.; Proceedings of Seminar on Public Transportation; ACKNOWLEDGMENT: TRRL (IRRD 209629)

31 264622 SIMULATION OF URBAN BUS OPERATION ON SIGNALIZED ARTERIALS. The purpose of this study was to develop a simulation model that represents urban bus operation on signalized arterial streets. The model is to be used as an evaluation tool in the formulation of new schemes to improve bus service in urban areas. To pave the way for the development of such a model, two basic relationships in urban bus systems were investigated. They respectively involve: (1) the time required to load and unload a certain number of passengers and (2) the bus speed and acceleration characteristics. The model developed was named "SUB" (Simulation of Urban Buses) and its program written in FORTRAN language. Traffic is simulated on the model by groups of vehicles that are processed at constant time intervals. Buses, on the other hand, are represented individually and processed only when significant events occur. The model has been calibrated in Washington, D.C. verified and subjected to sensitivity tests. It has been validated by comparing its results with real-life data and its usefulness has been demonstrated by applying the model to predict the effect of an exclusive bus lane.

Radelat, G ; Federal Highway Administration, (FCP 22B3-022) Final Rpt. FHWA-RD-74-6, Dec. 1973, 251 pp; SPONSORING AGENCY; RESPONSIBLE INDIVIDUAL; ACKNOWLEDGMENT: Federal Highway Administration (T-0092); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236795

31 265303 BART/TRAILS, BICYCLING-RIDING-HIKING. This report contains the findings of a study conducted to improve bicycle commuter accessibility to the Bay Area Rapid Transit (BART) system, and to create recreational trails deriving from the system. There are many factors in favor of promoting more bicycle and recreational trails, among them environmental concerns, energy conservation, relief of traffic congestion, physical exercise, and economic savings. The several chapters of the report focus on such topics as the background for the study, pilot studies in other areas, transporting bicycles on BART, and the question of funding. It is recom-

mended that local communities take the initiative in planning demonstration projects to determine the needs of the users before implementing any plans for commuter bikeways and recreational trails. Included with the report are a schematic bicycle plan and a schematic riding/hiking plan.

Hart Krivatsy, A Stube; Department of Transportation DOT P5600.2, Feb. 1974, 67 pp, Figs., Photos., Refs.

31 265305 EVALUATION OF PASSENGER SERVICE TIMES FOR STREET TRANSIT SYSTEMS. The time required for passengers to board and alight from transit vehicles can play a significant role in the determination of realistic transit schedules and berth requirements for intermodal transfer facilities. This paper investigates the effects on passenger service time of various vehicles, different methods of fare collection, combinations of boarding and alighting through the front and rear doors, and time. The method of least squares is used to analyze and develop equations to predict passenger service time when the number of passengers boarding and alighting is known. Peak-period service time requirements were similar for a.m. and p.m. The exact-fare method of fare collection provided for faster passenger service times than did the conventional cash-and-change method. Trolleybuses with double doors had faster service times than did those with single doors. In addition, intercity passenger service times were found to be greater than those for local transit service.

Kraft, WH Bergen, TF (Edwards and Kelcey, Incorporated) *Transportation Research Record* No. 505, 1974, pp 13-20, 5 Fig., 2 Tab., 3 Ref.; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Orig. PC

31 265314 BUS ROUTES IN NEW HOUSING AREAS. Separate streets for buses can in many cases considerably improve public transport in new peripheral housing areas. A working group consisting of experts in the fields of hygiene, acoustics, medicine and traffic has helped produce this inventory of the problems of streets for buses in central locations. The report describes the different types of bus routes to be found and examines the consequences of any rerouting of traffic.

Tynelius, S ; National Swedish Council for Building Research Rept. No R17:1974, 1974, 2 pp, 3 Fig.; This article appeared in the synopses and summaries from National Swedish Building Research.; Grant Bs 6 45

31 265475 THE REMOTE AIRPORT: A STUDY OF ACCESS FEASIBILITY. The present airport to city center distances are stated for those airports that are 22.5 km (14 miles) or more from city centers, and the travel times required for access and average speeds at peak and off-peak hours are reported. It is then pointed out that pressures for increased capacity are forcing location of new airports at increasing distances from cities, and the term "remote airport" is defined as those at distances in the range of 40 km to 80 km (25 miles to 50 miles). The need for a means of access that will not require excessive travel time is recognized, and costs of two modes of STOL aircraft from downtown STOLports, and rail rapid transit, are analyzed and compared to capital and operating costs.

Miller, DR Dellaway, TK Holden, WHT (Daniel, Mann, Johnson and Mendenhall) *ASCE Journal of Transportation Engineering* Vol. 100 No. TE1, Proc. Paper 10359, Feb. 1974, pp 179-194, 4 Fig., 5 Tab., 11 Ref., 1 App.; ORDER FROM: ESL

31 265498 BUS PRIORITY IN INNER LONDON: 2. THE INNER LONDON BUS PRIORITY MODEL. AN OUTLINE IS GIVEN OF THE MODEL USED IN A STUDY INSTITUTED BY THE GREATER LONDON COUNCIL TO EXAMINE THE WAYS IN WHICH BUS LANES AND BUS-ONLY STREETS MIGHT BEST BE DEPLOYED IN INNER LONDON. THE MODEL WAS DEVELOPED TO ESTIMATE IN MONEY TERMS THE TIME AND DISTANCE CHANGES ACCORDING TO A STRATEGY OF PRIORITIES AND TO EMPHASIZE SOME OF ITS MORE NOTICABLE ASPECTS. THE MODEL WAS DESIGNED TO EVALUATE BOTH THE LOCALIZED EFFECTS AND THE MORE FAR-REACHING EFFECTS OF BUS PRIORITY MEASURES. THE OUTPUT OF THE MODEL FOR EACH TEST STRATEGY INCLUDED PLOTS OF LOCATIONS WHERE SPEED OF TRAFFIC WAS CHANGED BY THE STRATEGY AND WHERE QUEUES FORM. IT ALSO GAVE STANDARD PARAMETERS SUCH AS VEHICLE-HOURS, VEHICLE OCCUPANT HOURS, VEHICLE KILOMETRES, QUEUE LENGTHS AND AVERAGE SPEEDS FOR BUSES AND NON BUS TRAFFIC TOGETHER WITH BENEFITS TO BUSES, COMMERCIAL VEHICLES AND CARS EXPRESSED IN FINANCIAL TERMS. FURTHER DETAILS ARE GIVEN OF THE STRUCTURE OF THE DATA BASE WHICH CONSISTS OF 19 BASIC DATA ELEMENTS AND 28 TRAFFIC FLOW DATA, THE LINK TIME CALCULATIONS WHICH INCLUDE FIGURES SHOWING THE EFFECT OF CHANGING SATURATION FLOW AND CHANGING AREA OF QUEUED TRAFFIC UNITS ON THE AVERAGE NETWORK SPEED. THE TRIP MATRIX PRODUCTION AND THE UNLOADING/ RELOADING PROCESS, AND THE ECONOMIC EVALUATION. IT IS CONCLUDED THAT ALTHOUGH THE MODEL HAS SOME (INEVITABLE) WEAKNESSES IN DETAIL, ITS EVALUATIONS HAVE BEEN HELPFUL IN FORMULATING POLICIES RELATING TO THE PRESENT PROGRAMME OF INNER LONDON BUS LANES, AND IN A STUDY OF SUPPLEMENTARY LICENSING. THE FIRST PART OF THIS ARTICLE APPEARED IN *TRAFFIC ENG CONTROL*, 1974-02/03, 15 (10/11), P480.

Coombe, RD Buchanan, CM Rickard, IE Gower, JE Brown, P (Greater London Council) *Traffic Engineering and Control* Vol. 15 No. 12/1, Apr. 1974, pp 575-580, 4 Fig., 4 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 210256)

31 267006 A TRANSIT DEVELOPMENT PROGRAM FOR MANCHESTER. The primary objective of this study is to develop for the Manchester, New Hampshire urban area, a five-year transit development program which meets the public transportation needs, especially those of the transit-dependent, and which is

consistent with the goals and values of the residents in the area. A summary of the current status of public transportation and analysis of Manchester Transit's regular service on a route-by-route basis are presented. On-board passenger survey, community interviews and an appraisal of the transit system are discussed. There is an investigation of alternative forms of transit system ownership and management which are available to Manchester and a summary of pertinent state legislation. Included among alternatives are regular route service alternatives, school bus alternatives, and special transportation service alternatives. Examination of an alternative citywide demand-responsive system is included in one of the appendices. In discussion of recommended transit development program, details include a description of routes and services, program capital requirements, program implementation schedule, five-year cost-revenue forecasts, marketing plan, maintenance plan and the program monitoring plan. Tables, figures and maps are numerous. Appendices also include passenger survey methodology, Manchester population and income distributions and forecasted operating statistics.

Voorhees (Alan M) and Associates, Incorporated Final Rpt. UMTA-NH-09-0001-73-1, Apr. 1973, 202 pp; This report was prepared for Southern New Hampshire Planning Commission; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232305/AS

31 267012 PLANNING MODE SELECTION AND ECONOMIC FEASIBILITY REPORT-CHARLOTTE-HENRIETTA TRANSIT CORRIDOR-VOLUME I-PLANNING AND PRELIMINARY MODE SELECTION. The purpose of this report is to provide the necessary documentation by which an evaluation may be made of the economic and technical feasibility of the proposed Charlotte-Henrietta Rapid Transit System in Rochester, New York. The Charlotte-Henrietta Corridor is unique in that the proposed right-of-way is predominantly along existing railroad lines, thus minimizing the problems of land acquisition, relocation of residences and businesses, and the interference with existing transportation systems during construction or after implementation. The rapid transit system is also being designed to permit the continuance of existing freight service during nighttime operations without interference to passenger operations. Presented are an analysis of present conditions, the determination of future transit requirements and an initial analysis of alternative transportation systems. Requirements for rapid transit are based on population projections, employment projections, existing land use, proposed land use plans, patronage projections and resultant service characteristics. The three alternative rapid transit modes which best satisfy all of the criteria established for Rochester were the grade separated conventional rail, light rail and busway system. Appendices include description of existing railroad lines, models and projections, initial transit system design and a theoretical concept for obtaining qualitative measures of mode effectiveness. Figures, tables, maps and photographs are numerous.

Rochester-Genesee Regional Transport Authority, Corddry Carpenter Dietz and Zack, Engineers, (NY-09-0006) Tech Study UMTA-NY-09-0006-74-1, Feb. 1974, 318 pp; ACKNOWLEDGMENT: UMTA, Rochester-Genesee

Regional Transport Authority; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232347/AS

31 267017 MODE CHOICE AND THE SHIRLEY HIGHWAY EXPERIMENT. The Shirley Highway Bus-on-Freeway Demonstration Project represents a major part of the UMTA and FHA effort to test different technologies and system configurations in order to better serve the nation's transportation needs. The Shirley Highway Corridor, extending from suburban Northern Virginia to downtown Washington, D.C., is a 150 square mile area containing about 550,000 people. This project was designed to provide commuters with fast and reliable peak-period bus service to the 3 major employment areas of downtown D.C., Pentagon and the Northern Virginia Crystal City Complex. Elements are: (1) the busway, including exclusive land on Shirley Highway and bus-priority lanes in D.C.; (2) a bus transit operation with new buses, routes and schedules; (3) residential fringe parking facilities for bus riders. The objectives of this report are: (1) to determine and isolate those factors which influence the switch from auto to bus ridership, their relative importance and how they combine to produce the bus market share; (2) to see how the first objective could be satisfied in a fashion that would allow results to be generalized to other areas. Among products of the study are a new modal choice or market share model which has significant behavioral advantages over its predecessors and an analysis of data collected during the Shirley Highway Bus-on-Freeway Demonstration Project. Conclusions and recommendations for future research are offered. A bibliography is included.

McLynn, JM Goodman, KM ; National Bureau of Standards UMTA-IT-06-0024-73-1, Nov. 1973, 157 pp; Contract 3-35753; ACKNOWLEDGMENT: UMTA (IT-06-0024); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231893/AS

31 267020 A SHORT-RANGE TRANSIT DEVELOPMENT STUDY TECHNICAL MEMORANDA. These memoranda provide background and supporting information pertaining, among other things, to the existing transit system in the Tuscaloosa, Alabama urban area. The procedures and assumptions used in the development of performance indices and other data contained in the final report are identified. Peak-period directional passenger counts showing present patronage trends are discussed and a table presented showing transfer volume on the existing system. Also presented is the analysis and evaluation procedure used to develop the proposed transit system as described in the final report. Parameters and constraints unique to Tuscaloosa which influenced route selection are outlined and alternatives analyzed. A description of typical route scheduling envisioned for the recommended system is included. A table is presented showing transit travel times, including transfer wait times. Financial evaluation memorandum contains information pertaining to the procedures and estimates used in determining and analyzing the financial circumstances of the Tuscaloosa County Parking and Transit Authority. It is intended that this memorandum provide the basis for the Authority to contrast and modify, if necessary, revenue and expenditure estimates for the recommended five-year program. Tables and maps complement the text.

Bartholomew (Harland) and Associates Draft Rpt. UMTA-AL-09-003-74-2, Mar. 1974, 50 pp; ACKNOWLEDGMENT: UMTA (AL-09-0003); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232333/AS

31 300100 WHAT CAN BE DONE WITH THE ROAD AND TRAFFIC CONDITIONS TO IMPROVE THE WORKING CONDITIONS OF BUSES [Hva kan gjoeres med vei-Og Trafikkforholdene for aa bedre bussens arbeidsvilkkaar]. To evaluate the quality of working conditions for buses in relation to the road and traffic conditions, three criteria are usually considered: journey time (especially relative journey time compared to use of own car on the same distance), regularity and comfort/safety. In accordance with these three evaluation criteria there are three groups who evaluate the individual factors differently with reference to themselves. These three groups are: bus companies, passengers and bus drivers. All these factors have been included in a common matrix and possible improvements in the working conditions for buses are considered in relation to the different factors of the matrix. /TRRL/ [Norwegian]

Aksnes, L *Samsferdsel-Transport* Vol. 18 No. 2, Mar. 1979, pp 21-23, 1 Tab., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 240921), Norwegian State Highway Laboratory

31 300110 APPLICATION OF OPTIMAL SUBSET SELECTION TO PROBLEMS OF DESIGN AND SCHEDULING IN URBAN TRANSPORTATION NETWORKS. The paper describes some possibilities for modifying the optimal transport network algorithm developed by Boyce, Farhi and Weischel in a way that makes it applicable to some practical problems of network planning. The modifications, which have been tested with respect to their effect on the efficiency of the algorithm, include the introduction of asymmetrical demand structures, the integration of an existing network, the lexico-minimization of a dynamic objective function, and the consideration of constraints related to interdependencies between candidate links. Two small network problems and one medium-sized problem (61 nodes, 104 links, 16 candidates) have been computed; the results support the hypothesis that the algorithm may be applied to produce approximate solutions to problems of practical dimensions within a reasonable range of time. /TRRL/

Rothengatter, W (Karlsruhe Univeristy, West Germany) *Transportation Research* Vol. 13B No. 1, Mar. 1979, pp 49-63, 4 Fig., 4 Tab., 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240951)

31 300191 THE ENVIRONMENTAL IMPACT OF BUS PRIORITY SIGNALS. The changing nature of urban transport planning brought about by environmental, social and financial constraints has resulted in the emergence of transport system management (tsm) as an accepted planning philosophy. Of the many techniques which may be regarded as tsm schemes, one, the priority treatment of certain classes of vehicle, has received particular attention. This paper will concentrate on one type of priority scheme-active bus priority signals and will examine the energy and air pollution impacts of such a scheme. On the basis of the results of a

demonstration project in Melbourne, it will be shown that, contrary to previous speculation, such a priority scheme does not have immediate environmental advantages. The implications of this finding will then be discussed in the light of overall evaluation of the scheme, mode choice impacts of the scheme and the extension of the priority scheme to encompass a route of bus priority intersections. /Author/TRRL/

Richardson, AJ (Monash University, Australia); New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 198-218, 2 Fig., 2 Tab., 21 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239201), Australian Road Research Board

31 300212 THE EFFECTS OF DIVIDING A CROSS-TOWN BUS ROUTE INTO TWO RADIAL ROUTES. This report describes the effects of the division of a cross-town bus route in Chatham into a pair of radial routes with new termini at the centre, using the same resources. Two surveys were conducted to monitor bus timekeeping and headways, one just before the reorganisation and the other two months afterwards. In addition, the boarding and alighting points of passengers were obtained as well as their reactions to the reorganisation. The revision resulted in a significant improvement in timekeeping on both the new radial routes, especially in the evening peak. Similarly, headways were made more regular. For the passengers who used the previous route for cross-town journeys (approximately 11 per cent of the total), there was a deterioration in service as regards cost, journey time and convenience. For the operator, the two new routes were easier to manage and marginally cheaper in bus mileage. Because of technical reasons discussed in the report it was not possible to make a reliable assessment of the net effect of the change on patronage and revenue. /Author/TRRL/

Parry, JD Coe, GA ; Transport and Road Research Laboratory Monograph Suppl Report SR461, 1979, 21 p., 7 Fig., 5 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241094)

31 300323 MANAGING THE EVOLUTION OF EXISTING TRANSPORT SYSTEMS. Transport planning, particularly in urban areas, can be no longer seen as a purely technical process which sets about seeing definitive solutions to major movement problems. Basically, all the arguments reduce to the fact that transport planning and decision-making in built-up areas is controversial. Transport planning has to be carried out within the context of the current social, political and institutional climates; it cannot be seen and treated as an "external" technical/analytical process. What is probably the key issue facing the planner is how to come to grips with this situation, how to ensure the successful development of his transport proposals. The way to do this is to view transport planning as an evolutionary process which emphasises continual improvement upon the existing situation, rather than necessarily aiming at revolutionary solutions to dramatic problems. /TRRL/

O'Flaherty, CA (National Capital Development Commission, Australia) Potts, RB, Editor (Adelaide University, Australia); Academy of Science, Australia, (0 85847 048 9) Conf Paper 1978, pp 36-56, 3 Fig., 1 Tab., 8 Ref.; From Transport in

Australia; Some Key Issues. Papers Delivered at the Science and Industry Forum.; ACKNOWLEDGMENT: TRRL (IRRD 239141), Australian Road Research Board

31 300569 NOTES ON THE COORDINATION BETWEEN PUBLIC TRANSPORT SYSTEMS IN METROPOLITAN AREAS [Appunti sul coordinamento tra sistemi di trasporto pubblico nelle aree metropolitane]. With the rapid expansion of the urban areas and the development of road transport, the transport networks have undergone nonprogrammed evolutions, which have led to the impoverishing of the level of service and to congestion. This has made necessary a reexamination of traffic currents with origin-destination surveys, which have permitted the passage to models of integrated networks, with the support of integrated tariffs and common tariffs. When the metropolitan network cannot be extended for reasons of economy and amount of traffic, the necessity arises of envisioning tramway lines with high-speed vehicles, which must cover prevalently protected itineraries. [Italian]

Liberatore, M *Ingegneria Ferroviaria* Vol. 33 No. 12, Dec. 1978, p 1051; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 300581 THE POTENTIAL OF FEEDER BUS SYSTEMS SERVING COMMUTER RAIL STATIONS. Main objectives of this work are to develop mathematical models capable of predicting the number of commuters who would divert to rail via a feeder bus service under a wide range of alternative transport policy measures; the potential of feeder bus services to railway stations in the Crosby areas; and to analyze scale of benefits to different groups of commuters.

Leake, GR Read, M *Traffic Engineering and Control* Vol. 20 No. 2, Feb. 1979, pp 52-58, 6 Tab., 3 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

31 300708 MOREHEAD, KENTUCKY, SCHOOL BUS DEMONSTRATION PROJECT. Recent public policy has demonstrated increased concern for the effectiveness of existing transportation systems as a cost-efficient alternative to major capital expenditures. One such program in Kentucky uses a single school bus to provide transit service in the community of Morehead. A 36-passenger school bus operates hourly along a 12.1-km (7.5-mile) route from 8:30 p.m. on weekdays and from 9:30 a.m. to 2:30 p.m. on Saturdays. Service is provided to Morehead State University, several public housing projects, the central business district, a principal manufacturing house, and the hospital. The one-way fare is \$0.25. The Kentucky Department of Transportation, the Rowan County Board of Education, and the city of Morehead all share in the management of the project. Net operating costs during the 12-month demonstration period are shared between the department of transportation and the city of Morehead (75-25 percent, respectively). To date, farebox revenues have equaled 8.78 percent of the total operating costs. Initial patronage during the first 5 months of the demonstration program was low, increased drastically during severe winter weather, and moderated somewhat when warmer weather arrived. Weekday patronage averages 33.6 persons/d and Saturday patronage averages 16.8 persons/d. /Author/

Siria, BS Smith, DE Smith, WA, II (Kentucky Department of Transportation) *Transportation Research Record* No. 696, 1978, pp 73-76, 2 Tab.

This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

31 300972 CO-ORDINATION OF JOURNEYS TO WORK [Samordning av arbetsresor. En studie av pendlingen till kaernsjukhuset i Skoevde (kss) samt foerslag till atgaerder for effektivisering]. The purpose of this study is to seek ways to facilitate work trips for commuters employed at the regional hospital in Skoevde. The choice of the study object was motivated by the distribution of work hours at the hospital. The study deals only with employees who have to travel more than 10 km to work (25 percent of the total of 900 employed). Ninety percent of the commuters live in or close to 16 different communities along 8 so-called transport channels, and travel to work by private car. Some conclusions of the study: better utilization and increased competitiveness of the public transport system can be achieved by coordinating the work-hours for the various categories of personnel employed at the hospital, and also with those of other places of work in the neighbourhood. Also, small time table changes, extension and alterations of existing routes are factors of importance for improving the quality of the public transport system. [Swedish]

Jansson, H Vesterlund, Y ; Chalmers University of Technology, Sweden Monograph Arbetsrap 1978-10-26, Oct. 1978, 54 p., 4 Fig., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 241297), National Swedish Road & Traffic Research Institute

31 301072 DETERMINATION OF PRIORITIES FOR INCREMENTAL DEVELOPMENT OF THE MARTA SYSTEM. The Urban Mass Transportation Administration has recently established a policy for the incremental development of fixed-guideway transit systems. This policy necessitates the evaluation of system components and the subsequent assignment of priorities to system components. The Metropolitan Atlanta Rapid Transit Authority undertook a comparative analysis study to determine the most appropriate order of construction for its "referendum" rail system. This paper reviews the study methodologies and final results. The referendum system, excluding that currently under construction, was divided into 13 operational segments (11 rail and two busway). Analytical information was compiled for each segment, including expected patronage, estimated construction and operating costs, annual revenue, travel time, and various nonquantifiable data. Three criteria were employed in the evaluation of segments: cost efficiency, travel utility, and an index representing nonquantifiable factors. The study was performed in a series of iterative analyses based on sequential decisions. The following conclusions are made: (a) the concept of iterative analysis provides a reasonable method for determination of system extension priorities, (b) the analyses were sensitive to differences among segments, (c) wide variations of effectiveness were found among segments, and (d) the incremental development policy may adversely affect the ability of local areas to obtain local support for mass transit plans. /Author/

Mason, J Emory, B Germano, AT (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 698, 1979, pp 23-29, 1 Fig., 5 Tab., 5 Ref.; This paper appeared in TRB Research Record No. 698, Priority Programming, Finance, and Highway Investment Analysis.; ORDER FROM: TRB Publications Off

31 301308 NETWORK PLANNING FOR LIGHT-RAIL TRANSIT. A common problem in the approach to light-rail transit (LRT) planning is the development and testing of less than optimal networks. This problem arises from an incomplete understanding of the application of the mode and of the opportunities inherent in its application. This paper describes how unique characteristics of LRT can be exploited by developing networks to make better use of the mode. Guidelines for network development are described and illustrated by examples. A distinction is made between techniques applicable specifically to LRT and those applicable to other transit modes. The concept of tuning a network (to match the level of investment to patronage and other benefits on a segment-by-segment basis) is presented, together with a discussion of the advantages of retaining as many future options as possible in long-range transit planning. /Author/

Fox, GD (De Leuw, Cather and Company) *Transportation Research Board Special Report Conf Paper* No. 182, 1978, pp 54-61, 8 Fig., 4 Ref.; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

31 301316 TRAFFIC ENGINEERING FOR LIGHT-RAIL TRANSIT. The development of safe and operationally effective designs for at-grade interactions and crossings for light-rail transit (LRT) is an issue central to the future deployment of the mode. This paper describes a design approach based on the performance characteristics of light-rail vehicles (LRVs) and the application of conventional traffic engineering hardware and design practice. At-grade operation of LRT introduces potential conflicts with motor vehicles and pedestrians at intersections, in streets between intersections, and at mid-block crossings. These conflicts are a source of delay and accidents for LRVs. Application of the appropriate conflict-control techniques must consider that modern LRVs have performance characteristics essentially similar to those of transit buses. There are four strategies available to the traffic engineer to eliminate or control points of conflict among LRVs, motor vehicles, and pedestrians: at-grade separation of traffic flows in space, vertical separation of traffic flows in space, separation of traffic flows in time, and reduction in the number of traffic approaches. /Author/

Korve, HW (De Leuw, Cather and Company) *Transportation Research Board Special Report Conf Paper* No. 182, 1978, pp 107-115, 11 Fig., 2 Ref.; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

31 301326 MOTOR VEHICLE AND PEDESTRIAN INTERFACE WITH LIGHT-RAIL TRANSIT. This session focussed on the problem of finding the space within which to develop a surface-level light-rail transit (LRT) system. The

primary and secondary arterials of many cities which no longer have as much through traffic as they used to, seem likely candidates for future LRT systems. The question of how LRT lines could be placed into arterial or other roads of limited width was discussed. LRT can provide a low-cost solution to the need for providing for greater capacity in the face of the negative aspects of increasing the width of existing transport networks. LRT also provides the best potential for obtaining surface level linear parks. The substitution of grass or other materials for the usual ballast-and-gravel or dirt-track foundation was also discussed. Other topics covered include the implementation of LRT operations in existing streets particularly in cities that no longer have street railway operations or that promote LRT, standards for grade separation of LRT at principal perpendicular avenues and arterials, criteria for crossing of LRT Lines by pedestrians and motor vehicles, the use of European tramway and light-rail standards, the protection of level crossings, driver education for making left-turns in cities with new LRT systems, feeder busses to LRT terminals and intermediate stops, the institutional and regulatory aspects of joint LRT-railway operation, and the problem of the elderly and handicapped patrons.

Quinby, HD (Consultant, San Francisco) Rogers, LH (Institute of Public Administration) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 169-170*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

31 301327 INTERMODAL INTEGRATION. Intermodal integration is important to light-rail transit (LRT) which must be one part of a family of modes that serves an urban area. Such integration is successful in situations in which there is ease of transfer, compatibility in scheduling, carefully designed and located facilities, and a fare structure that supports transfer. The layout and functions of transit systems in metropolitan areas were discussed at the workshop. The negative consumer connotation associated with transfers, and the importance of pricing in making transfers acceptable are discussed, as well as the idea of time as a factor in choosing whether or not to take advantage of a transfer. It is noted that in Europe one mode is selected to serve a particular travel desire and other modes are coordinated with it. In the U.S., however, bus and rail usually compete, the damaging competition being the result of organizational in-fighting. Sophisticated ways of constructing incentives within the marketplace for coordination and cooperation between competing operators is lacking in the U.S. The growth of federal programs that subsidize operations should encourage such cooperation.

Sullivan, BE (British Columbia Ministry of Municipal Affairs & H) Lovelock, C (Harvard Graduate School of Business Administration) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 170-171*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

31 301358 VANCOUVER'S SEABUS SYSTEM: A TWO YEAR SERVICE REPORT. Reviews the operating experience of these diesel powered aluminum-hulled, catamaran ferries. It

includes a breakdown of the weekly passenger traffic and energy cost effectiveness of the system which has apparently been quite successful with only minor operating problems.

Case, J *Motor Ship* Vol. 60 No. 709, Aug. 1979, pp 65-66; ORDER FROM: ESL

31 301389 WATERBORNE TRANSIT. This special bibliography contains 183 abstracts of selected reports and journal articles that cover a range of topics, problems, and vessels found in the area of waterborne transit. Although a portion of the bibliography is devoted to cargo transportation, the emphasis is on passenger transportation. Operational experience with Jetfoils, Hydrofoils, Air Cushion Vehicles and Conventional ferry boats is also included.

Maritime Research Information Service Bibliog. Oct. 1978, 41 p.; ORDER FROM: TRB Publications Off

31 301891 DERBYSHIRE COUNTY COUNCIL PUBLIC TRANSPORT PLAN 1979-80 TO 1983-84. This is Derbyshire County Council's first public transport plan relating to the period April 1979 to March 1984. It concentrates on the first year but sets a framework of policies and objectives for the whole period. The basis of the plan is as follows: (1) the need for public transport; (2) the policies to meet those needs; (3) the resources required to put the policies into practice; (4) the services which will be provided as a result. The main focus of the plan is on bus routes within the county and thus deals with fares, subsidies and the future of existing services. The next major emphasis is on the provision of transport for school children of social service clients. Reference is made to provision of railway and coach services and to unconventional forms of transport for certain localities in particular. The plan also deals with facilities e.g. bus stations and shelters, needed to support the services. /TRRL/

Derbyshire County Council Monograph No. PTP1, 1979, 131 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 241375)

31 301962 PROVISIONS FOR REGIONAL PUBLIC TRANSPORT STOPPING PLACES [Haltevoorzieningen voor het openbaar streekvervoer]. The aim of the government and the transport companies to promote public transport is dependent on a decrease of the disadvantages of public transport. The promotion needs a punctual schedule, journey time, and good accessibility together with easily recognizable stopping places. The accommodation at stopping places needs to be such that a passenger has protection from rain and wind and can get information. The possibilities of combination with other public provisions can be a help. In the reconstruction of residential areas or the planning of new areas these aspects of public transport must be considered. Several designs of public stops and shelters are presented. /TRRL/ [Dutch]

Wolthuis, A (Zuid Ooster Autobusdiensten) Anthuis, AAD (Exploitatie Samenwerking Openbaar Vervoer Bedrijve) *Verkeerstechniek* 1978, pp 58-79, Figs., 2 Tab., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 241435), Institute for Road Safety Research

31 301965 PUBLIC TRANSPORT PLAN 1979/80. In this first edition of the public transport plan the Essex County Council has restated its specific policies relating to the provision and maintenance of public transport services and infrastructure. The plan is concerned primarily with passenger transport but also includes some mention of rail freight facilities. Part 1 covers present and future transport needs, and considers the economic and social significance of public transport as well as transport generally by road, rail, ferry and to school. An assessment is made of future requirements. Problems affecting the whole county and particular areas are considered in Part 2 and a description of the objectives of the plan are given in Part 3. Part 4 is concerned with the county's policies related to the transport needs already considered in Part 1. The proposed implementation of the plan is discussed in Part 5. Information on various transport services etc is contained in appendices. /TRRL/

Booth, AG (Essex County Council, England) ; Essex County Council, Planning Department Monograph Vol. 1 Mar. 1979, 128 p., 7 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 241372)

31 301966 PUBLIC TRANSPORT PLAN 1979-80. This is Buckinghamshire County Council's first public transport plan, relating to the period April 1979 to March 1984 in general and the first year in particular. The report reviews the requirements of the Transport Act 1978 regarding the duties of non-metropolitan county councils respecting public transport services. The county's public transport needs are considered, and the financial and legal framework for the provision of stage carriage bus services is presented. These services are considered in detail for South Buckinghamshire, Milton Keynes and Aylesbury Vale. A description is given of railway services in the county, and of secondary road-based services e.g. express coaches. The county's policy and obligations regarding school transport are presented, and consideration is given to the role of unconventional services. The results are recorded of a number of experimental transport services e.g. dial-a-bus and post buses. Mention is made of various travel concession schemes which have been tried in the county. /TRRL/

Buckinghamshire County Council, (0142-5579) Monograph Apr. 1979, 104 p., 10 Fig., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 241374)

31 302010 1979-80 PUBLIC TRANSPORT PLAN. The report represents Gwynedd County Council's draft public transport plan for 1979/80 to comply with the 1978 Transport Act. Transport policies are detailed in the following chapters: public transport planning, the statutory process; 1978 Transport Act; existing rail services; existing bus services; ferry and air services; public transport needs and criteria; draft public transport policies; filling the gaps; agreements with operators; financial resources; concessionary fares; and, public consultation. /TRRL/

Chadwick, C ; Gwynedd County Council Monograph 1979, 64 p., 8 Fig., 8 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 241356)

31 302186 TRAIN-TO-PLANE LINKS MANHATTAN AND JFK. The author discusses the premium rapid transit service which uses existing

trackage and stations; ties into bus service to various terminals at Kennedy International Airport in New York City.

Galler, S *Public Works* Vol. 110 No. 6, June 1979, pp 74-75; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 302255 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: TRANSIT ROUTE EVALUATION. VOLUME 4. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. The analytical aid presented in this report provides one method for evaluating individual transit routes for a fixed-route, fixed-schedule urban transit system. Individual transit system routes are evaluated semiannually, based on a comparison of nine performance factors with established route standards set for each factor. Input data used in the evaluation are recorded on a semiannual basis, and scores are computed for each of the nine performance factors for each route according to an evaluation score algorithm. Scores are then added for each route, and routes are ranked by their total evaluation score. The results of the evaluation are used as the basis for route refinement and modification decisions. The report points out that the evaluation procedure is best applied in systems whose overall ridership is growing. Stable or declining ridership conditions would not be satisfactorily treated by this procedure. Also, because the intent of this report is to provide a simplified analysis aid, modifications, embellishments, and improvements to the suggested procedure are encouraged if local data or previous analyses suggest more appropriate methods. (UMTA)

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, (UTP.PMM.77.1.1) Final Rpt. UMTA-IT-06-9020-79-4, Jan. 1979, 35 p.; Contract DOT-UT-50021; ORDER FROM: NTIS; PB-299983/AS

31 302587 WEST YORKSHIRE TRANSPORTATION STUDIES. 4. APPLICATION OF THE APPROACH AND TECHNIQUES TO LEEDS. This is the fourth in a series of papers which discusses aspects of the West Yorkshire Transportation Studies. The paper outlines the process, adopted for the development of the recommended plan, describes the identification of transport problems and gives some details of the various elements of the plan. The importance attached to the various types of problems was largely dictated by considerations of the county-wide plan. Short term (up to 1985) and medium term (from the mid-1980s to the mid-1990s) design periods were considered. The primary problem in Leeds was the accessibility to workplaces, especially at peak periods. The strategy was aimed at improving this situation through proposals which would increase safety and improve the environment. The rigorous analysis of the various transport issues in conjunction with more conventional interpretation of transportation model output led to a clearly defined set of problems. The approach of testing a series of elements in the system to determine the roles they might play in development of the final plan. The resulting plan, capable of phased implementation, relies upon a balanced development of the existing transport system in Leeds. (TRRL)

Coombe, RD (Martin & Voorhees Associates, England) *Traffic Engineering and Control* Vol. 20 No. 3, Mar. 1979, pp 111-116, 4 Fig., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241668)

31 302869 SOME ASPECTS OF THE DESIGN OF THE PUBLIC TRANSPORT SYSTEM IN SANTIAGO [Algunos aspectos de diseño en el sistema de locomoción colectiva de Santiago]. A study is made of a wide range of factors including street dimensions, height of a footboard of a bus, structure of the routes of different bus-lines, laws and regulations which govern vehicular and pedestrian traffic inside the city, and so on. Particular attention is paid to the consciousness of users, of design problems and to the level of interaction between public in general and elements composing the public transport system of Santiago. A series of ideas is developed, leading to the following statements: "the attitude of the population towards design is a good indicator of the level of socio-economic development of that population"; (2) the degree to which interaction between different agents of design-activity (user, producer, designer and government), influences level and speed of socio-economic development. (TRRL) [Spanish]

Gomez, A Quezada, M ; Catholic University, Chile Monograph Feb. 1977, 99 p., 2 Fig., Photos., 36 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 106901), Ministry of Public Works, Spain, Central Laboratory of Bridges & Highways, France

31 302945 SIGNAL SUCCESS FOR ORTON SPEEDLINE. The article describes the successful operation of the "speedline" bus service by the Eastern Counties Bus Co in the Orton Area of Peterborough. Buses operated by this service are fitted with devices which activate coils beneath the busway triggering traffic signals to green. This gives buses priority over other traffic enabling the services to avoid traffic congestion and penetrate into otherwise traffic-free areas so that passengers can get closer to their destinations. The Plessey ident-a-bus system is the selective vehicle detection (svd) equipment installed. (TRRL)

Palk, D *Surveyor - Public Authority Technology* Vol. 154 No. 4549, Aug. 1979, pp 27-29, 1 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 242274)

31 303058 THE MORNING TRANSIT LANE FROM BALGOWAH TO NEUTRAL BAY; REPORT ON LONG TERM TRENDS AND RE-EVALUATION OF INITIAL PERFORMANCE. On the 25th November, 1974 a transit lane was introduced along Sydney Road, Manly Road, Spit Road and Military Road, which forms a continuous route (Spit Bridge Route) between Balgowlah and Cremorne. The kerbside lane was reserved for use by specified vehicles: omnibuses, vehicles carrying three or more persons, taxi cabs, motor cycles, hire cars and vehicles turning left at or before the next intersection. The transit lane has since been extended at each end. Major surveys of car and bus travel times, traffic volumes and occupancies were carried out by the department of motor transport in one week of: October, 1974; (before the transit lane was introduced); March, 1975 and October, 1975. The n.r.m.a. Collected car travel time data for one week of: March, 1974 to 1978; August, 1975 to

1977; and October, 1975 to 1978. The October, 1978 study included counts of car and bus travel times, traffic volumes and occupancies to assess long term trends. /TRRL/

Searles, B ; National Roads and Motorists Association Monograph Oct. 1978, 29 p., 23 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239263), Australian Road Research Board

31 303197 OPERATING COSTS AND PERFORMANCE OF AMERICAN PUBLIC TRANSIT SYSTEMS. The escalation of operating costs is threatening the existing level of transit service in the U. S. Over the last two decades, lengthening passenger trips, as a result of suburbanization and lower development densities, have been a major factor influencing increasing costs per passenger. Over the past decade, the cost of operating transit service has risen 148%. Since operating revenues have not kept pace with costs, transit subsidies have grown even more rapidly than operating costs. Factors that have been involved in the rapid rise of operating costs are outlined. A summary is presented of approaches which could be used to help control costs.

Sale, JE (Urban Mass Transportation Administration) Green, B *Journal of the American Planners Association* Vol. 45 No. 1, Jan. 1979, pp 22-27, 12 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 303202 MECHANISM OF CROSS PASSENGER FLOW IN RAILWAY STATION. The study described was conducted to investigate the mechanism and nature of complicated passenger flow. As a first step of the study, the mechanism of cross flow is investigated by the observations at a concourse of a commuting train station in Tokyo, Japan and by a study on a mechanism model on the other hand.

Rartridge, LJ, Jr *Railway Technical Research Inst, Quarterly Reports* Vol. 20 No. 1, Mar. 1979, pp 15-21; ACKNOWLEDGMENT: EI, TRRL (IRRD 243835); ORDER FROM: ESL

31 303471 SOME ISSUES RELATING TO THE OPTIMAL DESIGN OF BUS ROUTES. The paper presents a discussion of some issues relating to the design of minimum cost bus routes serving a multiple origin-multiple destination trip distribution. It is shown that the objective function (total cost) is a nonconvex function of the assignment; the higher the demand for trips on a route, the better is the service that one can provide. One consequence of this is that a square grid of straight line bus routes is not likely to be an optimal geometry even under highly idealized conditions. "Good" geometries are more likely to focus routes onto a single street and past a common junction.

Newell, GF (California University, Berkeley) *Transportation Science* Vol. 13 No. 1, Feb. 1979, pp 20-35, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 303499 BUS NETWORK PLANNING: TRANSEPT APPRAISAL. This report is an appraisal of the "Bus Network Planning Workshop" held at the Australian Road Research Board, Melbourne, 25-27th October 1978. Traditional, fixed-route public transport systems (rail, bus, tram) are experiencing increased operating difficulties in most major urban areas in Australia.

lia. There is need for these systems to more effectively and efficiently match the demands for urban person travel and analytical techniques are being sought to aid in the processes of planning and operating fixed-route public transport systems. An appraisal of the bus network planning package, TRANSEPT, has been undertaken to assess its potential for application in Australia. This report documents the appraisal procedure and material, presents the findings, and indicates several directions for development in road public transport planning aids. The appraisal was structured around a two day workshop for public transport planners, managers and researchers. The workshop format proved to be an effective means of obtaining a first order feel for TRANSEPT and for considering bus planning needs in Australia. It indicated that TRANSEPT could aid bus planning in Australia, but that more comprehensive tests in an actual case study would be required to adapt the package to local conditions. The appraisal also identified an urgent need for more flexible, interactive techniques to aid the planning and management of bus transport services in Australia. (TRRL)

Bowyer, DP, Editor ; Australian Road Research Board Monograph Research Rpt ARR 88, July 1979, 94 p., 24 Fig., 12 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239386), Australian Road Research Board

31 303634 ECMT. ROUND TABLE 42 (PARIS, 9-10 NOVEMBER 1978), INFLUENCE OF MEASURES AIMED AT LIMITING THE USE OF CERTAIN TRANSPORT MODES [CEMT. Table ronde 42 (Paris, 9-10 novembre 1978). Influence des mesures visant a limiter l'usage de certains modes de transport]. Report on the 42nd Round Table on Transport Economics, held in Paris on 9 and 10 November 1978. After discussing the influence of measures aimed at limiting the use of certain transport modes, the report gives a summary of the discussion on the scope of the restrictions, indicating fields of research to be developed; it then presents practical means of restrictions on interurban and urban traffic, and lastly considers certain possible measures such as spreading transport demand more evenly in time, improving public transport, and improving the freight services offered by the railways. [French]

European Conference of Ministers of Transport UIC Cat. 01 N193, 1979, 82 p., 7 Tab., 1 App.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Organization for Economic Cooperation and Devel, Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006

31 303932 PREDICTION OF EFFECTS OF BUS-PRIORITY SCHEMES BY USING COMPUTER SIMULATION TECHNIQUES. This paper describes a computer program that predicts the effect of bus-priority measures applied to an urban highway network. The program predicts the travel times of buses and other vehicles along a highway network that has different types of intersection controls, with or without bus-priority schemes in operation. The paper describes how the program will allow transportation planners to assess the likely effects of proposed priority measures from a comparison of travel times through a complex highway system

by use of a model that computes the journey times of buses and other vehicles over a network that is composed of highway links that have priority, roundabout, or signal control at the intersections. The model follows the progress of each bus along a given route as it repeats the cycle from one bus stop to the next for various traffic conditions. Details of the master computer program and the associated subroutines are given together with details of validation studies carried out on the outer ring road of the city of Bradford. To demonstrate the practical use of the program details are given of the effect of bus-priority schemes on average delay, queue lengths, and bus travel times for the following highway and traffic situations: (a) priority intersections where the nearside lane of the minor road is allocated to buses for different traffic flow conditions and different lengths of priority lanes, (b) signalized intersections that have two or three approach lanes where the nearside lane of one approach road is allocated to buses for different traffic flow conditions and different lengths of priority lane, and (c) a 2-km length of bus route, which includes three signalized intersections and eight bus stops for differing traffic volumes and proportions of buses in the traffic flow. Details of the program output are given to demonstrate that the simulation model is flexible enough to study any particular section of a highway that may incorporate bus priority.

Salter, RJ (Bradford University, England) Shahi, J (Tehran Institute of Technology, Iran) *Transportation Research Record* No. 718, 1979, pp 1-5, 5 Fig., 4 Tab., 1 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

31 303934 IMPACT OF SHORT-TERM SERVICE CHANGES ON URBAN BUS TRANSIT PERFORMANCE. This paper examines the impact on a fixed route of small changes in three operational policy variables: frequency, number of bus stops, and fare. Analytical expressions are developed that trace the impact of each variable on various other system variables, which leads to an assessment of changes in selected measures of efficiency and effectiveness. The application of the methodology is demonstrated by a case study of a selected bus route in a medium-sized Indiana city. Three specific options are evaluated in terms of alternative frequency, number of stops, and fare policies. Since none of the options was actually implemented, the paper reports only on a theoretical analysis of the changes that might be expected under each option. The results indicate that significant improvements are possible in most of the efficiency and effectiveness measures under all three options examined. The technique does not require and extensive amount of data or calibration effort; instead it relies on information generally available from the records of a transit company and reasonable assumptions where necessary.

Bhandari, AS (Dares Salaam University, Tanzania) Sinha, KC (Purdue University) *Transportation Research Record* No. 718, 1979, pp 12-18, 3 Fig., 3 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

31 303937 EVALUATION OF THE GREENWOOD DRIVE FRINGE PARKING FACILITY (ABRIDGMENT). This paper describes a study that was conducted to determine why the service from the park-and-ride lot on Greenwood Drive in Portsmouth, Va. failed to attract more riders than it did. Also, it describes a procedural method proposed by Wester and Demetsky to assist transit planners in developing park-and-ride facilities. The methodology is based on the analysis of population, service and urban development characteristics of park-and-ride operations in Richmond and Virginia Beach; and it also estimates the demand for the bus service. The application of the methodology to the planning of the express bus and fringe parking transit to the Greenwood Drive service reveals that the low levels of patronage that have been experienced could have been expected. When the Greenwood Drive service was planned, the completed subscription bus service was not properly considered. Thus, it was concluded that the methodology improves the general capability for developing successful park-and-ride transit operations. The following observations were made regarding the future potential of the Greenwood Drive lot service to attract riders: the competitive subscription bus service clearly dominates the market for transit to the NOB-NAS; the site is somewhat isolated from the local neighborhood; the service should have been advertised continually and more directional signs should have been provided on local roads, and the lot design is adequate, but better maintenance and security are desirable.

Demetsky, MJ Robertson, RN Jalette, RE (Virginia University) *Transportation Research Record* No. 718, 1979, pp 28-30, 2 Tab., 4 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

31 303938 BUS ROUTE ANALYSIS MODEL (BRAM) SUMMARY REPORT. This describes the bus route analysis model (BRAM), a computer system that was developed to design bus routes. The computer program uses an iterative process to test various route configurations and to minimize the number of routes, the distance traveled, and the total travel time within constraints established by the parameters of maximum riding time and average speed of the bus. In the active mode BRAM designs bus routes by first dividing the district into a number of pie-shaped sectors, which are preselected by the planner, and then designing a route within each sector. Bus stops are first assigned to a sector by location and are then assigned to a route. A theoretical loop curve that represents an ideal route is used to form the routes. Bus stops are assigned to the route based on distance from the ideal curve and other constraints (such as bus capacity and student travel time). In order to test feasibility the routes are then subjected to a modeling procedure to determine travel time and travel distance. Through an iterative process various configurations of routes are tested until the best configuration is determined. BRAM is user oriented. A user's procedure manual describes the procedures for data collection and completion of coding forms, which are then keypunched. Support personnel input the data to the computer program and also establish the various parameters and constraints used. The printout is then sent back to the school district,

where the routes are plotted and analyzed. The computer program also includes a management information system that can summarize daily statistics and print out monthly reports on the bus system. These reports provide information on the buses, routes, employees, and related costs. BRAM provides a design tool that can quickly investigate route alternatives for school buses or other fixed-route transit systems.

Bengtson, R (Upper Great Plains Transportation Institute) Markue, K (North Dakota State University) *Transportation Research Record* No. 718, 1979, pp 30-34, 5 Fig., 5 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

31 303953 LIGHT RAIL TRANSIT AND BUS INTEGRATION IN EDMONTON (ABRIDGMENT). This paper discusses the appropriateness of light rail transit (LRT) and bus integration as a public transportation option in Edmonton. Three transportation options were considered: a northeast freeway option that would require 70 buses during peak periods; including express services for the corridor; an all-bus option that would require use of 150 buses during peak periods, including express services through the central area of the city; and an integrated bus-LRT option that would require 75 buses during peak periods to serve mainly as feeders and cross-city services, together with 14 LRT cars on the northeast line. An integrated option means that the LRT line is part of the transit network but uses a different technology. It was concluded that the LRT-bus system has proved able to handle the existing transit patronage and has attracted additional riders, notwithstanding the introduction of transfers. The conversion from express buses to feeder buses-LRT has been accepted as an attractive alternative. The integrated system has also shown its worth during special events at the Coliseum, Exhibition grounds, and Stadium; however, a system capable of carrying 5,400 people an hour in one direction cannot be expected to fill a stadium of 46,000 people. The disadvantage of the LRT system is that it does not serve two major trip destinations--the government center and the university--without a second transfer. A fully valid solution probably requires a more complete system.

Bakker, JJ (Alberta University, Canada) *Transportation Research Record* No. 719, 1979, pp 45-47, 2 Fig., 3 Ref.; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

31 303954 PROVIDING COORDINATED TRANSIT SERVICES BY USING A TRANSIT-FUNCTIONAL CLASSIFICATION. This paper describes a planning concept used in providing coordinated bus and rail service to a suburban county of the Washington, D.C., metropolitan area. This concept, which is that of a functional classification of transit services, is analogous to that long in use for highways. Four transit service classes are defined: transitway, regional, collector, and community. Like the highway classification, the transit classification has universal applicability to all metropolitan areas, although it is more easily illustrated in large areas. The transit-functional classification con-

cept, used by Montgomery County, Maryland, as a network planning tool, was found to be particularly useful in planning a comprehensive restructuring of county bus services that provide coordinated services to the first part of Washington's Metrorail system extending into the suburbs. The county planning department has also used the transit-functional classification concept as a policy-planning tool in carrying out a fiscal impact analysis for a growth policy study and in transit financial planning and intergovernmental responsibilities for transit operations.

Winick, RM (Maryland-National Capital Park and Planning Comm.) Alter, CH (Washington Metropolitan Area Transit Authority) *Transportation Research Record* No. 719, 1979, pp 48-53, 1 Tab., 9 Ref.; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

31 304533 LEVEL-OF-SERVICE CONCEPTS IN URBAN PUBLIC TRANSPORTATION. The study examines the level-of-service concept as it might be applied to public transportation services. It describes proposed definitions of public transportation level of service based on both system and rider attributes. The variation in public transportation quality as viewed by various user market segments is examined, and the sensitivity or demand elasticity to the various factors constituting 'level of service' is then made. Finally, a proposed study methodology to evaluate the increased level of service provided to user groups in line with their perceived measures of service quality is outlined.

Taylor, W Brogan, J; Highway Safety Research Institute, Michigan State Highway Commission UM-HSRI-78-50, Sept. 1978, 22 p.; Sponsored in part by Michigan State Highway Commission, Lansing.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298849/1ST

31 304694 ANALYZING THE FREQ3CP FREEWAY OPERATIONS SIMULATION MODEL. The report is intended to more thoroughly describe the FREQ3CP freeway simulation and priority ramp control computer program and its application on Interstate Highway 10 West in Houston, Texas. A procedure for obtaining the freeway and ramp traffic operations data (speeds and volumes) is described along with the presentation of the traffic data in its computer program compatible form. The calibrated computer program model of the peak period freeway traffic operations for both the AM inbound and PM outbound directions is obtained when the simulation program results approximate the field measured traffic data. The background information for the implementation of an economic analysis computer program was collected, updated and structured. Travel time, vehicle operating and accident cost were selected to be implemented along with fuel consumption and pollution emission data for Texas facilities.

Ritch, GP Buffington, JL; Texas Transportation Institute, Federal Highway Administration, Texas State Department of Highways & Public Transp Res Rpt. TTI-2-18-77-210-3, FHWA/RD-79-T0336, Oct. 1978, 121 p.; Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301117/8ST

31 304835 GOLDEN EMPIRE TRANSIT DISTRICT SHORT RANGE TRANSIT PLAN, FY 1979/80-FY 1983/84. The report presents an analysis of the Golden Empire Transit District to determine operations and service improvement needs over the next five years. The report addresses all of the points of the Region IX UMTA Short Range Transit Planning Guidelines at a level of detail appropriate for an

Kelly, WJ; Golden Empire Transit District, Bakersfield, CA.*Urban Mass Transportation Administration,, Washington, DC., (UMTA-CA-09-0076) UMTA-CA-09-0076-79-1, 1979, 122p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111958

31 305206 COMPARISON OF TRANSPORTATION STRATEGIES: LONG RANGE IMPLICATIONS. SPECIAL REPORT NO. 6. The report discusses the range of impacts that could be expected by combining various strategies (e.g. carpooling, rapid transit) to reduce traffic demand, fuel consumption and auto emissions. The analysis is designed to identify limits as to what the projected range of impact would be for the maximum and minimum efforts which could be implemented for each strategy. It is also designed to evaluate combinations of strategies, and to identify those strategies which complement each other.

Rosapep, TJ; Regional Planning Council, Federal Highway Administration, Maryland Department of Transportation BTL/RPC-77/004, Sept. 1977, 78 p.; Sponsored in part by Federal Highway Administration, Washington, DC., and Maryland Dept. of Transportation, Baltimore.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299486/1ST

31 305315 FIVE METHODS OF CHANGING FIXED-TIME TRAFFIC SIGNAL PLANS. In many towns, traffic is controlled by signals which are co-ordinated together on fixed-time plans. The plans are derived to suit the average traffic flows which are expected to occur during a particular time period. Since average traffic flows vary with time, it is common practice to derive a number of plans for different times of the day. This report examines what happens during the changeover from one fixed time plan to another. Five methods of changing plan are described. For each method, the average additional delay experienced by each vehicle in the network is given. The two best methods caused an additional delay of 14 seconds per vehicle in the network. The other methods tested caused an additional delay of at least 36 seconds per vehicle. (Copyright (c) Crown Copyright 1979.)

Bretherton, RD; Transport and Road Research Lab., Crowthorne, (England). TRRL-LR-879, c1979., 28p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300632/7ST

31 305352 STRONGER FEDERAL DIRECTION NEEDED TO PROMOTE BETTER USE OF PRESENT URBAN TRANSPORTATION SYSTEMS. In 1975, the Federal Highway Administration and the Urban Mass Transportation Administration jointly issued regulations requiring urban areas to develop short-range transportation plans aimed at making better use of present urban transportation systems. The regulations, however, have not been as effective as they could have been because the two Federal

agencies have not administered the regulations consistently, urban areas have not been able to institute planning processes that result in unified plans, and projects that have the most potential for improving the efficiency of existing transportation systems have not been widely adopted. The Secretary of Transportation needs to strengthen Federal administration of the regulations.

General Accounting Office Cong Rpt. CED-79/126, Oct. 1979, 71 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300974/3ST

31 305421 GUIDELINES FOR USING OPERATING CHARACTERISTICS IN THE EVALUATION OF PUBLIC TRANSIT SERVICE.

This report is an introduction to transit service evaluation and its application to transit systems such as those of upstate New York. The intent of the report is to serve as a basis for legislative decision-making concerning public transit services. The concept of transit evaluation in terms of level of service is discussed in detail. The state of the art in research and practice is studied. The theory of transportation evaluation is examined along with several of the important issues involved such as transit operating subsidy. The main purpose of the report is to present and discuss a comprehensive set of service characteristics which should be considered in bus transit evaluation. The application of an evaluation methodology is discussed and an example is given to clarify the concepts. The report proposes guidelines which explain how the New York State Legislature and other agencies should become involved in the implementation of a transit evaluation system. Some of the difficult issues which may arise are mentioned as well as measures that could be taken to abate these problems.

Allen, WGJ DiCesare, F ; New York State Assembly Scientific Staff, National Science Foundation SS-504, NSF/RA/G-75/095, June 1975, 97 p.; Prepared in cooperation with Rensselaer Polytechnic Inst., Troy, NY. School of Engineering, and New York Sea Grant Inst., Albany.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301429/7ST

31 305441 URBAN TRAVEL DEMAND FORECASTING PROJECT FINAL REPORT SERIES, VOLUME VII. AGGREGATION METHODS AND TESTS.

Data for the study from a survey of 771 workers drawn from about half of the San Francisco Bay Area evaluates travel patterns to determine accuracy of quantitative predictions. The choice attribute variables (travel times, costs, etc.) are from highly individualized trip simulations. Presented are two new aggregation methods. The first determines which variables contribute the bulk of aggregation error in a particular setting as a basis for selective disaggregate data collection. A minority of variables can be corrected for aggregation error and they vary with the scale of aggregation. The second method, the utility classification method, has much greater computation efficiency and more systematic implementation criteria than the by-variable-value classification method. Recommendations are made on which aggregation and data collection methods should be used for several planning categories. The report identifies the effort necessary to achieve accurate aggregated predictions for traditional segmented sys-

tems and recommends prediction frameworks better matched to planning needs, data resources, and aggregation requirements.

Reid, FA ; California University, Berkeley, National Science Foundation Final Rpt. UCB-ITS-RR-78-6, NSF/RA-780635, July 1978, 158 p.; Grant NSF-APR-74-20392; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-102577

31 305542 NORTHWEST INDIANA TRANSIT SYSTEM PROGRAM. No abstract available.

Barton-Aschman Associates, Incorporated, Urban Mass Transportation Administration 3 Volumes, 1977, 335 p.; Set includes Phase I, Phase II and Phase III Reports as RRIIS 23 305543, PB 80-111206, RRIIS 23 305544, PB 80-111214 and RRIIS 23 305545, PB 80-111222; Bulletin 8002.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111198

31 305543 NORTHWEST INDIANA TRANSIT SYSTEM PROGRAM. PHASE I REPORT: EXISTING TRANSIT SYSTEM CHARACTERISTICS AND DEMAND ANALYSIS.

The Northwestern Indiana Regional Planning Commission (NIRPC) had a Transit System Program (TSP) prepared. This TSP is intended to serve as a basic reference for future transit planning. As such, it is being used to develop the transit improvement program (TIP) for the region and serve as the transit element of the transportation systems management (TSM) program. The goal of the study was to prepare a five-year capital improvement and noncapital intensive program for mass transportation that is consistent with the goals and policies of NIRPC, with Urban Mass Transit Administration requirements, and with accepted transit engineering/planning practices, and also responsive to local needs and desires. The transit system program is being coordinated with other regional plans and developed with the understanding that it should be updated annually. The study is completed in three phases with a separate report issued at the conclusion of each phase: Phase 1-Existing Transit System Characteristics and Demand Analysis; Phase 2-Plan Development; Phase 3-Five-Year Transit Improvement Recommendations. This report summarizes the work completed in Phase 1 of the study. This work included extensive data collection. It included discussions with, and obtaining operating statistics from the existing transit operators; interviews with representatives of special interest groups; a survey of current transit riders; and the assembly and review of all pertinent planning data. The data was then analyzed to review the operation of existing transit service and identify shortcomings, determine existing and unfilled demand for public transportation, and to identify key problems and issues relating to mass transportation in Lake and Porter Counties.

Barton-Aschman Associates, Incorporated, Urban Mass Transportation Administration Feb. 1977, 123 p.; See also Volume 2, PB80-111214. Sponsored in part by Urban Mass Transportation Administration, Washington, DC. Prepared for Northwestern Indiana Regional Planning Commission, Highland. Also available in set of 3 reports PC E11, PB80-111198.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111206

31 305544 NORTHWEST INDIANA TRANSIT SYSTEM PROGRAM. PHASE II REPORT: PLAN DEVELOPMENT.

Phase II of the study of the Northwest Indiana Transit System program shows the development and evaluation of alternative transit service concepts. Based on local and regional transit goals and objectives, specific criteria to be used in the formal evaluation process were identified. A wide range of alternative service concepts that would meet the existing and unfilled demand for public transportation in the region were tested. The most promising of these were then developed in sufficient detail for evaluation and public review. Based on the results of the formal evaluation and comments received during the public review, a recommended program--incorporating the best components of the various alternatives and appropriate for the estimated funding available--was then selected. The Phase II report serves as the technical basis for the detailing of the recommended Program in Phase III.

Barton-Aschman Associates, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0040) Jan. 1978, 58 p.; See also Volume 1, PB80-111206 and Volume 3, PB80-111222. Prepared for Northwestern Indiana Regional Planning Commission, Highland. Also available in set of 3 reports PC E11, PB80-111198.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111214

31 305545 NORTHWEST INDIANA TRANSIT SYSTEM PROGRAM. PHASE III REPORT: FIVE-YEAR TRANSIT IMPROVEMENT RECOMMENDATIONS.

The report is the third phase of a three part transit development program for Lake and Porter Counties, Indiana. This report presents the technical details needed to implement the transit program as recommended in Phase II of the study. The transit system recommended for Northwest Indiana consists of four elements: a regional bus route system, commuter service, express service, and service for the elderly and handicapped. The report discusses financial requirements, sources of assistance and suggests administrative structure for operation of the service.

Barton-Aschman Associates, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0040) June 1979, 154 p.; See also Volume 2, PB80-111214. Prepared for Northwestern Indiana Regional Planning Commission, Highland. Also available in set of 3 reports PC E11, PB80-111198.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111222

31 305839 DEVELOPMENT OF AN URBAN PEAK-HOUR TRAFFIC MODEL BASED ON THE 1970 CENSUS AND CONCURRENT GROUND COUNTS, PHASE II.

The application of the 1970 Census Urban Transportation Planning Package (UTPP) for the development of a peak hour model was attempted. A peak hour model as a function of the UTPP file was not developed. The major reason for not developing a model was that the research methodology is highly dependent on other sources of data and models. It is argued that the research effort was unsuccessful because of the reliance on other data sources especially the need for origin destination information from a survey. An additional effort in this research was to impact and to evaluate

transportation related questions in the 1980 Census instrument.

Covault, DO Moskaluk, MJ; Georgia Institute of Technology, Georgia Department of Transportation, Federal Highway Administration, (GDOT-7005) Final Rpt. SCEGIT-78-172, July 1979, 54 p.; See also P.J-218234. Sponsored in part by Georgia Dept. of Transportation, Atlanta., and Federal Highway Administration, Atlanta, GA. Georgia Div.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-127467

31 307710 DEVELOPMENT OF CONGESTED AREAS BY MEANS OF PUBLIC PASSENGER TRANSPORT [Erschliessung von Verdichtungsraeumen Durch den Oeffentlichen Personennahverkehr]. After some introductory definitions and a description of the traffic situation in congested areas, the author establishes the necessity for more rapid developments in transportation. Interdisciplinary studies are required which would take into account the traffic-related, sociological and economic premises and which would have as their goal a co-ordinated total regional concept. Making use of the requirements of the OEPNV, considered from the viewpoints of the user, the operator and the community at large, certain fundamental considerations are identified in relation to the provision of rail-bound and non-rail-bound local transportation. Finally, alternative solutions and possibilities for improvement of transportation services in congested areas of large conurbations and in moderately congested areas are presented, and proposed for further research. /TRRL/ [German]

Heimerl, G (Stuttgart University, West Germany) *Internationales Verkehrswesen* Vol. 29 No. 5, Sept. 1977, pp 284-290, 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 307714), Federal Institute of Road Research, West Germany

31 307764 PUBLIC TRANSPORT PLAN APPENDIX 3-REPORT OF CONSULTATION. This document is an appendix to the Public Transport Plan and contains the following addenda: (1) schedule of bodies receiving copies of the preliminary draft; (2) submissions from consultees; (3) summary of comments and observations and action approved by County Council Highways & Transportation Committee; and (4) summary of submissions received after early December 1978. /TRRL/

East Sussex County Council Monograph Apr. 1979, 75 p., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 242051)

31 307765 PUBLIC TRANSPORT PLAN 1980/81. This is the second edition of the County Council's Pt Plan, and is arranged as follows: part 1-needs: present and future. This covers road passenger transport, school and rail transport, ferries, and the consultation process. Part 2-problems. These are issues concerning all types of transport affecting the county as a whole and certain areas in particular. Part 3-objectives. This part presents the overall strategy and future role of public transport. Part 4-policies. These concern the various transport modes, their compatibility with broader transportation policies, and the need for flexibility. Information on the financing of road, rail and school transport is presented, together with the possible rationalisation of some

services. The infrastructure of the transport system is considered, e.g passenger interchanges and bus shelters. The implementation of the public transport policy is covered in part 5. This includes annual expenditure and the financial programme for 1980-85. Details are given of the county policy towards individual operators such as British rail and London transport. The section concludes by considering transport within the district council areas and those of the neighbouring county councils. Travel data is summarised in the appendices. /TRRL/

Essex County Council Monograph July 1979, 121 p., 7 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 242349)

31 307889 KENT COUNTY COUNCIL. PUBLIC TRANSPORT PLAN 1980-81. PRELIMINARY DRAFT FOR CONSULTATION ONLY. In this report a summary is given of the major tasks to be undertaken over the next five years. The responsibilities of the County Council towards public transport are presented, in the light of traffic acts and regulations, and a description given of existing public transport services in Kent. The objectives and policy of the local authority to satisfy transport demand is included. Details are given of a 5-year development plan for bus and rail services covering urban, inter urban and rural areas. A fares policy for the same period is presented. The financial performance of local bus operators is examined, together with school transport and the rail network in the county. Transport within the district councils' areas are considered. (TRRL)

Kent County Council Monograph 1979, 188 p., 23 Fig., 19 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 242757)

31 307958 A SET OF METHODS IN TRANSPORTATION NETWORK SYNTHESIS AND ANALYSIS. The article discusses the problem of modifying a transportation network in order to meet an existing demand. A set of procedures were applied to the replanning of a medium-size town bus network in a number of case studies. The chosen approach, which is the result of five years research applied to ten towns in France, is described and results are presented and discussed for two cases. (TRRL)

Dubois, D Bel, G Llibre, M (Centre D'etudes Res Toulouse, France) *Journal of the Operational Research Society* Vol. 30 No. 9, Sept. 1979, pp 797-808, 5 Fig., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242602)

31 308105 THE (R) EVOLUTION OF A REGIONAL ROADS PROGRAM FOR VANCOUVER. The Greater Vancouver Regional District has prepared a 5-year Regional Roads Program which would advise on planning, priority setting and financing for major arterial streets throughout the region. The program seeks to preserve transportation corridors by including them in the Official Regional Plan, determines region-wide priorities for improvements to regionally significant roads, and proposes sources of financing for a regional improvement program. The program identified designation criteria to define a network of regionally significant roads. The program collected transportation data from which current arterial road deficiencies and future needs were identified. Municipal and provincial plans and capital budgets for arterial road con-

struction were compiled and compared against both current deficiencies and future needs. The Program is currently assessing future arterial plans in meeting existing deficiencies for future needs from a region-wide perspective. This process will be complemented by an independent estimate of future roads needs based on a forecasting of urban development trends and various rapid transit options. transit options.

Hamilton, GD (De Leuw Cather Canada Limited) Glover, RS Spaeth, JD (Greater Vancouver Regional District, Canada); Roads and Transportation Association of Canada Preprint 1979, pp 23-44, 5 Fig., 3 Tab., 3 Ref.; Annual Conference Preprints.

31 308125 A NOTE ON BUS ROUTE EXTENSIONS. This paper investigates the circumstances under which bus route extensions can be viable. Ten recent route extensions in Albany and Rochester, New York are examined with respect to ridership generated, length and frequency of service, type and size of the new population served, and additional operating cost. The extensions included extensions to new residential and industrial sites, reverse commute services, and services to major employment sites. A simple revenue/cost ratio for bus route extensions is used to compare the results. Confirming conventional wisdom, the paper concludes that route extensions which are (a) short, (b) serve a dense area of concentrated employment or residences, and (c) do not increase main-route headway, are the most likely to be successful. (Author)

Boyle, DK; New York State Department of Transportation, Department of Transportation Prelim Rpt No. 164, Aug. 1979, 12 p., 2 Tab., 4 Ref.

31 308283 STUDIES ON THE POSSIBILITIES OF USE AND LIMITATIONS OF RAIL TRANSPORT AS A MEANS OF ACCESS TO AIRPORTS [Untersuchungen ueber die Einsatzmoeglichkeiten und Grenzen des Schienenverkehrs als Zubringer zu Flughafenen]. Means of access should not only be studied as short-distance, but also as long-distance transport. The report makes a general comparison between rail links and other transport modes, to assess the importance of the railway and the most favourable areas for its application. [German]

Belting, R; Technical University of Braunschweig, West Germany No. 20, DB:Dok 5034, 1979, 259 p., 23 Tab., 81 Phot., 62 Ref., 5 App.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Technical University of Braunschweig, West Germany, Pockelstrasse 14, D-3300 Braunschweig, West Germany

31 308522 THE DESIGN OF BUS-RAIL TRANSIT FACILITIES. The reasons for integrating bus and rail services are given and the physical aspects of station design, and the operational integration relevant to design are considered. The special aspects of bus/light rail integration are also discussed. The article emphasizes the need for integration of different modes of transit, especially bus and rapid transit. The elimination of transfer charges will help in the area of fare coordination. Schedules can also be coordinated without any capital investment and could lead to operating cost savings. Any short-term loss in revenue will be made up by

increasing patronage. Efficient station design can follow. Existing rapid transit systems should improve amenities at the transfer point. A major improvement would be to add direct (bus-to-paid area) transfer areas and common fare collection systems. New systems such as those in Atlanta, Miami, Baltimore, Buffalo and Washington, D.C., should give top priority to bus/rail coordination.

Stanger, RM (Metropolitan Atlanta Rapid Transit Authority) Vuchic, VR (Pennsylvania University, Philadelphia) *Transit Journal* Vol. 5 No. 4, 1979, pp 61-72, 5 Fig.; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

31 308563 ANALYSIS OF THE METROPOLITAN BOSTON TRANSPORTATION SYSTEM DURING THE POSTBLIZZARD WEEK--FEBRUARY 13-17, 1978. On February 6 and 7, 1978, a major blizzard crippled transportation services in the Boston metropolitan area. The disruption was so great that all but emergency vehicles were banned from the streets and highways in most eastern Massachusetts communities during the week after the blizzard. Not until midnight on Monday, February 13, was the ban completely lifted in the densely populated activity centers of the region. In some of these communities an on-street parking ban remained in effect through Tuesday, February 14. In addition to these legal restrictions, large quantities of snow presented additional obstacles to vehicular travel. Because of these legal and physical impedances, state and regional transportation agencies encouraged the use of transit or ride sharing for work trips in the region. In addition, the state recommended staggered work hours for employees in downtown Boston. This paper analyzes the effects of the driving and parking bans on travel in the region. Data pertaining to the volumes and temporal distribution of the various modes of travel during the week after the blizzard were collected and analyzed. These data were compared with travel data from a more typical time period. The analysis indicates that a significant shift to public transportation took place for the commute-to-work trip and that, through a combination of staggered work hours and special suburban transit services, the public transportation system was able to accommodate the great increase in demand. This shift to public transportation was only temporary in nature, however; normal preblizzard travel patterns returned when restrictions on vehicular travel were removed. (Author)

Dansker, B Kalauskas, C (Central Transportation Planning Staff) *Transportation Research Record* No. 723, 1979, pp 31-39, 6 Fig., 7 Tab., 2 Ref.; This paper appeared in TRB Record No. 723, Travel Behavior Methodology.; ORDER FROM: TRB Publications Off

31 308790 PEAK PUBLIC TRANSPORT: AN AREA STUDY. A study of the supply of and demand for peak public transport services in an area centred on the large free-standing town of Northampton is reported. Two publicly-owned bus companies supplied virtually all the stage services within the area while, by contrast, 24 privately-owned bus and coach companies supplied the vast majority of the numerous contract services to schools and workplaces. In the morning peak the two groups of companies ran

comparable numbers of in-service vehicle-kilometres in their respective areas of operation. While the publicly-owned companies carried about twice as many passengers as the private ones they generally catered for shorter journeys so that the numbers of passenger-kilometres carried by the two groups were comparable. A smaller though significant amount of transport was provided for workers by employer-owned vehicles. Fares were not charged at all on the majority of works services and on many of the remainder were only nominal so employers were shown to provide substantial financial support for public transport within the study area, alongside the county councils (who provided the overwhelming majority of school services) and central government. There was judged to be only very limited competition between the stage buses and other services.(a) (TRRL)

Jackson, RL Martin, PH ; Transport and Road Research Laboratory, (0305-1293) Monograph SR 885, 1979, 18 p., 4 Fig., 4 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244172)

31 308823 A WAY TO BETTER BUS SERVICES. The paper begins with a bus operator's view of the principal objectives necessary to attract passengers to his services and indicates some areas where the highway engineer can assist the operator in achieving these objectives. The engineer discusses these points and uses two examples, one the history of a contra bus lane in a Lancashire town and secondly the differing approach to public transport adopted in the new towns of Skelmersdale in Lancashire and Run-corn in Cheshire. The authors have deliberately maintained a general and somewhat non-technical approach to the subject and up to this point the engineer's views have been somewhat critical. In the final section the definition of highway engineer is widened to cover the role of the county engineer as a co-ordinator of public transport and an explanation is given of the highly successful relationship that has developed between Ribble Motors Ltd and Lancashire CC, with special reference to the agency method of bus operation in the area of those district councils that have their own municipal services. (a) /TRRL/

Whiteley, JM (Lancashire Country Council) King, BR (Ribble Motor Services Limited) *Highway Engineer* Vol. 26 No. 10, Oct. 1979, pp 3-9, 3 Fig., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244129)

31 308844 DOWNTOWN TRANSIT MALL. PRELIMINARY EVALUATION. This report, prepared by Rice Center, for the City, Office of Public Transportation, describes three design options for a downtown transit mall and documents the results of a comparative evaluation across nine impact parameters. Both the need for a transit mall and general design concepts have been established in a previous study. The intent of this report is to provide sufficient information to the City, the Metropolitan Transit Authority (MTA), and affected downtown groups so that they can select, from the three options presented herein, a final solution to carry forward into detailed design and construction. The next steps include design and costing, specific impact studies such as utility relocation, tunnel access, retail impacts during and after construction, and joint development opportunities, an environmental im-

pact statement, and preparation of the preliminary engineering grant application. This document contains a technical report of three parts and two appendices. The first part of the report documents a summary of findings of the study, the second describes the current situation and design options which were developed. The final part details the evaluation of the design options across nine specific impact parameters. A fixed time reference has been established for each design option to insure timely analysis, evaluation and implementation between 1978 and 1985.

Rice Center, Urban Mass Transportation Administration UMTA-TX-09-0089, Dec. 1978, 114 p., Figs., Tabs., Apps.; This work was prepared under Contract 17485 with the City of Houston as Administered by the Office of Public Transportation and Houston-Galveston Area Council.; Contract 17485

31 308847 URBAN PASSENGER TRANSPORTATION SYSTEMS: SOME SELECTION CRITERIA. This article discusses some of the factors that should be considered when planning on urban passenger transportation system by drawing the experience of metropolitan Toronto. An important factor is the cost and energy intensiveness of a given mode (e.g. the diesel bus is much less energy intensive than rail transit, while the low occupancy automobile is the most energy intensive of all). Another is convenience and travel time for the passenger. Rail transit is generally perceived as providing a superior service to bus systems, but the latter can be upgraded to approach the convenience of rail by providing exclusive rights-of-way and improved stations and shelters. The main factor to consider when the transportation network and designating the land uses is population density. A residential density of not less than 15,000 persons per square mile is considered necessary to make public transit viable. The most economical tool for transportation improvements is a transportation management system designed to make more efficient use of existing highways, streets and transit systems without requiring large capital investments. This concept calls for establishing better balance and coordination among various elements of the urban transportation system in order to contribute to broader local and national goals of energy conservation, economy, environmental improvement, equity for transit dependent persons and the creation of aesthetically attractive urban land forms. This in turn calls for improved vehicular flow, high-occupancy vehicle preference, travel reduction, parking management, ride sharing, transit and para-transit improvements and transit-management efficiency measures.

Cooke, HR (Acres Consulting Services Limited) *Urban Forum/Colloque Urbain* Vol. 4 No. 4, 1979, p 4

31 308947 TRAFFIC REORGANIZATION OF UPPSALA CITY CENTRE 1972. SUPPLEMENTARY STUDIES 1978 [Trafikreglering av Uppsala Stadskaerna 1972. Efterstudier 1978]. A traffic reorganization plan for the city centre of Uppsala in Sweden (population 140000) was put into operation for a period of one year in 1972. The aim being above all to: (A) improve conditions for pedestrians and cyclists with regard to safety, noise and air pollution, (b) improve conditions for bus passengers by introducing a faster

and more regular service, and (C) restrict the volume of car traffic in order to avoid increasing the width of existing streets. In order to evaluate the effect of the trial period a comprehensive investigation was carried out (in May and September) before the plan was put into operation, as well as during the year long trial period (mainly during the months of April and May 1973). After the trial period the reorganization plan was established and is still in operation. A similar investigation was carried out in 1978. The aim being to, if possible, clarify the effects which the traffic reorganization would have had over a longer period of time. Effects on traffic flow, journey speed, noise, accidents, parking, shopping and journey habits and retail trade sales were studied. Difficulties which arose were in estimating the extent to which the traffic reorganization contributed to the changes which have taken place in the city centre, and to the changes in traffic to and from the city centre. In this report a general view of the effects is made. However the main aim of the report is to give an account of the findings of the investigations, which can be then used as a basis for further and deeper analysis. (TRRL) [Swedish]

Transportforskningsdelegationen Monograph TFD1979:7, Mar. 1979, 80 p., 21 Fig., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 243640), National Swedish Road & Traffic Research Institute

31 309577 DEMONSTRATION CYCLE TRACKS IN THE HAGUE AND TILBURG [Het gebruik van de demonstratie fietsroutes in den Haag en Tilburg]. One of the studies connected with the demonstration projects on cycling in a big city and a middle-sized town in the Netherlands deals with the usage of these cycle tracks. The article gives an introduction on the total study design and the objectives. It specifies the actual stage of implementation and gives major results of traffic counts. The main conclusions are that bicycle usage in both towns has increased especially for non-compulsory trips. The special tracks attract many cyclists from parallel routes, the "catchment area" stretching for about a sixth of a mile both sides of the track. There is only a slight influence on mode choice. There are only minor effects on public transport usage. (Author/TRRL) [Dutch]

Dersjant, A Wentink, C Hoekwater, J *Verkeerskunde* Vol. 30 No. 8, Aug. 1979, pp 358-361, 2 Fig., 5 Tab., 4 Phot., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243311), Institute for Road Safety Research

31 309755 TWO-WHEELED VEHICLES IN THIONVILLE-1-GENERAL REPORT, 2-DETAILS OF FACILITIES [Les deux-roues a Thionville- 1-rapport general, 2- detail des aménagements]. The authors state four current requirements regarding two-wheelers: to improve safety, to give them a fair share of access to the town's facilities, to give people a real choice of transport mode, and to improve the quality of life and of the environment. This report describes various means of improving two-wheeled vehicle traffic: dense network of cycle tracks, which it is possible to establish in the town of Thionville, with a short-, medium-and long-term policy. It is also possible to take actions as regards the parking of these vehicles. Plans of the whole and parts of the network are appended. [French]

Rebois, M Royer, R ;

Centre d'Etudes Tech de l'Equipement de l'Est Monograph Sept. 1977, 127p, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 105516), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

31 309917 A COMPARISON OF STREET-CAR AND SUBWAY SERVICE QUALITY. Replacing a surface streetcar line with grade separated rail rapid transit will often improve operating speeds substantially; but increased station spacing means longer walks to the stops or stations, and rapid transit service is often less frequent. A time cost model is employed to evaluate trips in which service has been improved or degraded by the Bloor subway construction in Toronto. It is found that trips up to four miles in length, and sometimes much more, have become more time-consuming. With the high disutility of walking time, the proportion of travellers experiencing degraded service may be surprisingly large. (a)

Deweese, DN (Toronto University, Canada) *Journal of Transport Economics and Policy* Vol. 13 No. 3, Sept. 1979, pp 295-303, 4 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244332); ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England

31 309986 COMPARISON BETWEEN URBAN/SUBURBAN AND MONOCENTRIC AND POLYCENTRIC RAIL NETWORKS [Vergleich mono-und polyzentrischer S-Bahnnetze]. Following the creation of the new polycentric S-Bahn network of the Rhine-Ruhr region, the author examines the differences between monocentric and polycentric S-Bahn networks from the point of view of transport, operations and network design as well as similarities, to see what conclusions can be drawn as to the performance of the different concepts. [German]

Endmann, K *Eisenbahntechnische Rundschau* Vol. 28 No. 10, No Date, pp 759-770, 9 Phot., 9 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

31 309990 INTERNATIONAL CONGRESS-INTERNATIONAL UNION OF PUBLIC TRANSPORT (UITP), 43RD, 1979. Proceedings include 12 papers one of which contains short presentations on the transportation management. The papers discuss the adjustment of surface public transport supply to urbanization trends; evolution and perspectives in regional public transport; technical and economic aspects of articulated buses; traffic evaluation methods; management systems in public transport, including staff adaptation; and light rail transport system for the future.

International Union of Public Transport 1979, v.p.; International Congress of the International Union of Public Transport 43rd, 1979, Helsinki, Finland June 10-15, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium

31 310074 SEMINAR 1979. URBAN TRANSPORT AND THE ENVIRONMENT, 10-12 JULY 1979. 2. CASE STUDIES. This volume contains a series of case studies which exemplify

the introduction of urban transport policies in cities of varying size, geographical situation, and historical development. The case studies presented are as follows: Gothenburg, Sweden (Blide, B); Ottawa, Canada (Bonsall, JA, Somerfeld, WO and Hue, R); Groningen, Netherlands (Bourdrez, JA, Klaaseen, LH, Otten, GR and Van der Vlist, JA); Oporto, Portugal (Bovy, P, Ferreira, G and Stohler, W); Osaka, Japan (Morita, K); Ankara, Turkey (Oezdirim, M); Paris, France (Bovy, P, Fradin, J-R and Fisher, J-J); Brussels, Belgium (Forton, P and Miyazaki, T); Singapore, Kuala Lumpur and Bangkok (Dunkerley, H); Area Licensing in London (Bayliss, D); Curitiba, Brazil (Dely, R). (TRRL)

Organization for Economic Cooperation and Development Monograph 1979, 283 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 244719)

31 310186 ANNUAL CONFERENCE PRE-PRINTS-PLANNING TECHNICAL SESSION AND WORKSHOPS, 1979. The following papers are to be presented at the conference:-Productivity gains from increasing the size of intercity buses (Taylor, GW); Paratransit in Ontario (Bonner, DM); Transit in the Battlefords-An innovative system (King, JM and McCleary, RE); The Ontario share-a-ride program (Dalton, P, Harmelink, M, Smith, D and Wong, J); Car and vanpooling in Canada-Its immediate past and prospects for the future (Johnson, WF and McCoomb, LA); Land use and metropolitan transit (Nitkin, D); The role of joint development and value capture in transit planning (Lacey, AM, Martin, TE and Read, AE); Background to Calgary's choice of LRT (Hemstroock, JD); continued on IRRD Abstract No 244442. (TRRL)

Roads and Transportation Association of Canada Monograph 1979, 324p, 31 Fig., 58 Tab., 4 Phot., 115 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244441), Roads and Transportation Association of Canada

31 310189 ANNUAL CONFERENCE PRE-PRINTS-TRANSPORTATION OPERATIONS SESSION, 1979. The following papers are to be presented at the conference:- A traffic accident information system for Saskatchewan (Popoff, AJ, Massier, A and Hack, C); A state-of-the-art review of non-capital intensive transportation options and the applicability to the City of Winnipeg (Nielsen, LD); Standardization in computerized traffic control (Heti, G and Case, ER). (TRRL)

Roads and Transportation Association of Canada Monograph 1979, 66 p., 6 Fig., 7 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244435), Roads and Transportation Association of Canada

31 310249 CITIES AND TRANSPORT IN EVOLUTION. This paper surveys the historical interrelationships between the development of cities and of transport. Factors outlining accessibility of cities are discussed. The result of the continuing improvement of long distance transportation by water, rail and recently air has been an exponentially growing trend towards concentration of activities and population in large metropolitan agglomerations. The introduction of the automobile has brought about a radical

change in urban form, which in turn has affected urban transportation planning. This historical survey points to an increasing shift in the modal split to the automobile. (TRRL) [French]

Blumenfeld, H (Toronto University, Canada); Transport Canada Research and Development Centre Monograph Working Paper 1, 1978, 44 p.; ACKNOWLEDGMENT: TRRL (IRRD 244444), Roads and Transportation Association of Canada

31 310333 LOCAL BUS SERVICES IN OXTED, A REPORT ON TWO EXPERIMENTS. This report describes two experiments, in which a maximum off-peak fare was applied to a local Oxted bus service, to establish whether a reduced fare would generate an increase in journeys and whether this increase would be reflected as a gain in total revenue, and a shopping service was introduced from outlying villages to see if it could justify itself. An analysis of daily ticket issues/cash income records over two years shows that the fare reduction increased passenger journeys by 35 per cent but reduced revenue by ,1500. The village bus carried 8000 passengers at a further loss of ,1500. Recommendations are given for increased fares which it is hoped would make up for the loss in revenue with the minimum loss of passengers. It was also recommended that revised publicity material should be distributed on a house-to-house basis. (TRRL)

Surrey County Council, England Monograph Feb. 1979, 20p, 3 Fig., 7 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 244351)

31 310369 THE BENEFITS OF MINIBUSES. THE CASE OF KUALA LUMPUR. The introduction of 400 minibuses in Kuala Lumpur (population approximately one million) makes possible an analysis of the net benefits of this policy change. On conservative assumptions it is shown that the value of benefits was US \$10 million per annum, or US \$17 per head of the adult population-almost 1% of the per capital income. This value is surprisingly large, and suggests that the same policy might show a similar gain in other countries.(a) (TRRL)

Walters, AA *Journal of Transport Economics and Policy* Vol. 13 No. 3, Sept. 1979, pp 320-334, 3 Fig., 2 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244330)

31 310384 FACTORS INFLUENCING THE PLANNING AND DESIGN OF BUS TERMINALS. This paper is concerned with the planning of city-centre bus terminals for urban services. The factors which affect the decision to develop a bus terminal are discussed, and the importance of precise location in the heart of the city centre is stressed, related as this is to high land costs, the availability of suitable land and the constraints of the surrounding road network. Peripheral locations are shown to result in disbenefits in terms of increased bus operating costs. The major issues which influence the design of a terminal once the decision to proceed has been taken are reviewed, related to arrangements for segregating bus and passengers within the terminal, bus manoeuvring, type of bus stand and the separation of boarding, alighting and storage stands. Reference is made to recent bus terminals in Britain-Bradford, Huddersfield, Northampton, Preston and Manchester. Alternative configurations associated with the preliminary design of a major bus terminal in

central Dublin and associated statistical data are illustrated and discussed. It is suggested that in the case of city centre locations, there would appear to be substantial merit in seeking to integrate into the design some other development appropriate to the needs of the city centre which can help defray land acquisition costs likely to be involved. (TRRL)

Steer, JK (Steer, Davies and Gleave) *Traffic Engineering and Control* Vol. 20 No. 8/9, Aug. 1979, pp 406-409, 6 Fig., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244356)

31 310573 MIDDLESBROUGH CYCLEWAYS. A description is given of Middlesbrough's urban cycleway which was completed in 1978, many years before the local authority thought possible. It was decided that any cycleway scheme in Middlesbrough would be based on new routes along the existing areas of open space, or by utilising existing footpaths and carriageways already established. These criteria meant that the expenditure involved in establishing such a scheme would be minimal being based upon minor alterations, signs and new road markings. Any decision to delete the cycleway scheme after an experimental period would result in a useful addition to the existing footpath system and minimal abortive costs. The main philosophy behind the provision of cycle routes was to provide four north/south routes on the lines of established linear parks and to link these routes to residential areas by a number of east/west routes. The theoretical objectives for route location were to provide a direct route more attractive from the point of view of travel time than the existing highway system and that the routes should pass as close as possible to the main traffic generators and with special priority for educational establishments. Details are given of the various routes, design standards and construction details. The innovative traffic regulation orders required to implement the scheme are described together with a note on promotion of the system and costs incurred. A survey on the use of the cycleway and attitudes to it is being made by the Transport and Road Research Laboratory with assistance from the Highway Authority and Middlesbrough Borough Council. (TRRL)

Ratcliffe, JT Turver, MG (Middlesbrough Borough Council, England) *Chartered Mechanical Engineer* Vol. 106 No. 5, May 1979, pp 146-150, 3 Fig., 1 Tab., 5 Photo.; ACKNOWLEDGMENT: TRRL (IRRD 243590)

31 311187 PLANNING FOR ACCESSIBLE TRANSPORTATION. An outline of the Dayton, Ohio program for establishing priorities and construction of curb ramps at transit bus stops is presented.

Stagich, TM (Dayton University) Boyce, RW *Public Works* Vol. 110 No. 11, Nov. 1979, p 72; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 311198 TWO PROGRAMS TO EASE AUTOMOBILE CONGESTION AT LOS ANGELES INTERNATIONAL AIRPORT. Two programs that have had a positive impact on alleviating automobile congestion at Los Angeles International Airport are discussed. One program consists of reduced-rate off-airport parking lots and free tram service to the terminal buildings. Two lots that provide a combined total of about

11,400 parking spaces are currently in operation. The other program, the FlyAway Bus, is an express bus service that transports people to and from Van Nuys, a large suburban community 32 km (20 miles) north of the airport. The service includes low-cost parking for up to 15 days at the suburban bus terminal. The success of both programs is significant not only because of their current impact on airport congestion but also because of their potential for expansion to broader uses in the future and because they prove that the public can be persuaded to trade the privacy and control of the automobile for the efficiency and convenience of public trams and buses. (Author).

Schoenfeld, WM (Los Angeles Department of Airports) *Transportation Research Record* No. 732, 1979, pp 61-64, 2 Fig.; The paper appeared in TRB Record No. 732, Aviation Forecasting, Planning, and Operations.; ORDER FROM: TRB Publications Off

31 311245 DESIGN FOR PASSENGER TRANSPORT. The book is based on the proceedings of the Conference "Design for Passenger Transport" held at the University of Nottingham in 1978. The aim of papers included in the book is to examine ways in which standards of design, particularly related to the environment, could be improved to enhance the psychological and psychological well-being of passengers and staff. Aspects of design in the fields of air, rail, road and water passenger transport are studied. Parts 1 and 2 of the book deal with passenger handling design while parts 3 and 4 examine various forms of vehicle design with an emphasis on passenger comfort. The following papers are included: Airports, railway stations and people (Roberts, ERC); Interchange design (Wood, AA and Downs, IC); Design policy for greater Manchester transport (Evans, PR); Passenger behaviour and expectations at an airport (Deighton, R); TWA corporate identity (Rondepierre, J); Aircraft, trains, buses and people (Waterhouse, R); Vehicle suspension systems and passenger comfort (Pollard, MG); Boeing jetfoil (Shultz, W); The interior design of wide bodied aircraft (Molony, G); Bus interiors-with particular reference to the Leyland Titan (Burnicle, DS and Heath, M); and, Inter-city trains (Cousins, JS). (TRRL)

Pergamon Press, Incorporated Monograph 1979, 140 p., Figs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 245470); ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

31 311322 DOWNTOWN TRANSIT TERMINAL/MALL STUDY. The report analyzes constraints and opportunities for development of a downtown terminal facility to accommodate the existing and projected needs for the Laredo Municipal Transit System. Alternatives were developed and analyzed, resulting in the selection of an off-street terminal, in the block east of City Hall, as the preferred alternative. Development concepts are presented for consideration in the design of the facility. (Author)

Smith (Wilbur) and Associates UMTA-TX-09-0123, Feb. 1980, 33p, 13 Fig., 1 Tab.; Prepared for the City of Laredo, Texas. In association with Ashley Humphries and Partners.

31 311797 PUBLIC TRANSPORT PLAN 1980-81, HAMPSHIRE COUNTY COUNCIL. This plan, produced to meet the requirements of the 1978 Transport Act, is identical to the plan for 1979/80, except that the statistics are updated and a revised section on the market analysis project bus studies is included. Details are given of the current position in Hampshire, and the arrangements used at present for the provision of public transport duties. Measures to assist and promote public transport discussed include surveys, concessionary fares, and the works programme. The various sources of finance available to local authorities and local operators are given. Consultation procedures are discussed. Details are given in an appendix of present policies and objectives, basic bus operator statistics and car parking facilities at British Rail stations. (TRRL) Hampshire County Council, England Monograph July 1979, 109 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 244895)

31 311822 WEST YORKSHIRE-A NATIONAL BUS COMPANY. This book presents a detailed history, with numerous photographs, from 1906 to the present day, of the West Yorkshire Road Car Co Ltd. A description is given throughout the book of the gradual expansion of the company to become the major operator serving both urban and rural areas in central Yorkshire. The changes in public service vehicle design are traced, the changeover during 1934-39 from petrol to diesel oil as fuel is noted, and a section included on the company's wartime operations. The post war buildup of the bus and coach fleet is considered, with a major change from front-to-rear-engined buses. The final main section covers fleet modernisation 1976-77. Information is also included on service and preserved vehicles, and on the company's depots and offices. (TRRL)

Jenkinson, KA ; Transport Publishing Company Monograph 1977, 160p, Photos.; ACKNOWLEDGMENT: TRRL (IRRD 244802)

31 312007 THE STOCKHOLM CYCLE PLAN 1978 [Cykelplan 1978 foer stockholms kommun]. This report presents a plan for the development of the Stockholm cycle road network. The plan is presented in text and on maps describing the planned cycle road network. The text describes previous plan proposals, views from organizations and authorities involved, the principles of the plan, connections with other planning, standard, costs and implementation. On the maps the planned parts of the network are described in three categories: (1) new cycle tracks/footways projected in connection with routes, street reconstruction or exploitation, (2) new cycle tracks in parks under the city park administration, (3) new cycle tracks/footways projected with special funds from the budget of the city street department. Total cost for the measures according to category 3 was calculated to 104 milj swcr (1978). From 1977 there is a special grant of 5 milj swcr per year. Consequently the implementation will take 20 years. State subsidies and temporary cycle tracks on the carriageway separated by road markings may reduce implementation time to 15 years. Background factors concerning bicycle use and possibilities are compiled in an appendix. This is intended to produce a basis for a discussion on cycle track construction. (TRRL) [Swedish]

Stockholms Gatukontor Monograph 1979, 31p, 4 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 244663), National Swedish Road & Traffic Research Institute

31 312114 ITALIAN COMPANY STRUCTURE: A GUIDE TO THE COMPLEX. Intermetro, an Italian consortium formed in 1969, is principally engaged in the design and construction of underground railway networks in Italy and abroad. It forms part of an intricate mesh of Italian financial, commercial and technological interests. Covering the whole metro field, and surface railway construction as well, IM carries out research, design, construction and equipping of all types of guided transport systems (including rubber tyred metro systems). The company presents an example of the complex structure of Italian industry and commerce, and the interrelationships that exist between companies and the government of that country. A profile of Intermetro, Italy's answer to the "total approach" to metro and railway construction, is given in the article.

Harding, PG *Tunnels and Tunnelling* Vol. 11 No. 9, Nov. 1979, pp 55-57; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 312124 FLOATING TRAFFIC CONTROL FOR TRANSPORTATION SYSTEM. This paper proposes "Floating Traffic Control", which is a dynamic scheduling with no fixed time table, for a public transportation system with high density traffic. Traffic models and evaluation functions are formulated for the control. Applying Linear Regulator Theory, the optimal control for the model is derived. Dynamics of the model and characteristics of the control have been investigated with several examples. To apply this method to actual traffic system, sensitivity analysis to system disturbance and simplification of calculating logic have been investigated.

Sasama, H Ohkawa, Y *Railway Technical Research Inst. Quarterly Reports* Vol. 20 No. 3, Sept. 1979, pp 122-125; ACKNOWLEDGMENT: EI; ORDER FROM: Japanese National Railways, Kunitachi, Box 9, New York, New York, 10017

31 312142 URBAN PUBLIC TRANSPORT IN JAPAN. This article describes some general features of public transport provision in the urban areas of Japan (especially the large urban areas), and some specific features of an integrated transport system currently being developed in one such area.

Jenkins, IA (Newcastle upon Tyne University, England) *Transportation (Netherlands)* Vol. 8 No. 3, Sept. 1979, pp 259-274, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 312273 BUSES GET PINT IN HALF-PINT POT. Manchester's new Arndale bus station, which can handle over 1000 buses a day, was originally designed in the 1960's as part of a shopping centre. The author describes the new design which had to accommodate much larger buses within the same dimensions. To make the best use of the space "available, two "saw tooth" island platforms have been provided, each with eight boarding and alighting points. Buses can also use entrance and exits in both directions. Pedestrians have a segregated perimeter walkway providing all the necessary facilities for passen-

gers. Precautions to combat vandalism are described. With only a 450 mm clearance for buses, fluorescent lighting is reflected off the tyrolean rendered roof to make the ceiling appear higher. Photo-electric cells control the light intensity at the entry and exit points to match internal and external conditions. The concrete floor slab has been waterproofed with an epoxy resin mortar, but rubber from the buses' tyres has caused difficulties with cleaning. A special ventilation system has been devised to cope with problems caused by the low profile of the building. (TRRL)

Acton, P *Surveyor - Public Authority Technology* Vol. 155 No. 4573, Jan. 1980, pp 14-16, 1 Fig., 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 246280)

31 312839 LUXURY EXPRESS COMMUTER COACH SERVICES. This report describes the performance of three luxury express coach services offering travel to and from the centers of cities to commuters living in outlying towns or suburbs. The services were offered at premium prices and catered for journeys between 7 and 15 miles in length. They aimed to attract managerial and professional workers from their cars. None of the services was successful. Average loadings varied between 7 and 20. The proportion of allocated costs recovered was at best 39 percent and at worst 23 percent. Discussion of the findings centers on possible reasons for this lack of success. These are believed to be fares which were high in relation to the perceived costs of motoring, the inflexible service timings, the problem of attracting sufficient patronage from limited catchment areas containing a low density of potential users and, in one case, the method of fare collection which required payment for unmade journeys. There was no evidence to suggest that services of the kind considered offered scope for success in other locations. (Copyright (c) Crown Copyright 1979.)

Jackson, RL ; Transport and Road Research Laboratory, (0305-1315) Monograph TRRL SR 497, 1979, 24 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-116593

31 313527 URBAN PARKING (CITATIONS FROM THE NTIS DATA BASE). The problems of parking in urban areas are presented. Aspects included are fringe or satellite parking for public transportation systems, airports, and parking in the central business district. (This updated bibliography contains 211 abstracts, 34 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Feb. 1980, 218p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-805369

31 314021 PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON TRAFFIC CONTROL SYSTEMS HELD AT BERKELEY, CALIFORNIA ON AUGUST 6-9, 1979. VOLUME 2A: KEYNOTE ADDRESSES; CONCEPTS AND STRATEGIES. Contents: A local traffic control policy which automatically maximizes the overall travel capacity of an urban road network; Capacity and timing calculation methods for signalized intersections; A new method of traffic-responsive control of traffic signals; Algorithms for the computer control of urban traffic; Assessment by observation and by simulation studies of the interest of different methods of bus preemption at traffic lights;

Strategic concepts in residential neighborhood traffic control; A systematic approach to the derivation of driver information requirements in work zones; Current research in planning work zone traffic control; Advance treatment of no-passing zones for safety; Strategies and effectiveness of traffic control systems on freeways in the Federal Republic of Germany; Self-sufficient control of speed on freeways; Reducing travel time by freeway ramp metering especially when peak traffic demand exceeds corridor capacity; Automatic incident detection; and Incident detection in Europe.

California University, Berkeley, Federal Highway Administration UCB-ITS-P-79-4, Dec. 1979, 320p; See also Volume 1, PB80-105091, and Volume 2B, PB80-180698. Sponsored in part by Federal Highway Administration, Washington, DC. Also pub. as ISSN-0192-4117.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-180680

31 314022 PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON TRAFFIC CONTROL SYSTEMS HELD AT BERKELEY, CALIFORNIA ON AUGUST 6-9, 1979. VOLUME 2B: CONTROL EQUIPMENT. Contents: The Northeast New Jersey route guidance; S.C.A.T. The Sydney co-ordinated adaptive traffic system-philosophy and benefits; Hampton roads traffic surveillance and control system; Signal systems without cables; On-line vehicle classification; An in-vehicle information system for drivers; The integrated motorist information system--an examination of three tradeoff studies; Highway advisory radio; The use of a CB radio-to-telephone interconnect for motorist aid communications; A sensor for control of arterials and networks; Function, equipment and field testing of a route guidance and information system for drivers; Automatic vehicle identification--tests and applications in the late 1970s; Transit vehicle fleet information and on-line management; and Automatic vehicle monitoring--a tool for vehicle fleet operations.

California University, Berkeley, Federal Highway Administration UCB-ITS-P-79-5, Dec. 1979, 312p; See also Volume 2A, PB80-180680, and Volume 2C, PB80-180706. Sponsored in part by Federal Highway Administration, Washington, DC. Also pub. as ISSN-0192-4117.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-180698

31 314024 PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON TRAFFIC CONTROL SYSTEMS HELD AT BERKELEY, CALIFORNIA ON AUGUST 6-9, 1979. VOLUME 2D: ANALYSIS AND EVALUATION; PRESENT AND FUTURE CONSIDERATIONS OF INTERACTIONS BETWEEN AUTOMOBILES AND TRAFFIC CONTROL SYSTEMS. Contents: Measures of effectiveness for urban traffic management; Capacity and quality of flow on urban arterials; Traffic data collection system for the Belgian motorway network-measures of effectiveness aspects; Effectiveness of freeway traffic control systems with respect to environmental protection; Simulation and assignment of traffic in urban road networks; A microscopic discrete-event time-oriented traffic simulation model for a two-lane highway network; Assessment of integrated traffic control

systems in downtown areas by a complex simulation model; A simulation model for signalized intersections; Computer-aided design and evaluation of traffic systems; Scope and limitations of analytical models in optimizing traffic control in urban streets; Development of a dynamic traffic assignment model of urban street networks; Route choice and traffic control in central urban areas; The comprehensive automobile traffic control system--a look at the future; Interactions between automobiles and traffic control systems; On-board logic for interaction with traffic control systems; and criteria for planning interactive traffic control systems.

California University, Berkeley, Federal Highway Administration UCB-ITS-P-79-7, Dec. 1979, 278p; See also Volume 2C, PB80-180706. Sponsored in part by Federal Highway Administration, Washington, D.C. Also pub. as ISSN-0192-4117.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-180714

31 314362 RECREATIONAL TRANSIT SERVICE TO THE CALIFORNIA SANTA MONICA MOUNTAINS [D]. This is a report on first year operations of a weekend subscription transit service to a recreational area outside a major metropolitan area. In this demonstration, the feasibility was tested of providing a seasonal recreational transit service from inner city areas of Los Angeles to Malibu Creek State Park and Tapia County Park located in the Santa Monica Mountains 35 miles west of downtown Los Angeles. The demonstration service offered access to outdoor recreational opportunities for a large portion of the region's population who are heavily dependent on public transportation. The project was intended to measure the demand for such a service and to demonstrate its economic and operational feasibility.

Webb, P ; Crain and Associates, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. UMTA-CA-06-0130-80-1, Jan. 1980, 148p; SPONSORING AGENCY: Contract DOT-TSC-1408; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB80-183056

31 314616 TRANSIT ACCESS STUDY: EXECUTIVE SUMMARY. This report summarizes the major findings and recommendations of the D.C. Transit Access Study, conducted by the District of Columbia's Office of Planning and Development. The study has been reviewed by and received valuable guidance from the staffs of the Council of Governments, Washington Metropolitan Area Transit Authority (WMATA), the D.C. Department of Transportation, as well as numerous public interest groups. The study provides an indepth overview of the access problems that may arise from the opening of Metrorail stations in the city. This overview forms the base for the recommendations, contained herein, to improve the access to many of the current and proposed Metro stations. In most cases, it is recommended that minor improvements and modifications be made to existing streets and bus routes servicing the stations to make access easier and safer. But in a few cases, major modifications are necessary to improve access. (Author)

District of Columbia, Government UMTA-IT-09-0033, Nov. 1979, 30p

31 314617 TRANSIT ACCESS STUDY: VOLUME I--CAPITOL EAST STATIONS, UPPER NORTHEAST STATIONS, FAR NORTHEAST STATIONS. This report is Volume I of a three volume study analyzing access to and from Metrorail stations in the District of Columbia. It covers the Capitol East, the Upper Northeast and Far Northeast stations. These stations are part of the Blue Line, Red Line and Orange Line, respectively of the regional Metrorail system. Although some of these stations are currently in operation, this study does not concentrate on existing conditions since changes will occur as more segments of the system are opened. Rather, the report attempts to focus on long range conditions in the year 1990 and beyond, the time period to which available patronage projections are pegged, and by which time the entire Metrorail system should be completed. It should be noted that patronage projections contained herein assume a 100-mile regional rail system and are predicated on a specific fare structure. Changes to either of these will affect patronage to all stations. The report is divided into 11 sections, one for each station discussed in this volume. Station facilities are described and analyzed for each of the 11 to assess the ability of these facilities to handle projected patronage. Types of facilities looked at include station entrances, the number of bus bays and shelters, park-and-ride and kiss-and-ride areas, pedestrian linkages, and the availability of bicycle racks and lockers. The access pathways to the stations are analyzed to determine their ability to function as conduits to the station. The street system around each station is analysed to assess its capability of handling additional automobile and bus traffic. Bus routes are studied to ensure sufficient station area service. Possible pedestrian links are investigated to make certain walk access is provided. Existing and proposed bicycle routes are examined to determine the feasibility of connecting them to Metro stations. In addition, existing land use and development potential are examined in an effort to assess the impact of these factors on station patronage and access. Finally, access issues and problems are identified, and, where feasible, recommendations made for improvements. (Author)

District of Columbia, Government Nov. 1979, 174p, Photos.

31 314618 TRANSIT ACCESS STUDY: VOLUME 3--DOWNTOWN WEST STATIONS; DOWNTOWN EAST STATIONS. This report is Volume III of a three volume study analyzing access to Metrorail stations in the District of Columbia. It covers the Downtown West stations (Farragut West, Dupont Circle and Foggy Bottom/GWU) and Downtown stations. Farragut North and Dupont Circle are part of the Shady Grove or Red Line of the regional system now in operation. The Farragut West and Foggy Bottom/GWU stations are on the Huntington or Blue Line and were opened to the public in July, 1977. Downtown Washington, the city's original commercial area, is an especially important section of the city. It is the city's and the region's major retail center, a cultural and entertainment center, a tourist center, the headquarters for the District government, and the home of thousands of city residents. Downtown is generally defined as the area between Massachusetts and Pennsylvania Avenues, 15th and Third Streets, N.W.

However, for purposes of this analysis, the definition has been expanded to include a portion of the "Monumental Core" south of Pennsylvania Avenue with Union Station on the east. The following seven Metro stations are within the area: McPherson Square, Metro Center, Gallery Place, Judiciary Square, Federal Triangle, Archives, and Union Station. Downtown is, in fact, the center of the regional system, with all lines radiating from either the Metro Center or Gallery Place stations. In this report, station facilities are described and analyzed for each of the 11 stations to assess the ability of these facilities to handle projected patronage. Detailed recommendations are made for improving access to each of the Downtown West stations. The report then examines the special nature of access planning in downtown. Next aspects of access are analyzed including the street system and vehicular traffic, bus service, the pedestrian environment, and underground links between stations and adjacent buildings. These elements are then related to overall planning for downtown redevelopment. Finally, Metro access considerations are viewed in relation to an overall transportation strategy for downtown. (Author)

District of Columbia, Government Nov. 1979, 152p, Photos.

31 314660 ANALYSIS OF AN URBAN BUS-LINE SERVING A RAPID TRANSIT. This study develops a model that predicts the distribution arrivals, unequal bus headways, unequal train headways, and alights. The arrivals of passengers at stops along the independently of trains, (2) a bus from a pool at the analysis assumes the same frequency of dispatch under all Alameda-Contra Costa County Transit District and that serves

Shanteau, RM ; California University, Berkeley Dissertain UCB-ITS-DS-79-3, Dec. 1979, 102p, Figs., Tabs., 3 Ref., 1 App.; Research supported in part by the National Science

31 314672 SOUTH SUBURBAN AREA TRANSIT STUDY. This report documents the findings of an 18-month study of the Chicago South Suburban Areas's public transportation needs. It presents a five-year program designed to meet those needs. Over 500,000 persons reside in the area's 200 square miles. Two carriers provide commuter railroad service to downtown Chicago and a third provides subregional and regional bus service. Over 60,000 trips are made by transit each weekday, to, from, and within Chicago's southern suburbs. The recommended bus plan reinforces and expands upon the existing network of services. Regional express service to downtown Chicago is maintained and route coverage is expanded. Subregional service is improved significantly through increases in frequency and the addition of new routes. Community services are also strengthened. Rail system recommendations focus on the maintenance and improvement of suburban stations and their access systems. Many suburban stations are 50 years old, obsolete, deteriorated, and have insufficient capacity or inadequate accessibility. To correct these deficiencies, a long-term program of station reconstruction is recommended. For those stations not included in the initial construction phase, immediate action improvements are identified. In addition to the improvements in bus and rail services, this study presents a plan for coordinated, substi-

itized taxi service for the elderly and handicapped and several proposals for improving transit operations through traffic engineering actions. (Author)

Scales, RC Brown, RL Weaver, TA Lundberg, BD ; Barton-Aschman Associates, Incorporated, Chicago South Suburban Mass Transit District, (1-07) Final Rpt. 4387-07, July 1979, 291p, Figs., Tabs., Photos., Apps.; Contract IT-09-0052

31 315169 BUS STATIONS [Estaciones de autobuses]. The various aspects of bus stations are discussed: general principles, legislation in Spain, requirements, suitable location, installation, economic efficiency, number of stations for each town, capacity of stations, types of station as a function of use, carrying of luggage, construction, lighting. Details are given of bus stations in Valladolid, Avila and Salamanca with regard to: influence of the terrain, urban development in each town, environmental characteristics, construction and equipment. The three examples cited fulfill the policy of the Ministry of Public Works which tries to prevent cars from crossing the town centre and to create stations of adequate capacity in a number of regional capitals. (TRRL) [Spanish]

Olalla, V *Informes de la Construcción* Vol. 29 No. 289, Apr. 1977, p 3, 12 Fig., 30 Phot.; ACKNOWLEDGMENT: Ministry of Public Works, Spain (LTMS29078E), Central Laboratory of Bridges & Highways, France, TRRL

31 316506 BUS NETWORKS AND SETTLEMENT IN TOWN CENTRES IN MEDIUM-SIZED URBAN AREAS [Busslinjenät och bebyggelse i medelstora tätorters centrumområden]. This project deals with the following questions: (1) what possibilities are there to reduce journey times by improving change possibilities for travellers within given resources, (2) what are the effects on various groups of road users, residents, bus companies, trade and authorities of alternative line strategies within a town centre. The alternatives were compared by means of case studies in 3 Swedish towns (Malmö, 250000 inh, Umeaa 80000 inh, Halmstad 50000 inh). (a) Malmö. 3 alternatives were studied, a conventional route with a central change stop and mainly radial lines, an axis system and a pole system with three poles. The differences in journey times were small. In total the pole system was found more favourable than the other alternatives. Considering other effects the pole and axis systems are better than the conventional. However, the axis and pole systems show higher construction costs. (b) Umeaa. 2 alternatives were studied. A partly developed axis system and an axis system with 3 axes. The alternatives were found equal considering both journey times and other effects. (c) Halmstad. 2 alternatives were studied. An alternative with a central change stop and radial lines and an axis system. The comparison shows that the axis system throughout is the most favourable. (TRRL) [Swedish]

Johansson, I ; Lund University of Technology, Sweden Monograph Bulletin 30, 1978, 105p, Figs., 6 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246662), National Swedish Road & Traffic Research Institute

31 316588 NEARLY OPTIMAL PARAMETERS FOR A RAIL/FEEDER-BUS SYSTEM ON A RECTANGULAR GRID. An approximate analytical model of a rail plus feeder bus system that is serving a peak-period many to one type demand is presented. The underlying highway grid is assumed to be rectangular with the railway parallel to one axis. A simple graphical solution procedure is given for the general case when all the relevant rail/feeder-bus parameters are free. Explicit analytical solutions are given for the lower and upper bounds and for two special cases in which the station locations are pre-determined and the feeder-bus routes are relatively long, respectively. The model is applied to the Calgary (south corridor) LRT system.(a) (TRRL)

Wirasinghe, SC *Transportation Research. Part A: General* Vol. 14A No. 1, Feb. 1980, pp 33-40, 6 Fig., 3 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247547); ORDER FROM: ESL

31 316738 THE HEATHROW AIRPORT UNDERGROUND LINK-ONE YEAR ON. The objectives of this link were first to reduce passenger's journey times; second to divert traffic from road to rail and so help to contain the demands both for new road provision and for local parking space; third, to earn money. Following points are also examined: the traffic evaluation and repartition; the effect of the opening on the airport itself on its users and on the road traffic; the financial aspect and success, some operating experience.

Robbins, RM (London Transport Executive) *UITP Revue* Vol. 28 No. 2, Apr. 1979, pp 127-151, 3 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 247480); ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium

31 316796 PARKING POLICIES [Políticas de estacionamiento]. Parking, as an integral part of highway matters, has been regulated in the United States and Europe since the 1920's. The most advanced countries require that every new building provides adequate parking facilities. The author cites examples of public service parking in many important world cities, emphasizing Mexico City, and concludes that highway planning must no longer consider the road only, but also the storage of vehicles at the end of each trip. The city that does not provide for public and private parking will be increasing the problem of congestion and increasing operating costs to the road user. Parking places will give better service precisely where the demand exists. Cities which have opted for integral plans for parking in the commercial center have less traffic congestion and more commercial business. If private industry is not sufficiently responsive to the demand for parking facilities, the government must take over the responsibility. (Author) [Spanish]

Cal y Mayor, R ; International Road Federation Conf Paper Vol. 3 3 Volumes, 1980, n.p.; Presented at the IRF Inter American Regional Meeting, Buenos Aires, 5-9 May 1980. Papers can be obtained in original language only. For individual papers see also TRIS 316755-316799; ACKNOWLEDGMENT: International Road Federation; ORDER FROM: International Road Federation, 1023 Washington Building, Washington, D.C., 20005

31 316927 PAPERS PRESENTED AT A SYMPOSIUM ON SUPPLEMENTARY TRANSPORT HELD AT THEATR CLWYD MOLD ON SATURDAY 16 SEPTEMBER 1978. The following papers were presented at the symposium: Clwyd community bus (Gylee,M); Development of post-bus services within Wales and the Marches (Stark,J); The use and value of voluntary car services in Wales (Walden-Jones,J); Welsh (Jones,B); "MAP" as applied to rural areas and the possible integration of supplementary services (MacBriar,I); The Welsh rural transport experiment scheme (Dredge,AS); The provision of market and other day bus services in Dyfed provision of market and other day bus services in dyfed (Winfield,RC); The development and use of the "butterfly bus" in the Vale of Glamorgan (Bailey,S); The development and use of the Sunday bus (Slater,P). (TRRL)

Gylee, M Stark, J Walden-jones, J Jones, B MacBriar, I Dredge, AS Winfield, RC Bailey, S Slater, P ; Transport and Highways Group, Welsh Office England Monograph Apr. 1979, 69p, Figs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 246393)

31 316992 ALTERNATIVES ANALYSIS FOR ARTERIAL STREETS. The purpose of this article is to describe a series of impact analysis methodologies and an evaluation technique useful for answering two central questions. 1. What will be the major impacts of any given improvement to an arterial street? 2. Given a set of alternative improvements for a specific street, which one is best? The first section presents a series of impact analysis methodologies and the second describes a simple, but useful evaluation technique.

Kuner, R (New Alternatives, Incorporated) *Traffic Quarterly* Vol. 33 No. 3, July 1979, pp 459-472, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 317030 TRANSPORTATION'S ROLE IN DOWNTOWN DETROIT REVITALIZATION. The article describes the improvements proposed and undertaken to the Detroit, Michigan downtown transportation system, presenting their rationale in terms of desired effects.

Hicks, RR (Department of Transportation) Kobran, MF *Traffic Quarterly* Vol. 33 No. 3, July 1979, pp 331-346, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 318784 HIGHWAY RAMP CONTROL, 1964-JUNE, 1980 (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1964-Jun 80]. The bibliography contains citations of reports on ramp design, merging control, ramp metering, and ramp use. Studies are documented of freeway collector lanes, exits into city streets, traffic bottlenecks, express bus lanes, vehicle collisions, road curves, freeway entry control—all involving ramp engineering. Computerized simulations and freeway corridor models are presented, along with traffic models, ramp control strategies, optimization procedures, and studies of freeway traffic flow. A few cases in which accident incidence has been linked to faulty ramp design, thereby calling for improved vehicle monitoring has been included. (This updated bibliography contains 142 abstracts, 12 of which are new entries to the previous edition.)

Kenton, E ;

National Technical Information Service July 1980, 149p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-812803

31 319532 PUBLIC TRANSPORT PLAN 1980-1981. This is the final version of the County Council's plan covering the five years period 1980-85. The plan takes account of the government's changed public expenditure plans for 1979/80 and 1980/1, and is presented in 9 sections: (1) introduction; (2) background to public transport planning; (3) Clwyd County Council's policies for public transport; (4) the public transport system in Clwyd; (5) problems and issues affecting public transport in Clwyd; (6) the public transport system in Clwyd 1980/1 to 1984/5; (7) market analysis projects; (8) consultations; (9) agreements with public transport operators. Comments on the plan are contained in an appendix. (TRRL)

Clwyd County Council, England Monograph Mar. 1980, 81p, 12 Fig., 15 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 247363)

31 319582 UNIVERSITY OF NEWCASTLE UPON TYNE TRANSPORT OPERATIONS RESEARCH GROUP PROGRESS REPORT 1979. A summary of progress on the following projects is given: strathclyde centrally-integrated traffic control (citrac) feasibility study; traffic control, routing and assignment, plan-change algorithms for area-wide traffic signals; on-line measure of delay in a computer-controlled road traffic system; practical methods of improving bus services; impact of the new metro on the Tyneside conurbation; public transport policies in rural areas; commodity flow studies; response within the freight market to changes in the pattern of supply; major factors influencing modal-choice decisions in the freight market; the Channel Tunnel: potential for bulk freight traffic; comparison of retail distribution strategies; costs and constraints in delivering goods to urban retail premises; urban goods movement in a planning framework; the monitoring of hazardous goods movements by road; measures of driver behaviour related to driving safety; the safety of small roundabouts in Newcastle upon tyne; urban safety demonstration project; identification of countermeasures. Details of symposia, short courses and other activities of the department, and of references to papers published are also given. (TRRL)

Silcock, DT (Newcastle upon Tyne University, England) *Traffic Engineering and Control* Vol. 21 No. 4, Apr. 1980, pp 195-198, 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247270)

31 322016 SETTING THE TASKS FOR RAIL RAPID TRANSIT IN URBAN CONGLOMERATIONS [Aufgabenstellung fuer den Schienenbahnverkehr in Ballungsraeumen]. Trends in the development of suburban railroad traffic are reviewed. Various types of rail systems are considered to suit different conditions and different population centers. The rapid transit system is considered as an integrated whole. [German]

Pampel, F *ETG-Fachberichte* No. 4, 1979, pp 169-178; Schienenverkehr-Zukunft mit Vernunft, Fachvortrag, Hamburg, Germany, June 12-14, 1979; ACKNOWLEDGMENT: EI; ORDER FROM: VDE-Verlag GmbH, Bismarckstrasse 33, 1000 Berlin 12, West Germany

31 322473 ANALYSIS AND SIMULATION OF AN URBAN BUS ROUTE. A highly developed and flexible simulation model of an urban bus route in peak hour traffic is described. The simulation program is presented, with particular emphasis on the facilities for interactive control of the simulation run and for presentation of overall and detailed statistics from the simulation. An independent statistical program system, based on the mathematical models underlying the simulation model, has been used to provide input parameters for the simulation. This program is applied to the analysis of a bus route in Central Stockholm; in this connection the mathematical models are discussed. (a) (TRRL)

Anderson, P-A Hermansson, A Tenguald, E (Linkoping Institute of Technology, Sweden) Scalia-tomba, G-P (Stockholm University, Sweden) *Transportation Research. Part A: General* Vol. 13A No. 6, Dec. 1979, pp 439-466, 32 Fig., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247598)

31 322810 THE PARK-AND-RIDE CORRIDOR STUDY [De corridorstudie parkeer-en-reis]. From Amsterdam a major railway line leads north into the province of North-Holland. Along this line some suburbs are situated. The authors report on a study which was carried out in 1979 by means of counts and interviews among commuters in this corridor. They are particularly interested in commuters who for their home-work trips can choose between car and train. Some conclusions are as follows: many employees are free to choose and this group already often takes the train; a quarter of the non-captive train commuters use park-or kiss-and-ride. The study leads to the conclusion that parts of major cities outside the CBD area should also be serviced by rail. [Dutch]

Baanders, A Vannanders, A *Verkeerskunde* Vol. 31 No. 7, July 1980, pp 347-350, 1 Fig., 5 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 249328), Institute for Road Safety Research; ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands

31 322812 TRAVELLING TO WORK. REPORT OF THE WORKING PARTY SPONSORED BY THE CITY OF WESTMINSTER CHAMBER OF COMMERCE. The various aspects of the journey to work which give cause for concern are examined. They include the extent to which the commuter is captive, the standard of service provided by the transport authorities, the gradually diminishing supply of suitable workers ready to take employment in central London, decrease in freedom of movement, and advantages and disadvantages of car usage. The transport systems of Belgium, France, West Germany, the Netherlands, Norway, Sweden, Denmark, Japan and USA are compared to that of the United Kingdom. Data are presented on rises in the cost of travel in the UK, British rail, underground and bus services, rise in incomes, and changes in pattern of travel to work. Results are given of a survey conducted among those who use public transport to get to work. Recommendations are put forward.

Stevens, R ; City of Westminster Chamber of Commerce Monograph No Date, 74p, 7 Fig., 21 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 248859);

ORDER FROM: City of Westminster Chamber of Commerce, Mitre House, 177 Regent Street, London, England

31 323233 AIRPORT RAIL LINKS TAKE OFF. As air travel continues to grow so does the problem of providing reliable and efficient transport between airports and the regions they serve. A number of cities have built airport rail links of one kind or another. While some have been successful, others have not--yet the number of links planned or under construction continues to rise. Good access to both in-town and airport stations is of prime importance, but high speeds are not as important as frequency. It is often better to plug the airport into the metro, so offering the widest possible spread of destinations, rather than providing a faster and perhaps more costly non-stop link to a city terminal which less than a third of air passengers will want to use.

Ashford, N *Railway Gazette International* Vol. 136 No. 7, July 1980, pp 594-597; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

31 323354 URBAN TRANSIT OPERATIONS: AN INTRODUCTION. The emphasis throughout the report is on bus transit operations particularly in the province of Ontario. However, several sections of the report will be generally applicable to all types of transit operations. In particular, the sections on monitoring, reporting and policy development should be of general interest.

Puccini, R ; Ontario Ministry of Transportation & Communic, Can Monograph June 1979, 191p, 11 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 249539), Roads and Transportation Association of Canada; ORDER FROM: Ontario Ministry of Transportation & Communic, Can, 1201 Wilson Avenue, Downsview, Ontario M3M 1J8, Canada

31 325210 BEEP DEMONSTRATION PROJECT. The Bus Express Employee Program (BEEP) currently being demonstrated in the El Segundo, California area is an efficient subscription-type commuter operation that can serve essentially all commute distances. The unique aspect of the concept is the methodology for scheduling a system of buses to terminate at an employment center and match staggered shift hours. This methodology is presented along with descriptions of the techniques used in planning and operating the demonstration project, a history of the patronage, and the requirements for computer aids for an expanded service.

Taylor, P Schnitt, A ; Western Periodicals Company 1979, pp 24-34, 4 Ref.; AIAA Monograph, Vol 25, Proceedings of the Society and Aerospace Technological Workshop, Los Angeles, California, November 15, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 325418 THE BICYCLE IN SHORT DISTANCE TRANSPORT. MEASURES FOR A SAFE AND MORE ACTIVE USE OF THE BICYCLE [Das Fahrrad im Nahverkehr. Massnahmen fuer eine Sicherere und Staerkere Benutzung des Fahrrades]. This report is intended not only to show the importance of bicycle traffic and to increase this but in addition to give important guidelines for the formation and realisation of bicycle traffic facilities. It is shown that the bicycle contributes considerably in reducing

poor transport infrastructure for the traffic objectives school, shopping and work and it makes possible the mobility of broader sections of the population and of groups with disadvantages. Safety in traffic for the cyclist is the most important factor which influences readiness to use a bicycle. Accident statistics show that in the last 15 years the cyclist has generally become exposed to greater danger as a result of the greatly increased number of vehicles on the road. The following measures are recommended as some of the ways the situation could be improved: improving cycle tracks, intensifying the network of tracks, wider "cycle-track-roads", uniform design, separation of the cycle-tracks from the roadway, traffic division using grassed areas, a reduction in the number of points of conflict bicycle/vehicle and more comprehensive information on the subject. (TRRL) [German]

Ruwestroth, G *Zeitschrift Verkehrserzieh* Vol. 29 No. 2, 1979, pp 3-11, 1 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 311494), Federal Institute of Road Research, West Germany

31 325871 BURY INTERCHANGE. A study is made of the Bury interchange, a terminal complex providing an all-weather passenger interchange between the British Rail electric railway service to Manchester and local bus services. Although the railway line to Bury was threatened with closure at one time, the area has since developed and now rail and bus services have been combined to give an overall 11% increase in journeys made. The interchange has an island platform long enough for six-car trains and also features a heated passenger waiting room. Stairs and an escalator link the platform to the bus area where there is room for nineteen buses as well as parking space. The success of the interchange terminal has proved that by providing ease of interchange between the two transport modes additional passengers will be attracted away from private transport.

Longworth, IJ *Modern Tramway and Light Rapid Transit* Vol. 43 No. 514, Oct. 1980, pp 333-337, 1 Fig., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 250061); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

31 326248 CAMDEN COUNTY COORDINATED MASS TRANSPORTATION SYSTEMS STUDY. PHASE II. The 1970s set in motion a continuing transportation planning program that would provide an efficient and cost effective system of public transportation services for Camden County. Camden County initiated a systematic planning effort--the Coordinated Mass Transit Systems (CMTS) Study--to analyze the transportation needs of the county residents and subsequently to develop a transportation improvement program. Phase I of the CMTS study was completed in July 1977, and it focused on specific transportation issues such as an assessment of the quality of service; evaluation of public information programs; and the role of the county in public transportation. Phase II work was completed in June 1979. Phase II study, this report, focused on three areas: (1) feasibility of park-n-ride express bus service between the future PATCO Berlin Station site and the Lindenwold Station; (2) analysis of all paratransit services; and (3) analysis of all fixed-route transit services

in the county. This report documents the evaluation steps and the recommendations of the CMTS Phase II study. It also contains an Executive Summary that highlights the principal conclusions and recommendations of both Phase I and Phase II study efforts. The CMTS Phase II study has recommended a specific implementable plan to improve mobility in Camden County. The recommendations developed during this study are summarized herein as well as the discussions of each of the three study areas. This study recommended that Camden County establish a program to improve coordination between services operated by municipalities, TNJ (Transport of New Jersey), PATCO, and Social Service Agencies.

Simpson and Curtin, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0050) Final Rpt. UMTA-IT-09-0050-80-1, June 1980, 116p; See also Appendices, PB80-216203. Sponsored in part by Camden County Planning Board, NJ.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-216195

31 326249 CAMDEN COUNTY COORDINATED MASS TRANSPORTATION SYSTEMS STUDY. PHASE II. APPENDICES A, B, C, AND D. The 1970s set in motion a continuing transportation planning program that would provide an efficient and cost effective system of public transportation services for Camden County. Camden County initiated a systematic planning effort--the Coordinated Mass Transit Systems (CMTS)--to analyze the transportation needs of the county residents and subsequently to develop a transportation improvement program. Phase I of the CMTS study was completed in July 1977, and it focused on specific transportation issues such as an assessment of the quality of service; evaluation of public information programs; and the role of the county in public transportation. Phase II work was completed in June 1979. Phase II study, this report, focused on three areas: (1) feasibility of park-n-ride express bus service between the future PATCO Berlin Station site and the Lindenwold Station; (2) analysis of all paratransit services; and (3) analysis of all fixed-route transit services in the county. This report documents the evaluation steps and the recommendations of the CMTS Phase II Study. It also contains an Executive Summary that highlights the principal conclusions and recommendations of both Phase I and Phase II study efforts.

Simpson and Curtin, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0050) Final Rpt. UMTA-IT-09-0050-80-2, June 1980, 371p; See also PB80-216195. Sponsored in part by Camden County Planning Board, NJ.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-216203

31 326303 ACCESSIBLE BUS SERVICE IN ST. LOUIS. The Bi-State Development Agency (BSDA), the transit operator for metropolitan St. Louis, Missouri, became the first public transit system in the country to operate buses equipped with hydraulic lifts for boarding persons in wheelchairs in August of 1977. This was the first large scale accessible bus project in transit history. One-hundred fifty-seven lift equipped buses were put into revenue service over a three and one-half month period. Seventeen routes were selected for accessible bus service (Phase I and II). This evaluation is primarily concerned with the 12

1/2 months of Phases I and II (August 1977-August 1978). The evaluation covers the development planning, the implementation process, operations, service and equipment reliability, travel behavior, productivity, economics, and service impacts. This report discusses the results of the St. Louis accessible service and the implications for other operators.

Teixeira, D Varker, F Bowlin, R ; Applied Resource Integration Limited, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. DOT/TSC-UM027/R0712, Feb. 1980, 349p; Contract DOT-TSC-1248; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-102824

31 326328 FEASIBILITY OF A SEPARATE SHORT RUNWAY FOR COMMUTER AND GENERAL AVIATION TRAFFIC AT DENVER. An analysis is made of the feasibility of a short, separate runway for general aviation at Denver's Stapleton International Airport and how it may be facilitated by FAA Engineering and Development products. General aviation is defined as private, corporate, and fixed base operators (flight schools and air taxis), and commuter airlines. The analysis is for Instrument Meteorological Conditions using current ATC procedures and consists of: runway placement, obstacle clearance, location of navigational aids, airspace design to segregate aircraft by type to two separate parallel runways, and the design of taxi patterns to allow unimpeded movement of ground traffic. Details of ILS siting such as terrain and multipath problems are not addressed. (Author)

Garner, JD ; MITRE Corp McLean VA METREK Div*Federal Aviation, Administration, Washington, DC. Office of Systems, Engineering Management MTR-80W00034, FAA-EM-80-4, May 1980, 47p; Contract DOT-FA80WA-4370; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A089317/2

31 329516 DESIGN GUIDELINES FOR PARK-AND-RIDE LOTS. A list of guidelines is presented to aid in the development of park-and-ride site design. Included in these guidelines are considerations for streets leading to the lot, convenient movement by all modes within the lot, amenities for the passengers, environmental impacts of the facility, the use of proper design standards, and similar considerations for joint-use facilities. Local examples of park-and-ride sites are presented to illustrate how design principles outlined can be used in actual practice.

Allen, DA (North Central Texas Council of Governments); Institute of Transportation Engineers Conf Paper 1979, pp 85-95, 17 Ref.; Compendium Technical Papers Annual Meeting

of the Institute of Transportation Engineers, 49th, Toronto, Ontario, September 23-27, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Institute of Transportation Engineers, 1815 North Fort Myer Drive, Arlington, Virginia, 22209

31 329623 EVALUATION OF PROPOSED PARK-AND-RIDE LOTS WITH THE "EXTRA" PROGRAM. This paper describes the EXpress TRansit Analysis (EXTRA) computer program and its use in the evaluation of proposed park-and-ride lots and systems in the Dallas-Fort Worth metropolitan area.

Barker, WG (North Central Texas Council of Governments) Allen, DA ; Institute of Transportation Engineers 1979, pp 202-220, 6 Ref.; Compended Technical Paper of the 49th Annual Meeting of The Institute of Transportation Engineers, Toronto, Ontario, Canada, September 23-27, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

31 329971 THE RAILWAY SERVICE TO THE NEW TOWN OF CERGY-PONTOISE [La desserte ferroviaire de la ville nouvelle de Cergy-Pontoise]. To ensure transport services to the new town of Cergy-Pontoise the authorities adopted in 1974 the solution proposed by the SNCF: optimum use of existing lines so as to reduce the construction and cost of new infrastructures. Details are given of the alignment of the new line and of the new service which keeps pace with the development of the town and is integrated in the master plan for public transport in the Paris region. [French]

Unia, M *Transports* No. 244, July 1979, pp 299-301, 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105499), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM: Editions Techniques et Economiques, 3, rue Soufflot, 75005 Paris, France

31 330172 TRANSIT CENTERS: A MEANS OF IMPROVING TRANSIT SERVICES (ABRIDGMENT). The role of transit centers in improving the overall effectiveness of an urban bus transit system is defined and assessed. Transit centers are defined as physical facilities that facilitate the movement of buses and, thus, of bus patrons. Transit centers are more than park-and-ride lots because they can be located in high-visibility locations, even in the downtown core, and thus can serve to increase the attractiveness of transit. They are major transfer points at which several types of routes can come together. Express and local routes, as well as pulse-scheduled circulators, can thus provide the bus user with many potential destinations and greatly reduce transfer time. Transit centers can be located in the central city, on freeways, or in

suburban activity centers. Planning guidelines are developed to assist in the successful planning and implementation of transit centers. These guidelines address general locational considerations, bus berths, parking, accessibility, and potential joint-development opportunities. These planning guidelines are used to locate and conceptually design a potential transit center for the Salt Lake City area. It is concluded that the impact of current pioneer transit-center projects in the United States should be closely monitored. (Authors)

Taylor-Harris, A (Princeton University) Stone, TJ (De Leuw, Cather and Company) *Transportation Research Record* No. 760, 1980, pp 39-42, 5 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

31 330249 SEPARATION OF TRAMS AND MOTOR TRAFFIC USING SAFETY BARS: NICHOLSON STREET. The report was prepared for the Melbourne City Council, Melbourne and Metropolitan Tramways Board and the Road Safety and Traffic Authority, Victoria.

In May 1978, safety bars were installed along the northbound carriageway of Nicholson Street, Melbourne, to provide separation of trams and motor traffic. The bars are made of precast reinforced concrete and are spaced at 4.5M intervals. This report describes the results of this trial, including how the safety bars have performed as a separator, their effect on car performance along Nicholson Street, accident rates in Nicholson Street, tram travel times along the street, and the effect on cars in Nicholson Street. In general the study has indicated (I) that the safety bars have established a physical median which car drivers are reluctant to cross and so effectively separate trams from motor traffic. (II) the separation has had a statistically insignificant effect on motor vehicle operations along Nicholson Street and little effect on the travel times of motor vehicles approaching Nicholson Street at intersections. (III) the major effect on motor traffic and pedestrians appears to be in regard to safety in providing a facility for pedestrians which is akin to a central refuge and also physically separating opposing streams of traffic. (IV) no statistically significant tram journey time improvement can be attributed to the installation of the safety bars.

McKenzie, HP Bates, C (Victoria Road Safety & Traffic Authority, Australia) Semenow, J (Melbourne City Council, Australia); Melbourne and Metropolitan Tramways Board Monograph June 1979, 30p, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 239923), Australian Road Research Board

32 082728 SOME CONSIDERATIONS FOR DETERMINING DIAL-A-RIDE FEASIBILITY IN THE WASHINGTON L'ENFANT AREA. Dial-A-Ride (DAR), according to the author, is a viable transportation system for the Washington, D.C. L'Enfant area. The relatively high DAR demand density of the area (average of 50 demands per square mile per hour) suggests that DAR may be more desirable than the present taxi system and should complement existing public transportation by providing feeder service to the fixed route facilities. Completion of the first phase of the METRO subway system will reinforce the DAR feeder system concept. The L'Enfant DAR system size can be estimated from the simulation results reported in this document. A rough estimate of the economic feasibility of the system is possible based on the number of vehicles and cost per trip. Conclusions are based primarily on cost considerations although the utility of a system should also consider aspects such as relief of traffic congestion and improvement of urban environment. This report attempted to identify some of the needs of the area disadvantaged which could be aided by DAR implementation. It was concluded from the high demand density of elderly and handicapped that DAR is necessary and might be initiated solely to support their needs. Even assuming a low modal split for the low income people, enough demand would be generated to make DAR suitable for mobilizing this group to suburban job opportunities. Therefore, indications encourage DAR implementation in the L'Enfant area for use as either a feeder system or as a service to the disadvantaged. /IMTA/

Gale, JE (George Washington University); Consortium of Universities, (UTC-06-74) UMTA-DC-11-0003-74-2, June 1974, 53 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236897/AS

32 083961 THE DIAL-A-RIDE R&D PROGRAM. This report discusses the role and the economics of Dial-A-Ride, a modern concept of public transportation particularly well suited for suburban areas. The following five roles are identified: (1) suburban feeder service to line haul transit; (2) suburban local transit; (3) small urban area transit; (4) night and Sunday service; and (5) transit for the handicapped, senior citizens and other groups with special needs. It is found that by bringing all residents of an area within the reach of the transit system, higher patronage is realized than with conventional service in the same area. Also, the use of Dial-A-Ride service as a feeder to line haul bus or rapid rail service provides a transit system that is a true alternative to widespread private automobile usage. The cost of Dial-A-Ride service is reflective of the cost of any transit services in areas of low, widely dispersed demands. Annual subsidies have been required for transit services in such areas. The subsidies of Dial-A-Ride service are comparable to the costs of other public services such as garbage collection and police protection.

Ziegler, E, Jr (Urban Mass Transportation Administration) *Institute of Traffic Engineers, Proceedings* No. 44, Sept. 1974, pp 18-22, 1 Fig., 1 Tab., Refs.

32 084229 DIAL-A-RIDE IN MAIDSTONE. This evaluation of the many-to-two Dial-a-Ride Service in Maidstone, considers the degree to

which the scheme has achieved the goals of operational viability, social equity and consumer satisfaction. Details of the Maidstone experiment (initiated in 1972) are given. The assessment of service consisted of a before survey of the catchment areas to ascertain its travel characteristics, an appraisal of the operational strategy, and a survey of the user section of the community. The survey details are described and pre-trial survey data are included in the appendix. This evaluatory study generated data on operational procedures and passenger requirements which should prove useful in ensuring better results in future trials.

Slevin, R Ochojna, S ; Centre for Transport Studies CTS Report 6, Aug. 1973, 55 pp, 23 Tab., 4 App.

32 084755 OPERATING POLICIES FOR PERSONAL RAPID TRANSIT. Personalized Rapid Transit (PRT) systems development is concerned with the more complex new generation of PRT systems that will utilize small automated vehicles closely spaced on an exclusive right-of-way to achieve a higher lane capacity and non-stop service, along with reduction of traffic congestion and pollution. The author perceives a need to carefully define and study operating policies relating to vehicle separation, and velocity as the capacity of the system increases. This report describes and evaluates operating policies for PRT systems and illustrates their implementation in a PRT vehicle autopilot. The vehicles frequency of passage and other considerations that contribute to the selection of such frequencies are the major topics of the report. Also studied are the various effects on system parameters and performance that follow the selection of an operating policy. The report examines 3 potential operating policies for PRT systems and defines the necessary limitations on headways resulting from design parameters and the effects of maneuvers. The operating policies considered are constant separation, constant K factor, and constant headway operation. A longitudinal control system was devised for the purpose of testing implementation of each operating policy. This test was accomplished by a digital computer simulation of a string of PRT vehicles controlled by the longitudinal control system models and operating according to the various policies. /UMTA/

Morag, D ; Urban Mass Transportation Administration, (RDD-8) UMTA-RDD-8-74-2, May 1974, 100 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB 239-825/AS

32 090032 SOCIOECONOMIC AND TRAVELING CHARACTERISTICS OF DIAL-A-RIDE USERS. Ten socioeconomic characteristics of the average daily users of the Dial-A-Ride system in Haddonfield, New Jersey have been obtained and compared with the characteristics of the residents of the entire service area. Five questions were asked on the trip characteristics, including frequency of Dial-A-Ride use during the week and weekend, trip purpose, trip distance, and the usual means of transportation. Ratings and rankings of seven Dial-A-Ride system characteristics were obtained using a seven-part semantic scale. This information was obtained by means of two 1973 on-board surveys.

Arrillaga, B ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-

06-0012) MTR-6717, June 1974, 47p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238163/OST

32 090451 DEMAND RESPONSIVE TRANSPORTATION SYSTEM FOR THE EAST/NORTHEAST AND WATTS MODEL CITIES NEIGHBORHOODS. The project was designed to demonstrate that a demand-responsive public transportation system using subscription techniques could be a successful and important service in supplementing existing fixed-route bus operations. Service priorities of the program were: (1) Persons requiring access to health and related facilities within the 2 Model Cities service areas; (2) elderly persons requiring transportation within the service area; (3) persons without autos to shopping facilities; (4) youth to Model Cities programs. A fleet of 12-passenger radio-dispatched vans would provide low fare transportation (15 cents). Operating data describing ridership, revenues, travel characteristics, performance of system in terms of wait and travel times are discussed. Funds expended and estimated monthly operating costs are presented.

Smith (Wilbur) and Associates, Incorporated, Urban Mass Transportation Administration, Los Angeles City Demonstration Agency, (UMTA-CA-06-0017) TR-2, May 1974, 94 pp; Prepared for the Los Angeles City Demonstration Agency, Calif. See also PB-239 945.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239836/OSL

32 090477 DEMAND RESPONSIVE TRANSPORTATION SYSTEM FOR THE EAST/NORTHEAST AND WATTS MODEL CITIES NEIGHBORHOODS. The report documents activities and operations of Demand-Responsive Transportation Projects in the East/Northeast and Greater Watts Model Cities Neighborhoods from May 1, '73 to Oct. 31, '73. The project was designed to demonstrate that a demand-responsive public transportation system using subscription techniques could be a successful and important service in supplementing existing fixed-route bus operations. A fleet of 12-passenger, radio-dispatched vans would provide low fare transportation (0.15). Operating data describing ridership, revenues, travel characteristics, types of pick-ups and general performance in terms of wait and travel times are included. Funds expended and estimated monthly operating costs are delineated. Productivity measures are evaluated.

Smith (Wilbur) and Associates, Incorporated, Urban Mass Transportation Administration, Los Angeles City Demonstration Agency, (UMTA-CA-06-0017) TR-1, Dec. 1973, 51 pp; Prepared for the Los Angeles City Demonstration Agency, Calif. See also PB-239 836.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239945/9SL

32 090951 DIAL-A-RIDE PILOT PROJECT. The report discusses the Dial-a-Ride pilot project that began operating in late 1971 in the Southwest area of Ann Arbor, Michigan. Among topics covered are project scope, including objectives, basic design features, project organization, and management. Following is a detailed description of the service area, destinations, service hours, and fare structure. The next section covers system

design and operation, including the basic dispatching algorithm, dispatching modifications, the possibility of computer assisted dispatching, vehicles used, communications system, personnel, marketing, and data collection. Costs and revenues of the system are discussed next. A chapter on ridership includes overall figures plus breakdowns by season, month, day of week, hour of day, and geographic trip patterns.

Augustine, R Dewey, M Guenther, K Koglin, T Strichartz, J; Ann Arbor Transportation Authority, Ford Motor Company, Michigan Bureau of Transportation Final Rpt. DAR-AATA-1, Apr. 1973, 198 pp; Prepared in cooperation with Ford Motor Co., Dearborn, Mich. Transportation Research and Planning Office. Sponsored in part by Michigan Bureau of Transportation, Lansing.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239647/1ST

32 090991 DIAL-A-RIDE IN NORTH AMERICA: REPORT OF A STUDY TOUR IN DECEMBER 1973. Visits were made to seven dial-a-ride systems, one taxi operator, Ford Motor Co (Transportation Planning and Research Office), Urban Mass Transportation Administration of DOT, and MITRE Corporation. The report describes the extent of dial-a-ride in North America, the ways in which it is being used, vehicle reliability, radio and telephone use, dispatcher selection and training, system design, computer applications, demand prediction, evaluation methods and government support policy. It is concluded that small dial-a-ride systems are no longer experimental in USA but that research and development is needed before systems of more than about 15 vehicles become practical. The limit to system size is at present set by the work-load on the dispatcher and the capacity of the radio channel. Computerized dispatching is not yet available as a routine technique but should become available within 2 to 3 years. Taxi-based dial-a-ride systems appear to be economically viable at fares of about \$1.00/passenger. Bus-based systems charge lower fares and achieve revenues which are 25 percent to 70 percent of cost.

Mitchell, CGB ; Transport and Road Research Laboratory R&D Rept. No. TS 95 UC, 1974, 46 pp, 10 Fig., 9 Tab., 16 Ref.; ACKNOWLEDGMENT: NTIS, TRRL (IRRD 213724); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239558/0ST

32 091360 AN EXPERIMENTAL DESIGN FOR THE HADDONFIELD DIAL-A-RIDE EXPERIMENTAL DEMONSTRATION. The overall experimental design was developed as three separate but related experiments that deal with estimation and explanation of ridership, estimation and explanation of costs, and identification and evaluation of benefits.

Carlson, RC Daetz, D Eschenbach, TG Jones, DLJ Jucker, JV ; Stanford University, Urban Mass Transportation Administration, (UMTA-CA-11-0008-74-2) Res. Rept. RR-14, July 1974, 118p; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241426/6ST

32 091475 CARPOOL INCENTIVES AND OPPORTUNITIES. REPORT OF THE UNITED STATES CONGRESS PURSUANT TO SECTION 3(E) PUBLIC LAW 93-239. EMERGENCY HIGHWAY ENERGY CONSERVATION ACT. The report includes (1) a description of methods and programs used to promote carpooling, (2) a discussion of the success of these methods, (3) an evaluation of a broad range of incentives to promote carpooling, and (4) recommendations on government actions to encourage carpooling. The report recommended that the Federal Government broaden its efforts to encourage carpooling to set an example as a major employer. The report also recommends that State and local governments expand efforts to encourage carpooling through (1) the development of highway projects providing preferential treatment for carpools, and (2) assistance to employers in promoting carpooling among their employees.

Federal Highway Administration FH-11-8325, Feb. 1975, 104 pp; ACKNOWLEDGMENT: NTIS, Federal Highway Administration; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241823/4ST

32 091903 THE NBS COMPUTERIZED CARPOOL MATCHING SYSTEM: USERS' GUIDE. The report includes flowcharts, input/output formats, and program listings for the programs, plus details of the manual process for coordinate coding. The matching program produces, for each person desiring it, a list of others residing within a pre-specified distance of him, and is thus applicable to a single work destination having primarily one work schedule. The system is currently operational on the National Bureau of Standards' UNIVAC 1108 computer and was run in March of 1974, producing lists for about 950 employees in less than four minutes computer time. Subsequent maintenance of the system will be carried out by the NBS Management and Organization Division.

Gilsinn, JF Landau, S ; National Bureau of Standards, (NBS-2050151) NBSIR-74-633, Dec. 1974, 65p; Final Technical Report; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; COM-75-10691/4ST

32 092401 ADVANCED DIAL-A-RIDE ALGORITHMS. Purposes of this report are to develop advanced dial-a-ride control procedures based on the experience gained in Haddonfield, NJ and to explicitly investigate the problem of controlling integrated dial-a-ride fixed route transit services. Objectives of this project can be subdivided into four tasks: (1) evaluation of simulation effectiveness and upgrading of simulation capabilities; (2) evaluation of the present dial-a-ride control algorithm used in Haddonfield, and identification of shortcomings and areas for improvement; (3) development of advanced computer control algorithms in the context of single module dial-a-ride systems incorporating better utilizations; and (4) definition, description, and evaluation of roles for computer scheduling which incorporate interfaces to each other and to existing conventional modes of transportation. This report describes work accomplished to date.

Wilson, NHM Weissberg, RW Higonet, BT Hauser, J ; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-MA-11-0024) Intrm Rpt. R75-27, UMTA-MA-11-0024-75-1, July 1975, 89 pp; ACKNOWLEDGMENT: NTIS, UMTA;

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244496/6ST

32 092440 CARPOOLING: STATUS AND POTENTIAL. The report contains the findings of studies conducted to analyze the status and potential of work-trip carpooling as a means of achieving more efficient use of the automobile. Current and estimated maximum potential levels of carpooling are presented together with analyses revealing characteristics of carpool trips, incentives, impacts of increased carpooling and issues related to carpool matching services. National survey results indicate the average auto occupancy for urban work-trip is 1.2 passengers per auto. A model was developed to predict the maximum potential level of carpooling in an urban area. A technique was developed for estimating the number of participants required in a carpool matching service to achieve a chosen level of matching among respondents, providing insight into tradeoffs between employer and regional or centralized matching services.

Kendall, DC ; Transportation Systems Center Final Rpt. DOT-TSC-OST-75-23, June 1975, 119 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244609/4ST

32 092447 AN APPROACH TO REGION-WIDE URBAN TRANSPORTATION. The evolving trends of our urban areas indicate a need for a new kind of urban system in which point-to-point, region-wide service is provided by a mix of conventional transit and flexible route paratransit elements acting cooperatively instead of competitively. In concert with improved automobiles and automobile utilization and management, there appears the promise of improved mobility for both the driver and the non-driver through reduced congestion and increased transportation options, overall reduced energy consumption, and cleaner air. The principal unknown is how to bring about the evolutionary and incremental implementation of these integrated systems over time. Their operational characteristics appear to be such that increasing ridership and reducing the peak/off-peak ratio will bring about both cost reduction and service improvement. A framework for an implementation strategy is presented. The implications for federal RD&D are noted for both system development implementation.

Ward, JD ; Office of Systems Development and Technology Final Rpt. DOT-TST-75-108, July 1975, 48 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244638/3ST

32 093014 SHARED RIDE TAXI SYSTEMS. No abstract available.

Tennessee University, Knoxville, Urban Mass Transportation Administration Aug. 1973, 757p-in 6v; Set includes PB-245 101 thru PB-245 106.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC; PB-245099-SET/ST

32 093015 SHARED RIDE TAXI SYSTEMS: AN ANALYSIS IN SUMMARY. Two privately owned demand-responsive transportation systems, one in Davenport, Iowa, and the other in Hicksville, New York, were studied to determine the economic feasibility and marketability of

these systems and the roles they play in small and medium-sized urban areas. The systems analyzed offer door-to-door service on a shared-ride basis using six-passenger automobiles. The overall objectives of the study were to: (1) Determine the cost, revenues, ridership, and other benefits of providing public transportation service with privately owned demand-responsive systems; (2) analyze the market demand for each level of service; (3) analyze the contribution of each level of service for providing mobility for specific segments of the urban community; (4) measure the economic viability of the different levels of service; (5) measure the demand for service as a function of level of service and pricing scheme; (6) determine the effectiveness of automatic scheduling and monitoring on system performance, costs, and revenues, if put into operation; and (7) determine the economic feasibility of these systems.

Heathington, KW Davis, FWJ Griese, SC Middendorf, DP Brogan, JD ; Tennessee University, Knoxville, Urban Mass Transportation Administration, (UMTA-TN-06-0004) UMTA-TN-06-0004-73-1, Aug. 1973, 26 pp; Paper copy also available in set of 6 reports as PB-245 099-SET, PC\$27.00.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245101/1ST

32 093017 AN ORGANIZATIONAL AND ENVIRONMENTAL REVIEW OF TWO PRIVATELY OWNED, SHARED RIDE TAXI SYSTEMS. The report has been based primarily on data from two privately owned demand-responsive public transportation systems operating in two different urban environments. Both are radio-dispatched shared-ride taxi systems, one in the industrial-agricultural city of Davenport, Iowa, and the other in the residential-commercial city of Hicksville, New York. Secondary data concerning national averages were obtained to enable generalized statements. Organizational aspects of these systems are discussed in terms of functional structure and methods of providing operational services. Requirements for and characteristics of taxi system's managerial personnel, dispatchers and drivers are examined. Regulatory issues confronting taxi systems are delineated. Meter, zone, multi-zone, and trip length pricing are discussed as alternative pricing mechanisms for taxi service. The data lead the authors to the major conclusion that the most important factor to be considered in the use of shared-ride taxi services is the needs of the various market segments in the urban public transportation market. It was also concluded that a taxi company under a highly innovative manager is an effective public transportation service.

Heathington, KW Davis, FWJ Griese, SC Symons, RT Alford, RW ; Tennessee University, Knoxville, Urban Mass Transportation Administration, (UMTA-TN-06-0004) Final Rpt. UMTA-TN-06-0004-74-1, Oct. 1974, 133 pp; Paper copy also available in set of 6 reports as PB-245 099-SET, PC\$27.00.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245103/7ST

32 093018 ECONOMIC CHARACTERISTICS OF PRIVATELY OWNED SHARED-RIDE TAXI SYSTEMS. The report presents an analysis of costs, revenues, and investment requirements associated with two privately owned,

demand-responsive transportation systems in Davenport, Iowa, and Hicksville, New York. Objectives of this report were: (1) determination of the costs, revenues, ridership characteristics, and benefits of providing public transportation with two privately owned systems; (2) measurement of the economic viability of the different levels of service; and (3) determination of the economic feasibility of combining the transportation of goods and people into a single operation. Primary sources of taxi revenue are identified and driver and vehicle productivity are evaluated. The financial analysis of taxi operations includes both capital costs and operating expenses for each of the four operational areas (vehicles, garage, dispatching, and administrative). A generalized model for predicting shared-riding investment requirements is presented. A comparison of privately owned, shared-ride taxi systems and publicly owned dial-a-bus systems is offered on the basis of cost, investments and revenues.

Davis, FWJ Heathington, KW Symons, RT Griese, SC Alford, RW ; Tennessee University, Knoxville, Urban Mass Transportation Administration, (UMTA-TN-06-0004) Final Rpt. UMTA-TN-06-0004-74-2, Oct. 1974, 117 pp; Paper copy also available in set of 6 reports as PB-245 099-SET, PC\$27.00.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245104/5ST

32 093019 AN ANALYSIS OF THE DEMAND FOR BUS AND SHARED-RIDE TAXI SERVICE IN TWO SMALLER URBAN AREAS. This report is a study of the demand for the publicly owned, fixed-route, fixed-schedule bus service and the privately owned, demand-responsive transportation service in two smaller urban areas--Davenport, Iowa, and Hicksville, New York. The objectives of the report were to compare the travel patterns and markets of the bus and shared-ride taxi systems, to compare the travel patterns and markets of the shared-ride taxi systems in each study area, to analyze factors and circumstances underlying the choice of either the bus or the shared-ride taxi, and to measure the public sentiment toward each form of public transportation. Information was gathered through on-board surveys, mail surveys, home interviews, and dispatching records and drivers' logs maintained by the taxicab companies. Users as well as non-users of public transportation were interviewed. A bibliography is furnished. Appendices contain Customer Data Record, Vehicle Data Record, and the bus passenger, taxi passenger and household survey questionnaires.

Middendorf, DP Heathington, KW Davis, FWJ Tennessee University, Knoxville, Urban Mass Transportation Administration, (UMTA-TN-06-0004) Final Rpt. UMTA-TN-06-0004-75-1, May 1975, 312 pp; Paper copy also available in set of 6 reports as PB-245 099-SET, PC\$27.00.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245105/2ST

32 093020 AN ANALYSIS OF TWO PRIVATELY OWNED SHARED-RIDE TAXI SYSTEMS: EXECUTIVE SUMMARY. The report is the executive summary of a comprehensive study of the markets, economic characteristics and operation of two privately owned, demand-responsive transportation systems in op-

eration in Davenport, Iowa, and Hicksville, New York. Objectives of the study are stated and the study areas examined. In terms of the characteristics of bus and shared-ride taxi usage, the level of ridership, roles of bus and shared-ride taxi service, level of service, market composition, frequency of use, and modal choice determinants are addressed. Revenue, goods movement, and costs are presented in the section on economic considerations. Attitudes toward public involvement, management and organization, and the potential of shared-ride taxi service are discussed.

Heathington, KW Davis, FWJ Symons, RT Middendorf, DP Griese, SC ; Tennessee University, Knoxville, Urban Mass Transportation Administration, (UMTA-TN-06-0004) UMTA-TN-06-0004-75-2, Apr. 1975, 25 pp; Paper copy also available in set of 6 reports as PB-245 099-SET, PC\$27.00.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245106/0ST

32 093078 DIAL-A-RIDE IN CARTERTON, A REVIEW OF RESIDENTS' TRAVEL PATTERNS. The report examines the travelling behavior of the residents of Carterton subsequent to the implementation of a local Dial-a-Ride service which started operations in November 1973. The data presented here is part of a combined TRRL/Cranfield assessment program designed to quantify the overall impact of the new mode on the township. The service is carrying 3.2% of all the in-town motorized trips that take place during its hours of operation. Knowledge of the service and its facilities is widespread. The main characteristic of those households which use the service is their lack of car ownership. They also tend to be from the lower income groups.

Ochojna, S ; Cranfield Institute of Technology, Transport and Road Research Laboratory Cranfield-CTS-8, June 1975, 45p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244858/7ST

32 093289 CITY OF ANCHORAGE DEMONSTRATION TRANSPORTATION GRANT. The objective of the demonstration project was to develop a fixed route transportation system in an area of limited mass transportation services, the city of Anchorage, Alaska. Groups served by this project include the elderly, handicapped, Indians, Native Eskimos, poor, unemployed, and youth. Several concepts of the demonstration were: (1) Inner-city circulation which would enable transit users to travel between different areas of the city. These routes provided resident access to health, employment, business and social service facilities. (2) Home-to-work and work-to-home services within the area served by the project. The effectiveness and benefits of the operation were measured and evaluated. Elements of the demonstration included: A take-home passenger survey to determine passenger attitudes, trip origins and destinations; a monthly bus pass, at reduced fares; and a shuttle service from a parking lot to the downtown core area.

Anchorage, City of, Alaska, Urban Mass Transportation Administration, (UMTA-AK-0001) UMTA-AK-06-0001-74-1, July 1974, 101 pp; Grant DOT-UT-783; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245160/7ST

32 093364 IMPLEMENTING SHARED TAXI-CAB SERVICES. A CASE STUDY IN ARLINGTON, VIRGINIA. Recent research has suggested that significant improvements in urban mobility could be achieved by allowing taxicabs to offer a variety of shared-ride services, for which passengers with different trip origins or destinations can share the same taxicab. Local regulations in most urban areas in the U.S. have historically discouraged or prohibited such services, however. Arlington County, Virginia, recently decided to introduce shared taxicab services on an experimental basis, with a view to their eventual implementation as a permanent new form of public transportation for the county. This paper discusses the motivation for this experiment, the issues and problems encountered in designing it, and the specific service provisions and fare structure adopted. The paper also outlines measurement procedures designed to assist Arlington County in evaluating the experiment.

Kirby, RF ; Urban Institute, Urban Mass Transportation Administration, (UMTA-DC-06-0093) UI-5051-10, UMTA-DC-06-0093-75-1, Feb. 1975, 45 pp; Contract DOT-UT-40008; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245645/7ST

32 093478 PORTLAND METROPOLITAN AREA CARPOOL PROJECT. The Interim Report of the Portland Metropolitan Area Carpool Project describes the development and success of carpool promotional efforts undertaken in Portland during 1974. Elements that contributed to the success of the program include: extensive marketing activities, carpool matching services, employer support, and identification of park-and-ride facilities. Based on followup surveys the report estimates that more than 22,000 persons, or nearly 7 percent of area employees, were induced to carpool as a direct result of project activities. The report also describes the institutional and financial arrangements for area-wide carpool promotion in Portland.

Graham, J ; Oregon Department of Transportation, Federal Highway Administration Prog. Rpt. Dec. 1974, 83 pp; HP&R; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245857/8ST

32 093567 RIDESHARING AND THE KNOXVILLE COMMUTER. Contents: Profile of the Knoxville commuter; Public commuter transportation in Knoxville; Commuter carpooling in Knoxville; Analysis of Knoxville transportation; Analysis of the impact of ridesharing on West Knox, Kingston Pike, I-40 corridor; Economics of ridesharing; Institutional and legal considerations; Suggested traffic improvements to support a comprehensive rideshare program.

Davis, FWJ ; Tennessee University, Knoxville, Department of Transportation Final Rpt. TCUT-1-75, Aug. 1975, 313 pp; Contract DOT-OS-40096; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247146/4ST

32 093606 RIDESHARING AND THE KNOXVILLE COMMUTER. EXECUTIVE SUMMARY. The report gives a detailed analysis of the Knoxville commuter, identifies the current commuting methods and their relative importance to members of the Knoxville work force, studies the relative importance of sharing rides for work trips

in the firms observed and analyzes employee attitudes towards various aspects of shared rides. The report also outlines the current rate of travel within various corridors of the Knoxville community and offers a detailed summary of the benefits of ridesharing in terms of congestion, fuel consumption, present and future highway capacity, and public acceptance of ridesharing. The report examines the legal and institutional constraints which are currently inhibiting the development of various ridesharing alternatives and offers recommendations for improving public transportation in Knoxville.

Davis, FWJ ; Tennessee University, Knoxville, Department of Transportation Final Rpt. TCUT-2-75, Aug. 1975, 66p; Contract DOT-OS-40096; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247187/8ST

32 094011 OPERATING PROCEDURES MANUAL FOR AN AUTOMATED SCHEDULING SYSTEM FOR DEMAND-RESPONSIVE PUBLIC TRANSPORTATION (HADDONFIELD DIAL-A-RIDE). No abstract available.

New Jersey Dept. of Transportation, Trenton. *Urban, Mass Transportation Administration, Washington, D.C. Oct. 1974, 355p-in 2v; Set includes PB-248 568 thru PB-248 569; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price; PB-248567-SET/ST

32 094012 OPERATING PROCEDURES MANUAL FOR AN AUTOMATED SCHEDULING SYSTEM FOR DEMAND-RESPONSIVE PUBLIC TRANSPORTATION (HADDONFIELD DIAL-A-RIDE). PART I. CONTROLLER FUNCTIONS. The two-volume manual is a user's guide for a computer-controlled, demand-responsive transportation system (Dial-A-Ride). The goal of the manual is to provide the information needed by the Dial-A-Ride Control Center personnel to operate an automatic Dial-A-Ride transit service using a Westinghouse 2500 mini-computer, its associated peripheral devices, and its software. The user of the manual should have a thorough knowledge of the operation of a manually scheduled demand-responsive public transportation system. With the exception of the Introduction (which is needed by all Control personnel), this manual is sectioned functionally. The personnel involved will find within their sections all the information necessary for them to do the tasks connected with their functions. Persons operating in a certain function should be aware of sections of the manual, but they will not need them for their day-to-day guidance. Part I contains the telephonist, dispatcher and supervisory functions. Part II encompasses the computer operator's function and the appendices--scheduling function, computer hardware, and glossary of terms.

New Jersey Department of Transportation, Urban Mass Transportation Administration, Mitre Corporation, LEX Systems, Incorporated, DAVE Systems, Incorporated, Massachusetts Institute of Technology, (UMTA-NJ-06-0002) UMTA-NJ-06-0002-74-6, Oct. 1974, 191 pp; Paper copy also available in set of 2 reports as PB-248 567-SET, PC\$12.00; Contract NJ-06-0002; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-248568/8ST

32 094013 OPERATING PROCEDURES MANUAL FOR AN AUTOMATED SCHEDULING SYSTEM FOR DEMAND-RESPONSIVE PUBLIC TRANSPORTATION (HADDONFIELD DIAL-A-RIDE). PART II. COMPUTER OPERATOR FUNCTIONS. The manual is the product of the Haddonfield Dial-A-Ride Demonstration sponsored by the New Jersey Department of Transportation. The purpose of this volume is to explain the Computer Operator's tasks in using an automated scheduling system for demand-responsive public transportation.

New Jersey Department of Transportation, Urban Mass Transportation Administration, Mitre Corporation, LEX Systems, Incorporated, DAVE Systems, Incorporated, Massachusetts Institute of Technology, (UMTA-NJ-06-0002) UMTA-NJ-06-0002-74-7, Oct. 1974, 144p; Paper copy also available in set of 2 reports as PB-248 567-SET, PC\$12.00; Contract NJ-06-0002; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-248569/6ST

32 094053 SYSTEM PERFORMANCE DATA PROCESSING FOR A DEMAND-RESPONSIVE PUBLIC TRANSPORTATION SYSTEM. The report is intended to be a guide for transit operators and managers interested in operating a demand-responsive transportation system and for programmers who maintain the data processing programs. In the broad evaluation of the Haddonfield, New Jersey Dial-A-Ride Demonstration Project, extensive data are required, including attitude data from personal interviews, cost data, and system performance data. The processing of system performance data is the topic of this report. The Haddonfield system was scheduled manually from the start of the demonstration in February 1972 until February 1974. During the latter part of this period, the automated system was the primary scheduling system. The procedures used in collecting and processing data from the manual scheduling system are described. Also discussed are manual system data files and tabulations. The computer programs that process automated system data and the automated system tabulations are presented.

Hartzler, RE ; Mitre Corporation, Urban Mass Transportation Administration, (VA-06-0012) MTR-6794, UMTA-VA-06-0012-74-3, Nov. 1974, 119 pp; Contract DOT-UT-40003; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248921/9ST

32 094127 SUMMARY EVALUATION OF THE HADDONFIELD DIAL-A-RIDE DEMONSTRATION. The Haddonfield, New Jersey Dial-A-Ride demonstration was instituted in February 1972 to determine public attitudes toward DRT, measure its public acceptance, evaluate its technical and economic feasibility, and measure the impacts of the DRT concept on the community. The purpose of the report is to summarize the preliminary evaluation of the Haddonfield demonstration in terms of what was learned from the experiment while attempting to achieve the stated objectives. The concept had favorable public acceptance, and the improvements in the system parameters, such as increase in service area, introduction of shuttle service, and

reduction of fares, caused increases in ridership and productivity. Ridership, productivity, and quality-of-service parameters of the Haddonfield system compare favorably with DRT systems operating in other U.S. cities.

Mouchahoir, GE ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0012) Summary Rpt. MTR-6926, UMTA-VA-06-0012-75-1, May 1975, 45 pp; See also PB-235 995.; Contract DOT-UT-500; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248839/3ST

32 094198 TRAVEL HABITS AND PATTERNS. VOLUME 1. 1964-1973 (A BIBLIOGRAPHY WITH ABSTRACTS). Travel habits and patterns in the U.S. are cited in this bibliography of Federally-funded research. The majority of the studies cover urban transportation including carpools, subways, buses, dial-a-ride, and private automobiles. Disadvantaged, disabled, student, and various age groups are discussed as are recreational data. Some aircraft and rail studies are included. (Contains 83 abstracts)

Adams, GH ; National Technical Information Service Report Jan. 1976, 88 pp; See also NTIS/PS-76/0026.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; NTIS/PS-76/0025/7ST, DOTL NTIS

32 094560 DEMAND RESPONSIVE TRANSPORTATION STATE-OF-THE-ART OVERVIEW. The document presents a state-of-the-art overview of demand responsive transportation. It is designed to make more accessible the knowledge which constitutes the state-of-the-art and is enhanced by the inclusion of a supplementary materials source book for further reference. The document further presents information on 80 demand responsive transportation services known to be operating in North America as of May 1, 1974. Color illustrations reproduced in black and white.

Transportation Systems Center, Department of Transportation Aug. 1974, 118 pp, 12 Fig., 8 App.; See also PB-243 878.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250108/8ST

32 095032 ROLE OF TAXICABS IN URBAN TRANSPORTATION. This report documents and integrates a number of taxicab related studies. It contains a general description of the taxicab industry, trip and rider characteristics, fare structure, operations, users, potentialities and issues. As one of the "para-transit" modes, taxicabs make an important contribution to urban transportation. It is recommended in this report that careful study should be given to making the entire spectrum of urban public transportation modes-including taxicabs-eligible for capital and operating assistance. A number of recommendations for specific courses of action are made.

Webster, AL Weiner, E Wells, JD ; Department of Transportation Dec. 1974

32 095033 IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This publication describes features of the installation and operation of the manually scheduled Haddonfield, New Jersey Dial-A-Ride system. Considerable interest has arisen in providing Dial-A-Ride

service to other localities. The purpose of this document is to provide guidelines from the experience in the Haddonfield project to assist others in procuring and operating a Dial-A-Ride system. Included are sections on: the facility and equipment, operations, handling of and accounting for revenue, communications, personnel training, and sales promotion. In order to serve as a guide for implementing a similar system, information for ordering and building equipment as well as actual operating procedures and forms are reproduced. The appendices explain the logic and rationale behind the development of certain procedures. This information should be useful in adapting those procedures to different situations.

New Jersey Department of Transportation, (NJ-06-0002) UMTA-NJ-06-0002-74-3, Mar. 1974, 224 pp; This project also consists of a summary report and 6 supplements.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233380/LK

32 095034 SUMMARY OF A REPORT COVERING THE IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is an executive summary of Report No. UMTA-NJ-06-0002-74-3, Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride). The subject report is a guide to installing and operating a manually operated Dial-A-Ride System, covering both the physical and functional aspects of the system, i.e., required equipment, furniture, and forms, and people and what they do to operate the system. The subject report is based on manual operation and control of the Haddonfield Dial-A-Ride Project, covering the period from February 1972 through January 1973.

New Jersey Department of Transportation, (NJ-06-0002) Summary UMTA-NJ-06-0002-74-3, Mar. 1974, 23 pp; This project also consists of a subject report and 6 supplements.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233379/LK

32 095035 CONTROLLER'S CLASS NOTEBOOK FOR IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is a supplement to "Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride)." This controller's class notebook is presented as an aid to training Control Room personnel in all phases of Control Room operation of a manually controlled Dial-A-Ride. Its purpose is to guide and direct those who are responsible for operating Dial-A-Ride system in Haddonfield, New Jersey, and surrounding service areas. It contains the necessary policy and procedures to operate the system. It is also used for training control room staff and the vehicle operators. As an adjunct to the operating portion there is also a section on personnel policies and procedures. Staff is discussed in terms of such issues as personnel selection and training, wage and pay policy. Another topic presented is on contingency/emergency procedures. Radio communications are discussed. Definitions are presented for ease in understanding.

New Jersey Department of Transportation, (NJ-06-0002) Supplement UMTA-NJ-06-0002-743A, Apr. 1974, 147 pp; This is one of 6 supplements to the subject and summary reports.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233381/LK

32 095036 DRIVER'S CLASS NOTEBOOK FOR IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is a supplement to "Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride)." This Driver's Class Notebook is presented as an aid to training drivers for a Dial-A-Ride type operation. Since attainment of the purpose of Dial-A-Ride is largely in the hands of the vehicle operator, such topics as public relations, pickup and delivery etiquette, stop procedures, handling cash fares and tickets, vehicle scheduling and driver assignment are discussed under the heading of vehicle operations. Contingency/emergency procedures to follow in case of illness or breakdown are presented. Radio communication is examined. Appendices present the phonetic alphabet and an example of the radio exchange when a vehicle makes a stop.

New Jersey Department of Transportation, (NJ-06-0002) Supplement UMTA-NJ-06-0002-743B, Apr. 1974, 90 pp; This is one of 6 supplements to the subject and summary reports.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233382/LK

32 095037 DRIVER'S CLASS DESCRIPTION SHEETS FOR IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is a supplement to "Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride)." These description sheets are presented as a detailed aid in preparing an hour-by-hour training program for drivers. The sheets have the following format: subject, content, what is to be learned, technique(s), references, visual and other aids, handout(s), and tests(s). Among the subjects covered by the class description sheets are orientation, personnel policies, area familiarization, public relations, vehicle operations, emergency procedures, simulation, mobile radio operation and driving instruction review. Lectures are given and tours arranged.

New Jersey Department of Transportation, (NJ-06-0002) Supplement UMTA-NJ-06-0002-743D, Apr. 1974; This is one of 6 supplements to the subject and summary reports.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233384/LK

32 095038 CONTROLLER'S CLASS DESCRIPTION SHEET FOR IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is a supplement to the report entitled "Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride)." Control-

ler's class description sheets are presented as detailed aids in preparing hour-by-hour training program for Control Room personnel. The description sheets are arranged in the following format: subject, content, what is to be learned, technique(s) references, visual and other aids, handout(s), and tests(s). Among the subjects covered by these description sheets are orientation, personnel policies, area familiarization, control map familiarization, public relations; dispatcher, scheduler and telephonist functions and control staff functions. Lectures are given and tours arranged.

New Jersey Department of Transportation, (NJ-06-0002) Supplement UMTA-NJ-06-0002-743C, Apr. 1974, 113 pp; This is one of 6 supplements to the subject and summary reports.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233383/LK

32 095039 MANUAL CONTROL OPERATING PROCEDURES MANUAL FOR IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is a supplement to "Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride)." This particular manual is presented as an aid to the operation of a manually controlled Dial-A-Ride. Personnel policies toward the vehicle operators and control room staff (i.e., public contact, wage and pay policy) are presented. In terms of vehicle operations, discussion includes pickup and delivery etiquette and vehicle scheduling. Contingency/Emergency procedures are related. Functions of telephonist, scheduler, dispatcher and supervisory activities and responsibilities are delineated. Radio communications are discussed. The appendices contain interim instructions.

New Jersey Department of Transportation, (NJ-06-0002) Supplement UMTA-NJ-06-0002-743E, Apr. 1974, 290 pp; This is one of 6 supplements to the subject and summary reports.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233385/LK

32 095040 PROCEDURE LOGIC DESIGN FOR IMPLEMENTATION AND OPERATION OF A DEMAND RESPONSIVE PUBLIC TRANSPORTATION SYSTEM (HADDONFIELD DIAL-A-RIDE). This report is a supplement to "Implementation and Operation of a Demand Responsive Public Transportation System (Haddonfield Dial-A-Ride)." This particular report on the procedure logic design is presented to show the logic flow of all phases of a manually controlled Dial-A-Ride. The logical design of the Dial-A-Ride Control System is the heart of the system design. From it stem the procedures and training materials. The diagrams shown here are after the initial simulation task was completed. The shorthand notational system employed is presented. Arrow flow diagrams show that time sequence and events in the system. With use of these diagrams, questions of timing, branching to new procedures, flow of documents and information storage can be studied. Personnel and equipment requirements can be determined. Results of time studies made during simulation are presented.

New Jersey Department of Transportation, (NJ-06-0002) Supplement UMTA-NJ-06-0002-743F, Apr. 1974, 87 pp; This is one of 6 supplements to the subject and summary reports.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233386/LK

32 095366 SOCIO-ECONOMIC AND TRAVELING CHARACTERISTICS OF DIAL-A-RIDE USERS. Ten socio-economic characteristics of the average daily users of Dial-A-Ride (DAR) in Haddonfield, N.J. were obtained and compared with characteristics of residents of the entire service area. Five questions were asked about trip characteristics, including frequency of DAR use during the week and weekend, trip purpose, trip distance and the usual means of transportation. Data were obtained from 2 on-board surveys in July '73 and Sept. '73.

Mitre Corporation VA-06-0012, July 1974; Abstract in UMTA Abstracts, Feb/March 1975, p. 4.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB 238-163/AS

32 095527 CARPOOLS: HOW SUCCESSFUL? Carpools are probably the most effective methods of mass transportation offering comfort and convenience while at the same time reducing traffic congestion air pollution, and conserving fuel. A study of the data on carpool matching programs for 1973 shows that automobile usage declined 23.5%. The recent rise in employer-sponsored carpools indicates the popularity of this form of urban transportation. This article briefly describes several examples of successful carpools started in cities across the country. The 3M company in St. Paul initiated the "commute-a-van" program, operating vans that accommodate 12 persons. This ride-sharing program saved money on a proposed parking facility, as well as saving gasoline. The Connecticut Department of Transportation developed a UNIVAC computer program to provide carpool matching services. Most employers participating in such programs give priority parking privileges to carpools. Several agencies in Knoxville joined together in forming an urban-wide pooling program, which was not a reaction to the energy crises but a positive step toward resolving problems such as traffic congestion and decreasing transit ridership. Express buses have also proven to be effective in attracting riders away from their automobiles. From various programs working successfully, it has been shown that a computer matching service encourages people to join or form carpools, and that encouragement and incentive from employers is beneficial in continuing effective carpool programs.

Pratsch, L (Federal Energy Administration) *ASCE Civil Engineering* Vol. 45 No. 2, Feb. 1975, pp 61-63

32 095821 ANALYTIC EQUILIBRIUM MODEL FOR DIAL-A-RIDE DESIGN. Dial-a-ride is a demand-responsive transportation system in the experimental stages of development. Previous analyses of the system have been dominated by relatively expensive, supply-oriented simulation models and crude, insensitive demand predictions. This paper presents an analytic equilibrium model that has minimal data and computational requirements and is suitable for use in

designing future dial-a-ride systems. The model is used to test the sensitivity of level of service and net operating cost to changes in demand model parameters and fares. The results demonstrate the important effects of decisions such as fleet size, service area, and fare levels on the economic and noneconomic prospects of a potential dial-a-ride system. In dial-a-ride as in many other transportation systems, the inter-relations between design parameters and demand response are so complex that only an equilibrium model can predict the impacts of a specific design.

Lerman, SR Wilson, NHM (Massachusetts Institute of Technology) *Transportation Research Record* No. 522, 1974, pp 38-46, 6 Fig., 11 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

32 095822 DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS IN THE PRIVATE SECTOR. Two privately owned demand-responsive transportation systems were investigated to determine the economic feasibility and marketability of these systems and the roles that they play in small-to medium-sized urban areas. The 2 systems are operated by innovative taxicab companies that offer door-to-door service in 6-passenger automobiles on a shared-ride basis. This paper summarizes the results of preliminary analyses of some of the basic information collected on the daily operations of these systems. The 2 companies differ in terms of fleet size, service area, fare structure, types of service offered, market strategies, and goals. Those differences are reflected in ridership, level-of-service, and economic characteristics. Preliminary results reveal the systems to be economically viable, marketable, and important components of the total public transportation system.

Heathington, KW Davis, FW, Jr Middendorf, DP Brogan, JD (Tennessee University, Memphis) *Transportation Research Record* No. 522, 1974, pp 47-55, 1 Fig., 6 Tab.; ORDER FROM: TRB Publications Off, Orig. PC

32 095823 LA HABRA DIAL-A-RIDE PROJECT. The La Habra dial-a-ride project, operated by the Orange County Transit District, has provided a high level of door-to-door service within a reasonable budget and fare structure. The service has proved to be efficient, extremely popular, and operationally feasible.

Shilling, DR Fielding, GJ (Orange County Transit District) *Transportation Research Record* No. 522, 1974, pp 56-64, 5 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

32 097923 SUBSIDIARY TRANSPORTATION: ITS ROLE IN REGIONAL PLANNING. Transportation planning in cities and metropolitan regions can contribute directly to meeting the transit needs of special groups and communities now being overlooked by generalized transit systems, without relying on expensive nationally funded studies. Improvements in transportation development can arise from application on a broad scale of experiments already under way that are demonstrating some effective new arrangements for transit service. This article suggests how an examination of existing subsidiary transit services, such as car or bus pools and subscription buses, which are designed to complement primary/secondary systems, might be organized as a useful input to transportation planning; describes the kinds of transit operations that

might be included in such an examination; and outlines the types of information that should be obtained about them. The objectives of the proposed approach are to speed transportation innovation and introduce greater flexibility in urban development.

Perloff, HS Connell, KM *American Institute of Planners, Journal of* Vol. 41 No. 3, May 1975, pp 170-183

32 097979 CARS FOR THE CAR-LESS. The article states that, in economic terms, the successful operation of a dial-a-ride bus service is dependent on the demand. The criterion for economic success used by Ford Motor Co. in the US is a demand of 10 trips/sq mile/hr. Research at MIT suggests however that the cost per trip can only rival that of a taxi service when the demand density is 20 trips/mil/hr. Demand itself is reported to be dependent on low fares, high residential density and accessibility to telephones. In Britain only 4 in 10 households have a telephone but the rate of increase of subscribers is high. In an attempt to develop the market for dial-a-ride, one firm in the US is reported to be negotiating contracts with local shopkeepers to provide a free dial-a-ride bus service. A brief report is given of investigations in Ann Arbor, Michigan, which are directed at providing a service between any 2 points in the town with a minimum of 2 transfers, using a fleet of 45 dial-a-buses and 15 fixed route express buses. /TRRL/

Bendixson, T *Built Environment* Vol. 3 No. 11, Nov. 1974, pp 582-583, 2 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 212017)

32 097985 THE RE-BIRTH OF THE BUS. This article notes the fact that, though the bus has a bad image, it is still important in most towns and cities in Britain, but that increasingly cars are used in response to the development of dispersed origins and destinations of trips. The author argues that many people are forced into buying cars and he identifies many more that do not have access to cars. The necessity to develop public transport services is described, and the advantages of the bus, particularly its capacity and its use for express services, are outlined. Examples are given of situations where reserved lanes on ordinary roads and motorways and contra-flow lanes contribute to large increases in speed. A number of towns are suggested in England that could give buses special motorway lanes, priority at junctions, and the use of dis-used (or under-used) rail tracks. These would apply to both radial and ring services. A variety of demand-responsive schemes are described which would collect people from low density suburbs. Provision for car-pool cars on reserved lanes is also suggested. The various modes would form an integrated system, with proper interchanges which would have associated shopping facilities. The system would require minimal investment. /TRRL/

Hall, P *New Society* Vol. 29 No. 625, Sept. 1974, pp 797-801, 1 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 212089)

32 098542 SAVING HIGHWAY FUEL: THE ENGINEER'S ROLE. It is one of the responsibilities of highway engineers and officials to see that the most efficient use is made of transporta-

tion in order to conserve fuel while at the same time preserving mobility. The greatest consumption of gasoline occurs in the work trip. An effective conservation measure is carpooling. The Highway Users Federation along with other employers has sponsored carpooling programs and they have proved a success in many instances. Innovative programs such as the vanpool organized by the 3M Company in St. Paul have prospered, and they continue to save fuel and reduce vehicle mileage. Incentives must be provided for more increased use of carpools. Economics can be an incentive since carpools can be more economic and efficient than many forms of public transit. Priority treatment such as exclusive and bypass lanes, traffic control systems that reduce delay thereby saving fuel, and reduced speeds are also good incentives. In considering a shift to transit, the relative energy efficiencies of each mode must be taken into consideration. Urban area size and development affect this greatly. Some energy, of course, can be saved, but not that much transit diversion can be expected to occur without altering basic lifestyles. Conservation depends upon what each individual is willing to give. Highway and traffic professionals, by creating new methods and enhancing old ones, can contribute toward a national, as well as personal, conservation goal.

Robinson, CC *Tire Science and Technology* Vol. 45 No. 5, May 1975, pp 9-13, 7 Fig., 2 Ref.

32 098661 CHARTER AND SCHOOL BUS OPERATIONS. Policies and procedures are prescribed (governing the provision of charter bus services and reporting of charter bus revenues and expenses by recipients of federal financial assistance for the purchase or operation of buses), procedures are formulated for the development of an agreement concerning charter bus/school bus operations, and discusses modification of prior agreements and amendment of applications for assistance. The revisions of certification are covered, as well as complaint procedures and remedies. Rules regarding reporting and records are also set forth. Interim agreements on charter and school bus operations are presented.

Federal Register Vol. 40 No. 115, June 1975, 13 pp ORDER FROM: GPO, Orig. PC

32 098964 HADDONFIELD DIAL-A-RIDE. The Haddonfield (New Jersey) Dial-A-Ride Project is one of about 60 demand-responsive transportation systems currently being used throughout the U.S. and Canada. The Haddonfield Project was designed, implemented and operated as a research and development project to determine the feasibility of a demand-responsive door-to-door transportation service. The prime objective of the Project was to obtain accurate and reliable data for evaluation of the Dial-A-Ride concept. This final report delineates project direction, beginning February 19, 1972 and ending June 30, 1974. It details ridership trends, vehicle productivity, service quality, revenues and costs of operation. The report includes a quantity of graphs, charts, and tables that show the effects of zonal mode of operation, and the elimination of the shuttle service. The main objectives of the Project covered by this report were to: (1) provide accurate data for demand and cost analysis; (2) determine the degree of public acceptance of demand-responsive transit systems; (3) determine limits of a manually controlled

scheduling system; (4) determine system parameters for a computer-controlled scheduling system; and (5) test the developmental computer-controlled scheduling system. Appendices contain a list of Haddonfield Dial-A-Ride reports and data collection and analysis procedures. /UMTA/

Smith (Wilbur) and Associates, (NJ-06-0002) Final Rpt. UMTA-NJ-06-0002-74-5, Dec. 1974, 78 pp; Sponsored by UMTA.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242331

32 099241 A PARATRANSIT PERSPECTIVE ON EVALUATION OF URBAN PUBLIC TRANSPORTATION. This paper points to the need to provide transportation service that responds to the articulated needs and demands of the traveling public, and states that formal evaluation cannot do much to improve this aspect of urban mobility. A marketplace evaluation mechanism is proposed, whereby the public by its consumption choices will provide an evaluation that reflects the true needs and demands of the traveling public. The traveling public is divided into three fundamental groups: the transportationally disadvantaged; individuals who have ready access to private automobiles and whose travel does not involve travel to a major activity center; and the large population group who drive their automobile as commuters between home and a major activity center in the morning and return in the evening, referred to as the RAC/MAC group. This latter group is viewed as the fundamental challenge to the public transportation system, and the need is seen for a much richer variety of possible ride-sharing arrangements or paratransit services. It is suggested that an evaluation of new paratransit modes be conducted by the marketplace process. Those that attract RAC/MAC passengers can be judged to be successful; those that fail to do so, regardless of their performance on explicit evaluation criteria, cannot be considered successful.

Blumstein, A *Transportation Research Board Special Reports* No. 155, 1975, pp 30-34, 1 Tab.; ORDER FROM: TRB Publications Off, Orig. PC

32 125093 POST BUS TRAVEL CAN BE THE ANSWER. This brief article describes the introduction of a post-bus service in a rural area around Dorling. Details of the appearance and special fittings of the van are presented and the author notes what sort of passengers are most common. The service operates three return journeys on weekdays and one on Saturdays. The advantages of the service are spelt out: it is not in competition with stage services, it is a personal and friendly service, and the minibus stops on demand. The service is flexible and the post-bus guarantees not to leave people stranded. Both shoppers and visitors to both friends and the countryside can take advantage of the service. /TRRL/

Falcon, CH *District Councils Review* Oct. 1974, pp 250-251, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 212857)

32 126150 DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS & SERVICES. The forty two papers presented at the conference on demand-responsive transportation (DRT) are oriented toward a number of significant issues that are still unresolved and will impact the future of

DRT. Three papers on the state-of-the-art of DRT examines the services and techniques used to provide those services. The role of DRT service in larger metropolitan areas with significant fixed route service is discussed and the importance of integrating DRT and fixed route systems is considered. Four papers cover aspects of planning for new and integrated DRT systems, and 2 papers discuss the implementation and operation of integrated transit services. Six papers describe the implementation and operation of new DRT services. Service for the elderly and handicapped (should it be combined with general DRT; and special vehicle design) is discussed in 2 papers, presented at the session devoted exclusively to taxicabs, examined the role of taxi companies in DRT operations, as well as the more general issues of taxicab operations. Research and development in DRT is covered in 4 papers. The role of automation is discussed and the issue of whether dispatching should be computer aided or computer controlled is examined. Four presentations on marketing and promotion of DRT, cover aspects such as fare structures, price-demand elasticities and marketing techniques and programs. Presentations were also made on system evaluation (2 papers) and political and public policy issues related to DRT (3papers). The panel and general discussions following the presentation of some papers are also included.

Transportation Research Board Special Reports Proceeding No. 154, 1975, 177 pp Proceedings of the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126152 STATE OF THE ART OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 1. The techniques used to provide the services of demand-responsive transportation (DRT) are examined and illustrated with reference to the small system in Batavia, N.Y. and the larger system in Rochester, N.Y. The vehicles used for DRT have evolved from 10-passenger vehicles to 20-and 25- passenger vehicles (some powered by diesel fuel). A battery-powered Electrobuss is the most recent innovation. Key-punched information from telephone operators is used with digital communication equipment to relay instructions to drivers. A radio voice message system serves as a backup. Permanent records from digital communication equipment can be based in analysis and reporting. Many to-on service, services provided for senior citizen housing units, and subscription service are now offered by DRT. The slowly developing small package delivery has been found to be profitable for DRT and compatible with passenger service. Small systems such as Batavia dispatch manually, but systems such as Rochester will include computer dispatching and the interface of the computer with digital equipment. The Rochester System will be integrated with the existing fixed-route system. Operating costs in the Rochester system has decreased from \$5.00 per passenger in August 1973 (first month of operation) to \$2.54 per passenger in August 1974.

Aex, RP (Rochester-Genesee Regional Transportation Auth) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 3-5

Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126157 PLANNING FOR NEW AND INTEGRATED DEMAND-RESPONSIVE SYSTEMS. SPEAKER 3. The implementation of various demand-responsive transportation (DRT) services is discussed (with emphasis on funding at the state and federal levels), and the DRT activities of several state transportation departments are reviewed. It is emphasized that the need for a service must first be established and then state administration must be approached to obtain funds to meet that need. Work in California is progressing on those lines. Funds for operating and capital expenses are available through federal programs such as Title 3 of the Older Americans Act. Capital assistance from UMTA is available for services designed for the elderly/handicapped and programs may be established to fit the fund. The importance is noted of combining services (eg services for the handicapped, meals services and other social services). DRT can serve a variety of riders, but the market segments must be identified and then the service marketed to that segment. Institutional constraints should be identified and resolved before the DRT service is implemented. Information is presented that was provided by 4 states involved in DRT activities. In Oregon, three demonstration projects incorporating DRT services were established in a cooperative program to improve mobility for the disadvantaged; funds from federal programs were combined with local and state funds. Data on these systems are tabulated. A non-fixed-route subscription, DRT system for the elderly and handicapped is in operation in St. Petersburg, Florida. The DRT system being planned and implemented in Wisconsin will be the first system open to the general public (other DRT services in the state are provided for elderly and handicapped). The Dial-A-Ride Transportation program in Michigan as well as the DRT services in 9 cities are briefly outlined. In California, funds provided by a 1971 Transportation Act are being used or planned for use in the provision of DRT.

Gray, G (California Department of Transportation) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 27-31, 1 Tab.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126168 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED. SPEAKER 2. The history is outlined and the operations are briefly described of a transportation service (Handicabs) for the elderly and handicapped in Milwaukee. The service offers

door-to-door, low-cost, safe transport of passengers by employees trained in handling wheelchairs and disabled passengers. For the success of the system, it is considered that the users must become aware of the type of service offered. The commission arrangement with the driver is considered essential for the efficiency and economics of a demand-responsive service. The operator must keep the turnover rate as low as possible. Detailed and accurate information (does passenger have a wheelchair or must it be provided? is the passenger on the second floor? etc.) is critically important. Correct billing information (Medicaid information) must be obtained on the initial order. Good dispatching is as important as good information gathering. Adequate 2-way radio control, and drivers efficient in wheelchair handling and ambulatory assistance are also considered essential. To better serve the health community, handicabs has developed a nonpaid advisory group of representatives of the health care community, a consultant group from the private agency field to advise on agency matters, and user input aids such as addressed evaluation forms.

Lovdahl, JL (Handicabs of Milwaukee, Incorporated) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 66-68; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126174 TAXIS AND OTHER PRIVATE TRANSPORTATION SERVICES. SPEAKER 1. The benefits that could result to the taxi operator and the municipal government from the integration of privately owned and publicly owned transportation systems is discussed, and plea is made for a change in the manner in which financial support is provided to various public transportation services. A comparison of the shared-ride taxi operation with several demand-responsive transportation (DRT) systems reveals that the levels of service of the taxi operations are higher although productivity is low. The demand for service is also higher for the shared-ride systems. Taxi operations are, however, not generally subsidized. DRT services are costly because of low demand, capital intensive-ness, high labor rates, restrictions on work rules, and few economic incentives. A publicly owned system that used federal money under a 13-C agreement cannot easily change its type of operation. It has been suggested that efficient services at low operating costs can be provided better by private enterprise. Private operations could receive financial assistance but difficulties in obtaining the assistance was so great that almost no private system did receive assistance. Recently, however, the 2 groups (private and public) have begun discussion on the potential that exists for cooperative venture of the 2 groups.

Heathington, KW (Tennessee University, Knoxville) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 84-86, 2 Tab., 6 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-spon-

sored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126175 TAXIS AND OTHER PRIVATE TRANSPORTATION SERVICES. SPEAKER 2. Certain features and problems are discussed of the taxi industry which has 190,000 vehicles, carries 25 percent of the commuter traffic and serves 3,400 cities of all sizes. An important feature of the industry is the group riding or demand-responsive transportation service. Contracts have been entered into with schools, and special education schools. Service is provided for welfare recipients and handicapped persons requiring wheelchair service. Package delivery and jitney service are also provided. One of the problems faced by the industry is retention of accumulated revenues. Ninety five percent of the money from the taxi meter goes to employees. During the past 10 years, the industry has moved from employer-employee businesses to a lessee relation in when the company provides licensed system insurance, dispatching, and coordination and rents the car to the driver. The frequent entry-exit problem is illustrated by the service in Washington, D.C. which has 8,000 licensed taxis and an estimated 1,500 on the streets in the best of times. Central coordination will improve the situation.

Boynton, C (Salt Lake City Taxicab Association) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 86-87; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126176 TAXIS AND OTHER PRIVATE TRANSPORTATION SERVICES. SPEAKER 3. In the field of demand-responsive transportation (DRT), government regulation at every level must be reviewed to permit the inclusion of more modern concepts of the 3 major areas of regulatory concern: chauffeurs, vehicles and service. This review must come soon because the thrust of current recommendations is to provide additional DRT service rather than to provide the means for existing business to meet the problem. In the area of chauffeur regulation, adequate and reasonable regulation must be enforced everywhere because too many licenses depend entirely on the licensing procedure to screen chauffeurs. Research indicates that the regulation of the design and construction of vehicles other than limitation of seating capacity is practically nonexistent. The regulations concerning age and condition of vehicle is generally left to administrative judgment. The van type vehicle is often omitted, and as a result vehicles rendering jitney and DRT services are unregulated. The point is made that taxicabs, which have historically been the vehicles for the private transportation of one or more persons, must have the opportunity to provide any additional or new DRT services that may be needed. The average DRT vehicle load is well within taxicab capacity. The latter is also suited

to package delivery. Partnership with public transit is also a possibility. Improvement in the regulations concerning the limitation of the number of vehicles to be licensed is long overdue. Regulations related to the requirement of financial reliability need to be updated. The enactment of no-fault insurance legislation will reduce accident costs. A further major regulatory feature of DRT industry is the fixing of rates of fare. The rate structures must be revised so that any new DRT service can be provided at the outset at least, by taxicabs or limousines of existing operators or other vehicles provided by the operators.

Samuels, R (Yellow Cab Company) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 87-91, 2 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126177 TAXIS AND OTHER PRIVATE TRANSPORTATION SERVICES. SPEAKER 4. The successful operation is described of a demand-responsive transportation (DRT) system in Huntington Park, California, and the opinion is expressed that DRT operation is entirely compatible with taxicab operation. The employees of the taxicab company (the successful bidders for the city's DRT operation), took only 3 hours for adjusting to the new operations. The city which uses federal revenue sharing funds to buy the services, is supplied with drivers, vehicles and vehicle maintenance. The cost to the city is \$8.25/hour. Rates are 25 cents for children, adults and senior citizens alike. Two buses are operated from 9:00 a.m. to 6 p.m., and carry an average of 95 passengers/day/bus. The vehicle used is a 16-passenger van. A third bus is now needed (to meet the growing ridership) with a lift for handling of the handicapped, particularly those in wheelchairs. After 9 months of operation, it is concluded that no matter how high the ridership is, at the current rate structure, the operation will never be profitable.

Greynshock, DG (All American Cab Company) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 91-92; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126178 TAXIS AND OTHER PRIVATE TRANSPORTATION SERVICES. SPEAKER 5. This paper pursues the proposition that a demonstration program is needed to evaluate the potential for taxicabs for providing various paratransit services, and specifies, in general terms, a program of empirical investigation and experimentation designed to test and evaluate promising service innovations for taxicabs. Regulations seldom deal adequately with the various shared-ride services (jitney, dial-a-ride, hail-a-ride, subscription) that taxicabs can provide. Taxicab operations by the private sector have not

been eligible for the UMTA Capital Grant Program. A promising subsidy mechanism is one in which the public body negotiates a contract with a transportation provider to offer certain specified services at reduced fares; public funds are paid to the operator to supplement fare revenues. A second subsidy mechanism is the use of tickets sold to target group travellers at reduced rates and redeemed at the full fare value by the transportation provider (variations of this mechanism are also suggested). Benefits and potential problems with these services (jitney, dial-a-ride, hail-a-ride, subscription) and subsidy mechanisms are discussed. Transforming innovations in taxi services from ideas to implementation involves 2 major steps: broadening the knowledge base, and the dissemination of information relating to these factors to planners etc. Analyses conducted on the lines outlined here could provide a basis for the development of planning guidelines and demonstrations.

Kirby, RF (Urban Institute) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 92-98, 3 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126179 TAXIS AND OTHER PRIVATE TRANSPORTATION SERVICES. SPEAKER 6. This paper expresses the opinion that the nations need for demand-responsive transportation (DRT) could be met by independent taxi-paying businesses, and deplores the current tendency toward socialization of transportation. For more than 25 years Long Island's taxicab industry has, in fact, been a DRT system. It has paid its way while fares have been maintained low. It has accomplished this within the confines of the existing socioeconomic system and without any direct subsidy through transit bills, tax relief, or price support for inequitable fuel costs.

Hirsch, S (Orange and White Taxi Systems) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 98-99; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126180 RESEARCH AND DEVELOPMENT IN DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 1. Electronic data processing (EDP) equipment used by the Yellow Cab Company of Los Angeles has demonstrated that the use of such equipment in dispatching demand-responsive vehicles is technically and economically feasible for an operation handling a minimum of 2,700 orders per day. The equipment receives and validates all types of incoming orders. Orders are automatically routed to the appropriate sender, and the first, second, and third alternate stand calls are displayed along with the address. The system automatically dis-

plays advance calls before the required service time. Call backs, repeat calls, cancellations, special and emergency calls are all handled appropriately. Several business-oriented reports monitor the total communications operation and the individual performance of the operators. The computer hardware consists of 2 Data General Nova series minicomputers of 32K each, 2 dual disk driver units, 1 line printer, 1 teletype, 14 Hazeltine CRTs, and appropriate switching gear to enable the system to be fully backed up in case of computer hardware failure.

Davidson, JH (Yellow Cab Company) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 103-104; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126181 RESEARCH AND DEVELOPMENT IN DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 2. Two research efforts devoted to the potential use of computers in the control of demand-responsive transportation (DRT) systems are reported: a computer simulation model to test alternative computer control algorithms and to predict system performance; and a set of control procedures in which (a) the immediate assignment of each request was made to the current 'tour' of the best vehicle, (b) the assignment was based on feasibility conditions, under which each user receives service within specified bounds, and (c) the determination of the best assignment was based on the minimization of total service times for current and future passengers. These control procedures were tested by a simulation model and were found to perform well in intuitive grounds and relative to other proposed algorithms. However, since no optimal solution algorithm has been developed, absolute statements about performance were not possible. A demonstration project of the concept was mounted in Haddonfield, New Jersey, to obtain a market test of the service concept and to obtain data on the potential of computer dispatching. The assumptions and simplifications of the real-world system required in the design of the simulation model are discussed, and the findings on modeling assumptions are described. Areas in which improved performance might be achieved are: inflexibility of hand constraints, objective function as a true reflection of utility, handling of advanced and periodic requests, constraint of vehicle position at future time, restriction of certain vehicles to given zones, preassignment capability, scheduling at start and end of driver and vehicle shift, and gearing of algorithm to underused system. The study shows that the simulation model can accurately predict system performance providing that vehicle in-service times are used. The lower demand densities at Haddonfield suggest that the economies of scale possible with these systems cannot yet be realized-and that productivities of 5 to 8 passenger trips per vehicle hour are more realistic than previously cited ranges of 9 to 13. Current research suggests that it is both feasible and desirable for the computer algorithms to achieve better service and to allow the operation of large

integrated DRT and conventional transit systems.

Wilson, NHM (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 104-109, 1 Tab.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126182 RESEARCH AND DEVELOPMENT IN DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 3. Defects in current demand-responsive transportation (DRT) technology are examined, and a way in which these defects may be corrected are described. DRT has paid little attention to the economic efficiency of vehicle use, and current technology is unable to provide practical DRT services to a large geographic area where, for example, door-to-door service could be as long as 2 hours. Another weakness is the poor accuracy of current scheduling methods. Technology based on low-cost, highly reliable minicomputers have been developed to assist with scheduling. Adaptive control methodology has also been developed which is based on a management information system (MIS). MIS is an automatic feedback by-product of a computer-assisted scheduling and dispatching system. MIS records operational transit statistics. The MIS also identifies when and where trips begin and end by each zone or reference point in the service area. A second level of control technology that has been programmed is the automated adaptive control process which can precieve a problem and reset the controls. This system is useful when heavy demand makes reliance on 15-minute pickup times infeasible. A truly integrated DRT and express bus system in which multiple demand-responsive trips are coordinated with the express bus schedules, requires substantial computerization of the entire bus operation. Computerization of a DRT system is not as previously thought. Typical cost figures generated from the paratransit model and simulation service in Santa Clara County are tabulated. The advent of microprocessor electronics makes the outlook for adaptive DRT computer-controlled systems look better than the current economics indicate.

Murphy, RE Paisley, PL Siersema, JN (LEX Systems, Incorporated) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 109-112, 1 Tab.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126183 RESEARCH AND DEVELOPMENT IN DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 4. Evaluatory study of the Haddonfield, New Jersey demand-responsive transportation (DRT) demonstration is

briefly summarized. The study was designed to determine public attitudes toward the DRT concept, measure public use of the system, forecast demand for DRT, determine the economic feasibility of a DRT system, test and evaluate the technical feasibility of such a system, and to measure and evaluate the impact of DRT on the community. A series of surveys prior to and during the demonstration also provided information on trip-making behavior of residents under different operating conditions. A comparison of users perceptions of the influence of DRT characteristics and of their former modes of transportation indicated that automobile users were not strongly influenced to use the DRT system. Surveys also indicated the reason why DRT was not used. The monthly ridership trends of the system have been changing as a result of changes in operating characteristics and seasonal effects. Three area expansions resulted in different effects on ridership. The introduction of a shuttle service and the reduction of fare from 55 to 25 cents also affected ridership. A comparison of the Haddonfield system with other DRT systems in the U.S. and Canada reflected favorably on the local system. The evaluation of the economic feasibility of the DRT concept as demonstrated in Haddonfield included analyses of costs, revenues and financing, and the results include the effects of experimentation and local conditions. The technical feasibility of the DRT concept has been evaluated in terms of the effects of the operating parameters on the quality of the service and vehicle productivity. The study reveals that the DRT concept was well received by residents, and that it was not used more often for work trips because it did not reach the desired destination. Area expansion caused increased ridership but quality of service decreased.

Mouchahoir, GE (Mitre Corporation) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 113-121, 4 Fig., 1 Tab., 11 Ref. Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126184 MARKETING AND PROMOTION OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 1. The fare changes made in the Haddonfield, New Jersey demand-responsive transportation (DRT) system, their impact on public attitude, and their effect on ridership are briefly described. Basically, two fare structures and a free-fare day have been in operation since the inauguration of the demonstration. A substantial increase in daily ridership, and a 26 percent increase in vehicle supply occurred during the free-fare day. The average productivity increased by 50 percent and the quality of service, as measured by promised pickup time, decreased. The number of cancellations and no-show customers (another measure of service quality) during the free-fare day was 3 times higher than the normal. The effect of fare reduction from 60 to 30 cents per ride could not be isolated because of the parallel changes in the mode of operation (shuttle, zonal, computer scheduling) and, possibly, the energy crisis. However, the effect of fare reduction

and improvement or additions to the service resulted in high elasticity of demand. This observation conforms with experiences of conventional transit systems, whose riders are more sensitive to service quality or travel time changes than to fare changes. The comparison of the DRT systems with conventional transit systems indicates that the riders of DRT respond to fare changes (at the 60-cent fare level) similarly to riders of conventional transit systems.

Mouchahoir, GE (Mitre Corporation) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 122-131, 11 Fig., 8 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126187 MARKETING AND PROMOTION OF DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 4. The acceptance and use of a personal transit (PERT) Dial-a-bus service was achieved by a marketing and promotional campaign which attempted not only to sell a service but also to persuade these who would use it to change their habits and life-styles. The various types of service (by the PERT system) each of which required specific marketing techniques are: home-to-work service, home-to-school service, feed-bus service and dial-a-bus service. The two basic approaches employed were the rifle approach (most successful) directed exclusively toward service area residents, and the 'shotgun' approach which used advertisements in the mass media. The initial plan called for 3 phases encompassing a period of 5 months. Phase I centered on direct contact with the various publics involved. In Phase II, the major preservice promotion, direct mail took a major part of the budget. A series of newspaper advertisements were placed, and a "Lunch by Bus" invitation was issued to news media representatives and public officials. During phase III, newspaper ads were continued, contact was established with school officials and PTA groups, incentive programs were worked out with half-fare coupons. Special citizen programs were implemented, and industrial and school charter work has been explored. A strong foundation of support from the various maintained on a constant basis.

Gates, HW (Rochester-Genesee Regional Transportation Auth) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 136-141; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126188 EVALUATING DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 1. This discussion of the important elements in the evaluation of a demand-responsive transportation (DRT) system, focuses on the

groups of individuals who are potentially affected by implementation of a service, and the type and degree of impact. The broad categories of affected groups are identified as users of DRT services; non-users of DRT; operators of DRT; operators of other transportation services, and managers of other business and activity centers in the area. It is recognized that evaluation is and must remain primarily a local issue. Decisions on whether to provide DRT service, who is to operate the service, the quality of service, and the financing of the operation will all be resolved at the local level. Users benefit either from the new service allowing them to take advantage of urban activities previously unavailable (induced demand) or from the new service being preferred to the one previously used. Nonusers are affected in a number of ways through externalities (air pollution, congestion, etc.) associated with the system. A basic decision is whether the operator of the service should be public or private transit based or taxi based. There may be significant negative impacts on other transportation services which must be recognized. The impact of DRT on other businesses and activities will be such that positive benefits will accrue to the activities previously poorly served by transportation and decreasing benefits associated with previously well-served activities. Research and operation experience indicate that more productive operations can be provided at higher demand densities; to achieve the higher demand density, however, requires subsidy.

Wilson, NHM (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 142-146, 1 Fig.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126189 EVALUATING DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. SPEAKER 2. Development trends in cities and their implication for urban transportation systems are briefly reviewed. The CBD-focused, fixed-route transit systems are mismatched to the evolving needs of increasingly low-density and multinucleated cities. Regionwide door-to-door systems such as those in Orange and Santa Clara counties, in Rochester and in Ann Arbor, overcome this mismatch. Conjectures as to how these regionwide systems might evolve are presented, and some criteria for their success are listed (double current transit ridership; achieve full decongested traffic flow without car disincentives; achieve mostly decongested flow with some car disincentives; increase current transit ridership 10 times; and provide 99 percent availability in time and space) are discussed. A figure is presented which compares a flexible-route system with a fixed-route system offering the same level of service, defined as the ratio of walk, wait, and trip time to the best no-wait direct route. Figures also show that the higher the service level, the greater the proportion of flexible-route elements in a total system. The two-phase evolution of the system over time is described; the first phase is that in which coverage of the low-density suburbs is

being added, and the second is that after complete coverage is achieved. Experience suggests that these new systems cannot pay for themselves while at the same time attracting a higher level of use. Apart from the problem of overall subsidy, there should be an internal-to-the-system cross subsidy between high-and low-productivity elements. Private taxi operators lead to the issue of private capital and public subsidy. These systems are seen to lend themselves ideally to incremental planning and implementation.

Ward, JD (Department of Transportation) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 146-153, 10 Fig., 2 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126191 POLITICAL AND PUBLIC POLICY ISSUES RELATED TO DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 1. The role played by the state in cooperating with local and federal agencies in sharing the risks that fall to innovators of DRT will be debated by the legislature, which will seek to develop a means of bridging the needs of local jurisdictions and the strengths of the federal government with state resources and thereby share in the risks that innovations in service and technology will entail. Demand-responsive transportation (DRT) is seen as an attempt to solve some of the problems of congestion and pollution, and the immobility of the poor and the elderly. It must, however, be realistic and efficient in implementation. It must be realized that most DRT systems have not generated demands greater than 10 requests/square-mile/hour; ridership surveys show that the majority of rides have not replaced automobile trips. Concern for efficiency is an important factor; the California legislature opposed DRT because of its labor-intensive nature and the resulting costs. Several communities in California are developing contracts with the private sector to transport the immobile. In Los Angeles, positive steps are being taken with respect to the private sector; the supply of taxicabs has been increased in its franchise areas and jitney services are being experimented. In Santa Clara county, an experimental countywide DRT and arterial bus system is being inaugurated.

Ingalls, WM (East Riverside, County of, California) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 160-161; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

32 126284 EXECUTIVE SUMMARY. CAR-POOLING SEMINAR. The seminar which was convened to answer specific questions related to particular situations encountered by attendees,

and to aggregate commonalities between systems with regard to approaches taken and methods evolved, was formatted in 5 sessions. The first session covered the recent history of carpooling (with emphasis on current activities and vehicle utilization factors), and institutions and funding. In this session, several specific common points were brought out particularly those related to the Los Angeles experience. The session (2nd) on relationships with employers emphasized that employer cooperation in carpooling is the greatest single contributor to the success of the program. Car/Bus pooling and local transit policy (the subject of the 3rd session) was discussed with specific reference to the Knoxville experience. The session concluded that the long-range success of transit depends on the effectiveness of the Transit Authority in: making the public aware of the capabilities of traditional transit, realizing the limitations to effectiveness of traditional carpooling, encouraging new modes and ownership of public transportation, recognizing the need for park-and-ride lots, and eliminating the resistance of public-spirited groups. The session (4th) on promotion and incentives agreed that it is important to secure early involvement of the local media representatives, employers and government agencies, and that a practice of credit sharing will benefit all parties. A wide array of promotional techniques were discussed and a general procedure was outlined. Evaluation was the subject of the fifth session which covered common points related to evaluation of program effectiveness. The potential of carpooling (near-term and future), community support, and selling the program were some aspects covered. The final (6th) session was devoted to summation and the review of the following topics: maintaining communications with and between company carpooling program managers; dealing with media in the area of promotion and incentives; and liability problems encountered in vanpooling.

Transportation Research Circular No. 169, Aug. 1975, 32 pp. ORDER FROM: TRB Publications Off, Repr. PC

32 126381 THE 3M COMMUTE-A-VAN PROGRAM. The 3M Commute-A-Van Program is a system whereby the 3M Company furnishes a standard 12-passenger van to an employee willing to take at least 8 other employees to and from work. The employee driver is compensated with free rides, personal use of the van at a reasonable mileage rate and the excess fares for any passengers over the minimum of 8. The program began as a 6-van pilot operation at 3M Center in April 1973. Since that time, the program has expanded to include as of May 1974, a total of 57 vans. Further expansion of the program at 3M installations both in St. Paul, Minnesota, and elsewhere is anticipated. Many transportation, environmental, and energy benefits have been achieved as a direct result of 3M's Commute-A-Van Program. In addition, a substantial amount of ramp-type parking construction at 3M Center has been delayed. Many other van pooling programs have been started by other firms as a result of the 3M experience. It is felt that van pooling can certainly make a significant contribution towards solving many of our perplexing urban transportation problems. /Author/

Owens, RD Sever, HL ; 3M Company Status Rpt May 1974, 50 pp, 7 Fig., 15 Tab., 2 App.

32 126848 THE TAXI'S ROLE IN URBAN AMERICA: TODAY AND TOMORROW. People who work in large metropolitan areas tend to live within the city limits and be the biggest users of public transit. This is contrary to the assumption that the majority of downtown workers live in the suburbs and an ironic contradiction to the massive networks of commuter rails around big U.S. cities. Within the city, the number of households owning automobiles has declined. Also transit ridership has dropped. The downtown commuter wants door to door, comfortable and private transportation. The taxicab, for that reason, dominates in use in some large cities. The taxicab should be recognized as a public transit vehicle. Fleet taxicabs handle almost forty percent more passenger than all U.S. Rapid rail transit systems, and, about sixty percent as many as bus transit in spite of the fact that the cost for the passenger is almost three times as high. If regulations governing the number and use of taxis in major cities were removed, the taxi would become an even more efficient and widespread form of public transit. It should be considered too, that they operate at a profit without government subsidy.

Wohl, M (Carnegie-Mellon University) *Transportation (Netherlands)* Vol. 4 No. 2, June 1975, pp 143-158, 9 Ref.

32 127467 RECREATION ACCESS STUDY. This study was conducted from the perspective of the user, to learn the role which transportation plays in recreation decisions, and from the perspective of the recreation area, to see how current access affects the areas. An inventory of regionally significant recreation resources under the jurisdiction of Federal and State governments was developed. In examining access to sample of these recreation areas, the following recurrent problems were identified: congestion at approaches to recreation sites at peak times; inadequate internal circulation systems; lack of adequate public transportation access; haphazard private development; and degradation of the physical environment with overaccommodation of the heavy reliance on private automobiles. In accordance with current energy, environmental, and economic concerns, several recommendations, none of which involve new legislation or new programs, are made. Briefly, these recommendations are directed toward the following objectives: increased attention by transit operators to opportunities to provide routes, schedules, and marketing efforts to increase recreational tripmaking by transit; reduction of Federal, State, and local regulations which impede efficient, profitable, and attractive transportation service by motor bus operators and other private interests; and development by land management and recreation agencies of investment and management practices which foster alternatives to auto access.

Office of the Secretary of Transportation Aug. 1975, 18 pp

32 128655 CURRENT FAD: ELECTRIC RENTAL CARS. The Witkar Cooperative Assn. in Amsterdam has introduced an experimental form of alternative public transportation: electric rental cars. The second stage of operations is completing the phasing-in of the computer system which will handle all the procedures involved in the rental process. The first stage tested the design of the cars and stations, and involved a marathon

with 2 electric cars. Only 214 kilowatt-hours of electricity were needed to recharge both cars, which resulted in an energy cost of only \$4.28 for 280 miles. Some design changes were implemented in this stage, and the effort now is aimed at increasing membership and number of rides paid for. Witkar is a nonprofit association and all costs are paid for by membership fees, advertising, and rental fees. The inauguration of the program is occurring simultaneously with Amsterdam's effort to reduce parking spaces and overall traffic density in the city. Since the program began in March 1974, transportation experts from all over the world have come to inspect the technical aspects of the system. The city government has provided only a small amount of financial assistance thus far, since the third stage, which will complete the network with 15 stations and 105 cars, must be implemented before licensing will be given. Despite this fact however, the program has progressed steadily, and membership has increased during its initial stages of operation.

Senger, WM *Automotive News* Vol. 51 No. 4571, Nov. 1975, p 12

32 128950 PARATRANSIT-EXISTING ISSUES AND FUTURE DIRECTIONS. Basic characteristics of paratransit services and fundamental issues unique to paratransit are examined, existing problems that are constraining paratransit development are described, and ways to overcome or minimize existing difficulties are suggested. A taxonomy of paratransit services is proposed so that these systems can be better related to each other, and the institutional environment of paratransit is examined from the viewpoints of planning, operation and regulation. Emphasis is placed on the integration of various paratransit services and of paratransit and conventional fixed route services. Several proposals are made relating to improvements in existing services, new service concepts, new institutional arrangements and service integration.

Roos, D (Massachusetts Institute of Technology) Alschuler, D (ECI Systems, Incorporated) *Transportation (Netherlands)* Vol. 4 No. 4, Dec. 1975, pp 335-350, 1 Fig., 1 Tab., 16 Ref.

32 128951 SOME PROMISING INNOVATIONS IN TAXICAB OPERATIONS. Several promising innovations in taxicab service provisions are presented and subsidy mechanisms which have been implemented or proposed are discussed. Well designed experimentation with such innovations could be a means of stimulating greater interest on the part of planners, policy-makers, regulators and public transportation operators in broadening the role of taxicabs in urban transportation. Four types of shared rider services are identified (dial-a-ride, hail-a-ride, subscription, and jitney) and specific operations are described. Removal of restrictions imposed by state or local regulations would increase the scope and variety of taxicab services. It is argued that taxicabs should be given greater consideration as potential providers of publicly subsidized transportation services.

Kirby, RF Miller, GK (Urban Institute) *Transportation (Netherlands)* Vol. 4 No. 4, Dec. 1975, pp 369-386, 11 Ref.

32 128952 SUBSCRIPTION SERVICE IN THE UNITED STATES. Several types of subscription bus and subscription van services are described, cost and revenue data are presented for comparison purposes, and recommendations are made for the improvement of the climate for the growth of such services. Subscription services have been proven to be attractive transportation services that can carry a significant number of peak period commuters. Although the demand for the service appears enormous, legal, regulatory and institutional constraints act as obstacles to the implementation of such service. It is recommended that urban transportation services (fixed route transit, subscription etc.) should be coordinated by a public transportation provided who will have the authority to provide the most appropriate service to meet an identified need.

Bautz, JA (Urban Mass Transportation Administration) *Transportation (Netherlands)* Vol. 4 No. 4, Dec. 1975, pp 387-402, 3 Tab., 6 Ref.

32 129372 PARATRANSIT: STRATEGIES FOR ENERGY CONSERVATION. Taxi and dial-a-ride operations are paratransit modes which could increase their fuel efficiency more than six times if steps were taken to deal with the regulatory financial and administrative problems, and by implementing strategies designed to capture a larger portion of the transportation market. Taxi industry regulations should be changed to achieve more productive service operations and higher occupancy. Productivity levels of many-to-one and many-to-few dial-a-ride operations are higher than those of many-to-many operations. Wait-time policy, hours of operation and selective expansion of the service area are other factors which affect energy efficiency. Three categories of strategies for increasing energy efficiency of these modes are identified: individual-those in which the modes are implemented by themselves in an energy-efficient manner; supporting-those which enhance the individual implementations by encouraging high occupancy or increasing the level of service; and integrated-those which coordinate operations with other high-occupancy modes. Some selective implementation strategies are summarized in a table.

Arrillaga, B (Urban Mass Transportation Administration) *Traffic Engineering* Vol. 45 No. 11, Nov. 1975, pp 39-43, 2 Tab., 2 Phot.

32 129946 PARATRANSIT: THE COMING OF AGE OF A TRANSPORTATION CONCEPT. The nature and potential of paratransit is examined, and the question of what accounts for its growing popularity is considered. The family of services known collectively as paratransit arose in the 1960's with rapid suburbanization and the need for transportation services that would approximate the convenience and ubiquity of the automobile, yet preserve the inherent economy and efficiency of public transportation. The concept of multipurpose community paratransit services are of special promise. Outstanding examples of such services are to be found in El Cajon, California, and Westport, Connecticut. In central cities paratransit can serve as a valuable complement to regular transit. The use of taxis to replace buses on routes that are little frequented, has been successful in German cities such as Munich, Stuttgart, and West Berlin. Potentially, the most far-reaching opportunity for paratransit lies in the concept of paratransit/transit opera-

tions. Although paratransit is not an alternative to the traditional transit services, it represents a viable mode in the current search for energy-saving transportation systems.

Orski, CK (Urban Mass Transportation Administration) *Transportation (Netherlands)* Vol. 4 No. 4, Dec. 1975, pp 329-334, 7 Ref.; Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research, and sponsored by the Urban Mass Transportation Administration.

32 129948 THE CHARACTERISTICS, USES AND POTENTIALS OF TAXICAB TRANSPORTATION. Taxicab transportation is a significant segment of urban transportation. Taxicabs, along with other "paratransit" type systems, provide service with characteristics between the automobile and mass transportation. Consequently, they are well suited to a number of special purposes. Taxicabs currently serve a wide range of trip purposes by travellers with varied socio-economic characteristics. Taxicab transportation is most attractive for serving lower density area and off-peak travel particularly where there is only minimal mass transit service. In this regard, taxicabs are a supplement to conventional mass transit. The use of taxicabs for collection and distribution functions for both passengers and freight is gradually being realized. The multiple use of taxicabs offers advantages of increasing taxicab productivity and reducing individual trip costs. Many of the problems related to taxicabs are regulatory and institutional in nature. Unless these constraints are eased or removed, wider application of taxicab transportation, including productivity gains, will be limited. /Author/

Weiner, E (Department of Transportation) *Transportation (Netherlands)* Vol. 4 No. 4, Dec. 1975, pp 351-367, 10 Tab., 9 Ref.

32 130533 WEDDING THE NEW TO THE TRADITIONAL IN BUS TRANSIT: DOOR-TO-DOOR AND FIXED-ROUTE SYSTEMS COMBINED IN CALIFORNIA. Details are given of the integrated transit system adopted by Santa Clara County, USA which had to provide a service to 1.07 million people spread of 1300 square miles by means of 200 buses. It was decided to use 110 of the buses for a fixed route service operating on major arterial roads only, and linking all important centres of activity, and to use the other 90 buses to provide a door-to-door service which would supplement the fixed route service; a control system was then selected which would integrate the entire bus fleet. Details are given of the computer assisted scheduling system adopted for the control of the door-to-door service. It is estimated that the combined system reaches 97 per cent of the population. Public response to the service has been very favourable. /TRRL/

Pott, JT (Santa Clara, County of, California) Helsing, RG (Lex Systems Incorporated) *Traffic Engineering and Control* Vol. 16 No. 4, Apr. 1975, pp 182-184, 1 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 215211)

32 131477 BUS DEMONSTRATION PROJECT. SUMMARY REPORT NO. 5 LEEDS. MINIBUS AND PEDESTRIANISATION IN THE CENTRAL SHOPPING AREA. This project consisted of, firstly, the introduction of a minibus service to connect the bus and railway stations via the central shopping area and, secondly, the pedestrianisation of certain streets within the shopping area. The purpose of the demonstration project was to test the feasibility and economics of operating a small bus within a central area and to assess the practicability of allowing these buses to penetrate at low speed into a pedestrian precinct. A comprehensive study of the effects of the scheme on conditions in the central shopping area was undertaken and the results and conclusions are listed in this report. Some brief details of a comparable project in Birmingham are included as an appendix. The project showed that it was quite feasible for a minibus to provide a useful service in a city centre where it would be inappropriate to use a larger bus and that it was quite practical to allow the bus to pass through pedestrian streets. There were disadvantages due to slow speed involved in city centre operations; firstly, the cost per mile was quite high and, secondly, excessive clutch wear seems to occur. Surveys of both pedestrians and minibus passengers showed that most people felt the minibus concept was good and that its main value was for those who could not walk far. It was found, not surprisingly, that a majority of passengers were in favour of the minibus going to stops inside the pedestrian precinct but pedestrians were marginally against this. It had been thought that shoppers laden with their purchases would have used the minibus for their homeward journey but it was found that most passengers made the journey into the centre and about a quarter made the complete journey from one station to the other. There was some evidence that the service had generated some additional shopping trips into Leeds, but in total there were not enough passengers using the service to make it economically viable. Environmental conditions in the shopping area were greatly improved and almost every pedestrian preferred the paved area to the original layout. The number of vehicles and the visual intrusion that they caused was reduced to a minimum and there was a significant drop in the number of accidents. There was also some evidence of a shift in the centre of gravity of the shopping area towards the paved streets and the number of pedestrians increased by about 9% compared with a fall of around 6% at a control point outside the precinct. /TRRL/

Department of the Environment, England Summary Rpt. No. 5, No Date, 20 pp, 9 Fig., 4 Tab., 7 Phot., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-213730)

32 131484 HOW DOES DIAL-A-BUS WORK?. Two dial-a-bus systems are examined, one at old Harlow and the other at Hampstead. Brief details are given of the mode of operation of the systems, the fare structure, ridership, and of passenger opinion. Results of a survey of passengers at Harlow suggest that journey-to-work users are in the minority and that use of the service by car-owning households has steadily risen since the service started. Cost, revenue and subsidies are discussed. The report concludes that both services are reliable and have attracted travellers from the private car. /TRRL/

Aldous, T *Architects Journal* Vol. 161 No. 9, Feb. 1975, pp 460-461, 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-213739)

32 131727 DIAL-A-BUS THREE YEAR'S EXPERIENCE IN ONTARIO. Dial-a-bus is a personalized type of transit service which responds directly to the user's demand for transportation by picking him up at his doorstep rather than requiring him to walk to a bus stop. It may have some, or no, fixed routes or schedules, but in any event usually requires the intending user to request service in advance. The level of service offered falls somewhere between that of a taxi and conventional fixed route transit. This paper looks at the history of dial-a-bus in Ontario. It reviews the experience gained by implementation in various Ontario centers and also gives a general prediction to the future development of a dial-a-bus system. /RTAC/

Bonsall, JA Simpkins, BD (Ontario Ministry of Transportation & Communc, Can) ; Ottawa-Carleton Regional Transit Commission, Can Oct. 1973, 38 pp, 11 Fig.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

32 132227 TAXIBUS IN LINKOEPING: A SIMULATION STUDY [Taxibuss i Linkoeping en simuleringsstudie]. This report deals with a new concept in public transport, the taxi bus. A simulation model for the study of this new system has been developed. Details are given of a major application example performed with this model in relation to a large urban area of 90,000 population, comprising areas of varying development density. The simulations show that, outside rush periods, 15-seater taxi buses can cope with up to 1000 passengers per hour. The number of vehicles required for this is double that in present bus services, but the standard of service is greatly improved, since the taxi bus collects passengers at their homes and takes them directly to their destinations. The system can also be used with advantage during rush periods as a complement to conventional bus routes, in order to cater for "odd" journey requirements. It would seem that the introduction of taxi bus traffic on a large scale will result in a greater degree of equality between different traffic users, not only between car owners and non-owners but also between urban and rural dwellers. /TRRL/ [SWEDISH]

Bjelkaaker, S ; SAAB-Sania AB R&D Rpt. 1975, 79 pp, 10 Fig., Tabs., 19 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN27017E)

32 132633 DIAL-A-RIDE IN BRITAIN: EXPERIENCE TO MID-1974 AND RESEARCH PROGRAMME. The results of small-scale operations of dial-a-ride systems in Maidstone, Harrogate, Abingdon, Carterton and Eastbourne are reviewed. Despite institutional restrictions on the services two of the operations are close to financial viability when all revenue is included in the balance. The plans for an experimental dial-a-ride system in Harlow are described, and the programme of research and evaluations of dial-a-ride to be undertaken by Cranfield Centre for Transport Studies is summarised. /Author/TRRL/ Mitchell, CGB (Transport and Road Research Laboratory) Slevin, R (Cranfield Institute of

Technology, England) ; Planning and Transport Res and Computation Co Ltd Proceeding No Date, pp 203-244, 9 Fig., 9 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216423)

32 133206 SMALL CITY TRANSIT CHARACTERISTICS: AN OVERVIEW. The report is based on information and operating data from thirteen small community transit systems which were studied as part of a larger project on small community transit and its potential. It summarizes organizational, institutional, and operational aspects of the case studies and contains an analysis of some of the relationships among service, cost and community response. Hypotheses are offered regarding the types of trips which are served, the cost and service trade-offs which are relevant when choosing between fixed-route and demand-responsive modes of operation, the critical variables such as labor agreements and maintenance arrangements which affect operating costs, the level of subsidy which may be anticipated, and the trade-offs between single-ride fares and transit passes as a means of fare collection. A number of conclusions are offered which bear on these topics, but the uniqueness of each community situation is stressed as an often dominant factor. The thirteen communities used for this study are: Amherst, Massachusetts; Ann Arbor, Michigan; Bremerton, Washington; Chapel Hill, North Carolina; East Chicago, Indiana; El Cajon, California; Eugene/Springfield, Oregon; Evansville, Indiana; Merced, California; Merrill, Wisconsin; Sudbury, Massachusetts; Westport, Connecticut; Xenia, Ohio.

Kendall, D Misner, J Stearns, M Waksman, R ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-1, UMTA-MA-06-0049-76-1, Mar. 1976, 44 pp; See also PB-251 502.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251501/3ST

32 133208 SMALL CITY TRANSIT: ANN ARBOR, MICHIGAN, PILOT DIAL-A-RIDE PROJECT IN A SECTOR OF THE CITY. Ann Arbor, Michigan, is an illustration of a pilot dial-a-ride project implemented to test the feasibility of a coordinated dial-a-ride/fixed route service. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Michener, W Waksman, R ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-3, UMTA-MA-06-0049-76-3, Mar. 1976, 14 pp; See also PB-251504; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251503/9ST

32 133212 SMALL CITY TRANSIT: EL CAJON, CALIFORNIA. CITY-WIDE SHARED-RIDE TAXI SERVICE. El Cajon, California, is an illustration of a shared ride taxi service. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along

with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Casey, R Paul, G ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0049-76-7, Mar. 1976, 10 pp; See also PB-251 508.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251507/0ST

32 133215 SMALL CITY TRANSIT: MERCED, CALIFORNIA. DIAL-A-RIDE TRANSIT IN AN AGRICULTURAL COMMUNITY. Merced, California, is an illustration of a dial-a-ride transit service with a relatively low operating cost. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Bronitsky, L Kendall, D ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 0 DOT-TSC-UMTA-76-5-10, UMTA-MA-06-0049-76-1, Mar. 1976, 20 pp; See also PB-251 511.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251510/4ST

32 133216 SMALL CITY TRANSIT: MERRILL, WISCONSIN, POINT DEVIATION SERVICE IN A RURAL COMMUNITY. Merrill, Wisconsin is an illustration of an innovative point-deviation transit service. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs of transit service within the local context is stressed.

Mergel, J ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 1 DOT-TSC-UMTA-76-5-11, UMTA-MA-06-0049-76-1, Mar. 1976, 18p; See also PB-251 512.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MFS2.25; PB-251511/2ST

32 133219 SMALL CITY TRANSIT: XENIA, OHIO. TRANSIT SERVICE FOR A REBUILDING COMMUNITY. Xenia, Ohio is an illustration of a transit service which evolved from a freefare emergency service to a demonstration of para-transit services. This case study is one of thirteen examples of a transit service in a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local context is stressed.

Casey, R Coefield, C ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt., 4 DOT-TSC-UMTA-76-5-14, UMTA-MA-06-0049-76-1, Mar. 1976, 16 pp; See also PB-251 515.; Contract MA-06-0049; AC-

KNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251514/6ST

32 133323 TAXICAB USER CHARACTERISTICS IN SMALL AND MEDIUM-SIZE CITIES. In-taxi interviews were conducted with 6176 taxi users in eight small and medium-size cities in North Carolina to determine taxi usage characteristics in these cities. The interviews were conducted in each city both early and late in the month in order to test the effects of early month ridership peaking. One half of the sample cities have transit service. The data were used to test twelve hypotheses regarding the variation of taxi usage with user characteristics, time of the month, and transit. The results show the taxi users: To have substantially lower incomes and car availability rates than do large city taxi users; to be more nearly homogeneous than are large city taxi users; and to seldom use transit. The results point clearly to the need to distinguish between large and small city taxi operations.

Gilbert, G Bach, RO Dilorio, FC Fravel, FD ; North Carolina University, Urban Mass Transportation Administration, (UMTA-NC-11-0003) Final Rpt. UMTA-NC-11-0003-76-1, Jan. 1976, 71 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251984/1ST

32 133443 TWO STOCHASTIC SIMULATORS FOR TESTING FIXED ROUTE AND DEMAND ACTUATED TRANSPORTATION SYSTEM ROUTING AND SCHEDULING POLICIES. Stochastic models for both fixed route and demand actuated transportation systems were developed in this dissertation. Event driven simulators based on these models were constructed and their operation verified. Several example simulations studies were performed. The fixed route transportation system model developed describes the movement of buses over a specified route, the generation of riders for the buses and the boarding and alighting of passengers at the various stops on the route. A computer program which simulates the operation of the model was written and its operation verified by hand checking its operation as the program processed a large number of events and by constructing the program so that it monitors the self-consistency of its operation.

Trygar, TA ; Pittsburgh University, Pittsburgh, National Science Foundation, Urban Mass Transportation Administration Final Rpt. SETEC-EE-75-040, Aug. 1974, 329 pp; Doctoral thesis. Prepared in cooperation with Urban Mass Transportation Administration, Washington, D.C.; Grant NSF-ENG72-03783; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-252647/3ST

32 133496 A TECHNICAL REVIEW OF RIDERSHIP FORECASTING METHOD: DIAL-A-BUS IN SMALL URBAN AREAS. This report is a technical review of the method used by the New York State Department of Transportation to predict the potential ridership of the dial-a-bus service in small urban areas. The method was applied to the City of Oneonta (population: 16,000), New York, in early 1974. A follow-up survey was undertaken in that city in the fall of 1974--three months after the dial-a-bus transit service was in operation. Based on the information obtained from this survey, both the

analytical basis and the predictive accuracy of the forecasting methodology are examined in this study by comparing the observed transit usage and also the after-service community sensitivity to fare policies with those predicted prior to the existence of the service. In addition, other aspects of the methodology and its application such as the adequacy of sample representation and the demand computation procedures are also examined from a critical viewpoint. Results of the study indicate that the method is sufficient in providing "ball park" estimates for the transit planner as it produces plausible prediction in terms of the overall system ridership. On the other hand, it is not a rigorous demand estimation tool at lower aggregation levels such as the subgroups stratified by traveller socio-economic characteristics (e.g., sex, age) and trip purpose (e.g., work, shop). The study further indicates that the main reason for the unstable transit usage estimation at some of the sub-groups appears to be the inadequate sample representation of these sub-groups. Finally, a number of suggestions are offered concerning possible improvements of the methodology for future applications.

Liou, PS ; New York State Department of Transportation RR 73, Feb. 1975, 42 pp, 12 Fig., 8 Tab., 6 Ref.

32 133706 DEMAND RESPONSIVE TRANSIT AND THE INTEGRATION OF D/R SYSTEMS WITH TRADITIONAL TRANSIT. This paper provides a background of the development of demand-responsive transit in small communities in the U.S.A. It also backgrounds traditional transit in metropolitan areas of the United States and outlines its deficiencies in terms of today's urban sprawl and in terms of today's society in metropolitan areas. Urban sprawl has developed city-like areas around big cities, but with lower population densities. Highways and roads were built. Cars were mass-produced. These new populations have never had an alternative to the private car. Today's society includes an ever-increasing number of senior citizens and handicapped persons. Senior citizens find it difficult to get to fixed-route bus stops; handicapped persons have difficulty in boarding regular buses and wheelchair persons cannot even get on board. Particular emphasis is placed upon the examination of the development of demand-responsive transit in metropolitan Rochester, U.S.A. And a demonstration project, sponsored by the Urban Mass Transportation Administration of the United States Department of Transportation. The paper also examines and makes reference to the results of integrated transit in Regina, Saskatchewan, Canada. The demonstration project has several key objectives, the principal one of which is the integration of demand-responsive transit with the fixed-route element of traditional transit. Other important objectives of the demonstration are the balancing of peak and off-peak service so as to improve the overall utilization of resources, increase transit coverage, regular (not special) service for the elderly and the handicapped, the utilization of a computer in dispatching, digital communications, and marketing and promotional techniques. (A) /TRRL/

Aex, RP (Rochester University) *Transportation (Netherlands)* Vol. 4 No. 4, Dec. 1975, pp 419-428, 3 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-217022)

32 134011 A STUDY OF PARA-TRANSIT OPERATIONS IN RHODE ISLAND. A descriptive analysis is presented of a portion of para-transit services in Rhode Island, which, for the most part, are provided for the transportation disadvantaged, elderly, an handicapped. The modes considered are predominantly dial-a-ride in nature. The services offered by various social service agencies were identified and quantified; and a narrative of each paratransit operator surveyed is presented. Identified operators are providing 612,400 to 627,400 passenger trips annually to elderly, handicapped, low income, mentally retarded and others through the state. The greatest need for demand-responsive transportation is with the elderly. These needs are only partially fulfilled. A state-wide demand-responsive system utilizing mini-buses was recommended in 1974. The consolidation of the demand-responsive system into a subsystem operating within the public transit system is advocated. Funding for such a system could come through section 5 of the National Mass Transportation Assistance Act of 1974.

Rhode Island Statewide Planning Program Technical Paper #55, June 1975, 48 pp, 3 Fig., 17 Tab., 33 Ref., 2 App.

32 134233 OXFORDSHIRE LEADS WAY ON SELF-HELP TRANSPORT. This brief article describes two of the schemes used in Oxfordshire to counteract the phasing out of public transport subsidies: car pooling and the use of school buses for wider local purposes. Mention is made of two other possible solutions: a luxury bus and the staggering of working hours within the county council. The latter schemes are not implemented yet. /TRRL/

Municipal Engineering Vol. 153 No. 1, 1976, p 5
ACKNOWLEDGMENT: TRRL (IRRD 217376)

32 134525 THE ADELAIDE DIAL-A-BUS STUDY. The results of a study of dial-a-bus public transport and of its possible application in metropolitan Adelaide are discussed in this paper. The study involved a review of theoretical research, feasibility studies and demonstration projects conducted overseas. It also included extensive market surveys and investigations into possible applications of dial-a-bus in specific areas in Adelaide. Both many-to-many and many-to-one applications were considered. A field experiment was subsequently conducted in which 12 buses were used to operate a many-to-many service over a large part of the Adelaide metropolitan area. (A) /TRRL/

Keal, PD Foley, SP Morris, RWJ *Australian Road Research Board Conference Proc* Vol. 7 No. 2, 1975, pp 320-335, 5 Fig., 5 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218034)

32 134528 SHORT-DISTANCE CENTRAL AREA BUS SERVICES. This paper examines the usage of the minibus as a means of improving the quality of movement within the central area while causing the minimum intrusion on the environment. The literature on this subject is reviewed and the results of two surveys carried out in Leeds are reported. It is concluded that the minibus used should be designed for a particular class of passenger; the most important features of a short-distance service are the frequency of the buses and their routing relative to the desired destinations; the extent to which the minibus will

compete with other transport modes cannot be quantified at this time; a successful service is not necessarily one that is financially viable; and the success of the service is better ensured if it is given extensive and effective publicity. (A). /TRRL/

O'Flaherty, CA (National Capital Development Commission, Australia) Morton, TW Cross, AR *Australian Road Research Board Conference Proc* Vol. 7 No. 2, 1975, pp 384-396, 3 Fig., 5 Tab., 2 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 218037)

32 134671 AN EVALUATION OF CARPOOL MATCHING SYSTEMS. This evaluatory report covers such aspects as establishing personal and spatial compatibility, domain extension techniques, the relative advantages of conformant and non-conformant-area domains, considerations in choosing the appropriate basis of conformant-area domain definition and geo-coding procedure, temporal compatibility, operation of the matching systems, pooling campaign strategies, and desirable features of many-to-one and many-to-many matching systems. The system requirements of computerized car pool matching systems, particularly as these relate to applications to Canadian cities, is established. Existing matching software and procedures are evaluated, and the matching systems best suited to Canadian Cities are identified. Future research requirements related to car pooling in general and future modifications of the recommended systems are identified.

Peterson, DM ; Ministry of Transport, Canada Oct. 1975, 227 pp, Figs., Tabs., 3 App.; ACKNOWLEDGMENT; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

32 134677 COMPARISON OF PRIVATELY AND PUBLICLY OWNED DEMAND-RESPONSIVE SYSTEMS. Urban transportation planners usually agree that urban systems can be put into 3 categories. One of these, multiple or shared-ride, demand-responsive systems, has received comparatively little investigation and consideration as a workable form of urban public transportation. This paper deals with this form of urban transit. Six publicly owned shared-ride systems are compared with 2 privately owned systems. Similar variables are observed, and conclusions are drawn from the observations. The information indicates that the private systems are servicing a large area with a smaller seating capacity. Both are attracting the same market segments, but the private systems are obtaining a higher average fare. This, coupled with the lower costs of the private operation, enables the private systems to operate at a profit while the majority of public systems operate at a deficit.

Davis, FW Heathington, KW Alford, R Symons, R Middendorf, D (Tennessee University, Memphis) *Transportation Research Record* No. 559, 1976, pp 11-20, 3 Fig., 4 Tab., 6 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

32 134678 SUMMARY OF ORGANIZATION AND ENVIRONMENTAL REVIEW OF 2 PRIVATELY OWNED, SHARED-RIDE TAXICAB SYSTEMS. Steadily decreasing ridership on traditional urban transportation modes has prompted concern about urban transporta-

tion systems. This paper deals with 1 level of such a system—privately owned, shared-ride, demand-responsive services. The intention of this paper is to provide an introduction to some of the basic characteristics and concepts of taxicab service in urban areas. It has been written primarily for the use of those who are generally uninitiated in the subject area but who are nevertheless interested in alternative methods of providing urban public transportation service. The paper serves as a starting point for more detailed study of taxicab systems and services, and it serves to develop an awareness of the operating environments and functional structure that have proved fundamental to the success of any organization. Thus it follows that the way in which a privately owned, demand-responsive taxicab system organizes itself, provides itself with the necessary personnel, equipment, facilities, and services, and formulates and follows an operating strategy will be the fundamental factor in making the system a workable enterprise. This paper, then, examines the functional structures of taxicab systems, the requirements and characteristics of the people who operate them, the regulatory environments in which the systems operate, and the various pricing strategies that the systems may follow.

Heathington, KW Davis, FW Alford, R Symons, R Middendorf, D (Tennessee University, Memphis) *Transportation Research Record* No. 559, 1976, pp 21-32, 9 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

32 135032 COMPANY-PROVIDED INCENTIVES BOOST RIDE SHARING. The use of incentives to increase employee participation in company-sponsored ride-sharing programs is discussed, and the efforts of 2 companies that have introduced incentives to increase participation in pooling are described. Free parking or reimbursement of parking fees for carpools, reimbursing transit fares, and savings bond and TV prizes are some of the incentives used. The United Gas Pipe Line Company in Houston, Texas initiated a Busing and Carpool Subsidy Program that pays employees to use the Houston's mass transit system and carpools. The transit rebate program works two ways, either with a company-provided bus pass or through reimbursement of bus fares. Free parking is provided for carpools of 4 or more. As well as offering reimbursement, the company pays taxes due on such income. A commuter club started by the Jones and Laughlin Steel Corp. in Pittsburgh, Pa. is described. As an incentive, a monthly drawing is sponsored for bus passes which permit employees to ride the bus free for a month, and provides 15 car washes and fill-ups.

Pool it News No. 6, Jan. 1976, pp 1-3

32 135034 LEGAL AND INSTITUTIONAL ISSUES IN IMPLEMENTING PUBLIC OR PRIVATELY SPONSORED CARPOOLING PROGRAMS IN CANADA. This study of 4 different types of carpooling (car pools, dynamic car pools, van pools, and bus pools) considers aspects related to implementation, regulations, and liability, and discusses specific case studies. In the conventional carpool, passengers and drivers are known to each other; dynamic carpooling can be arranged by radio, TV or the newspapers, and involves picking up passengers at designated stops; poolers may also combine to purchase a van or the van may be purchased by

the employer; bus pools are run at specified times between a community and an employment center. The study concludes that the question of who should implement a carpooling program should be considered after the program is drawn up. Driving license requirements and taxi regulations vary, and the attitude of the transit authorities to exclusive franchise rights of transit systems are also known to vary. The liability of the driver of a carpool vehicle to the passenger, the liability of passengers to injured third parties, employer liability, and taxation are also discussed.

Glasbeek, S ; Transportation Development Agency Oct. 1975, 116 pp, 1 Tab.; ACKNOWLEDGMENT; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

32 135928 PARATRANSIT IN THE FAMILY OF TRANSIT SERVICES. The need is indicated for a mixture of conventional transit and paratransit to provide a family of services that can be designed to fit the market needs of different portions of the urban community. In rural America and areas of exurban development, paratransit may be the only form of transit. Establishing paratransit service will require new approaches to the organization of the management of public transportation services in a region. Coordination is critical to the achievement of maximum benefits from the transportation system. This is most effectively accomplished where a single agency is responsible for all service types. The transit agency's role in planning for paratransit is examined. Planning must be preceded by local feasibility studies which must evaluate the benefits and negative results of such service, and the impact of paratransit operations upon the rest of the transportation system. The observation is made that where paratransit produces sufficient public benefit, the use of public funds to supplement user charges is justified. Constraints to implementation of paratransit are examined and the fragmentation of the funding process is considered one of the greatest constraints. Paratransit performance to date is reviewed, and various paratransit concepts are outlined in an appendix.

Transit Journal Vol. 2 No. 2, May 1976, pp 5-26, 1 Tab., Refs., 1 App. Prepared by the Task Force on Paratransit, American Public Transit Association.

32 136508 AN ANALYSIS OF TAXICAB OPERATING CHARACTERISTICS. The purpose of this report is to present the results of a survey of taxicab operating characteristics conducted during the fall of 1974. It presents the most extensive effort undertaken to date to gather statistics for the taxicab industry. Prior to this time studies were based upon small specialized samples, so there is no basis for comparison with previous studies which, according to the authors, probably tended to underestimate the total taxicab population in the United States. A mail questionnaire was sent to active operators, of whom 696 (10.8%) responded. In spite of this rather low response rate, the sample provides broad geographic coverage and represents all sizes of operations. General industry characteristics are examined. Fare structures are also studied.

International Association of Taxicabs, Urban Mass Transportation Administration, Wells Research Company, (UMTA-IL-06-0029) UM-

TA-IL-06-0029-75-2, Aug. 1975, 37 pp; Prepared by Wells Research Co., Silver Spring, Md.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251147/5ST

32 136509 DIAL-A-RIDE: THE NEW YORK CITY EXPERIENCE. AN ALTERNATIVE TRANSPORTATION SYSTEM FOR THE ELDERLY. Dial-A-Ride was set up to design, initiate, operate and conduct research on a demonstration low cost car service for the elderly and handicapped to see whether there is a latent demand for such a service among elderly and handicapped; whether providing demand-activated transportation would improve the quality of life for the elderly by improving access to medical and social service facilities and social contacts, and whether such a service, based on group-riding and tied to existing private transportation facilities could become self-supporting. The demonstration area consisted of 2.9 square miles in the north-west Bronx. All elderly 60 and over and ambulatory handicapped 21 and over were eligible for the service. Evaluation of the impact of the system on the social and psychological well-being of program users indicated that although there were problems in service delivery, most users felt the program saved them money and gave them a sense of security. The primary purpose for which the program was used was obtaining medical services. A major implication was that subsidization is necessary for the operation of any model of an alternate transportation system.

Cantor, MH Harris, J Rosenthal, K Stratton, J Shatzkin, K ; New York City Office for the Aging, Administration on Aging Final Rpt. May 1975, 197 pp; Prepared in cooperation with Administration on Aging, Washington, D.C.; Grant SRS-93-75148; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251135/OST

32 136802 AN ANALYSIS OF COMMUTER VAN EXPERIENCE. The report analyzes the planning, organization, and operation of commuter van programs (often called van pools) in the U.S. and Canada. More than 30 existing operations have been examined and classified by considering the major organizational arrangements for providing the service. The potential benefits van commuting generates for the users, employers and community are discussed, and the paper presents guidelines on the demand environment and indicates the service characteristics that are likely to be important in attracting riders. Major legal issues including public regulation, competition with bus transit, liability and insurance, and implications of driver compensation are also reviewed. The potential for widespread van programs and the proposals for large-scale, area-wide van service are also discussed.

Miller, GK Green, MA ; Urban Institute, Urban Mass Transportation Administration, (UMTA-DC-06-0120) Final Rpt. UI-5050-2-2, UMTA-DC-06-0120-76-1, Feb. 1976, 41 pp; Paper copy also available in set of 2 reports as PB-252 303-SET, PC\$8.00.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-252304/1ST

32 136803 GUIDELINES FOR THE ORGANIZATION OF COMMUTER VAN PROGRAMS. The document describes the major stages in the development of a company spon-

sored commuter van program including: the investigation of program feasibility, the promotion and organization of the service, and the operation and administration of an ongoing operation. These guidelines are based on the experience of several successful programs and potential sponsors should find them useful for their particular situation. Seven detailed case studies which are representative of the major types of commuter van services are also presented.

Miller, GK Green, MA ; Urban Institute, Urban Mass Transportation Administration, (UMTA-DC-06-0120) Final Rpt. UI-5050-2-5, UMTA-DC-06-0120-76-2, Feb. 1976, 97 pp; Paper copy also available in set of 2 reports as PB-252 303-SET, PC\$8.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-252305/8ST

32 136915 A COMPENDIUM OF PROVISIONS FOR A MODEL ORDINANCE FOR THE REGULATION OF PUBLIC PARATRANSIT. This report comprises a complete set of provisions for the regulation of various types of public para-transit transportation. Its preparation consisted for five stages: Collection and analysis of the statutes of every state, the ordinances of some 600 municipalities and several multi-state compacts; the compilation, comparison, and the organization and drafting of the sections; considerations of varying attitudes concerning several philosophies of regulation as revealed by the existing regulations; research into the needs which would appear from the implementation of new forms of public para-transit transportation; and the assembly of the COMPENDIUM. On the pages opposite the text are cross-references, comments by the authors, some legal warnings, and generalizations intended to assist the user in the selection process. The sections of the COMPENDIUM are: Definitions; ambiguities; the licensing authority; operating licenses; vehicle licenses; chauffeur's and attendant's licenses; fees and penalties; financial responsibility; inspection of vehicles; books and records; reports; service of notice, etc.; hearings; affiliates; taxicabs; liveries and limousines; non-transit buses; jitneys; ambulances and cabs; criminal offenses; police powers not infringed; amendments; and, partial invalidity.

Samuels, RE ; International Taxicab Association, Urban Mass Transportation Administration, (UMTA-IL-06-0029) UMTA-IL-06-0029-76-1, Feb. 1976, 235 pp; Contract IL-06-0029; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-253182/OST

32 136916 THE GRAND RAPIDS DIAL-A-RIDE. A DEMAND RESPONSIVE COMMUNITY SERVICE TRANSPORTATION PROJECT. This is the final report of a demonstration project, conducted in Grand Rapids, Michigan, from June 1971 through August 1974. The purpose of the project was to develop a demand-responsive public transportation system which would supplement the existing fixed-route, fixed-schedule transit operations. The system was primarily oriented to the inner-city poor and elderly residents and their needs for travel to jobs, health and social service facilities, and cultural and recreational activities. The chapters of the report are: introduction; operating plan summary; dispatching and evaluation design; operations and training; interim results from summer

operation; final results from 13 month full operation; and conclusions. Appendices are 'Transportation Inventory Survey of the Grand Rapids Model Neighborhood' and 'Model Cities Evaluation Report.'

Grand Rapids City Demonstration Agency, Urban Mass Transportation Administration, Ford Motor Company, (UMTA-MI-06-0004) Final Rpt. UMTA-MI-06-0004-74-1, Aug. 1974, 118 pp; Prepared in cooperation with Ford Motor Co., Dearborn, Mich.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253195/2ST

32 136978 DEMAND RESPONSIVE TRANSPORTATION SYSTEM FOR THE EAST/NORTHEAST AND WATTS MODEL CITIES NEIGHBORHOODS. The report documents the activities and operations of a Demand-Responsive Transportation Project in the East/Northeast and Greater Watts Model Neighborhoods of Los Angeles for the period of May 1, 1973 to April 30, 1974. Included are a chronology of events, a summary of operations, cost and performance data as well as an evaluation of the system performance. The project was undertaken to determine if demand-responsive public transportation, using subscription techniques, could be a successful and important service in supplementing existing fixed bus route operations within an inner city area. The study was to identify socio-economic, urban planning and transportation criteria, which, if successful, could be used in adopting similar dial-a-bus programs on a city or nationwide basis. The following were the program priorities in terms of provision of service: (1) persons requiring access to health and related facilities within the service areas; (2) elderly persons requiring transportation within the area; (3) persons without autos to shopping facilities; (4) youth to facilities and services available under Model programs; and (5) other priorities defined on the basis of project experience.

Smith (Wilbur) and Associates, Los Angeles, City of, California, Urban Mass Transportation Administration, Department of Housing and Urban Development Tech. Rpt. UMTA-CA-06-0017-74-2, June 1974, 81 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-253181/2ST

32 137053 ADVANCED DIAL-A-RIDE ALGORITHMS RESEARCH PROJECT. The work builds upon the algorithms and the computer control procedures developed under the CARS Project between 1967 and 1971, and upon the findings of the Haddonfield, New Jersey, dial-a-ride demonstration project which ran from February, 1972 to October, 1974. The purpose of the Advanced Dial-A-Ride Algorithms Research (ADAR) Project was to develop advanced dial-a-ride control procedures based on the experience gained in Haddonfield, and to investigate the problem of controlling integrated dial-a-ride/fixed route services. Another demonstration project in Rochester, New York, began in April, 1975, which also provided significant input to the ADAR Project research. This document is structured so as to be readable by nontechnical persons not familiar with dial-a-ride algorithms research, as well as by more technical transportation planners. The first chapters contain background material---what a control algorithm does, who it serves, and various general elements of algorithms planning. Later chapters describe the new work

performed under the ADAR Project, and lessons learned from the demonstrations.

Wilson, NHM Weissberg, RW Hauser, J; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-MA-11-0024) Final Rpt. R76-20, UMTA-MA-11-0024-76-1, Mar. 1976, 130 pp; See also report dated Jul 75, PB-244 496.; Grant UMTA-MA-11-0024; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254752/9ST

32 137322 OPERATIONAL IMPLICATIONS OF A MAJOR MODAL DIVERSION TO TRANSIT. PROGRAM USERS' GUIDE. The study has examined the implications of dramatic increases in transit patronage on system structure and performance. Models were developed to examine the cost and service attributes of a variety of system components, including express bus, exclusive lane operation, subscription service, dial-a-ride, and several route-based feeder options. These models were applied in a regional context over a range of patronage assumptions to evaluate both the individual components and the synergisms resulting from various service combinations. The analysis has provided insights into the structure of integrated transit systems and the expansion of these systems to serve increasing shares of urban travel.

Batchelder, JH Englisher, LS Sobel, KL; Multisystems, Incorporated, Department of Transportation Final Rpt. DOT-TST-76/73, Apr. 1976, 149 pp; Contract DOT-OS-50266; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254749/5ST

32 137426 URBAN DESIGN AND USAGE FACTORS OF PARATRANSIT VEHICLES AND FACILITIES. The study explores history and future of equipment and facilities for paratransit usage, focusing particularly on facilities for demand responsive services. Relevant technology development programs are discussed along with safety, human factors and operators' concerns, with special attention to boarding considerations of the elderly and handicapped. A spectrum of vehicles is conceptualized for single and multi-party service in both near and mid-term time frames, and in specialized versions to accommodate elderly/handicapped and general population. Local, line-haul and terminal facilities for paratransit vehicles are examined including ubiquitous treatments to support elderly/handicapped access, integration in high traffic, multi-modal terminal facilities; priority and exclusive rights-of-way with the long-term prospect of wayside power to overcome limitations of chemical battery storage; introduction of electric-powered vehicles.

Adams, R Hildebrand, G; Pratt Institute, Urban Mass Transportation Administration, (UMTA-NY-11-0011) Final Rpt. UMTA-NY-11-0011-76-1, Apr. 1976, 150 pp; Contract NY 11-0011; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-255541/5ST

32 137437 OPERATIONAL IMPLICATIONS OF A MAJOR MODAL DIVERSION TO TRANSIT-A MACRO-ANALYSIS. The study examined the implications of dramatic increases in transit patronage on system structure and performance. Models were developed to examine the cost and service attributes of a variety of

system components, including express bus, exclusive lane operation, subscription service, dial-a-ride, and several route-based feeder options. These models were applied in a regional context over a range of patronage assumptions to evaluate both the individual components and the effects resulting from various service combinations. The analysis provided insights into the structure of integrated transit systems and the expansion of these systems to serve increasing shares of urban travel.

Batchelder, JH Englisher, LS Kullman, BC Sobel, KL; Multisystems, Incorporated, Department of Transportation Final Rpt. DOT/TST-76/72, Apr. 1976, 124 pp; Contract DOT-OS-50266; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255921/9ST

32 137751 THE OPERATIONAL CHARACTERISTICS OF THE CARTERTON DIAL-A-BUS SERVICE. The whole of the free-standing Village of Carterton in Oxfordshire is served by a single-vehicle between-peaks dial-a-bus service. This report provides a detailed description of the service and the way in which it operates in practice. After one year of operation, the regular patronage is roughly 7-800 trips per week. Over 90 per cent of the adult trips are made by women, and the purpose of two-thirds of the trips is shopping. There are about twice as many trips out from the village centre as into it. In the absence of the service, nearly 80 per cent of the trips would be made on foot. The service has assumed a mode of operation which is essentially that of a fixed-route minibus, with only about 4 per cent of trips being initiated by telephone. The service has succeeded in attracting new bus patronage from areas already served by conventional buses apparently as a result of its simple timetable, its good adherence to schedule, and its central waiting room, which has become a sociable meeting place. In its original form the service covered little more than one fifth of its total costs, but modifications are planned to both increase revenue and curtail costs. /Author/TRRL/

Watts, PF; Transport and Road Research Laboratory Lab. Rpt. 694, 1976, 40 pp, 15 Fig., 19 Tab., 4 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-219279)

32 138150 FORECASTING DIAL-A-BUS RIDERSHIP IN SMALL URBAN AREAS. A method is developed for estimating potential demand for innovative transit services such as dial-a-bus and park-and-ride in small urban areas and suburban communities currently lacking such services. The method assumes that the rate of usage of a particular type of service is similar for particular population groupings, regardless of their geographical location. The rate of usage is presumed to depend on factors such as age, sex, and service attributes rather than characteristics of the community under consideration. The procedure is applied in the analysis of demand for dial-a-bus service in Oneonta, New York, by using the existing system in Batavia, New York, as the base for determining actual rates of response to such a service. Results indicate that the method gives reasonable estimates of demand and demand sensitivity to policy variables such as fare and gasoline price.

Hartgen, DT Keck, CA (New York State Department of Transportation) *Transportation Research Record* No. 563, 1976, pp 53-62, 3 Fig., 7 Tab., 5 Ref.; Report prepared for the 54th Annual

Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

32 138154 OPERATIONAL PLANNING OF FIXED-ROUTE AND DEMAND-RESPONSIVE BUS SYSTEMS IN THE GREATER LAFAYETTE, INDIANA, AREA. Many small urban areas in the United States are evaluating implementation of a demand-responsive transportation system in addition to the conventional bus system. This paper suggests the proper combination of the two modes, fixed-route and demand-responsive systems, that best serves the demand at a level of service required by the customer. The greater Lafayette area is used as a case study. A simplified procedure was developed to design the fixed route of the bus system of the greater Lafayette area. The level of service was measured by the total time the users spend on the bus system. Computer simulation was used to duplicate the operations of the demand-responsive system in the real world. The system operates on a many-to-many basis, i.e., many origins to many destinations, and is dispatched by computer. Cost comparisons of the two systems provided the feasible operation of the two bus modes for various demand levels under the same level of service. The results show that the fixed-route system best serves the high demand, i.e., more than 90 persons per hour. The demand-responsive system best serves the lower demand. No generalization of the results could be reached at this point in time, except for small urban areas similar in size and in structure to the greater Lafayette area.

Hobeika, AG (Virginia Polytechnic Institute & State University) Satterly, GT (Purdue University) *Transportation Research Record* No. 563, 1976, pp 92-95, 1 Ref.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

32 138439 PARATRANSIT: SOME PRELIMINARY OBSERVATIONS FROM THE TRANSIT INDUSTRY. General comments are made on the transit situation in the last decade, the current situation is examined, and recommendations are presented. It is emphasized that paratransit applications must be promoted in full coordination and cooperation with the transit operators in an area, and the aim must be to complement the services offered by bus and rail facilities. This type of coordination is exemplified in the Minneapolis-St. Paul area, where the Transit Commission operates express and local buses as well as promotes car pools and van pools. It is also desirable to coordinate all financial programs to achieve common objectives. Attention must also be directed toward equipment. Comment is made regarding labor problems and section 13c of the Urban Mass Transportation Act. Much work needs to be done concerning licensing and regulating paratransit. The relaxation of regulations should not be extended to the point of jeopardizing the safety of passengers, or of permitting the return of illegal jitneys. Potential paratransit applications must be submitted to the same rigorous cost and social-effectiveness examinations that UMTA is applying in the field of conventional transit.

Stokes, BR (American Public Transit Association) *Transportation Research Board Special Reports* No. 164, 1976, pp 27-30; Paratransit:

Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138440 TAXICABS IN MULTIMODE PARATRANSIT OPERATIONS. The history of taxicab operations in the paratransit mode is briefly reviewed, and comments are made with regard to its future. The statistics for taxicab operations (the number and types of vehicles, and employee level) are noted. The major concern of the industry at the present time, are maintaining and expanding ridership, controlling costs, diversifying operations, and integrating services with other modes. To provide an equitable arrangement in public transportation, the industry advocates the following: subsidize the rider; enter into contractual arrangements for public transportation with private companies which are the most cost efficient; and provide direct subsidies for capital improvements and operations to private companies that are currently providing services below replacement and operating costs of a new system. Areas for future research are: ridership characteristics; liability insurance rates and alternatives such as self insurance; the termination of demonstration projects; comparative studies of various transportation modes, and measures of productivity.

Gallagher, RV (International Taxicab Association) *Transportation Research Board Special Reports* No. 164, 1976, pp 31-34, 6 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138441 PARATRANSIT: A STATE-OF-THE-ART OVERVIEW. Various paratransit forms are grouped according to their major service characteristics (vehicles which are hired or rented on short-term basis; vehicles which are called or hailed; and vehicles in which ride sharing is pre-arranged, such as carpools etc.), and examples of existing paratransit services are presented to illustrate the potential of these forms of transport for meeting urban travel needs. The main obstacles to widespread adoption of paratransit are also identified. Paratransit services can be provided by private individuals, volunteer drivers, private operators, and by public of private operators of conventional transit services. The role of paratransit in urban transportation systems is greatly influenced by state and local public service commission regulations. Regulations often severely limit the kinds of services the existing services could offer. Regulation of fare levels has also encountered problems. UMTA's encouragement of the use of federal subsidy funds for paratransit is discussed, as well as the availability of public funds for research and development projects. Questions are considered which have been raised by attempts to expand paratransit services in the following areas: the high density house-to-work travel, low density travel demand, access trips to line-haul transit, and travel within business and commercial areas. Suggestions are made for the resolution of problems relating to the implementation of paratransit in U.S. cities.

Kirby, RF (Urban Institute) *Transportation Research Board Special Reports* No. 164, 1976, pp 37-44, 3 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138443 KNOXVILLE AND PORTLAND: TWO SUCCESSFUL COMMUTER POOLING PROGRAMS. The operational characteristics are examined of programs involving car pools, van pools and express bus services, and the findings are generalized to make them applicable to a number of U.S. urban areas. An innovative concept implemented in Knoxville is that of the urban transportation broker. This broker unites buyers and sellers, as well as has the goal of providing a level of service acceptable to the commuter at an unsubsidized fare the commuter will accept. Details are also briefly described of the express bus system, the van pooling venture at the Tennessee Valley Authority, and commuter ride-sharing programs in Knoxville. The major conclusions are listed of an extensive analysis of the commuting needs of Knoxville workers in which their use of public transportation and the economics of alternative forms of transport were examined. Portland's carpool program which consists of 3 phases (employer-based programs, general public promotion and matching, and incentives) is outlined. Issues centering on legality have suppressed the potential of pooling programs. Until social and legal institutions are altered, traffic can be accommodated by 2 methods: construct new facilities and increase vehicle occupancy. The latter approach offers the best return on investment and excellent door-to-door service.

Pratsch, L (Federal Energy Administration) *Transportation Research Board Special Reports* No. 164, 1976, pp 55-62, 2 Tab., 2 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138444 OVERCOMING INSTITUTIONAL BARRIERS IN SPECIALIZED TRANSPORTATION. The Delaware Authority for Specialized Transportation's (DAST) mission is defined and some of the problems encountered by DAST are identified and discussed. Attention is focussed on the enabling legislation that created the authority, planning requirements, funding and budget development, liaison with other transportation providers and administrative agencies, labor and grant problems, and equipment availability. The transition between the Delaware Interagency Motor Service Inc. (DAST's predecessor) and DAST occurred smoothly. DAST is exempted from state taxes but not from federal liabilities. A formal mechanism was initiated so that DAST could apply for capital and operating assistance grants and also be certain the legislative mandate against competition with other private or public providers is fulfilled. The meeting of planned requirements at the state and federal level is discussed. Funding problems are discussed and the suggestion is made that existing and planned transit services should explore fund-

ing potentials of the health and social service programs within their service areas along with the traditional UMTA and state and local services. DAST not only is a service provider but a mandated transportation broker and coordinator. DAST will seek the most cost-effective method of meeting the specialized transportation needs of the transportation disadvantaged. DAST is a nonunion transportation property, but its bus drivers are unionized represented by the Amalgamated Transit Union (ATU). The implications of section 13C of the National Mass Transportation Act of 1974 which requires labor protection assurances are also discussed.

Povlitz, T (Delaware Authority for Specialized Transportation) *Transportation Research Board Special Reports* No. 164, 1976, pp 63-69; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138445 INTEGRATION OF PARATRANSIT AND CONVENTIONAL TRANSIT: PROBLEMS AND POSITIVE DIRECTIONS. This discussion of the problems underlying the integration of conventional and paratransit alternatives in urban areas notes that legislation and the current regulatory framework severely constrain innovation, and points out the folly of expansion of the conventional peak-time transit fleet by traditional methods. A change from the homogeneous origin-destination type to a heterogeneous market-oriented process is encouraged, and a restructuring of the urban public transportation system is advocated. Policy decision-making must seek to change conventional private transit systems to meet consumer demands for mobility. The integration with paratransit alternatives provides the only possibility for attracting sufficient ridership to public transportation to permit the achievement of desired urban transportation goals. The organization (transit management, transit officials, private suppliers, and transit users) of the conventional systems and the federal role in such systems are discussed, and comments are made. The organization for regional public transportation is reviewed, and figures are used to illustrate the traditional planning process, the target market approach to urban transportation, the organization of metropolitan regional transportation authority, and the product and functional orientation of regional transportation authority.

Mundy, RA (Tennessee University, Knoxville) *Transportation Research Board Special Reports* No. 164, 1976, pp 73-80, 5 Fig., 6 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138446 MARKETS AND ROLES FOR PARATRANSIT SERVICES IN AN INTEGRATED URBAN TRANSPORTATION SYSTEM. This paper which seeks to define appropriate areas of integration of all forms of conventional paratransit services by comparing and contrasting conventional and paratransit markets and service characteristics, discusses the urban transportation market and the nature of both conventional and paratransit service op-

tions, comments on the basic services provided by these forms of transport, and presents potentially beneficial integration concepts. The characterization of the urban transport market presented here highlights those aspects that affect roles of the conventional transit and paratransit services with respect to each other and the automobile. These aspects include origin-destination patterns, regularity of trip making, congestion, and auxiliary transport of goods. The characteristics are listed of environments in which paratransit and conventional transit perform well. Whether the potential benefits of service integration concepts presented will be realized, will depend on the ability of transportation planners to identify and analyze the potential innovations.

Kullman, BC (ECI Systems, Incorporated) *Transportation Research Board Special Reports* No. 164, 1976, pp 81-88, 1 Fig., 5 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138447 THE FEDERAL GOVERNMENT AND PARATRANSIT. This exploratory effort to identify several federal policy issues and to review significant experience, discusses the issue of taxi-transit competition, the legal aspects of "transit", and the integration of taxicabs into transit planning and subsidy policy. Issues raised by paratransit innovations are considered, and the application of section 13c is discussed. The questions are discussed about the precise boundary between private and mass transportation, about how to integrate taxis into transit planning, about the eligibility of shared-ride taxi service for transit subsidies, and about public policy with respect to the fair treatment of private companies harmed by publicly subsidized competition. Paratransit poses significant issues of potential competition with conventional transit, particularly with respect to van-pool and special services. Paratransit also poses issues in the area of labor protection (section 13c).

Altshuler, A (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 164, 1976, pp 89-104, 12 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138448 INSTITUTIONAL CHANGES NEEDED TO FOSTER THE DEVELOPMENT OF PARATRANSIT. The institutions that affect the provision of paratransit service are examined (from 4 viewpoints: planning, funding allocation, regulation, and operations), shortcomings and conflicts with existing institutional arrangements are analyzed, and changes to overcome existing problems are proposed. The paratransit sector suffers from fragmentation; operations are small, with limited capital and management expertise. Few organized groups of operators exist, and no organized constituencies or lobbies have developed. Regulations that are outdated, conflicting, and inconsistent must be updated. The regulatory, funding allocation and planning functions should be closely coupled but separated from operational functions. Paratransit

provides the opportunity both to increase available options with respect to the service that is provided and to allow more of a free market situation to develop. With new and improved institutional and regulatory frameworks, the mix of service can be successfully integrated, at one level by interfacing paratransit services with each other and at a higher level by interfacing paratransit with conventional fixed-route transit in a complementary manner.

Roos, D (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 164, 1976, pp 105-113, 1 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138449 REGULATIONS AND PARATRANSIT. This discussion of the regulations that affect paratransit applications, focuses on institutional changes necessary to foster the development of paratransit and outlines a specific approach for accomplishing those changes. The profile of the regulatory framework is reviewed from the point of view of rationale and justification for regulation and the determination of who is to be regulated. The profile chart of the regulatory framework including regulators and their characteristics and areas subject to regulation is also reviewed. An outline of the regulatory framework in relation to paratransit modes and the provision or lack of provision of adequate treatment under the existing regulatory framework for such modes identifies and discusses certain practical problems. The principal areas that require further review are the jurisdictional matters, the areas that are subject to regulation, and the degree of enforcement of such regulations. Recommendations are presented with regard to the options available to facilitate the development of paratransit.

Wolffington, VA (Carey Corporation) *Transportation Research Board Special Reports* No. 164, 1976, pp 114-119, 1 Tab., 2 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138450 PRIVATE CARRIERS AND URBAN TRANSPORTATION. This paper considers the current role of private carriers, discusses the issues facing private carriers, and makes recommendations with regard to research in this area. Variations in the kind of service provided by private carriers turn largely on the degree of privacy desired by the passenger first hiring the vehicle, the capacity of the vehicle, and the control over the points of origin and destination of the trip and the route travelled. The spectrum of vehicles employed are listed, and the characteristics of prospective passengers are briefly described. The financial potential of demand-responsive transportation is considered and the regulation of such transportation is discussed. Many improvements in practice would have been implemented if they were not inhibited by local regulations, some of which may also inhibit the development of paratransit. The industry is faced with cost increases that result from legislative acts that go beyond the ability of the

industry to recoup by greater fares. This creates financial problems that must be met by subsidy. Relation between operators and the federal government is discussed. A major area of research is in the area of implications and problems underlying the exposure of all public carriers to liability arising from the operation of the various vehicles employed in paratransit.

Samuels, RE (Yellow Cab Company) *Transportation Research Board Special Reports* No. 164, 1976, pp 120-126; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138451 LABOR IMPLICATIONS FOR PARATRANSIT SERVICE. Labor arrangements unique to transit are discussed, collective bargaining which is influenced by industry characteristics is reviewed, section 13c of the Urban Mass Transportation Act is examined, and the need is indicated for a consistent labor policy and an organizational structure designed to effectively deal with labor issues. The hourly wage rate, hours of work and working conditions in mass transit are briefly discussed. Labor questions are crucial for dial-a-ride and subscription services. Some work and operating rules in paratransit are outlined. Then there are several transit firms in an area, bargaining is on a company-by-company basis. The management organization for bargaining is similar for both private and public systems. When a transit system becomes publicly owned, its collective bargaining is no longer under the jurisdiction of general federal labor legislation. The provisions of section 13c of the Mass Transportation Act are discussed. The point is made that the 2 goals of primary importance to any transit of paratransit labor policy are the distribution of income on some equitable basis and the preservation of free collective bargaining. A discussion of labor policy focuses on 3 issues: fare regulations and operational deficit funding; work rules and system efficiency; and technological changes and employment.

Smith, JA, Jr (University of North Florida) *Transportation Research Board Special Reports* No. 164, 1976, pp 127-136, 10 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138452 ROLE OF PARATRANSIT IN RURAL TRANSPORTATION. Rural travel characteristics are briefly discussed and comments are made on the growth of public transportation in such areas. The economic efficiency and consolidation of resources related to rural transportation are described. The need for effective managers with entrepreneurial skills is indicated, and the question of whether to focus on special services for subgroups of the population or to provide a variety of services for the general public is considered. Small, person personalized systems providing door-to-door service were first developed in rural areas by community action agencies. Although the cost per passenger trip is high (very long trips are being serviced; and the average load factors are more than 65 percent) for rural transit,

2 important factors indicate that these systems are being operated at reasonable cost and are quite efficient. The greatest impact on transportation in rural areas will come from finding ways to more efficiently use equipment and labor that various agencies currently use to provide paratransit services. Regulations that do not allow flexibility in the use of currently available transportation funds must be changed. The need is indicated for an academic option at universities that would train students in planning and managing specialized transportation services.

Saltzman, A (North Carolina Agricultural and Technical State U) *Transportation Research Board Special Reports* No. 164, 1976, pp 137-142, 6 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138453 SERVICE AND COST CHARACTERISTICS OF SMALL-COMMUNITY TRANSIT: A TENTATIVE OVERVIEW OF OPERATIONAL RESULTS.

Thirteen small-community transit systems were studied in an effort to describe and interpret local transit projects to enhance transferability of the lessons learned for other localities considering the initiation of similar service. The case studies illustrate not only a range of service options and results, but also a variety of community settings, service objectives, financing mechanisms, and political environments. The range of goals that may motivate the initiation of transit service in a small community and the service characteristics that can usually be achieved are discussed and it is noted that the role of transit in small communities is different from that in large urban areas. A particular target group is the youth market. The factors that determine operating cost and those that are subject to management and control are reviewed, and fare structures, fare collection procedures, subsidy levels, and the relation between ridership and revenue collection are examined. Several tentative conclusions based on the case studies are listed and it is emphasized that all results related to ridership, revenue and productivities, are subject to different influences in each particular setting (much more than in a larger urban area). Costs are greatly affected by the entrepreneurial skills of the operator, and ridership is influenced by the ability to get both the employees and the residents personally involve in the system's success.

Misner, J Waksman, R (Transportation Systems Center) *Transportation Research Board Special Reports* No. 164, 1976, pp 143-153, 1 Fig., 3 Tab.

Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138454 PARATRANSIT IN SMALL COMMUNITIES AND NONURBANIZED AREAS.

This overview which focuses on the interrelation of Urban Mass Transportation Administration (UMTA) policies that promote paratransit and that foster mobility improvements in small towns and rural areas, contrasts various federal programs with one another and with nonfederal efforts. Federal guidelines that are currently being formulated for a new small-town assistance pro-

gram are introduced. Legislation is being considered to permit UMTA to provide operating assistance in nonurbanized areas having fewer than 50,000 residents. Precedents for waiving costly labor protection agreements have been established, especially those pertaining to paratransit programs involving nonprofit organizations. The proposed guidelines for UMTA'S small-community program, relate to funds, the apportionment of resources, the administration of the funds, the availability of capital funds, and the requirements for eligibility. Questions that arose during the development of the preliminary guidelines are listed.

Gurin, DB (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 164, 1976, pp 154-156; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138457 OPERATIONAL ISSUES FOR PARATRANSIT: OPERATOR'S PERSPECTIVE.

This review of the activity of a taxicab operator in the paratransit field, discusses labor, vehicle selection and maintenance, control and dispatching issues. Comments are made on the overall management structure, marketing and promotion, and paratransit services. Vehicle productivity and cost of operations are also discussed. The ability to recruit and maintain a sufficient force of taxicab drivers is the key to the success of a taxicab operation. Experimentation with vehicles not normally used in service (van configurations and diesel-powered standard stock cars) has been underway, but no ideal vehicle to meet paratransit needs has been developed. Dispatching practices and vehicle control are integrally related in taxi industry. In the specific operation described here, a system of geographical separation of channels in mobile 2-way radio communication was used to obtain maximum productivity. Several computerized and automated radio communication systems are available. The lack of middle management positions is seen as a serious problem, and the need is indicated for the expansion of marketing and promotion efforts. Vehicle productivity is noted to improve upon diversification of operations into other modes of transportation. A new format on industry expenses which will generate economic and statistical information hitherto unobtainable, is outlined. In this new format, fuel costs, insurance, vehicles, parts and service are adjusted upward on a weekly basis.

Glassman, MA (United Transportation) *Transportation Research Board Special Reports* No. 164, 1976, pp 166-173, 2 Tab.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138458 COORDINATION AND CONTROL OF PARATRANSIT SERVICES.

This resource paper which summarizes the current state of development of coordination and control procedures and raises issues relating to future developments, has as its basic premise, the concept that paratransit services should be designed

to complement one another as well as other transportation services. The more significant technological developments are reviewed and issues relevant to their evaluation are raised. The principal areas in which work has reached the point of implementation are computer control and communication. The potential of automatic vehicle location systems is also reviewed. The coordination of paratransit services is viewed at 2 levels: the coordination problem for a single operator; coordination among several operators. Fully coordinated service implies optimization of the total trip with an explicit attempt to minimize transfer times. The best approach to coordination among different operators is to create a nonoperating authority with regulatory control over all the operating agencies. In the area of cost effectiveness and vehicle productivity, the principal avenues for effort are in improved control and evolution of service concepts. The control issues are the range of systems providing efficient combinations of service quality and productivity, and the extent to which they can take advantage of the economies of scale conceptually feasible by attracting the sizeable support of the public.

Wilson, NHM (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 164, 1976, pp 174-182; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138459 ROLE OF PARATRANSIT IN SERVING THE NEEDS OF SPECIAL GROUPS.

Four transit-dependent groups, the elderly, the handicapped, the youth, and the poor, are discussed in terms of definitions and subgroups, and UMTA projects directed toward resolution of some of their problems are outlined. Confusion is noted as to whether the need is for a single system to handle all travelers including the handicapped, a 2-tier system (a basic system and a special paratransit operation for the handicapped) or 3-tier system (includes a special system for the wheelchair handicapped). Problems are discussed of organization, UMTA legislation, certification of those eligible to use the second and third tiers of paratransit, and the application of the labor protection clause of the act to UMTA grants for services for special groups. Key ongoing projects in the UMTA Service and Methods Demonstration (SMD) Program, are those in Chicago, Danville, Cleveland, Portland and Albuquerque. Solutions to the problems of transportation for the transit dependent include the following: modification of buses and rapid transit stations to accommodate the handicapped; demand-responsive of dial-a-ride systems; organizational approaches (charter services, operations contracted to social agencies, etc.); financial approaches which organize a continuing flow of funds (e.g. the Golden Gate Bridge Highway and Transit District System in the San Francisco area).

Crain, JL (Bigelow-Crain Associates) *Transportation Research Board Special Reports* No. 164, 1976, pp 183-190, 2 Tab., 7 Ref.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138460 ROLE OF PARATRANSIT IN AN INTEGRATED URBAN TRANSPORTATION SYSTEM--WORKSHOP 1. The principal conclusions and observations are listed of the workshop which addressed the potential for improved service through cooperative and coordinated operation of paratransit elements and conventional transit. The workshop sought to ascertain the opportunities for and potential roadblocks to such integrated systems, and to identify mechanisms and strategies needed to bring the systems into operation. The workshop identified the spectrum of urban transportation markets and needs and determined the kinds of paratransit or conventional transit service best suited to them. The potential synergisms between and among the different kinds of transit services are discussed, and problems and solutions in the planning and implementation of all transit services are identified. Some of the conclusions listed here relate to: the ideal mix of the various paratransit and conventional transit; the unimodal approach; transportation for the transit-dependent; integrated systems; ridership densities; organization and organizational criteria; planning; the need for information; and the need for reliable forecasts of total equipment needs.

Ward, J (Department of Transportation) *Transportation Research Board Special Reports* No. 164, 1976, pp 193-196; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138461 EFFECT OF GOVERNMENTAL CAPITAL AND OPERATING ASSISTANCE ON THE DEVELOPMENT OF PARATRANSIT--WORKSHOP 2. The workshop discussion focussed on how federal money will be spent on paratransit in the next few years, particularly UMTA money, and how the precedents established by the expenditure of these funds will shape the future development of this field of transportation. The workshop noted that where new services are being created (particularly demonstrations), potential conflicts can be reduced by dealing directly with uncertainties. User-side subsidies for approved paratransit and transit seem least likely to adversely impact labor and private operators and most likely to benefit target groups with specific unidentified transportation needs. The workshop also found that mechanisms of cooperation that render the greatest efficiencies of all available resources are to be preferred to the creation of numerous isolated projects that have separate client groups and paratransit equipment. Emphasis on services rather than suppliers ought to foster the fuller use of private sector resources, existing transit systems, and centralized paratransit systems for specialized client needs. Areas for further study as well as recommendations made by the workshop are listed.

Burco, RA (Oregon Department of Transportation) *Transportation Research Board Special Reports* No. 164, 1976, pp197-200; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138462 INSTITUTIONAL CHANGES NEEDED TO FOSTER THE DEVELOPMENT OF PARATRANSIT--WORKSHOP 3. The workshop which sought to examine the roles of organizations responsible for the planning, funding, implementation, operation and coordination of various paratransit and transit services, described the type and impact of regulation on the provision of paratransit service, as well as institutional and legal changes. Labor arrangements for different paratransit services were examined, and the current and potential roles of private paratransit providers were reviewed. A first step in assisting new services would be to get adequate representation for paratransit operators in metropolitan planning organizations (MPO). Possible actions in the field of regulations are listed, and suggestions are made regarding insurance of paratransit vehicles. Courses of action are also suggested regarding the initiation of new paratransit services, and the UMTA section 16b2 program for providing capital funds for selected private non-profit transportation projects. Guidelines are presented for coordinating transit and paratransit. Other issues covered include: ombudsman for paratransit operators; the substitution of paratransit operations in low-volume routes; the redirection of public policy; fares; and integration with urban transportation services.

Shiatté, KW (New York State Department of Transportation) *Transportation Research Board Special Reports* No. 164, 1976, pp201-205; Paratransit: Proceedings of a conference held November 9-12, 1975 conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138463 PARATRANSIT IN SMALL COMMUNITIES AND NONURBANIZED AREAS--WORKSHOP 4. The findings and recommendations are presented of the workshop which sought to identify paratransit services that can be used in small communities which do not generally have planning staffs and often do not have regular access to planning information, and ways that these services can be implemented. The workshop also considered the development of regulations, and the roles of federal and state governments. The workshop found that paratransit services are appropriate for serving the transportation disadvantaged, but identified problems stemming from the low trip density of rural areas, lack of coordination in service, management and financing, legal and contractual barriers, and poor management. A major need exists for specific information on performance characteristics of paratransit systems. This information should include operating costs, productivity levels, fare structures, methods for estimating demand and procedures for project evaluation. The recommendations presented here relate to the need for a national advisory committee, operating subsidies, implementation of the nonurbanized area program, incremental implementation, planning, coordination, role of the states, and the collection and dissemination of information.

Saltzman, A (North Carolina Agricultural and Technical State U) *Transportation Research Board Special Reports* No. 164, 1976, pp 206-209 Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.;

ORDER FROM: TRB Publications Off

32 138464 OPERATION ISSUES FOR PARATRANSIT: PRODUCTIVITY, VEHICLES, DISPATCHING, MANAGEMENT--WORKSHOP 5. This effort to examine the existing and new ways of provision of paratransit service, particularly the coordination of complementary services to improve the overall levels of service and productivity, outlined 3 major areas (costs, financial considerations, and problem resolution), and amplified 2 major areas: cost reductions (vehicles, labor, organizational structure) and increased productivity. Recommendations are presented related to the following issues: reporting costs and operating statistics; dissemination of information to taxi operators and paratransit organizations; consumer information system; personnel training programs; and ways of reducing costs and increasing productivity.

Reading, JE (Denver Regional Transportation District) *Transportation Research Board Special Reports* No. 164, 1976, pp 210-213, 1 Tab.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138465 ROLE OF PARATRANSIT IN SERVING THE NEEDS OF SPECIAL GROUPS--WORKSHOP 6. Seven issues are discussed which were covered by the workshop which sought to identify the mobility needs of the special groups, determine the advantages and disadvantages of various paratransit options in meeting those needs, the barriers to the implementation of promising options, and the mechanisms and strategies for overcoming those barriers. The question of whether the emphasis in serving special groups should be on modifying existing services or in providing special services, is discussed in relation to each of the groups (and subgroups) of the transportation disadvantaged. Car pools and vanpools are indicated for the poor and the handicapped. Recommendations for the most feasible operators of the various types of special and general paratransit forms are tabulated. Other issues covered here include the following: the subsidizing of such services or the users of the services; certification of eligibility of individual users; the structure of demonstration projects; the synthesis of information from such demonstration projects; and the role of federal, state, and local government.

Pignataro, LJ (Polytechnic Institute of New York) *Transportation Research Board Special Reports* No. 164, 1976, pp 214-218, 3 Tab.; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138466 CONFERENCE SUMMARY. Salient points discussed at the conference are noted, critical issues are examined and future directions of paratransit are considered. Implementation problems associated with labor, insurance and regulations (particularly the last) were much discussed, and it is noted that regulations that are outdated, conflicting and inconsistent should be updated. The need is also noted for adequate

education and information transfer at several levels including transfer at the microlevel. The question of how to ensure that paratransit alternatives will be given consideration in the planning and resource allocation process is considered, and it is suggested that UMTA and other federal agencies should be more involved in the planning process. The transportation system management element can be an effective mechanism to ensure that urban areas consider paratransit alternatives, regulatory issues, and alternative providers of transportation. The issue of using private operators to implement new paratransit services is considered and the primary responsibility for coordination of transportation is discussed. The development of an integrated system using both conventional and paratransit services, and the federal role in such services are also discussed.

Roos, D (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 164, 1976, pp219-222; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

32 138852 INTERMEDIATE FORMS OF URBAN PUBLIC TRANSPORT IN DEVELOPING COUNTRIES. This paper describes intermediate forms of public transport devised in developing countries to meet demands of rapidly-growing urban populations. Such systems are frequently composed of individually-controlled vehicles carrying more people than a taxi but less than a bus, thus achieving flexibility in routing and scheduling without sacrificing entirely the efficiencies of large-scale operation. Examples given include the jeepneys of manila converted vans and trucks in Africa and Asia, and shared taxis of various kinds, including the dolmus of Istanbul and ankara, the jeepneys of manila, and the cycle rickshaws of the far east, the betjak of indonesia.(a) /TRRL/

Jacobs, GD Fouracre, PR (Transport and Road Research Laboratory) *Traffic Engineering and Control* Vol. 17 No. 3, Mar. 1976, pp 98-100, 1 Tab., 4 Phot., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220131)

32 138914 ALTERNATIVE TAXICAB SYSTEMS. A LONDON CASE STUDY. The specific objectives of this study were:-(1) to establish the pattern and level of demand for alternative taxicab systems; (2) to consider the feasibility of alternative taxicab systems, and (3) to examine such systems in terms of quality and convenience, operating costs, and fare levels. The London taxicab trade is examined in relation to legislative and institutional background, cost structure, revenues and drivers' earnings. Data on trip patterns by licensed taxi in London are presented and analysed, and taxicab services of several large cities in western Europe are reviewed and discussed. Dial-a-ride systems are discussed, including details of their cost and revenue characteristics. Potential changes in the existing pattern of London taxicab services are examined and legislative constraints to such changes are discussed. /TRRL/

Doganis, RS Lowe, SR ; Polytechnic of Central London, England *Research Report* 2, Apr. 1976, 240 pp, 15 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-219909)

32 139343 TRANSPORTATION IMPROVEMENTS: A MULTIAGENCY EFFORT. This cooperative effort of local, state, federal and regional governments which places primary emphasis on public transportation, covers such items as carpooling, public transit information, priority treatment for high occupancy vehicles, traffic operation, legal considerations and intersystem transfers, with primary emphasis on express transit service with interim park and ride facilities. The project, which is of a transportation system management nature, has incorporated all possible citizen participation, and consists of 2 phases. Phase I will provide transportation improvement within the corridor (on I-5) and is oriented to physical action and actual improvement. The project not only analyzed and proposed solutions but also addressed, emphasized and assisted in implementation. Through study and field review of the major causes of congestion, low-cost solutions to reduce the impact of the existing problems were determined and identified. The results are outlined of an origin/destination study, and the details are briefly discussed of the area's transit service. The analysis of the areas problems resulted in the development of a number of low-cost improvement recommendations in the existing transportation system. These include an express bus service, interim park and ride facilities, and a program that would provide intersystem transfers.

Davis, HE Gibby, AR Krawczyk, JM (Columbia Region Association of Governments) *Traffic Engineering* Vol. 46 No. 4, Apr. 1976, pp 40-42, 1 Fig., 3 Phot., Refs.

32 139593 ANATOMY OF A SYSTEMS FAILURE: DIAL-A-RIDE IN SANTA CLARA COUNTY, CALIFORNIA. Late in 1974 and early in 1975 the Santa Clara County Transit District initiated, operated, and then discontinued a demand responsive dial-a-ride system within a 5-1/2 month span. This systems failure was primarily the result of poor systems planning. Specifically, four major mistakes were made that led to the death of the system. They were: (1) Inadequate Customer Communication System, (2) Starting the Entire System at Once, (3) Inadequate Number of Vehicles, and (4) Taxicab Buyout. Each of these four mistakes is discussed in detail. Recommendations for instituting dial-a-ride systems are made. Getting through the difficulties of the start-up period is emphasized. Costs are discussed, and some relevant cost data are presented. /Author/

Carlson, RC (Stanford University) *Transportation (Netherlands)* Vol. 5 No. 1, Mar. 1976, pp 3-16, 1 Tab., 3 Ref.

32 141071 A SIMULATION MODEL FOR PLANNING DUAL-MODE BUS SYSTEMS. This paper presents the outline of a dual-mode simulation model which will be helpful in the planning and design of such systems. The planning requirements for dual-mode bus systems are discussed in the context of the urban transportation planning process, and the adequacy of the existing tools are evaluated. It is concluded that the current software for transit planning-UTPS (UMTA Transportation Planning Systems)-Which is designed for fixed route and fixed schedule systems, can be utilized for a coarse analysis of dual mode networks, but is not

adequate for simulating the demand responsiveness and station operations; further analytical tools are needed for such purposes. The simulation model is presented as a means of supplementing the current planning techniques. There is a detailed discussion of the assumptions built into the model and careful consideration is given to the process of implementing the simulation. For illustrative purposes, results of sample runs of the simulation are included in the paper. /Author/

Heintz, TJ (Marquette University) Chatterjee, A (Tennessee University, Knoxville) *High Speed Ground Transportation Journal* Vol. 10 No. 1, 1976, pp 31-46, 3 Fig., 9 Tab., 8 Ref.

32 141272 COMPARISON OF AUTOMOBILE EMISSIONS BASED ON TRIP TYPE IN TWO METROPOLITAN AREAS. Estimates of the distribution of automobile emissions among various trip types in the Washington, D.C. area are developed and compared with analogous estimates previously reported for Allegheny County, Pennsylvania. Work trips produce approximately equal proportions of emissions in both regions. However, trips to and from the central area and short trips are of considerably lesser importance in Washington than in Allegheny county. In addition, cold starts and evaporations produce a smaller proportion of emissions in the Washington area than in Allegheny County. These results suggest several ways in which measures that are effective in reducing automobile emissions in Washington are likely to differ from measures that are effective in achieving the same objective in Allegheny County. For example, improved suburban transit service and disincentives to suburban automobile travel are likely to be of greater importance in the Washington area than in Allegheny County. Jitney service or other measures oriented toward short trips may be of greater value in Allegheny County. In both regions, however, control of emissions from trips with one or both ends in the suburbs is necessary to achieve substantial reductions in regional automobile emissions.

Horowitz, JL (Environmental Protection Agency) Pernela, LM (Alaska University) *Transportation Research Record* No. 580, 1976, pp 13-21, 2 Fig., 11 Tab., 7 Ref.; ORDER FROM: TRB Publications Off

32 141385 HEY-TAXI. The hybrid vehicle created by Volkswagen for New York's City Taxi Project is a part electric, part gasoline powered vehicle. It looks like a conventional microbus, but its capacity can accommodate up to four passengers and a driver, and there is a space for wheelchairs or shopping carts and a luggage compartment in the rear. Despite its interior capacity, it is only inches longer than the regular subcompact car. The best feature of the City Taxi, of course, is its ability to run totally on electric power, thereby producing no gaseous pollutants. In low emission areas, it can switch to both electric motor and gasoline engine operation. When the gasoline engine's output is more than adequate for driving needs, the electric motor acts as a generator, storing the excess power in the batteries as electrical energy. When operating on hybrid power, the vehicle has lower emissions than the standard internal combustion engine. Because the electric motor provides all the driving power when the vehicle first starts up, as the gasoline engine takes over the throttle valve is

allowed to open slowly, causing low emission rates. The comfort and convenience offered by this prototype city taxi far surpass the usual New York taxi service.

Electric Vehicle News Vol. 5 No. 3, Aug. 1976, pp 14-15, 5 Phot.

32 141404 LESSONS FOR TRANSPORTATION POLICY DRAWN FROM PUBLIC HOUSING, URBAN RENEWAL, AND OTHER FIELDS. Goal achievement in transportation programs appears more likely if policy-makers, program analysts, and educators learn from the experiences of people in nontransportation programs. Expensive mistakes, dead-end approaches, and negative impacts that can be avoided in transportation policies are illustrated with analogies to the implementation problems and program impacts of public housing and urban renewal. Evaluations of public housing programs suggest that the mere provision of new mass transit facilities and services is unlikely to change the basic values and behavior preferences of many population segments despite the hopes of planners, environmentalists, and mayors. The transformation of large-scale, impersonal public housing programs to smaller scale, personalized, and home-owner rehabilitation programs has transportation analogies in pedestrian and private vehicle access improvement programs. Subregional transit services run by managers sensitive to community and traveler needs appear likely to improve population mobility more than investments in costly downtown-oriented linehaul systems. Evaluations of urban renewal programs suggest that urban transportation system management policies must consider the nature, extent, and incidence of negative social, psychological, and economic impacts associated with various strategies to reduce automobile ownership and use. As with relocation housing, comparable public transportation services must be available to affected car users, or adequate financial compensation should be made available. The paper concludes by specifying the institutional implications to reflect lessons from nontransportation fields. New services are suggested to help transportation suppliers and the traveling public. Professional transportation education improvements are recommended.

Gurin, DB (Urban Mass Transportation Administration) *Transportation Research Record* Conf Paper No. 583, 1976, pp 15-28, 1 Tab., 14 Ref.

Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

32 142142 ALTERNATIVE TAXICAB SYSTEMS. A LONDON CASE STUDY. VOLUME 2: APPENDICES. This volume comprises the following 5 appendices: appendix a. A comparative description of taxi operation in 6 European cities. The 6 cities involved in this study are Amsterdam, Brussels, Copenhagen, London, Madrid and Paris; appendix b. Variations in the geographical distribution of the private car hire trade in greater London. The main concern of this appendix is to attempt to establish whether there are any significant differences in the distribution and size of private hire firms between London boroughs and, if so, what factors appear to cause those differences; appendix c. An analysis of taxi hirings at central London rail terminals. These

patterns of taxi usage are investigated with particular regard for the distribution of taxi journeys by destination, by time of day and by the number of passengers who are conveyed on each trip. Since the available data are only a sample of taxi journeys it is necessary to derive factors whereby the sample size could be grossed up to represent the true population; appendix d. A mathematical model of a two-class taxicab system. The model used in the differentiated fare taxi system is formulated; appendix e. The legal framework for taxicab and bus operations in London. The concern of this appendix is to investigate the legal standing of and distinctions between the various conventional branches of the public road transport industry in London (notably taxis and buses), and to provide a detailed background for chapter 7. The appendix is divided into two parts: 1. Legal definitions of road passenger transport modes; 2. Similarities and differences in the regulation of road passenger transport modes. For abstract of volume 1 of this report see IRRD no. 219909.

Doganis, RS Lowe, SR ; Polytechnic of Central London, England Monograph No. 2, Res. Rpt. No. 2, Apr. 1976, 128 pp, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 220811)

32 142146 SOME PRELIMINARY RESULTS OF THE HARLOW DIAL-A-BUS EXPERIMENT. An experimental dial-a-bus service has been running in harlow since August 1974. It connects the residential neighbourhood of old harlow to a number of destinations in harlow new town between the hours of 07.00 and 23.30. After six months the service was carrying over 4000 passengers per week at an average load factor of 50 per cent. Lack of a telephone had not proved a significant deterrent to using the service. About 75 per cent of passengers were booking journeys and/or receiving doorstep service. Survey results are given that indicate the purposes for which journeys were made and the mode that would have been used if dial-a-bus were not available. The experimental results are found to compare well with predictions made using a conventional modal choice model. The cost of the experimental service is 4.86 per bus hour and the gross revenue covers about 30 per cent of this cost. It is estimated that a non-experimental service could cost 3.9 per bus hour and achieve revenue to cover 60-70 per cent of its cost. (a) for the covering abstract of the conference see IRRD abstract no. 220828. /TRRL/

Mitchell, CGB Martin, PH (Transport and Road Research Laboratory) ; Planning and Transport Res and Computation Co Ltd Analytic, ANALYTIC P126, July 1975, pp 88-144, 9 Fig., 11 Tab., 1 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220832)

32 142176 DRAFT MODEL FOR BALANCE BETWEEN DEMAND RESPONSIVE AND ROUTE BOUND BUS TRAFFIC IN BUILT-UP AREAS [Foerslag til modell foer avvaegning mellan anropsstyrd och linjebunden bustrafik i taetorter]. This study is performed within the project optkolt (optimization of public transportation in urban areas, IRRD no 601276) and is a first stage in developing a mathematical model to find the optimum balance between demand responsive bus traffic and route bound bus traffic in a built-up area. The model includes costs of vehicles, drivers and journey time and

level of service in both systems. In this study is also included a test and an adjustment of a computerized method for solving the model. A few calculations were performed and the following results were obtained:-in periods of low demand of journeys the demand responsive system is most advantageous especially concerning long journeys,-if a higher value is placed on journey time the share of demand responsive traffic increases,-if requirements on maximum journey time are decreased the share of demand responsive traffic decreases. /TRRL/ [Swedish]

Hjelte, L ; Linkoeping University, Sweden Rpt. LIH-MAT-EX-74-1, 1974, 26 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN34026E), TRRL (IRRD-220910)

32 142360 DEMONSTRATION OF POTENTIAL FOR IMPROVED USER-ORIENTED TRANSIT TO MAJOR TRIP GENERATOR (ABRIDGMENT). The results of a demonstration project, the UBUS, which provided a direct user-oriented service to a major trip generator, the campus of the University of Wisconsin-Milwaukee, are described. Major trip generators provide a large concentration of trip-making activity around which specialized transit service can be centralized. Project description and project objectives are reviewed as changes in mode choice; and parking use. Conclusions are drawn as to the successfulness of the UBUS service and the potential for widespread user-oriented transit service to major trip generators are examined.

Beimborn, E (Wisconsin University, Madison) Kampschroer, J Marsho, J Weiss, J (Wisconsin University, Milwaukee) *Transportation Research Record* No. 590, 1976, pp 14-16, 1 Tab., 1 Ref.; ORDER FROM: TRB Publications Off

32 143016 THE SCHOOL BUS: A TRANSPORTATION RESOURCE FOR NORTHEASTERN ILLINOIS. The purpose of the study is to explore the possibility of more extensive use of school buses in northeastern Illinois. The study area includes the six counties of Cook, DuPage, Kane, Lake, McHenry, and Will. The study approaches the subject through four steps: (1) putting the school-bus resource in the six-county area into perspective; (2) examining the potential market for additional transit service; (3) identifying the principal constraints in using school buses for non-student transportation purposes; and (4) developing conclusions regarding areas of opportunity for the broader use of school bus equipment.

Northeastern Illinois Planning Commission, Gilman (WC) and Company Incorporated, Urban Mass Transportation Administration Summ. Rpt. UMTA-IT-09-0026-75-1, Jan. 1975, 77 pp; Prepared by Gilman (W. C.) and Co., Inc., Evanston, Ill.; Contract IT-09-0026; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-255544/9ST

32 143034 A MULTI-ORIGIN/DESTINATION TAXI SYSTEM. VOLUME 1, EXECUTIVE SUMMARY. PRELIMINARY DESIGN FOR SINGLE-ORIGIN/DESTINATION TRIPS. The long range goal of this research project is to design, develop and implement an experimental demand responsive multi-

origin/destination taxi system. The overall research program consists of information acquisition, studies of deployment and allocation of equipment, development of pricing mechanisms and operating procedures. The work is divided into three stages: (1) Preliminary design for single-origin/destination trips; (2) prototype design for shared rides; and (3) experiments and evaluation of technology, pricing mechanisms and operating procedures. Although development of the experimental system initially involves only standard taxi services, the resulting hardware and software packages are applicable to other types of paratransit systems. Hence, the entire project is referred to as the Ride-Shared Vehicle Paratransit System or RSVP System. This report contains the results of the first stage of RSVP System development.

Au, T Baumann, DMB ; Carnegie-Mellon University, Department of Transportation Tech. Rpt. DOT/TST-76/84-ES, Sept. 1975, 11 pp; See also PB-255975.; Contract DOT-OS-40081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255974/8ST

32 143035 A MULTI-ORIGIN/DESTINATION TAXI SYSTEM. VOLUME 1. PRELIMINARY DESIGN FOR SINGLE-ORIGIN/DESTINATION TRIPS. Contents: Significance of research; Fare calculation; Control center; Vehicle hardware; Data base management system; Future prospects.

Au, T Baumann, DMB ; Carnegie-Mellon University, Department of Transportation Tech. Rpt. DOT/TST-76/84, Sept. 1975, 55 pp; See also PB-255974.; Contract DOT-OS-40081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255975/5ST

32 143036 CASE STUDY EVALUATION OF THE BOSTON AREA CARPOOLING PROGRAM. The report evaluates a carpooling program in operation in the Boston, Massachusetts area from August, 1973 through August, 1974. The program, entitled the WBZ/ALA Commuter Computer Campaign, was the first program in the nation to promote and organize carpooling on a regional scale. It consisted of a free computer matching service for prospective carpoolers supported by an intensive multi-media promotional effort. The evaluation was structured around a two-pronged survey effort. The WBZ/ALA Follow-Up Survey was administered to a sample of program participants to determine participant demographic and travel characteristics; their reasons for wanting to carpool; the extent of carpool formation as a result of, or independent of, the WBZ/ALA program; and participant experiences and attitudes toward the program. The Eastern Massachusetts Survey, the second survey, was designed to measure the penetration of the WBZ/ALA Program as well as provide data on the level of carpooling in the region and the characteristics and attitudes of carpoolers, non-carpoolers, and potential carpoolers.

Heaton, C ; Transportation Systems Center Final Rpt. DOT-TSC-OST-76-23, May 1976, 279 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255976/3ST

32 143194 SCHOOL/REGULAR ROUTE COORDINATION SERVICE. The study demonstrates, both operationally and financially, the feasibility of expanding routes in suburban re-

gions of Erie County, Pennsylvania, through coordinated school/regular route bus service. The initial phase of this report contains a review of school transportation laws and existing transportation services in the County including those provided by the Erie Metropolitan Transit Authority (EMTA), the school districts and private carriers. This review indicates the feasibility of the school/regular route coordinated service concept. Two corridors in the County were chosen and three joint-use routes were defined which expand EMTA regular route service to about 20,000 residents in Erie County who at present have no transit service available. About 430 students from three School Districts would be served by the coordinated school/public transit routes. Finances of the project are discussed as well as fleet size and manpower quotas.

Simpson and Curtin Incorporated, Urban Mass Transportation Administration, Erie Metropolitan Transit Authority, (UMTA-PA-09-0016) SIMCUR-204, UMTA-PA-09-0016-74-1, Aug. 1974, 58 pp; Sponsored in part by Erie Metropolitan Transit Authority, Pa.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255961/5ST

32 143224 DATA BASE DESIGN FOR DEMAND-RESPONSIVE TRANSIT. A data base for demand-responsive transit operations has been designed to provide for systematic reporting and to be a standard of comparison between transit operations. The data base design is presented in the form of data sheets that may be used directly for recording information about transit operations. Subjects included in the data base include urban characteristics, ridership, costs, and services. Steps necessary for the complete development of a data base include design test, analytical validity, design revision, and development of reporting procedures and maintenance. The result will be a source of information for communities to plan new systems, to restructure existing systems, and to develop new system guidelines. This manual data base system is structured so that it may be automated at a future time.

Thurlow, VS Winchester, S ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0024) MTR-7254, UMTA-VA-06-0024-76-2, July 1976, 93 pp; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, Federal Highway Administration; ORDER FROM: NTIS; PB-256820/2ST

32 143230 HADDONFIELD DIAL-A-RIDE DEMONSTRATION, THIRD HOUSEHOLD SURVEY. The Haddonfield, New Jersey Dial-A-Ride (DAR) System operated from February 1972 to December 1974. The overall objective of the project was to determine the public attitudes, economic and technical feasibility, and community impacts of the Demand-Responsive Transportation concept. The household survey discussed in this report was conducted in September 1974 in the dial-a-ride service areas of Haddonfield, Barrington, Lawnside, and Cherry Hill, New Jersey. The Haddonfield Dial-A-Ride had been in service for 20 months. This survey was administered to obtain data on the socioeconomic profile and travel characteristics of the users of Dial-A-Ride and the users of taxi, fixed-route bus and auto modes. Tabulations of the responses collected were made for each of four

samples on a household, person and trip basis. Among conclusions reached was that the use of Dial-A-Ride for travel between home and work was higher than that shown by previous surveys.

Winchester, SA ; Mitre Corporation, Urban Mass Transportation Administration MTR-7168, UMTA-VA-06-0024-76-1, Mar. 1976, 70 pp; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-257033/1ST

32 143930 THE EVOLUTION OF INTEGRATED TRANSIT-THREE PARABLES. In the past decade, a desire for expanded urban public transportation has been generated by increased environmental and energy awareness, and by the negative impact of extensive freeway construction in the nation's major cities. More recently, increasing transit operating deficits have kindled interest in the more efficient use of existing transportation facilities and in finding more cost-effective means of improving and expanding public transit service. Restructured conventional and para-transit services, operated as a comprehensive regional transit system integrated operationally, physically, and institutionally, offer a promising solution. This study examines the implications of embarking on a ten-year strategy to implement such a system. Three levels of ridership response are assumed which affect system scale and operating policy decisions at biennial intervals. The operating cost and deficit implications of these three response parables are then traced, yielding insight into the feasibility of an evolutionary strategy.

Sobel, KL Batchelder, JH ; Multisystems, Incorporated, Office of Systems Development and Technology Final Rpt. DOT/TST-76T/4, June 1976, 38 pp; Contract DOT-OS-50266; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257160/2ST, DOTL NTIS

32 143982 DEPLOYMENT SCENARIOS FOR INTEGRATED REGIONAL TRANSPORTATION NETWORKS. The report describes the cost and service implications of alternative scenarios for the deployment of an integrated regional transportation system in a hypothetical city. The impacts of various levels of user acceptance are investigated. For the selected study area, a limited expansion of integrated transit service to suburbs, and the improvement of off-peak suburban service through the use of flexible-route systems appears desirable. In view of the large areas and low suburban population densities characterizing the study region, full coverage of the entire suburbs appears to be economically feasible only at reduced service frequencies.

Billheimer, JW Bullemer, R Holoszyk, M ; Systan, Incorporated, Department of Transportation Final Rpt. Systan-D147-1, DOT-TST-76T-7, Aug. 1976, 145 pp; Contract DOT-OS-50265; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257742/7ST, DOTL NTIS

32 145318 HOW TO CALL THE BUS-TAXI [Hoe roep ik een bustaxi op]. One of the efforts to meet the demand upon public transport is the development of the bustaxi-system. The customer supplies the following data to a control centre: (1) the address of destination (2) the time of arrival and (3) the number of co-travellers. By means of an algorithm this control centre allots the cus-

tomers to the most appropriate bustaxi. The customer is able to communicate with the control centre by means of a terminal. To allow proper functioning, it is convenient to split this terminal in two parts (1) a part concerned with transmission and reception and (2) a part that enables the customer to enter the required data and to receive the data returned from the control centre. The design for the latter part of the terminal is discussed. /TRRL/ [Dutch]

Vandelham, F Dam, JVT ; Delft University of Technology T-75, May 1976, 64 pp, Figs., Tabs.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV58070E), TRRL (IRRD 223193)

32 145337 DEMAND RESPONSIVE TRANSPORTATION: AN INTERPRETIVE REVIEW. The problems and potential of several demand responsive transportation (DRT) modes are examined in this paper. The analysis provides suggested recommendations to decision makers, as well as policy analysts and transportation planners. Included in the definition of DRT are the auto, taxi, rent-a-car, jitney, dial-a-bus, car pool, and subscription bus. The main conclusions are: (1) decision makers should not focus on taxis, rent-a-car, jitney, dial-a-bus, car pool, or subscription bus to reduce congestion and pollution without disincentives to auto use; (2) jitneys can help the transit poor, and jitney development by the private sector should be encouraged, particularly along routes currently overloading public transit where resistance from transit operators is likely to be the least. Or, jitneys might be encouraged to feed public transit, if this proves politically feasible. (3) Since the greatest potential of dial-a-ride is in helping the poor and elderly rather than reducing congestion, decision makers should consider providing vouchers to the poor and elderly for use on taxis before considering the public provision of an entire dial-a-ride system. (4) Local decision makers, as well as state agencies supporting local demand responsive transportation, should support efforts to increase the supply of taxis. Recognizing the political difficulties involved in increasing the supply, compromise solutions aimed at encouraging incentives for competition, such as leased cabs, should also be encouraged. /Author/ /TRRL/

Higgins, T *Transportation (Netherlands)* Vol. 5 No. 3, Sept. 1976, pp 243-256, 2 Fig., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 222585)

32 145400 REGIONAL CARPOOL MATCHING SYSTEMS: A SIMULATION OF THE BOSTON EXPERIENCE. In August of 1973, WBZ, a Boston radio station, launched one of the nation's first regional carpooling programs in affiliation with the Automobile Legal Association (ALA), an auto and travel firm. The author explains that the motivation of these organizations in starting the program was to provide a useful service to their main public constituency, commuters, in the face of the impending fuel shortage which was to reach near-crisis proportions in New England during the winter of 1973-74. The concept of the program involved soliciting names and work-trip data from car commuters in eastern Massachusetts and matching them with others who had similar commuting characteristics so that they might form a carpool. Over a million questionnaires were distributed.

The process of commuter matching is described and discussed, leading to important implications for carpooling policy-makers. The experience of such a low ratio of applications received, some 13000 leading to the matching of about 3800 people, for example could, it is felt, indicate commuter disinterest with regional carpooling programs. /TRRL/

Berry, WL (Ohio State University) *Logistics and Transportation Review* Vol. 12 No. 1, 1976, pp 25-37, 2 Fig., 3 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-222046)

32 145588 DIAL-A-RIDE SOFTWARE INSTALLATION GUIDE. The Demand-Responsive Scheduling Software Package is a set of procedures and computer programs designed to assist researchers, agencies, and transit operators in the operation of demand-responsive transportation systems. This package is being tested and is currently operating on a PDP-10 time-sharing system in Rochester, New York. The package includes program documentation, descriptions of input data file preparation, operators' guides, and program source code. The manual contains preliminary guidelines for installing the on-line portion of the software package at a user site. It outlines such steps as obtaining and organizing resources, constructing data bases, and starting and operating scheduling operations.

Ferrantino, JR ; Mitre Corporation, Urban Mass Transportation Administration MTR-7211, UMTA-VA-06-0024-76-4, Sept. 1976, 68 pp; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258333/4ST

32 145620 USER DOCUMENTATION FOR THE FHWA CARPOOL MATCHING PROGRAM (SECOND EDITION). The full documentation for the computerized FHWA Carpool Matching Program is divided into two reports: user documentation and program documentation. This report only covers the user portion of the documentation and is intended to be used as a guide and set of instructions for operating the program. On October 1, 1974, the Federal Highway Administration released the latest, improved version of the program. This second edition of the user documentation includes a description of all the improvements and additions that have been added to this latest version of the program. The FHWA program is written in American National Standard COBOL and thus should be readily transferable to environments other than the IBM 360/65 (OS) under which it has been developed and tested.

Federal Highway Administration FHWA-PL-77-003, June 1975, 61 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258771/5ST

32 145621 PREFERENTIAL FACILITIES FOR CARPOOLS AND BUSES-SEVEN REPORTS. These seven reports on preferential facilities for carpools and buses have been assembled and reprinted by the Federal Highway Administration. The reports provide information on several recent projects to increase the person-moving capacity of the highway system by designating facilities for preferential use by high-occupancy vehicles. The reports cover many different types of priority treatment. Some of the reports analyze and evaluate the effectiveness of

particular projects. Other reports emphasize the project design and operational features; others simply describe the current operation of unique or unusual projects.

Federal Highway Administration FHWA/PL-77-005, May 1976, 59 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258839/0ST

32 145622 PROGRAM DOCUMENTATION FOR THE FHWA CARPOOL MATCHING PROGRAM. The full documentation for the computerized FHWA Carpool Matching Program is divided into two reports: user documentation and program documentation. This report covers the program portion of the documentation. It is intended for use by those persons who desire to learn the internal operation of the program. The FHWA program is written in American National Standard COBOL and thus should be readily transferable to environments other than the IBM 360/65 (OS) under which it has been developed and tested.

Federal Highway Administration FHWA/PL-77-002, Jan. 1974, 22 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258840/8ST

32 145623 NATIONAL CONFERENCE ON AREAWIDE CARPOOLING PROCEEDINGS (1975) HELD AT HOUSTON, TEXAS, DECEMBER 8-10, 1975. Activity toward increasing commuter ridesharing has been steadily increasing throughout this country over the past several years. As the number of programs involved in stressing ridesharing across the country increases, the need for coordination and information also increases. In response to this demonstrated need, the 1975 National Conference on Areawide Carpooling was envisaged. Sponsored jointly by the Houston Carshare Program, the Federal Highway Administration and the Federal Energy Administration, the conference had one paramount objective: to exchange experiences and to heighten the knowledge and effectiveness of area-wide ridesharing programs. The 3-day conference was organized around workshop sessions covering a gamut of topics from marketing and promotion to legal and regulatory issues. The attendees, numbering over 130, were representative of all regions of the United States, from a wide range of private and public agencies, institutions and organizations actively involved in promoting increased ridesharing. The proceedings presented in this document will help to fill the great need for information and concern for transportation alternatives.

Somerville, R ; Houston Carshare Program, Federal Highway Administration FHWA/PL-77-006, 1975, 264 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258844/0ST

32 146500 FEASIBILITY STUDY OF THE EMPLOYMENT CENTER BUS SERVICE CONCEPT. A new approach to commuter-oriented bus operations is studied. Advantage is taken of the spread in working hours in an employment center by having each bus make multiple trips during peak periods. Buses serve the first shift and then return with additional passengers to serve subsequent shifts. Groups of buses are assigned to make trips of various

lengths. The service resembles subscription bus service; however, the increased productivity results in breakeven fares which should attract a large segment of non-transit dependent travelers almost irrespective of commuting distance. Procedures for developing and applying the service are provided, particularly using trip combinations of various lengths which can serve two to four staggered shifts. As a concluding test of feasibility, the service is applied to an actual employment center.

Schnitt, A Bush, LR ; Aerospace Corporation, Urban Mass Transportation Administration Final Rpt. ATR-76(7583)-1, UMTA-CA-06-0084-76-1, Aug. 1976, 170 pp; Contract DOT-UT-60024; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-259941/3ST

32 147043 THE HARLOW DIAL-A-BUS SERVICE: SOME OPERATIONAL STATISTICS.

The report provides some information about the practical operation of the Harlow experimental dial-a-bus service. Demands upon the control arrangements and the response of the system are analyzed in considerable detail, and some more general operational statistics are also reported. The system is found to be coping comfortably with the present level of demands upon it. A good quality of service is evidenced by prompt attention to requests, accurately estimated pick-up times, a high level of doorstep service, and reasonable journey times.

Watts, PF ; Transport and Road Research Laboratory TRRL-Suppl-225UC, 1976, 30 pp; Also pub. as ISSN-0305-1315. See also PB-245 229(PC A03/MF A01); ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258903/4ST

32 147056 PROPOSED ENERGY CONSERVATION CONTINGENCY PLAN; EMERGENCY COMMUTER PARKING MANAGEMENT AND CARPOOLING INCENTIVES. ECONOMIC IMPACT ANALYSIS. ENVIRONMENTAL IMPACT ASSESSMENT CONTINGENCY PLAN NO. 2.

This report describes the economic impact of a plan whose objective is to reduce demand for gasoline by restricting the availability of auto parking for commuters and encouraging commuters to form carpools or use mass transit during a supply interruption.

Federal Energy Administration FEA/H-76/431, Sept. 1976, 214 pp; Also available in set of 5 reports as PB-258 623-SET, PC E99/MF E99; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258625/3ST

32 147303 UNIVERSITY AREA TRANSIT STUDY. A PRELIMINARY DESIGN.

Situations and events of the past ten years in the University Area of the West Bank, East Bank and St. Paul Campuses of the University of Minnesota, generated discussions of the need for a transit circulation and distribution system and the need to define the relationship between the circulation system and the regional transit system. The University Area Study was conducted in two parts: Part (1) System selection--The work completed (goals, objectives, culture and performance requirements, identification of potential users, transit system alternatives, and summary report) resulted in the definition of a conceptual transit system for the University Area. Part (2) Preliminary design--This work refines the concep-

tual transit system, defines system performance specifications, estimates capital and operating costs, and includes an implementation schedule.

Bather-Ringrose-Wolsfield, Incorporated, Simpson and Curtin Incorporated, Urban Mass Transportation Administration 74-5, UMTA-MN-09-0010-74-1, Dec. 1974, 165 pp; Prepared by Simpson and Curtin, Philadelphia, Pa.; Contract DOT-MN-09-0010; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-260688/7ST

32 147374 DEMAND RESPONSIVE TRANSPORTATION PLANNING GUIDELINES (1976).

Demand Responsive Transportation (DRT) is a type of transit operation providing 'on-demand,' door-to-door service with small buses. More than forty DRT services are now operating in the U.S. These systems provide the data base for a set of relationships which can be used for planning and design of new DRT systems. In addition, the experience of active operators emphasizes a number of important steps in developing successful DRT services.

Chung, CC Ferrantino, JR ; Mitre Corporation, Urban Mass Transportation Administration, (UMTA-VA-06-0024) MTR-7360, UMTA-VA-06-0024-76-6, Oct. 1976, 81 pp; Supersedes PB-232 970; Contract DOT-UT-50016; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-261314/9ST

32 148131 TRANS-CAB: A DEMONSTRATION OF SHARED TAXIS FEEDING FIXED ROUTE TRANSIT SERVICE.

The purpose of this paper is to describe transit demonstration programs which may be classified as follows: DEVELOPMENT (EXPERIMENTAL): To develop, with transit properties, innovative transit strategies which show promise of being of value to the industry. While benefits may be expected, their value may not be identifiable or quantifiable prior to implementation. DEMONSTRATION (EXEMPLAR): To demonstrate, through transit properties, innovative strategies for which benefits can be identified and quantified with an acknowledged degree of certainty. This paper deals specifically with the Trans-Cab Demonstration Project as an example of new transit programs. /RTAC/

Vervoot, CM (Ontario Ministry of Transportation & Communic, Can); Roads and Transportation Association of Canada Proceeding Report Number 7, Sept. 1975, pp 105-130, 8 Fig., 3 Tab.

This paper was presented at the Annual Conference held in Calgary, 1975; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

32 149260 FARE COLLECTION AND TICKETING CONSIDERATIONS AT DUAL-MODE STATIONS.

Dual-mode transit system concepts are now being developed to provide demand-responsive transportation in metropolitan areas. Since these systems combine the features of demand-responsive service and shared, multiple origin and destination vehicle usage, their ticketing and fare collection functions will be more complex than those of conventional transit systems. Fares are likely to be related to trip distances; fares may also depend on the time of day and characteristics of the traveler. The reservation request and confirmation process

associated with demand-responsive systems will result in additional functions. It may also be necessary to verify or control (or do both) the passenger loading of each vehicle. Finally, the possible implementation of a dual-mode transit system in an evolutionary manner, beginning with a single-mode dial-a-bus service, requires that both interim and final goals be considered when the initial ticketing and fare collection concept is designed. This paper explores these new and expanded functions of ticketing and fare collection for dual-mode transit systems. A case is made for integrating the design of reservation, ticketing, and fare collection functions with the overall design of a dual-mode transit system. Careful integration of these functions will produce a high level of passenger service and economies resulting from shared vehicle use and extensive automation.

Hamberg, WA (Stanford Research Institute) Cowan, RW (General Motors Corporation) *Transportation Research Board Special Reports* No. 170, 1976, p 103; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

32 149499 WISCONSIN TAXICABS: VOLUME I, EXECUTIVE SUMMARY.

The 3-phase study reported here consisted of the compilation of an inventory of taxicab firms, a survey of cities and villages regarding taxicab regulations, and a survey of taxicab firms. The taxicab inventory (Vol. II) includes 109 firms headquartered in 78 cities and villages. Volume III of this study analyzes the regulatory structure within which the taxicabs operate. It is reported that taxicabs are subject to more intense local regulation than are other public transportation modes, and receive more favorable tax treatment from the state government. Volume IV describes the results of the survey of taxicab firms and contains information about hours of operation, fares, vehicles, work force etc. Nine taxi firms serve elderly and handicapped persons, 6 firms offer reduced fares, 8 firms offer subsidized programs, and 4 firms operate specially equipped vehicles. A bibliography with over 100 recent references is presented in Volume V.

Wisconsin Department of Transportation Exec. Summ Aug. 1976, 20 pp, 1 Fig., 2 Tab.

32 150485 INTEGRATION OF PARA-TRANSIT WITH CONVENTIONAL TRANSIT SYSTEMS.

This is one of eight information bulletins developed on pressing transportation problems for the Urban Consortium for Technology Initiatives. The bulletin explores the problems associated with integrating paratransit services into more general transit operations. Areas covered include markets, planning, regulation, operating concepts, labor issues, financial issues, the role of other providers, and maintenance.

French, BI Casebeer, EMC ; Public Technology, Incorporated, Department of Transportation, Urban Consortium for Technology Initiatives Final Rpt. DOT/TST-77-5, Oct. 1976, 39 pp; Prepared for Urban Consortium for Technology Initiatives. Transportation Task Force.; Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262254/6ST

32 150521 A MARKETING APPROACH TO CARPOOL DEMAND ANALYSIS. SUMMARY REPORT. The report presents an overview of the major findings, conclusions and recommendations of a study initiated by the Office of Transportation Policy Research, in its program effort to determine policy incentives and to encourage people to alter their travel habits in favor of more energy-efficient modes. The carpool policies examined in this study are well known to transportation personnel, but the use of a marketing approach in estimating changes in carpool demand is new. The use of a specially designed survey of commuters in three major areas, which is the key tool developed for this research, has resulted in a sizeable new data base on respondents' socioeconomic and worktrip characteristics, travel perceptions, and travel preferences. Of particular interest is the survey's use of trade-off questions requiring respondents to weigh commuting alternatives and define the conditions under which they think they would switch from solo-occupant automobiles to carpools.

Peat, Marwick, Mitchell and Company, Market Facts, Incorporated, Federal Energy Administration FEA/D-CP-54A, Apr. 1976, 101 pp; See also PB-261821.; Contract FEA-C-50179-00; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261825/4ST

32 150522 A MARKETING APPROACH TO CARPOOL DEMAND ANALYSIS. TECHNICAL MEMORANDUM IV. EVALUATION OF MODEL IMPACT ESTIMATES. The memorandum explains and details the evaluation procedures and their application in assessing the various policies examined in connection with a research effort examining the role of individuals attitudes and perceptions in deciding whether or not to carpool. The research was based upon a survey of commuters in three major urban areas and has resulted in a sizeable new data base on respondents' socioeconomic and worktrip characteristics, travel perceptions and travel preferences. An overview of the findings, conclusions and recommendations of this research is contained in the Summary Report, also available through NTIS.

Peat, Marwick, Mitchell and Company, Market Facts, Incorporated, Federal Energy Administration FEA/D-CP-54E, July 1976, 50 pp; See also PB-261825.; Contract FEA-C-04-50179-00; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261824/7ST

32 150523 A MARKETING APPROACH TO CARPOOL DEMAND ANALYSIS. TECHNICAL MEMORANDUM III. TRADEOFF MODEL AND POLICY SIMULATION. The memorandum discusses the theoretical basis of the trade-off model and its adaptation particularly in the simulation procedures used in evaluating specific policies. Two published articles dealing with the development and application of the trade-off model for market research are included as appendices to this memorandum. This model was the primary instrument used in connection with a research effort examining the role of individuals attitudes and perceptions in deciding whether or not to carpool. The research was based upon a survey of commuters in 3 major urban areas and has resulted in a sizeable new data base on respondents' socioeconomic and worktrip characteristics, travel perceptions and

travel preferences. An overview of the findings, conclusions and recommendations of the research is contained in the Summary Report, also available through NTIS.

Peat, Marwick, Mitchell and Company, Market Facts, Incorporated, Federal Energy Administration FEA/D-CP-54D, July 1976, 53 pp; See also PB-261824.; Contract FEA-C-04-50179-00; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261823/9ST

32 150524 A MARKETING APPROACH TO CARPOOL DEMAND ANALYSIS. TECHNICAL MEMORANDUM II. SURVEY TABULATIONS AND EVALUATION. The memorandum contains many detailed tabulations, cross tabulations, and major conclusions for policy assessment resulting from a survey taken in connection with a research effort examining the role of individuals attitudes and perceptions in deciding whether or not to carpool. The research was based upon a survey of commuters in 3 major urban areas and has resulted in a sizeable new data base on respondents' socioeconomic and worktrip characteristics, travel perceptions and travel preferences. An overview of the findings, conclusions and recommendations of this research is contained in the Summary Report, also available through NTIS.

Peat, Marwick, Mitchell and Company, Market Facts, Incorporated, Federal Energy Administration FEA/D-CP-54C, July 1976, 109 pp; See also PB-261823.; Contract FEA-C-04-50179-00; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261822/1ST

32 150525 A MARKETING APPROACH TO CARPOOL DEMAND ANALYSIS. TECHNICAL MEMORANDUM I. SURVEY DOCUMENTATION. The memorandum details the survey design and methodology employed in connection with a research effort which examined the role of individual's attitudes and perceptions in deciding whether or not to carpool. The study was based upon a survey of commuters in 3 major urban areas and has resulted in a sizeable new data on respondents' socioeconomic and worktrip characteristics, travel perceptions and travel preferences. The memorandum includes a copy of the survey instrument. An overview of the findings, conclusions and recommendations of this research is contained in the Summary Report, also available through NTIS.

Peat, Marwick, Mitchell and Company, Market Facts, Incorporated, Federal Energy Administration FEA/C-CP-54B, July 1976, 72 pp; See also PB-261822.; Contract FEA-C-04-50179-00; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261821/3ST

32 151158 STUDY OF FUTURE PARATRANSIT REQUIREMENTS. SCENARIO REPORT. The overall objective of the study is to define the future dimensions and characteristics of paratransit and the requirements for testing innovative transportation services for the development of new vehicles, and for ways to overcome legal and institutional constraints. The analysis is based on urban scenarios projected into the 1980-95 time frame and representative of a large number of locations. The report describes how these scenarios were constructed and evaluated and how the findings were aggregated for the entire U.S.

Voorhees (Alan M) and Associates, Incorporated, Urban Mass Transportation Administration Intrm Rpt. UMTA-IT-06-0104-77-1, Nov. 1976, 233 pp; Contract DOT-UT-50023; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-262629/9ST

32 151213 PRIORITY TECHNIQUES FOR HIGH OCCUPANCY VEHICLES: STATE-OF-THE-ART OVERVIEW. The report, part of a series of publications based on research and development efforts is a concise state-of-the-art overview of priority techniques for high occupancy vehicles (buses, carpools, and vanpools). The report identifies and summarizes selected characteristics of 17 freeway-related and 37 arterial-city street priority techniques. The document also provides a perspective on planning and implementation guidelines, and legal, financial, and institutional considerations associated with priority techniques. Supplementary material includes a listing of current sources of information, a directory of referenced transit authorities, operating agencies, and governmental units, and a glossary of terms used.

Transportation Systems Center DOT-TSC-OST-76-65, Nov. 1975, 108 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263117/4ST

32 151617 PERCEPTION AND VALUES IN TRAVEL DEMAND [Transportation research record rept]. Contents: Effects of travel time and cost on the frequency and structure of automobile travel; Generalized attribute variable for models of mode choice behavior; Perception of the availability of transportation alternatives for various trip purposes; Methodology for analyzing errors in prediction with disaggregate choice models; Alternative sampling procedures for calibrating disaggregate choice models; Application of disaggregate techniques to calibrate a trip distribution and modal-split model; Public policy development--the matrix for decision making; Behavioral impacts of the energy shortage--shifts in trip-making characteristics; Incentives and disincentives to ridesharing behavior--a progress report; Parametric access network model.

Moore, M ; Transportation Research Board, Washington, D.C. TRB/TRR-592, 1976, 55p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261042/6ST

32 151722 JOINT EPA/UMTA/FEA STRATEGY FOR URBAN TRANSPORTATION AND AIR QUALITY. VOLUME 3. THE POTENTIAL OF DUAL MODE. Interdependence of goals of the three agencies, EPA, UMTA, and FEA generates this four-volume study. The common issue around which all three agencies' policies revolve is the use of the private auto involving both incentives and penalties to catalyze a change in existing urban travel characteristics. This third volume expresses INTERPLAN's judgment about the applicability, timing, and impact of dual mode urban transportation technologies. A three-system, three-phase, gradual evolution of demand for dual mode is suggested. The dual mode essay is prefaced by a short overview and comparison of the propulsion and energy use characteristics of conventional and future urban transportation modes.

Krzyczkowski, R Henneman, SS ; Interplan Corporation, Naval Underwater Systems Center,

Urban Mass Transportation Administration, Environmental Protection Agency UMTA-RI-06-0005-77-3, 7346-R-Vol-3, Dec. 1974, 41 pp

See also Volume 2, PB-263 841. Prepared in cooperation with Environmental Protection Agency, Washington, D.C.; Contract N00140-74-C-6026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263842/7ST, DOTL NTIS

32 151824 STUDY OF FUTURE PARATRANSIT REQUIREMENTS: 1980-1995. The report examines a range of paratransit service concepts in context with a set of typical urban settings under three alternative 1995 futures. These alternative futures are described in terms of energy cost and degree of automobile disincentives. Integrated transit and paratransit systems are defined and match a combination of transit and paratransit services with forecasted transportation needs for each individual setting. Using estimated representativeness factors for each setting, the setting results are expanded to provide order-of-magnitude nation-wide estimates of potential future paratransit activity. These estimates are presented in terms of passenger demand, subsidy requirements, and vehicle requirements.

Voorhees (Alan M) and Associates, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0104) Final Rpt. UMTA-IT-06-0104-77-2, Jan. 1977, 278 pp; See also PB-262 629; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264082/9ST

32 151953 COMMUTER VAN POOLING OPERATIONS GUIDE FOR EMPLOYERS. The background information and operating procedures are described as well as the experience gained in launching and operating van pool programs at Chrysler's corporate facilities. The program provides that the employer will furnish 12-passenger vans to employees who elect to participate in the program. The launching and administration of the program should be under the general supervision of the personnel manager or administration manager. The requirements for both the driver/coordinator and backup driver are listed. The program should receive the support and encouragement of top management. The ways in which van pooling may be promoted are discussed, and details of fare calculation are set forth. Comments are also made on the evaluation of the program. Six exhibits which include a manual and computerized employee matching techniques, solicitation folder, orientation guide, and operating agreement for driver/coordinator are included.

Chrysler Corporation Monograph No Date, 27 pp, Figs., Tabs., 1 Phot.

32 152922 THE EFFECTIVENESS OF CAR POOLS IN URBAN AREAS. A car pool is a means of transport whereby a number of commuters travel in a single vehicle, a taxi, instead of each commuter using his own vehicle. The effect of car pools on vehicle distance travelled in the entire city is calculated for several different models. These models take into account the distribution of people's homes and workplaces, the routing system in the city, and the rules used to decide who will share the taxi. /TRRL/

Cousins, E (Newcastle University, Australia) Buckley, D ; Elsevier Scientific Publishing Company, (444195327) Proceeding 1974, pp

541-560, 8 Fig., 7 Ref.; Transportation and Traffic Theory. Proceedings of the Sixth International Symposium on Transportation and Traffic Theory. University of New South Wales, Sydney, Australia, August 26-28, 1974; ACKNOWLEDGMENT: TRRL (IRRD 224477)

32 153167 ASSESSING DEMAND FOR RIDE-SHARING SERVICES. A relatively simple, quick and inexpensive method is proposed for estimating the demand for ride-sharing services. The method which resembles the sketch-planning methods suggested for more capital-intensive public transportation projects, can be used by planners to assess demand for particular modes of ride sharing within large generalized areas of the city. Appropriate areal units are first identified, followed by the identification of transportation-related variables to stratify the study area into similar socioeconomic groupings. A formula is presented for estimating the demand for ride sharing. The testing of the proposed method in Knox County Tennessee is described in detail.

Petrocelli, JJ (Westchester County Department of Transportation) Bell, TL (Tennessee University, Knoxville) *Traffic Quarterly* Vol. 31 No. 1, Jan. 1977, pp 59-76, 2 Fig., 3 Tab.

32 153309 ZONAL TAXI SYSTEMS: AN IMPROVEMENT IN LOCAL MOBILITY. Details are given of a zonal taxi service, the aim of which is to improve the local mobility of low-income groups, and old and handicapped people, especially those without telephones. The scheme proposed is as follows: taxis would be allocated to a residential area, operating from a local centre, and travelling according to predetermined routes and schedules. The passengers would board or alight on a hail-stop basis, sharing a taxi as necessary. For the old and disabled particularly, route diversion could selectively be allowed so as to enable them to be picked up or set down as close to their homes as possible. Based on Greater London transportation survey data for the London borough of Camden, an investigation is made into the possible number and costs of journeys; a flat rate fare of 5p per person in a high-density area and 21p in a low-density area would make the scheme attractive to both taxi drivers and passengers. This scheme has many similarities to dial-a-ride systems, but, by eliminating the need for a high proportion of telephone ownership, it is especially suitable for less affluent zones. It is suggested that such a scheme, offering an inexpensive pleasant method of making short local journeys and operating in areas currently without public transport, would generate new public transport demand, which, rather than divert from existing services, might feed into them. /TRRL/

Lowe, SR (London Borough of Hammersmith, England) *Traffic Engineering and Control Analytic* Vol. 17 No. 12, Dec. 1976, pp 520-521, 1 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 224585)

32 153898 IS THERE STILL A FAIR CHANCE FOR THE WITKAR? [Krijft witkar nog een eerlijke kans?]. Witkar, the experimental battery-powered vehicle for intra city travel in Amsterdam, is being hampered by the fact that owing to reconstruction work at this moment only one station can be operated. There are also

financial problems. Next year six stations will serve 25 witkars. 105 vehicles and 15 stations will ultimately be available. This article describes the fully automatic operation and payment system and deals with the cost-benefit aspects, according to a recent report on witkar. /TRRL/ [Dutch]

Visser, C *Verkeerskunde Analytic* Vol. 27 No. 12, Dec. 1976, pp 584-587, 8 Phot.; ACKNOWLEDGMENT: Institute for Road Safety Research (SVOV61004E), TRRL (IRRD-224847)

32 153964 ORGANIZING AND OPERATING A VANPOOL PROGRAM: FEASIBILITY OF VANPOOLING IN VIRGINIA. The report identifies the various elements of passenger transportation vanpool programs and describes the procedures necessary for employers and agencies to implement a vanpool program, based on Virginia conditions. The concept of vanpools is introduced and benefits to management and employees are identified. Among these are reduced needs for parking, reduced traffic congestion, lower commuting costs and conveniences. Employer concerns about vanpool implementation are discussed, such as legal aspects and insurance costs. In Virginia there are no serious legal problems to prevent vanpooling. Experience with vanpools elsewhere in the U.S. indicate that methods for managing and operating programs differ from one company to another although the basic concept is similar to that selected by the 3M Company in its pioneering effort.

Hoel, LA Herrin, M ; Virginia Highway & Transportation Research Council, Virginia Department of Highways and Transportation, Virginia University, Federal Highway Administration Final Rpt. FHWA/VHTRC/RD-77-R15, VHTRC-77-R15, Oct. 1976, 37 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264635/4ST

32 154019 SMALL BUS PROGRAM: VEHICLE OPERATION EFFICIENCY REPORT. PART I. EXPERIMENTAL BUS PROGRAM (15-20 PASSENGER BUSES). PART II. VAN CONVERSIONS FOR DIAL-A-RIDE SERVICE (12 PASSENGER BUSES). The Michigan Department of State Highways and Transportation, Bureau of Urban and Public Transportation, has prepared the report describing operational experience with some 15 vehicles produced by a variety of manufacturers. The report consists of a series of individual driver's and mechanic's reports on the actual performance of the vehicles in different Michigan communities. Each vehicle is evaluated on the basis of its economy, capacity, dependability, durability, and the general impression made on the public, drivers, and mechanics. The information was gathered as part of the Michigan transportation agency's experimental bus program (15-20 passenger vehicles) and its Dial-A-Ride Transportation (DART) program which uses converted vans (12 passenger) and is operating in some 28 Michigan communities.

Fletcher, PB Hewitt, CH Pellonpaa, CV Woodford, JP ; Michigan Department of State Highways & Transport, Federal Highway Administration FHWA/PL-77/007, Nov. 1976, 170 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265131/3ST

32 154400 CARPOOL INCENTIVES: EVALUATION OF OPERATIONAL EXPERIENCE. The report reviews both the published and un-

published literature with respect to various incentives that could increase carpooling and to determine, where possible, the effects of these incentives on carpooling. The coverage included theoretical and analytical work, as well as empirical observations of programs in operation both in this country and abroad. The primary focus is on the identification of actual examples of possible carpooling incentives, their description and implementation characteristics, applicability, institutional/legal barriers, public acceptability, and their effects on travel behavior and energy use. The relevant literature, applications, and existing data sources were canvassed and used to evaluate both the technical potential and the feasibility of implementation of the various policies selected for study.

Cambridge Systematics Incorporated, Voorhees (Alan M) and Associates, Incorporated, Federal Energy Administration FEA/D-76/076, Mar. 1976, 176 pp; Prepared in cooperation with Voorhees (Alan M.) and Associates, Inc., McLean, Va.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263050/7ST

32 154626 ATTITUDES OF LOWER NAUGATUCK VALLEY HEALTH CARE PRACTITIONERS AND PROGRAMS TOWARD THE VTS DIAL-A-RIDE PROGRAM. The attitudes of health care practitioners and programs toward the Dial-a-Ride component of the Valley Transit System (VTS) in the Lower Naugatuck Valley area of Connecticut are investigated. The study was designed to obtain information about each respondent's knowledge of the VTS, attitudes about the VTS, and suggested changes for improving the VTS. The survey was limited to direct care practitioners, e.g., physicians, dentists, chiropractic physicians, optometrists, and podiatrists. Programs were identified as inpatient facilities (hospitals, long term care facilities, and convalescent facilities) and community agencies (health department, Visiting Nurses Association, and Homemaker Agency). Two approaches were used to obtain data. The first technique involved mailed questionnaires sent to all direct care practitioners in the valley. The overall response rate for the questionnaire was 63 percent (71 of 113 practitioners). The second approach was an interview with representatives of community health agencies and inpatient facilities. The total number of persons interviewed was 22. The majority of respondents had a favorable attitude toward the VTS. As viewed by respondents, a need was identified in the valley for a transportation program designed specifically for the elderly and handicapped. A number of those who felt the VTS did not meet all needs offered suggestions for improvement. These suggestions were concerned primarily with the number and kind of buses, scheduling and the fare system, and the expansion of the service area. Most respondents favored a combination of funding for the VTS from such potential sources as valley towns and agencies, riders, and the State of Connecticut.

Pearson, DA Tanenbaum, JL Bisbee, GE Webb, SB; South Central Connecticut Comprehensive Health, Planning, Inc., New Haven. *Lower Naugatuck Valley, Community Council, Inc., Ansonia, Conn. June 1974, 62; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0012096/4ST

32 154812 STUDY OF FUTURE PARATRANSIT REQUIREMENTS. EXECUTIVE SUMMARY. The overall objective of this study is to define the future dimensions and characteristics of paratransit and the requirements for testing innovative transportation services for the development of new vehicles, and for ways to overcome legal and institutional constraints. The analysis is based on urban scenarios projected into the 1980-1995 time frame and representative of a large number of locations. This Executive Summary report examines a range of paratransit service concepts in context with a set of typical urban settings under three alternative 1995 futures. These alternative futures are described in terms of energy cost and degree of automobile disincentives. Integrated transit and paratransit systems are defined and match a combination of transit and paratransit services with forecasted transportation needs for each individual setting.

Voorhees (Alan M) and Associates, Incorporated, Battelle Columbus Laboratories, Urban Mass Transportation Administration UM-TA-IT-06-0104-77-3, Feb. 1977, 27 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265821/9ST

32 155060 CARPOOL INCENTIVES: ANALYSIS OF TRANSPORTATION AND ENERGY IMPACTS. The report quantitatively analyzes the impacts of carpooling strategies on travel behavior and energy consumption. It details the effects of 18 candidate strategies on the utilization of different transport modes for work trips and the resultant effects on non-work travel patterns, household auto ownership, and total fuel consumption. Five specific objectives governed the work performed: (1) To collect information on carpooling behavior and analyze existing experience with strategies that may encourage ride-sharing; (2) to predict, by using behavioral travel-demand models, the changes in travel patterns that might result from implementation of such strategies; (3) to translate increased carpooling (or other changes in travel patterns) into decreased fuel consumption; (4) to evaluate the feasibility of implementing particular strategies; (5) to recommend strategies for increasing carpooling and reducing fuel consumption that will be both feasible and effective.

Cambridge Systematics, Incorporated, Voorhees (Alan M) and Associates, Incorporated, Federal Energy Administration FEA/D-76/391, June 1976, 198 pp; Prepared in cooperation with Alan M. Voorhees and Associates, Inc., McLean, Va. See also report dated Mar 76, PB-263 050.; Contract FEA-CO-04-50106; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263969/8ST

32 156100 AN INNOVATIVE PUBLIC TRANSPORTATION SYSTEM FOR A SMALL CITY: THE MERRILL, WISCONSIN, CASE STUDY. This paper describes a recently implemented innovative transportation system which can serve as a prototype for similar systems in other areas. The system was implemented in Merrill, Wisconsin, a city of 9500 persons that has had a long history of public transportation, but has been unable to maintain high-quality transit service in recent years. A point deviation bus system, a form of demand-responsive transportation that has seen little experimentation, has been introduced in

Merrill with the help of a state demonstration grant. The system uses two vehicles which make scheduled stops at checkpoints located around the city, but also respond to requests for doorstep pickups or drop-offs between checkpoints. A higher fare is charged for the premium doorstep service. With operating data for the first 7 months of service available, it appears that the point deviation concept is operationally valid. The service has been of high enough quality to attract a significantly greater number of passengers than has been using the transportation services that previously existed in Merrill. The higher cost, doorstep service option has been chosen by almost 40 percent of the adult ridership. Cost per hour has been below the cost of many other demand-responsive transportation systems. The system has demonstrated how high-quality transportation service can be provided in a small city. /Author/

Flusberg, M (Multisystems, Incorporated) *Transportation Research Record* No. 606, 1976, pp 54-59, 3 Fig., 6 Ref.; ORDER FROM: TRB Publications Off

32 156101 INTEGRATED URBAN TRANSPORTATION SYSTEMS: CHALLENGE FOR THE FUTURE. Paratransit has been described as a bridge between the conventional automobile and conventional transit. Certain concepts, such as taxi and car pooling, have developed from the automobile side, and other concepts, such as subscription bus service and dial-a-ride, have developed from the transit side. As service concepts continue to develop and there is movement from both sides toward the center, certain conflicts are inevitable. Two major cultures, privately operated taxi companies and publicly operated transit companies, that have previously operated independently and differently must now learn to understand each other's environment and work together. However, to view the problem simply as taxi versus transit or public versus private is naive. As in all situations involving the assimilation of different cultures, patience, time, and understanding are required. Paratransit is a melting pot of different approaches, in which gradual assimilation will occur while fundamental differences remain. Paratransit provides the opportunity to increase available options with respect to both the service that is provided and the providers of service. Service can be successfully integrated—at one level by interfacing paratransit services with one another and at a higher level by interfacing paratransit with conventional fixed-route transit in a complementary manner. /Author/

Roos, D (Massachusetts Institute of Technology) *Transportation Research Record* No. 608, 1976, pp 4-10, 3 Ref.; ORDER FROM: TRB Publications Off

32 156102 INTEGRATED TRANSIT SERVICE IN SANTA CLARA COUNTY. This paper describes the experience of an integrated transit system in Santa Clara County, California. Background information on the county and the origins of the system are presented, as well as a description of the services provided. After 4 1/2 months of operating the full system, elements of the system were dismantled. Some of the reasons for this failure are discussed. /Author/

Pott, JT (Santa Clara County Transportation Agency) *Transportation Research Record* No.

608, 1976, pp 11-15; ORDER FROM: TRB Publications Off

32 156103 DEMAND-RESPONSIVE TRANSPORTATION IN ANN ARBOR: PLANNING AND ADMINISTRATION. Since its formation in 1968, the Ann Arbor Transportation Authority (AATA) has made significant strides in shifting the emphasis from private automobiles to public transportation. This paper details the implementation of a system that has grown from ground zero in 1968 to 1,600,000 riders in fiscal year 1974-75. The attendant growth of AATA's capital equipment and annual operating budget is similarly impressive. Funding has been derived from federal and state grants and a local property tax adopted by the voters in 1973. The local funding support is important because it demonstrates a high level of community support for the transit system and furnishes the required matching funds for larger state and federal grants. The AATA system is truly demand responsive since it includes planning and service revisions as well as the dial-a-ride service. It is anticipated that the respective importance of dial-a-ride and line-haul service will shift as the system matures and ridership reaches a much higher level. Long-range growth can be ensured only because AATA continues to monitor public response to its service and to implement required changes. /Author/

Drake, WD (Michigan University, Ann Arbor) *Transportation Research Record* No. 608, 1976, pp 16-19; ORDER FROM: TRB Publications Off

32 156104 DEMAND-RESPONSIVE TRANSPORTATION IN ANN ARBOR: OPERATION. Ann Arbor, Michigan, has had a dial-a-ride service operating since 1971. Since passage of a special property tax for transit in 1973, dial-a-ride has expanded its role and ridership. It is now totally integrated with line-haul bus service within the Ann Arbor Transportation Authority's operation. Weekday service provides for coordinated transfers between dial-a-ride collector-distributor vehicles and line-haul buses at several points within the system. Dial-a-ride has helped the Ann Arbor Transportation Authority secure a dramatic increase in ridership over the past two years. The transit system is operating within budget. Staged incremental implementation has allowed the introduction of dial-a-ride with a relatively high degree of reliability and minimal disruption. A great deal of operational fine tuning has been done within each small implementation. Satisfactory results are being obtained with dial-a-ride vans and with a semiautomated computer-assisted dispatching system. Cost and productivity data are provided. /Author/

Guenther, KW (Ann Arbor Transportation Authority) *Transportation Research Record* No. 608, 1976, pp 20-25, 2 Tab., 1 Ref.; ORDER FROM: TRB Publications Off

32 156105 DIAL-A-RIDE IN THE CONTEXT OF DEMAND-RESPONSIVE TRANSPORTATION: A CRITICAL APPRAISAL. Dial-a-ride service has become one of a number of possible demand-responsive small-bus transportation systems. A comparison of several systems suggests that a well-marketed fixed-route bus system can be far more cost effective than dial-a-ride in low-density areas. The concept of

demand-responsive public transportation should be broadened to include well-planned fixed-route transit. Dial-a-ride appears to have greater value for special-need groups (e.g., elderly, handicapped) and at times when fixed-route transit would be uneconomical. Better integration with fixed-route elements is essential. /Author/

Hoey, WF (Smith (Wilbur) and Associates) *Transportation Research Record* No. 608, 1976, pp 26-29, 3 Tab., 10 Ref.; ORDER FROM: TRB Publications Off

32 156107 EVALUATION OF DRT SYSTEMS IN RICHMOND AND SANTA BARBARA. This study evaluated system performance and the economics of a publicly operated demand-responsive transportation system in Richmond, California, and a privately owned and operated demand-responsive transit service in Santa Barbara, California. The systems were evaluated from the viewpoint of users, nonusers, and system operators. The major conclusion from the research was that ownership and operation of demand-responsive transit by the private sector demonstrate significant potential and should be given serious consideration by policy makers. By subsidizing a private operator at approximately \$1.00 per passenger-trip, it should be possible for a local government to provide increased mobility to transit-disadvantaged sectors of the population with a greater degree of efficiency and equity than would be possible if the service were operated by a transit district. /Author/

Kadesh, E (Environmental Protection Agency) *Transportation Research Record* No. 608, 1976, pp 42-47, 8 Ref.; ORDER FROM: TRB Publications Off

32 156108 DIAL-A-RIDE SERVICE IN SANTA CLARA COUNTY. Late in 1974 and early in 1975 the Santa Clara County Transit District initiated, operated, and then discontinued a demand-responsive dial-a-ride system within a span of 5 1/2 months. This system's failure was primarily the result of poor systems planning. Specifically, four major mistakes led to the death of the system: an inadequate customer communication system, starting the entire system at once, an inadequate number of vehicles, and taxicab buyout. Each of these four mistakes is discussed in detail, and recommendations are made for instituting dial-a-ride systems. Getting through the difficulties of the start-up period is emphasized. Costs are discussed, and some relevant cost data are presented. /Author/

Carlson, RC (Stanford University) *Transportation Research Record* No. 608, 1976, pp 48-53, 3 Ref.; ORDER FROM: TRB Publications Off

32 156109 A STATEWIDE DIAL-A-RIDE PROGRAM. In 1972 the Michigan legislature voted to make state funds available for public transportation programs. This paper describes the kinds of programs undertaken with this support and explores the factors that have made these programs highly successful. /Author/

Geile, GA (Michigan Department of State Highways & Transport) *Transportation Research Record* No. 608, 1976, pp 54-56; ORDER FROM: TRB Publications Off

32 156110 DEMAND-RESPONSIVE PUBLIC TRANSPORT IN GREAT BRITAIN. This paper reviews the development of demand-responsive public transport (dial-a-ride) in Great Britain, as well as describing some of the other innovative small bus systems currently in operation. /Author/

Oxley, PR (Cranfield Institute of Technology, England) *Transportation Research Record* No. 608, 1976, pp 57-66, 20 Ref.; ORDER FROM: TRB Publications Off

32 156115 SERVICING THE INDUSTRIAL AND GOVERNMENT COMPLEX. This paper describes a six-company taxicab and delivery service corporation that provides for varied paratransit needs in the Washington, D.C., area, particularly serving the needs of business and government. /Author/

Nichols, NC (Transportation Incorporated) *Transportation Research Record* No. 608, 1976, pp 81-83; ORDER FROM: TRB Publications Off

32 156116 COMPUTER-CONTROLLED VERSUS COMPUTER-AIDED DISPATCHING. The city of Regina, Saskatchewan, instituted demand-responsive transit on a very limited budget. The author describes the training program designed for the system's initial personnel, who worked without computer assistance, and notes the benefits of the computer programs that are now in use. /Author/

McAdoo, GH (Regina Saskatchewan Transit System, Canada) *Transportation Research Record* No. 608, 1976, pp 86-88; ORDER FROM: TRB Publications Off

32 156117 ANN ARBOR'S DISPATCHING SYSTEM. This paper attempts to describe in detail the operational procedures used in the computer-aided dispatching system installed at the Ann Arbor Transportation Authority facility in Ann Arbor, Michigan. It is designed to facilitate the needs of the demand-responsive mass transportation concept that has been introduced and is in operation in Ann Arbor. The system has two basic parts: the central control center and the mobile units that handle the digital transmission. /Author/

Potter, B (Metroscan, Incorporated) *Transportation Research Record* No. 608, 1976, pp 89-92; ORDER FROM: TRB Publications Off

32 156118 AUTOMATION OF PARATRANSIT FARE COMPUTATION AND DISPATCHING. This paper examines the historical evolution of paratransit services and discusses a generalized fare-calculation system for paratransit operations. The prototype system is designed to reduce or eliminate a number of software and hardware constraints that have hampered the taxi industry's efforts to provide a full spectrum of paratransit services. Software constraints are analyzed in terms of regulatory and political processes that have evolved with the taxi industry. Hardware constraints are analyzed in terms of a lack of incentive for product improvement, since at present there is not a sufficient U.S. market for metering and dispatching systems and only a small market for specialized vehicles. In addition, innovations in hardware are hampered by the fact that implementation depends heavily on the relationship

between new technologies and existing regulations. The purpose of this paper is to discuss the need and mechanisms for change and to describe a prototype fare-calculation and dispatching system currently being developed at Carnegie-Mellon University. /Author/

Baumann, DM Au, T Copper, J (Carnegie-Mellon University) *Transportation Research Record* No. 608, 1976, pp 93-97; ORDER FROM: TRB Publications Off

32 156121 UMTA'S POLICIES AND PROGRAMS RELATED TO PARATRANSIT SERVICES. This paper deals with the Urban Mass Transportation Administration's policy toward the development of paratransit services, its view of the relationship between paratransit and traditional public transit, and its current grant and planning policies and explores some problems to be faced in the future. /Author/

Patricelli, RE (Urban Mass Transportation Administration) *Transportation Research Record* No. 608, 1976, pp 104-106; ORDER FROM: TRB Publications Off

32 156123 EXCLUSIVE-RIDE TAXICAB SERVICE. This paper discusses the problems faced by taxicab companies in coping with regulatory restraints and the absence of subsidies while they provide demand-responsive transportation through exclusive-ride taxi service. /Author/

Samuels, RE (Chicago Yellow Cab Company) *Transportation Research Record* No. 608, 1976, pp 113-116, 12 Ref.; ORDER FROM: TRB Publications Off

32 156124 PARATRANSIT DEVELOPMENT: SEARCH FOR AN APPROPRIATE LABOR POLICY. The potential of the various paratransit modes for serving urban transportation needs is as yet largely undetermined. An informed and equitable labor policy would greatly assist all current efforts to explore the market potential of paratransit. Group ride-sharing paratransit forms, such as car-pool incentive program, van pooling, shared-ride taxi service, and special services to the handicapped provided by sources other than conventional transit, raise difficult issues of labor policy. Where shared-ride services are to be integrated into the regional multimodal public transportation system in accordance with current planning requirements and policy directive, an appropriate labor policy should minimize political confrontation and labor conflicts. Labor ought to be involved at the outset in the planning and policy-and decision-making process. A good labor policy requires recognition of existing job equities and wage standards for transit labor. A successful labor policy will minimize unfair labor competition and jurisdictional conflicts between unions and groups of workers and require continued collective bargaining without government intervention. When adverse effects on the existing labor forces in the public transportation industry are unavoidable, they should be cushioned by job allowances, including job retaining and relocation expenses. /Author/

Maroney, DV, Jr (Amalgamated Transit Union) *Transportation Research Record* No. 608, 1976, pp 117-120, 1 Ref.; ORDER FROM: TRB Publications Off

32 156125 PAST ACCOMPLISHMENTS AND FUTURE DIRECTIONS OF PARATRANSIT: A DISCUSSION. The major topics discussed with respect to paratransit include the following: The three most significant accomplishments to date regarding paratransit, APTA's view of paratransit and the potential for public and private cooperation; the role of ITA in paratransit; the role of the federal government in paratransit; and, the three most important short-term objectives with respect to paratransit, and how to achieve them. The major accomplishment of paratransit is the identification of the wide range of available services that fall between the driver and his private automobile and buses. As a result of the government and academic's interest in taxicabs, the ITA has become more active in determining its role vis a vis the federal government. Paratransit has demonstrated that the present transportation system must be considered a multidimensional system in which services are going to be better tailored to individual needs. UMTA, in cooperation with APTA should share in a definitive program of planning for paratransit, striving for efficiency and implementing paratransit in ways which would compliment the existing transportation system. UMTA is seen as facilitating innovation at both the local and state levels of government. Through research and demonstration programs UMTA has been able to examine the various aspects of paratransit services as well as the delivery and integration of these services. Also, UMTA must assure that there be equity in the distribution of services within the urban area. In the short-run, each urban area should seek to establish effective coordination of its transit services, including the many facets of paratransit; UMTA must assure that there are effective laws to protect existing institutions that are providing transportation; and lastly, the existence of privately owned paratransit services and the removal of regulations that prevent those privately owned paratransit services from functioning on a shared-ride basis must be recognized.

Transportation Research Record No. 608, 1976, pp 122-130, 4 Ref. ORDER FROM: TRB Publications Off

32 156329 FARE CALCULATION AND VEHICLE COMMUNICATION MODULES FOR PARATRANSIT SYSTEMS. This paper discusses the design and development of fare calculation and vehicle communication hardware and software for the experimental Ride-Shared Vehicle Paratransit System. Key components include: a new electronic taxi meter which functions as a remote display for computer calculated fares and which has back-up metering capabilities for use when the computer or radio malfunctions; and a Data Base Management System which performs fare calculations and which will eventually provide real-time monitoring capabilities for the RSVP System. Design issues are analyzed in terms of hardware engineering, software engineering, and system integration. Descriptions of Control Center hardware, vehicle hardware, and RSVP operating procedures are presented.

Copper, J (Carnegie-Mellon University) Faulhaber, F Ghahraman, D ; International Federation of Automatic Control Proceeding 1976, pp 125-132; Proceedings of the International Federation of Automatic Control/International Foundation for Information Process/International Federation of Oper Research Society Interna-

tional Symposium: Control in Transportation Systems, Columbus, Ohio, August 9-13, 1976.; ACKNOWLEDGMENT: EI (EIX770400455); ORDER FROM: ESL

32 156443 THE HARLOW DIAL-A-BUS EXPERIMENT: COMPARISON OF PREDICTED AND OBSERVED PATRONAGE. This report provides a preliminary validation of the demand model used in the TRRL programme of research into dial-a-bus. It compares the observed ridership of the experimental Harlow dial-a-bus system with predictions obtained from a modal split model. It is shown that the predicted patronage was about one-third too high but that the predicted distributions of the age of the passengers, their journey purposes and the modes foregone, were in reasonable agreement with the observations. These results indicate that the basic structure of the demand model is sound, but that, in the modelling, too low a generalised cost had been assumed for dial-a-bus. (a) /TRRL/

Martin, PH ; Transport and Road Research Laboratory Monograph TRRL Sup Rpt SR256, 1977, 7 pp, 1 Fig., 4 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225458), NTIS; ORDER FROM: NTIS; PB-276378/7ST

32 156472 MOVING IN CITIES. In this book, the author proposes practical solutions to the problems of urban mobility, and in doing so, draws on a whole range of new public transport systems resulting from modern technology. The book also explores what is being done to enable existing transport modes to work more efficiently, and how simple pleasures such as walking in cities and cycling are being made more enjoyable. Topics covered include the following: strategies for public transport; movement in the city centre; pedestrian movement systems (walking, conventional mechanical systems, conveyors, vehicular); passenger interchanges including park and ride, kiss and ride; goods movement (pneumatic pipelines for materials transport, canals, etc.); transport in residential areas; recreational trips (accessibility to the countryside, swimming pools, sports facilities etc.); moving pavements; continuous systems; rail and guideway systems (rapid transit tramways, automatic guidance systems, group-rapid transit, personal rapid transit); bus transport (operation, control, fares, design, infrastructure, dual-mode operation); dial-a-ride; car hire; cycling and cycleways. /TRRL/

Richards, B ; Casell & Collier Macmillan Publishers Limited Monograph 1976, 104 pp, Figs., 1 Tab., Photos., 25 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 225439); ORDER FROM: Macmillan Company, 866 Third Avenue, New York, New York, 10022

32 157172 BETTER NEIGHBORHOOD TRANSPORTATION. This study explores opportunities to improve neighborhood transportation. An effort is made to simultaneously evolve a fleet of small neighborhood vehicles, a sequestered roadspace environment carved out of the existing street system, and a new set of regulations governing the licensing and operation of special-purpose vehicles. This multiple strategy is referred to as vehicle/roadspace/control-system evaluation. The work completed focuses on the neighborhood level of transportation. The study explores several key facets of the idea of differenti-

ated neighborhood transportation; or "aid to walking" (ATW) systems. The study next explores the implication of ATW systems as a catalyst for improving the livability of neighborhoods. It concludes that ATW transportation is an attractive instrument of both a high level of residential amenity and neighborhood accessibility. The social need for the transportation service offered by ATW systems is also explored. Generic mobility disadvantaged groups are identified and discussed relative to ATW: the poor, the young, the elderly, and the handicapped. The major problem with the ATW innovation is that its implementation requires coordinated and comprehensive decision-making concerning vehicles, guideways, and controls. Three major decision-makers must be coordinated: governmental institutions that supply guideways and regulate drivers and vehicles, firms that supply and repair vehicles; and local communities which are the sites and major clients of implementation. A final section of the study describes evaluation methodology to be applied to a more mature specification of an ATW system.

Garrison, WL Clarke, JF, Jr ; California University, Berkeley Intrm Rpt. Report 76-3, Oct. 1976, 113 pp, 9 Fig., 3 Tab.; Prepared for the Department of Transportation.; Contract DOT-OS-50237.

32 157276 INCREASED TRANSPORTATION EFFICIENCY THROUGH RIDESHARING: THE BROKERAGE APPROACH, VOLUME I. Ridesharing is the process of improving transportation efficiency by increasing vehicle occupancy. Brokerage is the process by which ridesharing is promoted, coordinated and implemented. Brokerage is built on the concept of matching specific individual needs with a broad array of transportation services. This report defines the brokerage concept, describes benefits, assesses market potential, describes mechanisms for determining needs, outlines methodology for comparing costs of alternative types of service, identifies institutional barriers to program implementation and develops strategies for increasing ridesharing. /Author/

Davis, FW, Jr Barnaby, DJ Bell, TL Hood, TC Wegmann, FJ ; Tennessee University, Knoxville, (TC 76-018) Final Rpt. DOT-TST-77-36, Nov. 1976, 228 pp, 35 Fig., 28 Tab., 58 Ref., 4 App.; Sponsored by DOT, Office of University Research.; Contract DOT-OS-40096; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267546/OST

32 157784 PARA TRANSIT. Policies and strategies adopted by the Urban Mass Transportation Administration, the Regional Transportation Policy Plan, and the Metropolitan Transit Commission are set forth, the paratransit demonstration and continuing programs are described and research studies in this field are outlined. The report notes that a major effort must be made to increase the use of carpools, van programs and bus services, especially in areas outside of the downtowns and university where ridership is closer to or exceeds the goals. Effort must be made to examine the potential for paratransit services, coordinated with each other and with the regular scheduled transit service. Attention must also be given to those activities such as the adoption of parking practices which could increase the use of transit and paratransit. The need

is indicated for the provision of a specific appropriation of state funds by the Metropolitan Transit Commission with which to carry on paratransit operations, separate and apart from funds available for regular transit operations.

St. Paul Metropolitan Transit Commission 1977, 43 pp, 1 Tab., 7 Phot., 3 App.

32 158058 1975 NATIONAL CONFERENCE ON AREAWIDE CARPOOLING "EXPANDED TRANSPORTATION SERVICES" (PROCEEDINGS). Activity toward increasing commuter ridesharing has been steadily increasing throughout this country over the past several years. As the number of programs involved in stressing ridesharing across the country increases, the need for coordination and information also increases. In response to this demonstrated need, the 1975 National Conference on Areawide Carpooling was envisaged. Sponsored Jointly by the Houston CarShare Program, the Federal Highway Administration and the Federal Energy Administration, the conference had one paramount objective: to exchange experiences and to heighten the knowledge and effectiveness of areawide ridesharing programs. The 3-day conference was organized around workshop sessions covering a gamut of topics from Marketing and Promotion to Legal and Regulatory Issues. The attendees, numbering over 130, were representative of all regions of the United States, from a wide range of private and public agencies, institutions and organizations actively involved in promoting increased ridesharing. The proceedings presented in this document will help to fill the great need for information and concern for transportation alternatives.

Somerville, R ; Houston Carshare Program Proceeding Dec. 1975, 264 pp; Sponsored by Federal Highway Administration and by Federal Energy Administration.; ACKNOWLEDGMENT: Federal Highway Administration

32 158115 FACTORS INFLUENCING THE SUCCESS OF COMPANY-BASED CARPOOLING PROGRAMS. This study reports the results of two successive interviews with selected companies in Greensboro, North Carolina which undertook to review workers' interest in carpooling before, during and after the energy crisis. Companies are compared for extent of carpool formation. It is observed that companies which actively encouraged participation in carpool matching programs ended up with higher rates of carpool formation than companies which maintained a passive stance on carpooling. Carpooling appears slightly more prevalent among older workers, and among white collar workers. However, the sample of companies is biased in favor of white collar companies; therefore the relationship between occupation and carpooling remains unsettled. No difference appeared by sex. Social segregation in carpools is indicated by the relatively few (11% of total) carpools which carry both blue white collar workers. Corporate executives in some of the larger manufacturing concerns in Greensboro were unwilling to promote carpool matching efforts by the firm, because they do not want to invade workers' privacy, because they felt the majority did not want to carpool, and because they did not wish to interfere in the workers' mode choices. Of interest is the fact that in four out of the five companies studied, the

percentage of workers carpooling rose after the end of the energy crisis. New patterns of commuting by ridesharing evolved during the days of the gasoline lines, and continued thereafter, spreading to other workers over time. Companies reported with satisfaction the increased availability of parking spaces, and the continued good environmental effects of increased carpooling.

Pun, CF Kidder, AE ; North Carolina Agricultural and Technical State U, (A&T TI-20-UR-76) UMTA-NC-11-0004-76-1, May 1976, 63 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract NC-11-0004; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-259434

32 158386 VANS UNSNARL COMMUTER TRAFFIC. Knoxville, Tennessee, will be the first city in the country to act as a transportation broker for a commuter service that has shown it can sharply reduce inner city traffic, fuel consumption, and air pollution with low capital costs and operating fees. Knoxville's solution is van pooling. Since July, 1975, the Transportation Center at the University of Tennessee has conducted a demonstration brokerage program, funder with a \$1 million grant from the Service and Methods Program of the Urban Mass Transit Administration (UMTA), with a fleet of 51 12-passenger vans. /GMRL/

Nation's Cities Vol. 15 Feb. 1977, pp 26-27
ACKNOWLEDGMENT:

32 158400 PARA-TRANSIT: EXPERIENCE AND POTENTIAL IN THE USA. The study has identified four major applications of para-transit services which could contribute substantially in the near future to improving the efficiency and effectiveness of our urban transportation system. For the immediate future, perhaps the most important para-transit application is the increased use of high occupancy par-transit modes such as car pool, subscription bus, and jitney for high density home-to-work travel. A second important application of para-transit services is in serving low density travel demand, particularly when that demand is uneconomical for conventional transit. Third, the effectiveness of conventional transit services can be greatly increased by para-transit feeder services designed to collect and distribute transit passengers in areas of low demand density. Fourth mobility within business and commercial districts can be greatly improved by well regulated para-transit services, particularly taxi, dial-a-ride, and jitney. /GMRL/

Kirby, RF *Ekistics* Vol. 42 No. N248, 7607, pp 19-27; ACKNOWLEDGMENT:

32 158401 PARA-TRANSIT. This issue of the Compendium deals primarily with various applications of the Dial-A-Bus concept; however, also included are shared taxi, subscription services, jitney and vanpooling programs to demonstrate the variety of Para-Transit systems in operation.

Lea Transit Compendium Vol. 2 No. 8, 1975, 47 ppACKNOWLEDGMENT:

32 158418 COMMUTER VANS CATCH ON AT CORPORATIONS. A new type of mass transit network is quietly taking root around the U.S. Unlike the space-age systems proposed for many cities in recent years, it is based on a

mundane vehicle: the small 10-or 12-passenger van. A growing number of companies and groups are setting up fleets of such vans to haul employees-and in some cases the general public-to and from work. Despite the pedestrian image of such an approach, transit planners are beginning to think that "van pooling," as it is called, offers major hope for unsnarling the tangle of urban transportation. Van pooling's most significant test is shaping up in Los Angeles, where a program that will soon be the nation's biggest got under way last month. /GMRL/

Business Week No. 2472, Feb. 1977, pp 54-55
ACKNOWLEDGMENT:

32 159006 INTEGRATED DIAL-A-RIDE AND FIXED ROUTE TRANSIT IN ANN ARBOR, MICHIGAN. The report describes the development, implementation, and current status of the Teltran system as it existed in the spring of 1976. In particular, this evaluation provides a detailed description of Teltran system configuration (and changes in that configuration by time of day and day of the week), system dispatching and operation, and the effectiveness of an incremental implementation process. In addition, the effect of Teltran on improving transit level of service and ridership is examined as well as the productivities achieved.

Neumann, LA Wojno, JA Juster, RD ; Cambridge Systematics, Incorporated, Multisystems, Incorporated, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-1083-77-1, Mar. 1977, 206 pp; Contract DOT-TSC-1083; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-267941/3ST

32 159691 EMPLOYER-BASED COMMUTER RIDE-SHARE PROGRAM IN A MEDIUM SIZE URBAN AREA. The authors describe an employer-based commuter ride-share program that has been very successful in Knoxville, Tennessee. The program, consisting of express buses, carpooling and vanpooling, has attracted professionals of medium and high income groups who traditionally are not transit riders. The key factors for the success of the program include citizen participation, the support of employers and the city administration.

Stokey, SR (Tennessee Valley Authority) Wegmann, FJ Chatterjee, A Mauldin, HD *Transportation Engineering* Vol. 47 No. 1, Jan. 1977, pp 19-24, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 159698 COMMUTER VAN PROGRAMS--AN ASSESSMENT. Commuter van service is defined as a prearranged ride-sharing form of transportation in which vans are used for regular tripmaking between home and workplace. A distinction is made between vanpooling wherein the driver does not receive a fee and a subscription service wherein the driver receives compensation and the passengers pay in advance. This article focuses on vans, the demand characteristics, marketing problems, and several organizational and administrative features of carpools.

Miller, GK (Urban Institute) Green, MA *Traffic Quarterly* Vol. 29 No. 1, Jan. 1977, pp 33-57, 21 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 163336 CAR POOLING BY PRIVATE VEHICLES [Samaakning i privata fordon]. This publication suggests a program for investigation of the possibilities of increasing the degree of car pooling journeys to and from work. The first part of the study is a theoretical preparation for the second practical part in which a number of demonstration projects are to be carried out. The first stage contains an inventory and analysis leading to the formation of hypotheses. The hypotheses are to be tested by an investigation into traveller experience and attitude in the test areas to be used in the second stage. The demonstration projects are to be carried out on the basis of a car pool organization with resources to administer and support the tests. The activity is coordinated with the local authority and public transport company planning. The results of every subproject are to be evaluated and the consequences analysed, after which the overall results are to be systematized. /TRRL/ [Swedish]

Vesterlund, Y ; Chalmers University of Technology, Sweden Monograph Meddelande 77-1976, 1976, 33 pp, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-225947), National Swedish Road & Traffic Research Institute

32 163573 PARATRANSIT SERVICE IN THE WASHINGTON METROPOLITAN AREA. CASE STUDIES. Home-to-work, campus, or neighborhood specific systems which were established in response to a specific transportation need were studied. Of 13 services, 7 are primarily neighborhood oriented, operating between home and traffic generators in small communities; 3 are connector services supplementing regular transit routes; 2 serve university campuses to alleviate parking and traffic flow problems and provide personal security; and 1 service is a long distance commuter haul into downtown Washington. Of these services, 4 have failed or been discontinued, 2 are in danger of failing, and 1 is projected to begin service in the near future. The cause of failure in all cases is the high per-mile and per-passenger operating costs which place these modes beyond the deficit limit which sponsors are willing to subsidize. In some cases, paratransit systems are either self-supporting or low-deficit operations. It is noted that paratransit should be established to meet the needs of a constituency which cannot adequately be served by intra-regional bus and subway lines.

Metropolitan Washington Council of Governments Mar. 1977, 27 pp, 5 Fig.; The preparation of this report was financially aided through grants from the District of Columbia Department of Transportation, the Maryland Department of Transportation, the Virginia Department of Transportation, the U.S. Department of Transportation, Federal Highway Administration and through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1974, as amended.

32 163603 DUPLICATION BETWEEN DEMAND-RESPONSIVE SYSTEMS AND FIXED-ROUTE SYSTEMS. The purpose of this study was to determine the degree to which a specialized door-to-door transit service for the elderly duplicated existing fixed-route service in Cedar Rapids, Iowa. The analysis measures the proportion of elderly who could use the existing fixed-route system for their trip making and

therefore do not need the door-to-door system. The study proposes alternatives that can be implemented to increase service and to ensure service to those who need it. /Author/

Lichtenheld, JA (Iowa University) McKelvey, DJ (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 618, 1976, pp 30-33, 3 Fig., 1 Tab., 3 Ref.; This article appeared in *Transportation Research Record* No. 618, *Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement*; ORDER FROM: TRB Publications Off

32 163925 NATURE OF EQUILIBRIUM IN THE MARKET FOR TAXI SERVICES. This paper reports an investigation of the mechanism by which demand and supply are equilibrated in the regulated taxi market. A simple model is developed in which the demand for taxi trips, as measured by the passenger arrival rate, is a function of a set of exogenous variables, including fares, and of the endogenous variable, taxi availability, is developed. The profitability of taxi operations is determined by exogenous factors and by an endogenous variable, taxi utilization. The number of taxi vehicles supplied is determined by the profit function and by the industrial structure. Taxi availability, which is measured by expected waiting time, and utilization, which is measured by the expected proportion of time the vehicle is occupied, are determined by both the passenger arrival rate and the number of taxi operating. The complexity of the taxi market, particularly its spatial and temporal aspects, makes considerable idealization necessary for its analysis. Even the simple model developed here does not admit a closed form solution for its equilibrium conditions, thereby constraining the work to a numerical example. The most striking feature of the model is its demonstration that in the taxi market supply generates demand and vice versa since an exogenously caused increase in the number of taxis operating will decrease waiting times and thus increase the passenger arrival rate, which will increase the taxi occupancy rate and thus increase profits and, hence, the taxi supply. This supply-demand interaction can be explosive but eventually must damp out. /Author/

Manski, CF Wright, JD (Carnegie-Mellon University) *Transportation Research Record* No. 619, 1976, pp 11-15, 2 Fig., 7 Ref.; This article appeared in *Transportation Research Record* No. 619, *Innovations in Transportation System Planning*; ORDER FROM: TRB Publications Off

32 163927 PARATRANSIT PLANNING FOR URBAN ACTIVITY CENTERS (ABRIDGMENT). An experimental questionnaires-based planning program was developed to comprehensively address the transit and paratransit needs of employee commuters working in the major employment centers of Seattle. The study area chosen was a downtown hospital service node in Seattle. The experiment had three objectives: To develop detailed information about work related transportation needs and interests of individual employees. Attempt the operational application of survey information in planning improved transit service, employer shift and parking management, city controlled neighborhood parking and access, and the development of paratransit alternatives. And, to develop and enroll hospital employees in operational paratransit programs. Data analysis

suggests that the survey questionnaire was effective and the responses provided insight into a relatively extensive, latent market for transit and paratransit development. The planning appear for service development was only marginally feasible because those agencies operating existing transit services were limited in their ability to immediately participate in paratransit planning. A publicly financed survey planning approach that leads towards specialized transit and paratransit services was found to be an economical alternative.

Barb, CE, Jr (Oklahoma University) *Transportation Research Record* No. 619, 1976, pp 19-21, 1 Fig., 2 Ref.; This article appeared in *Transportation Research Record* No. 619, Innovations in Transportation System Planning.; ORDER FROM: TRB Publications Off

32 163996 THE BUSTAXI, A SYSTEM FOR DEMAND ACTUATED PUBLIC TRANSPORT [De bustaxi, een systeem voor oproepgestuurd openbaar vervoer]. The bustaxi is a demand actuated public transportation system, using a small computer for system control. An algorithm allots the demands for transportation in a way that total discomfort (the sum of waiting time and detour time for all passengers together) is minimized. An incoming demand is provisionally allotted to a bustaxi, whose provisional route may be changed. Because of this, an earlier allotment can be reassigned to another bustaxi. The allotment is finalized at the moment that the relevant route instruction is given to the bustaxi. Limitation of waiting time and detour time for the individual customer is not achieved, as is usual, by the use of fixed upper limits (hard constraints), but by the introduction of soft constraints, based on a disutility function (cost function), non-linear, depending on waiting time, detour time and if desired also on other parameters such as origin and destination of the demand. The practical character of the system is emphasized by the use of the street network and the demand distribution of an existing city. [Dutch]

Breur, NWKA (Technische Hogeschool, Netherlands) *Verkeerskunde Analytic* Vol. 28 No. 5, May 1977, pp 230-234, 7 Fig., 3 Phot., 14 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD-227162)

32 164088 THE CALL-A-BUS DEMONSTRATION PROJECT--SPECIALIZED TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED IN SYRACUSE, NEW YORK. This report describes, analyzes and evaluates the conduct and results of the Syracuse Call-A-Bus demonstration, in which special transit services were provided for the elderly and handicapped populations of Onondaga County, New York. These services included an advance-reservation door-to-door service for individual users and a group trip service for organizations. Subscription services were also provided. The demonstration was operated by CNY Centro, Inc., a transit operating subsidiary of the Central New York Regional Transportation Authority, during the period from October 1, 1973 to October 31, 1975. CNY Centro has continued to operate Call-A-Bus services under its own budget following the demonstration's termination. /Author/

Przepioria, J Clare, J Holoszyk, M Lave, R ; Central New York Regional Transportation Authority, Systan, Incorporated, (DOT-TSC-480

UMTA-77-21) Final Rpt. NY-06-0041-77-1, June 1977, 163 pp, Figs., Tabs., Photos., 7 App.; Sponsored by DOT, Urban Mass Transportation Administration and under contract to DOT, Transportation Systems Center.; ORDER FROM: NTIS

32 164246 THE LEVEL OF SERVICE PROVIDED BY TAXIS IN JULY, 1974. This report presents the results of a survey of the level of service provided by taxis in July 1974 and also, by comparison with the results from a similar survey carried out in February of the same year, seeks to establish the effects of the revision of taxi legislation which came into force on the 10th March 1974. Though the new legislation abolished the distinction between Hong Kong island and Kowloon taxi, the relationship between the level of activity in both areas showed little change (few taxi drivers appear to have made use of their new freedom to ply for hire on the opposite side of the harbour) and the factor which has had the greatest influence on the taxi trade was the increase in fares. The most obvious result of the fare increase, from the prospective passengers point of view, was the improvement in the availability of taxis for hire, but the study indicates that this increase in availability was the end result of a complex readjustment of the taxi trade to the new situation. With the increase in fare there was a 20% fall in demand to which the taxi trade reacted by a reduction of 10% in activity. Due to the very high level of taxi utilisation before the fare increase the subsequent changes in demand and activity resulted in a net increase of more than 50% in the number of taxis available for hire. However, the relationship between demand, taxi activity and taxi availability was not constant across the colony and, in general, the level of service improved in the down-town areas on both sides of the harbour to the detriment of the outlying districts. /TRRL/

Cowie, JD ; Department of Public Works, Hong Kong Monograph Technical Report 185, Nov. 1974, 44 pp, 8 Fig., 17 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-227324)

32 165140 BUS/CAR POOL SYSTEMS EVALUATION. The I-95/N.W. 7th Avenue Bus/Car Pool Systems Demonstration Project in Miami, Florida is presently being evaluated with respect to the following stated objectives: 1) To offer a viable alternative to the single occupant automobile in the I-95 corridor; 2) To convince a maximal share of the choice rider market that public transit and car pools can be convenient and attractive modes of transport; and 3) To minimize the total number of passenger-hours as opposed to vehicle-hours expended in the corridor; 4) To demonstrate the operational effectiveness and future application of various strategies for providing preferential treatment to express buses. The paper discusses the evaluation of the Project and the methodologies employed. /GMRL/

Siegel, RL ; Ford Motor Company July 1975, 20 pp; ACKNOWLEDGMENT:

32 165550 PORT AUTHORITY CARPOOL PROGRAM. In the summer of 1975, The port Authority of New York and New Jersey introduced a carpooling program by inviting motorists using its six tunnels and bridges to participate in a matching program simple by completing a short

questionnaire (attached). The program was designed to encourage the use of high-occupancy vehicles in order to increase the efficiency of the Port Authority facilities and the highways they serve, and also to assist motorists in forming carpools so they could take advantage of cost savings including a reduced toll rate for autos with three or more people. More than 150,000 questionnaires were given out to motorists; 4,100 were returned. The computer program--a modified version of the Federal Highway Administration (FHWA) Carpool Program--was able to match 1,400 respondents, while the remaining 2,700 were informed that they could not be matched at that time with anyone making a similar work trip. In order to ascertain the success of the matching program, the Port Authority conducted a telephone follow-up survey in which a 25 percent sample of the 1,400 people matched were polled. The respondents were stratified by residence so that a geographically representative sample was obtained. Results indicated that 36 percent of those matched did make an effort to form a carpool by calling someone on their list (or being called by someone), and that 10 percent were successful in joining or forming carpools. This follow-up survey also elicited the respondents' reasons for failing to form a carpool after contacting someone on their list, as well as the reasons given by the 64 percent of respondents who made no effort to form a carpool after receiving a list. /Author/

Port Authority of New York and New Jersey Apr. 1977, 30 pp, 8 Tab., 1 App.

32 165572 INTEGRATED DEMAND-RESPONSIVE URBAN PASSENGER AND FREIGHT TRANSPORT. This paper discussed how the temporal and spatial variations in the demand for urban passenger and freight capacity could be used to increase the productivity of existing manpower and vehicles in urban public transport operations through co-ordination of passenger and courier type parcel freight operations. Likely problems in the conversion of vehicles and drivers from one role to the other are discussed from an engineering, labour-management, institutional and potential user point of view. Advantages are seen in terms of improved levels of service, especially in off-peak periods when services operate in a demand-responsive manner, and in decreased subsidies. Integration of freight and passenger transport is not seen as a panacea to the urban transport problem, but as one step in the restructuring of the urban movement system to help align it with existing urban geography in an environmentally responsible manner. A possible application in Canberra is outlined. /TRRL/

Kissling, CC (Australian National University) ; Victoria Ministry of Transport, Australia Proceeding May 1977, 15 pp, 2 Fig., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use from the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227891), Australian Road Research Board

32 165600 DIAL-A-BUS SYSTEM IN TRAFFIC SEPARATED AREAS [Stadsplanetekniska foerutsaettningar foer taxi-bus i trafikseparerade omraaden]. In many new housing areas, public transport is remote from the users. One way in

which this situation can be improved is introduction of a telebus system, i.e. a demand responsive public transport system. The aim of this study was to examine the criteria for a telebus system, to examine the feasibility of the system in areas with traffic segregation, and to plan possible routes and pick-up points in such areas. The following conclusions and recommendations are made: (1) level of demand is very important for economical operation, and should be 8-25 journeys/square km/hour. Areas with less than 4000 population/square km are recommended. (2) layout of street network appears to be of secondary importance; cul-de-sacs should however be few and short. (3) the system is very flexible and can operate even in areas with traffic segregation, provided that housing density is low and accessibility is not unduly bad. (4) telebus operation should be allowed for in planning a traffic network for low-density areas. In traffic-segregated areas also, telebus operation is possible if some modifications are made. (5) the system can be introduced in many areas in Sweden, particularly in view of the increase in the number of old people and detached houses. /TRRL/ [Swedish]

Gunnarsson, SO Markstedt, L ; Chalmers University of Technology, Sweden Monograph 1974, 101 pp, Figs., 5 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-227596); ORDER FROM:

32 165749 EVALUATION OF SERVICE AND METHODS DEMONSTRATION PROJECTS: PHILOSOPHY AND APPROACH.

The Urban Mass Transportation Administration's Service and Methods Demonstration (SMD) Program has the objective of improving existing transit operations by sponsoring the development and implementation of new techniques and services on a nation-wide basis. The SMD Program pursues demonstration projects and studies in four major program areas: Traffic management, Paratransit, Service for Transit Dependents, and Price and Service Improvements. This document contains a summary description of the philosophy and technical approach underlying the evaluation of SMD projects. It describes the supply-demand framework for performing urban transportation impact evaluation and the application of this framework to the following demonstration topics: background and settings; project implementation and operations; level of service (supply) changes; travel behavior (demand) changes; operator impacts and productivity; and non-travel impacts. The SMD Program attempts to maximize the quality and utility of information gained from the demonstrations by developing and employing a consistent, carefully structured approach to demonstration evaluation. Each evaluation is built around the basic analytical framework described in this report, with emphasis placed on using state-of-the-art data collection and analysis techniques which are consistent from the standpoint of efficiency, accuracy, and output. /UMTA/

Abkowitz, M Heaton, C Slavin, H ; Transportation Systems Center, (DOT-TSC-UMTA-77-26) Intrm Rpt. UMTA-MA-06-0049-77-5, May 1977, 23 pp; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-271005

32 166436 REGULATING AND INSURING PRE-ARRANGED RIDE SHARING.

The report describes possible approaches to regulating

and insuring pre-arranged ride sharing (inc. carpools, vanpools, subscription buses), and summarizes the arguments which have been put forward on behalf of various approaches. Also it surveys the approaches actually being adopted in a cross section of the states. The possible regulatory approaches described vary from no regulation to comprehensive regulation covering entry, fares, service, safety, insurance, and competition with other operators and other modes. The arguments pro and con are found to center on the question of protection of pre-existing conventional transit operators. The survey results (from a 12 state survey undertaken in cooperation with the Federal Energy Administration and the Federal Highway Administration) indicate that carpools are not regulated in any state while subscription buses are regulated as common or contract carriers in 11 of the 12. The situation with respect to vans is varied with four states not regulating any vanpools four states regulating all types of vanpools and the remainder regulating some types of vanpools, generally those operated by third parties. The general trend is found to be toward de-regulation with all four of the states not regulating vans adopting this stance since 1973.

Womack, JP ; Massachusetts Institute of Technology, Department of Transportation Final Rpt. DOT/OS-76T-33, Sept. 1976, 59 pp; Contract DOT-OS-50240; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269574/0ST

32 166439 TAXICAB UTILIZATION BY LOWER INCOME GROUPS.

The study investigates the propensity of poor persons to use the taxicab. Data from previous studies are used to analyze the relative use of taxicabs by different income groups. It is shown that lower-income groups, particularly in small and medium size urban areas, display a relatively high rate of taxi utilization. A survey of taxi drivers in Greensboro, N. C., and an analysis of the origins of taxi trips is used to support this conclusion.

Allred, J Saltzman, A ; North Carolina Agricultural and Technical State U, Urban Mass Transportation Administration, (UMTA-NC-11-0004) Final Rpt. UMTA-NC-11-0004-77-2, A/R-TI-28-RR-76, Oct. 1976, 45 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269581/5ST

32 166459 EVOLUTION OF THE KNOXVILLE TRANSPORTATION BROKERAGE SYSTEM.

A demonstration project designed to explore the feasibility and transportation service impacts of the transportation brokerage concept is currently underway in Knoxville, Tennessee. The transportation broker seeks to identify and match transportation supply and demand across a wide range of users, providers, and modes. The report describes the brokerage system concept and documents the activities leading to the implementation of the brokerage system in Knoxville. Included is a discussion of the various institutional and regulatory barriers to participation by private providers and how some of these were overcome. The Knoxville pre-operational experience is potentially of interest and applicability to other locales.

Skorneck, AJ ; CACI, Incorporated, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-77-10, Oct. 1976, 72 pp; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270103/5ST

32 166712 EVALUATION OF TRANSIT SYSTEM COORDINATION AND FUTURE SERVICES IN THE CHARLOTTESVILLE URBANIZED AREA [Final rept]. The report results from a ten-month study that focused on how bus service could be improved to accommodate the future transit needs of the city of Charlottesville. Among the alternatives considered were strategies such as changing routes and schedules on the present system, coordinating the city service with the University of Virginia bus system, and expanding bus service into Albemarle County. The 123-page report contains an overview of all public transportation in Charlottesville, provides an in-depth analysis of present Charlottesville Transit Service ridership based on an on-board survey conducted in April, 1976, examines the operating characteristics of both the city and university systems, tests alternative routing concepts to determine the effectiveness of each in providing public transportation, and analyzes future transit demands in the city-county-university regional area.

Hoel, LA Demetsky, MJ Morris, D List, D ; Central Piedmont Urban Observatory,, Charlottesville, Va.**National League of, Cities/U.S. Conference of Mayors, Washington,, D.C.*Department of Housing and Urban Development,, Washington, D.C. Assistant Secretary for Policy, Development and Research. UO-LCCM-CHA-76-007, HUD/RES-1096, Dec. 1976, 131p

Prepared in cooperation with National League of Cities/U.S. Conference of Mayors, Washington, D.C., Contract HUD-H-2196R.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268866/1ST

32 167021 A MULTI-ORIGIN/DESTINATION TAXI SYSTEM. VOLUME 2. PROTOTYPE DESIGN FOR SHARED RIDE SERVICES.

The long range goal of this research project is to design, develop and implement an experimental demand responsive multi-origin/destination taxi system. The overall research program consists of information acquisition, studies of deployment and allocation of equipment, and development of pricing mechanisms and operating procedures for a multi-origin/destination taxi system. The work is divided into three stages: (1) Preliminary design for single-origin/destination trips (exclusive rides); (2) prototype design for shared rides; and (3) design improvements and experimental operations in an urban environment. This report describes the second stage of development which includes (1) a fare calculation procedure for shared rides which has been filed as a tariff under the Certificate of Public Convenience for a common carrier and approved by the Pennsylvania Public Utility Commission, (2) a base station located at a taxicab company which is equipped with computer, auxiliary storage, terminal and radio transmitter, and (3) a taxicab equipped with the RSVP System for testing technological capabilities and conducting experimental operations.

Au, T Baumann, DMB ; Carnegie-Mellon University, Department of Transportation Final Rpt. DOT-TST-76T-34, Sept. 1976, 60 pp; See also Volume 1, PB-255 975.; Contract DOT-OS-40081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270526/7ST

32 167307 COM-BUS: A SOUTHERN CALIFORNIA SUBSCRIPTION BUS SERVICE. The evolution and operations of the COM-BUS Subscription Commuter Bus Service are documented. COM-BUS is a privately owned organization operating at a profit without any form of subsidy. COM-BUS serves approximately 2,000 commuters per day on 47 routes which provide service in Ventura, Los Angeles, and Orange counties. A majority of the routes use chartered passenger buses with from 38 to 47 seats. A fleet of eight 13- to 16-passenger minibuses are used on routes where demand is insufficient to warrant the larger buses. Service provides a fairly personalized morning pickup, with major portions of the runs to work destinations being express and using freeways. In the evening, passengers are picked up at their work locations, and runs to their initial origins are accomplished. Because of its method of management operations, COM-BUS maintains subscription levels (weekly seat reservations paid for in advance) at better than 90 percent. COM-BUS was organized and now operates with a minimum of capital outlay, and is managed by essentially volunteer support. Travel times using COM-BUS are only slightly longer than those for private automobiles making the same trips. COM-BUS fares are considerably less than corresponding costs to operate a private automobile for a similar trip. The success of COM-BUS is particularly important in view of current heavy subsidies required for most transportation systems, and in view of the tendency of Southern California commuters to reject mass transit and to use private means instead.

McCall, CHJ; CACI, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UM-TA-77-13, 1200-24-77, May 1977, 106 pp; Contract DOT-TSC-1082-6; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272470/6ST

32 167478 INTEGRATION OF SCHOOL BUS AND PUBLIC TRANSIT SERVICE-SUMMARY REPORT. This document describes the investigation conducted within the framework of the Low Capital Alternatives Study as to the integration of school bus transportation and bus service in the Twin Cities Metropolitan Transit Taxing Districts where transit service is currently provided by the Metropolitan Transit Commission. The objective of the school bus study was to identify potentials and opportunities for better coordination of school bus service with other forms of transportation. The School Bus Study Goal relates the integration of school bus and Public Transit service to the goals of the Low Capital Alternatives Study. The study goals include, among others, the following: Increasing the effectiveness of the urban transportation system, maximize the traffic-carrying capacity of the existing street and highway system, minimize the use of limited energy resources in the movement of people and goods in the area and, achieve a level of urban mobility required for the social well-being and economic health of the entire Metropolitan Area. Several recommendations resulted from the study. The integration of the two services should be dropped from consideration under normal economic and fuel availability situations. During times of limited fuel availability, school hours should be staggered or school bus transportation policies changed. For overall transportation planning purposes, school dis-

tricts should submit selected monthly actual ridership totals to the Department of Education. Because some bus fleets are not utilized during off-peak fares, the Metropolitan Transit Commission should act as the catalyst among school districts, public social service agencies, private operators and those persons desiring transportation services to initiate the desired services.

Barton-Aschman Associates, Incorporated Rpt. 75-06, Mar. 1975, 34 pp, 2 Fig., 2 Tab., Photos.; This report was prepared for the Twin Cities Areas Metropolitan Transit Commission.

32 168124 PUBLIC TRANSPORT IN SMALL TOWNS. This paper describes work being carried out at TRRL under the dial-a-bus research programme. The aim is to compare the performance of dial-a-bus with alternative services and to determine which, if any, combinations of demand density and service area size are suitable for its operation. A comparative assessment is being carried out for the case of towns having populations of between ten and twenty thousands. This paper summarizes the model calibration stage of this work and presents the results of the optimisation of public transport for Carterton, Oxfordshire. It is shown that here any internal public transport service would require a subsidy. Only in the case of a fixed route minibus would the social benefits exceed the resource costs. The generalisation of these results to towns having different population densities and areas is currently being studied. /TRRL/

Martin, PH Tunbridge, RJ; Planning and Transport Res and Computation Co Ltd Proceeding 1976, pp 14-23, 3 Tab., 7 Ref.; Proceeding of Seminar M P141 of the PTRC Summer Annual Meeting, University of Warwick, England, July 12-15, 1976; ACKNOWLEDGMENT: TRRL (IRRD 228892)

32 168141 THE OPTIMISATION OF PUBLIC TRANSPORT IN SMALL TOWNS. A study was carried out with the aim of determining the optimum form of public transport for the town of Carterton, Oxfordshire. A demand model was developed and calibrated and was shown to be in close agreement with observations for three different levels of public transport in the town. This model was used to predict the variations of demand with fare and level of service for three different transport systems: fixed route minibus, many-to-many dial-a-bus and taxi. Supply models were developed for each of these types of operation, and the fare and level of service for each system was optimised according to both commercial and social objectives. It was concluded that none of these systems could be operated at a commercial profit and that only a fixed route minibus service could show a net social benefit. /Author/TRRL/

Martin, PH Tunbridge, RJ; Transport and Road Research Laboratory Monograph TRRL Lab. Rpt. 791, 1977, 43 pp, 8 Fig., 16 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 229181)

32 168442 RIDE SHARING: PSYCHOLOGICAL FACTORS. The conventional automobile transportation system is plagued with increasing congestion, pollution, energy consumption, and costs. These problems diminish the automobile's prime advantage of providing personalized, flexible transportation. Ride sharing--carpooling,

vanpooling-- can deal directly and effectively with these problems at a minimum cost. However, ride sharing has not become widely accepted. A carpooling attitudinal survey indicates that the two most important deterrents to potential carpoolers are the extra time requirements and the loss of independence. Ongoing research involves the analysis of the commuter decision-making process with regard to their mode choice. Models of experimental psychology are being used to study factors underlying individual preferences. These studies relate carpooling as a mode choice preference to interpersonal factors (i. e., composition of the carpool in terms of sex; prior acquaintanceship of potential riders) as important determinants of carpooling desirability.

Dueker, KJ (Iowa University) Bair, BO Levin, IP *ASCE Journal of Transportation Engineering* Vol. 103 No. TE6, ASCE 13324, Nov. 1977, pp 685-692, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 169303 KCMR DIAL-A-RIDE STUDY: REPORT NUMBER 1. DIAL-A-RIDE SERVICE POTENTIAL IN THE KANSAS CITY METROPOLITAN REGION. This study is comprised of 6 reports that encompass all of the major facets of a demand-responsive system. It is designed to assist the Mid-America Regional Council and local government agencies in the detailed service planning of Dial-A-Ride services in the Kansas City Metropolitan Region. A small pilot system was applied in Independence, Missouri, and a larger pilot system was applied in Johnson County, Kansas. Report No. 1 presents background and existing developments of demand-responsive systems in the KCMR. It presents relationships between general public systems vs. specialized systems (which are provided for the elderly and handicapped). It compares the various services, their applicability, potential and funding, and points out the limits and limitations of the Dial-A-Ride program. It was found that Dial-A-Ride service to the general public should be seriously considered for expansion of public transportation in major portions of the KCMR, and especially in medium and lower density suburban areas.

Mid-America Regional Council, Huron River Group, Incorporated, Missouri Transportation Associates, Bishop Engineers, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0047) UMTA-IT-09-0047-77-1, Mar. 1977, 74 pp; Prepared by Huron River Group, Inc., Ann Arbor, Mich., Missouri Transportation Associates, Kansas City, and Bishop Engineers, Inc., Kansas City, Mo.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275686/4ST

32 169304 KCMR DIAL-A-RIDE STUDY: REPORT NUMBER 2. DISPATCHING AND COMMUNICATIONS. This study is comprised of 6 reports that encompass all of the major facets of a demand-responsive system. It is designed to assist the Mid-America Regional Council and local government agencies in the detailed service planning of Dial-A-Ride services in the Kansas City Metropolitan Region. A small pilot system was applied in Independence, Missouri, and a larger pilot system was applied in Johnson County, Kansas. Report No. 2 describes the dispatching and communication requirements for small Dial-A-Ride systems, such as the small

pilot system in Independence, Missouri, and for a large integrated system, such as the one proposed for Northeastern Johnson County, Kansas. The report presents operating procedures and design and cost considerations for the equipment of the systems, as well as a glossary of radio terminology. It was found that Dial-A-Ride service to the general public should be seriously considered for expansion of public transportation in major portions of the KCMR, and especially in medium and lower density suburban areas.

Mid-America Regional Council, Bishop Engineers, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0047) UMTA-IT-09-0047-77-2, Apr. 1977, 33 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275687/2ST

32 169305 KCMR DIAL-A-RIDE STUDY: REPORT NUMBER 3. PERSONNEL AND TRAINING FOR DIAL-A-RIDE. This study is comprised of 6 reports that encompass all of the major facets of a demand-responsive system. It is designed to assist the Mid-America Regional Council and local government agencies in the detailed service planning of Dial-A-Ride services in the Kansas City Metropolitan Region. A small pilot system was applied in Independence, Missouri, and a larger pilot system was applied in Johnson County, Kansas. Report No. 3 is aimed at providing prospective operators of relatively small Dial-A-Ride systems with tested and workable guidelines for the recruitment, scheduling, and training of personnel. It describes the basic personnel operations of the small and large systems, and lists the necessary duties of management. Sample lesson plans, training sessions, map and routing exercises, dispatcher and driver evaluation checklists, and a self-training worksheet are included. It was found that Dial-A-Ride service to the general public should be seriously considered for expansion of public transportation in major portions of the KCMR, and especially in medium and lower density suburban areas.

Mid-America Regional Council, Huron River Group, Incorporated, Missouri Transportation Administration, Urban Mass Transportation Administration, (UMTA-IT-0-0047) UMTA-IT-09-0047-77-3, June 1976, 50 pp; ACKNOWLEDGMENT: NTIS; UMTA; ORDER FROM: NTIS; PB-275688/0ST

32 169306 KCMR DIAL-A-RIDE STUDY: REPORT NUMBER 4. VEHICLES, MAINTENANCE, FARE COLLECTION. This study is comprised of 6 reports that encompass all of the major facets of a demand-responsive system. It is designed to assist the Mid-America Regional Council and local government agencies in the detailed service planning of Dial-A-Ride services in the Kansas City Metropolitan Region. A small pilot system was applied in Independence, Missouri, and a larger pilot system was applied in Johnson County, Kansas. Report No. 4 is concerned with the maintenance and specifications of Dial-A-Ride vehicles. Considerations in vehicle acquisition is discussed, such as procurement, leasing, specification guidelines, and provisions for wheelchairs. Transit fare collection equipment and related functions are discussed, and alternatives to cash fares are presented, such as tickets or prepayment. It was found that Dial-A-Ride service to the general public should be seriously

considered for expansion of public transportation in major portions of the KCMR, and especially in medium and lower density suburban areas.

Mid-America Regional Council, Huron River Group, Incorporated, Missouri Transportation Associates, Urban Mass Transportation Administration, (UMTA-IT-09-0047) UMTA-IT-09-0047-77-4, Aug. 1976, 28 pp; ACKNOWLEDGMENT: NTIS; UMTA; ORDER FROM: NTIS; PB-275689/8ST

32 169307 KCMR DIAL-A-RIDE STUDY: REPORT NUMBER 5. MANAGEMENT INFORMATION SYSTEMS. This study is comprised of 6 reports that encompass all of the major facets of a demand-responsive system. It is designed to assist the Mid-America Regional Council and local government agencies in the detailed service planning of Dial-A-Ride services in the Kansas City Metropolitan Region. A small pilot system was applied in Independence, Missouri, and a larger pilot system was applied in Johnson County, Kansas. Report No. 5 discusses the role of management in a demand-responsive system. Management's primary role is the continual modification of service, in order that it may remain responsive to the needs of the users. Data generated through the daily operation of the system must be reviewed and analyzed, and the report shows how this data may best be used by management in its decision making process. Sample tables, graphs, and surveys are included. It was found that Dial-A-Ride service to the general public should be seriously considered for expansion of public transportation in major portions of the KCMR, and especially in medium and lower density suburban areas.

Mid-America Regional Council, Bishop Engineers, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-09-0047) UMTA-IT-09-0047-77-5, Apr. 1977, 27 pp; ACKNOWLEDGMENT: NTIS; UMTA; ORDER FROM: NTIS; PB-275690/6ST

32 169416 SCHEDULING DIAL-A-RIDE TRANSPORTATION SYSTEMS: AN ASYMPTOTIC APPROACH [Interim rept]. There has been some recent interest in the Dial-a-Ride proposal for innovative public transportation systems. These schemes ideally provide large numbers of passengers with personalized service. A passenger is taken from his origin to his destination by a small bus; the bus may deviate en-route to collect and deliver additional passengers. In such systems the central mathematical problem is one of scheduling: the assignment of a passenger to a bus and the determination of a time for the trip.

Stein, DM ; Harvard Univ Cambridge Mass Div of Engineering and, Applied Physics TR-670, Sept. 1977, 142p; Grant; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A046162/4ST

32 170313 THE 'INTELLIGENT BUS SYSTEM' TESTED BY HAMBURG'S TRANSPORT AUTHORITY [Hamburgs Verkehrsverbund Testete "Intelligentes Bussystem"]. One hundred and ten public transport specialists at a conference in Berlin, received an interim report on the development of new and improved bus systems, metropolitan railway systems and urban rapid transport systems, cabin taxi systems, automation and rationalization concepts, moving pavement technology and use

studies. Amongst those mentioned was the so-called 'intelligent bus system', which runs purely on demand and completely independent of fixed time-tables. The studies and model tests have demonstrated beyond doubt, that both the systems "automatically controlled taxi buses" and "dial a ride" are technically feasible without difficult problems and suitable both from the traffic and operational viewpoint. /TRRL/ [German]

Polizei und Verkehrsjournal Vol. 14 No. 5, 1976, pp 22-24 ACKNOWLEDGMENT: TRRL (IRRD-304831), Federal Institute of Road Research, West Germany

32 170351 METHODOLOGY FOR SHORT-RANGE TRAVEL DEMAND PREDICTIONS. ANALYSIS OF CARPOOLING INCENTIVES. This paper presents a methodology for predicting changes in travel patterns for short-range transport options, including carpooling incentive policies. The methodology is based on the application of disaggregate travel demand models. These models are based on the multinomial logit probabilistic choice model. The data used to estimate the coefficients of these models are taken from home interview surveys and represent a cross-section of households in Washington, DC, USA. The dependent variables of the models are the reported travel choices made; the independent variables are socio-economic characteristics measures of travel times and costs, and survey estimate of employment and land use characteristics in the urban area. The models represent the direct and indirect effects on travel behaviour: (1) shifts in mode of work trips from driving alone and transit to carpooling; (2) alternative use of cars left at home for non-work travel; and (3) changes in car ownership level. Results results are presented of predicting from a case study application of this methodology to various carpooling related policies. The paper concludes with a summary of major findings and recommendations for further improvements in carpooling and short-range demand prediction methods. /TRRL/

Ben-Ariva, M (Massachusetts Institute of Technology) Atherton, TJ (Cambridge Systematics, Incorporated) *Journal of Transport Economics and Policy Analytic* Vol. 11 No. 3, Sept. 1977, pp 224-261, 5 Fig., 19 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 229346)

32 170928 DIAL-A-RIDE-TRANSPORTATION-OPERATIONS MANUAL. A flexible, self-regulating system identified as demand-actuated-responsive-transportation (DART) is described. DART operates by picking up passengers at 5 or 6 locations in one general area and transporting them to different locations throughout the city. Notes are provided regarding the various functions relating to dispatchers, drivers, conduct on the job, and operating techniques and maneuvers. Procedures for bus drivers at railroad grade crossings, planning for emergencies and basic safety rules are covered, as well as radio procedures, 10-codes, accident reporting, waiting for passengers, and hail stops. Other aspects covered here include the drivers log, passenger relations, special transportation bus and equipment, and drivers duties.

Michigan Department of State Highways & Transport Mar. 1976, 17 pp

32 172093 USING THE DIAL-A-RIDE SYSTEM TO SERVE THE AUTOLESS. An assessment of the nature of transportation problems of the poor, elderly, and handicapped comprises the first section of this paper. It is shown that demand-responsive transportation systems such as Dial-A-Ride are demonstrably superior to conventional transit in providing for the transportation needs of the transportation disadvantaged. The impact of various demonstration projects of demand-responsive transportation are reviewed. The emphasis is on the effect these projects had on serving the poor, elderly and handicapped. /GMRL/

Saltzman, A Amedee, G (North Carolina Agricultural and Technical State U) ; American Society of Mechanical Engineers July 1975, 24 pp; ACKNOWLEDGMENT:

32 172546 PARA TRANSIT OR THE THIRD WAY: ALTERNATIVE TRANSPORT ARRANGEMENTS FOR THE THIRD WORLD. PRELIMINARY PROPOSAL AND PROGRAMME STATEMENT FOR A PROJECT INITIATIVE BEING UNDERTAKEN BY THE OECD DEVELOPMENT CENTRE. This report surveys different forms of paratransit used in developing countries, e.g. vehicle sharing, collective taxis, route-deviation minibuses. Details are given of a 3-phase research project undertaken to provide an improved understanding of these systems and to give guidelines as to ways in which they might be improved. Phase 1: "program design" describes the literature search and review, the draft questionnaire which will be used in case studies, case study technique, design of the matrix for the comparative assessment of alternative systems, selection of sites for detailed case studies. In phase 2: "pilot project and first report" the preparation of case studies is outlined together with that of an international workshop. Phase 3 explains how to set up a collaborative international research and advisory programme. /TRRL/

Organization for Economic Cooperation and Development Monograph Feb. 1977, 10 pp; ACKNOWLEDGMENT: TRRL (IRRD-229539)

32 172829 RIDESHARING BEHAVIOR: A REVIEW OF RECENT FINDINGS. This paper reviews recent studies of ridesharing behavior to determine the underlying factors influencing ride-sharing and ways to encourage it. The incidence of ridesharing in the U.S. is estimated at about 10% of work trips, and much lower for other trip purposes; this figure did not increase substantially during the energy crisis of 1973-74. Few demographic factors distinguish carpoolers from non-carpoolers. Most studies have found ride-sharing to be a complex (and little understood) behavior relying heavily on social and psychological processes, particularly group dynamics, role, attitude, perception, and personality. Attempts by agencies to increase its incidence through matching services or appeals to economic or public concerns have thus been generally unsuccessful. It is concluded that, while more basic research is needed to understand the process better, agencies should begin now to address the basic concerns raised against carpooling by solo drivers, if they hope to significantly increase carpooling incidence.

Hartgen, DT ; New York State Department of Transportation Prelim. Res Rpt. 130, Nov. 1977, 36 pp, 12 Tab., 34 Ref.

32 174177 URBAN TRANSPORTATION IN NORTH AMERICA. 4. PARA-TRANSIT. Para-transit is defined as a form of public transportation since the user is transported in a vehicle driven by someone else, the ride is shared with others, and service is provided in an organized and systematic way. It is considered that para-transit can take many forms such as dial-a-bus, jitneys, shared taxis, subscription services, van pools, and public automobile service using small vehicles. In summary, para-transit refers to a class of urban transportation modes that utilizes small vehicles on existing streets and highways. The author describes various forms of para-transit and provides information on the operations of existing demand responsive transit systems in the United States, Canada and Europe. Reference is also made to the jitney, or shared taxi, and examples quoted of their operation in the USA, Caracas, Venezuela and Manila in the Philippines. Other systems are also described, and it is suggested that the objective of all such systems is to improve mobility by making better use of what already exists and at a reasonable cost. The major impediments to realizing these benefits are felt to be in the areas of regulations, insurance, control of vehicles and drivers, and labour. /TRRL/

Hoel, LA (Virginia University) *Transportation Planning and Technology* Vol. 4 No. 2, Jan. 1978, pp 71-80, 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 231398)

32 175163 STUDIES OF THE HARROGATE CHAUFFEUR COACH SERVICE. The Harrogate minibus service started operation on 30 October 1972 operating in eight areas as a fixed-route minibus diverting on demand onto a number of other roads on request. In practice the number of demands for diversion have amounted to less than 10 per cent of the total patronage. TRRL studies of the system comprised: timing measurements of radio usage, operational observations of boarding and alighting locations and times and details of articles of luggage carried, and an on-vehicle survey to ascertain the types of people using the service. The patronage of the service built up from 500 passengers per week initially to stabilise at around 700 during 1975. From the on-vehicle survey, it was found that 83 per cent of passengers used the service for shopping. Approximately 84 per cent of users were female. Almost half of the users were aged 65 or over and nearly 60 per cent were non car owners. At the time of travel 90 per cent of users did not have a car available to them. The number of users having telephones was high (72 per cent) and approximately 50 per cent previously travelled by stage-carriage bus. (Copyright (c) Crown Copyright 1977).

Tunbridge, RJ ; Transport and Road Research Lab., Crowthorne, (England). 53 TRRL-SUPPLEMENTARY-2, 1977, 27p; Also pub. as ISSN-0305-1315; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276217/7ST

32 175317 PUBLIC TRANSPORT IN CHIENG MAI, THAILAND. This report surveys the operations and organization of the public transport system in Chieng Mai, Thailand's second city. The role of the shared taxi service is examined and comparison is made between this form of intermediate public transport and the

competing bus service. The report illustrates, by example, how important intermediate public transport can be in a developing country. (Copyright (c) Crown Copyright 1977.)

Fouracre, PR Maunder, DAC ; Transport and Road Research Lab., Crowthorne, (England). 85 TRRL-SUPPLEMENTARY-2, 1977, 34p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276836/4ST

32 175566 KCMR DIAL-A-RIDE STUDY: REPORT NUMBER 6. MARKETING AND PUBLIC INFORMATION. The study is comprised of 6 reports that encompass all of the major facets of a demand-responsive system. It is designed to assist the Mid-America Regional Council and local government agencies in the detailed service planning of Dial-A-Ride services in the Kansas City Metropolitan Region. A small pilot system was applied in Independence, Missouri, and a larger pilot system was applied in Johnson County, Kansas. Report No. 6 deals with marketing (news coverage, displays, promotion, advertising, etc.). It discusses the needs of the users and how to arouse and hold the interest of current and potential users. The marketing process for Dial-A-Ride systems are functions which need to be performed by management, but not necessarily by one department or by one individual. It was found that Dial-A-Ride service to the general public should be seriously considered for expansion of public transportation in major portions of the KCMR, and especially in medium and lower density suburban areas.

Mid America Regional Council, Huron River Group, Incorporated, Missouri Transportation Associates, Urban Mass Transportation Administration, (UMTA-IT-09-0047) UMTA-IT-09-0047-77-6, July 1976, 42 pp; Prepared by Huron River Group, Inc., Ann Arbor, Mich. and Missouri Transportation Associates, Kansas City. See also Report dated April 1977, PB-275690; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278812/3ST

32 176499 LOCALLY GENERATED TRANSPORTATION MODES OF THE DEVELOPING WORLD. The details are given of 3 public transportation cases in Asia, Africa and South America, and brief descriptions are given of 5 cases from other parts of the developing world. An attempt is also made to summarize these cases particularly highlighting the administrative, financial and regulatory features. The vehicles, ownership, procurement and use are described, as well as the operation and income of the motorized tricycle rickshaws of Karachi. Similar details are given of the public service transport of passengers on St. Lucia, West Indies, as well as the intercity taxis of Egypt. The Carros por puesto of Venezuela, the jeepneys of the Philippines, the kia-kias of Nigeria, the colectivos of Ecuador, and the Sherutim of Israel are also described. The key features of all these highly successful services are flexibility and responsiveness. They are all the projects of private enterprise. However, certain concerns which appear to be common to these systems are also listed.

Grava, S (Parsons, Brinckerhoff, Quade and Douglas, Inc) *Transportation Research Board Special Report* No. 181, 1978, pp 84-95, 2 Tab., 5 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives,

Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

32 176513 THE IMPACT OF PARATRANSIT INNOVATIONS ON THE JOB SECURITY OF CONVENTIONAL TRANSIT EMPLOYEES WITH DISCUSSION. Some general questions are discussed and the various paratransit service modes are reviewed from the point of view of job security. It is noted that the economic viability of demand responsive transit (DRT) has not yet been established, and that it does not appear to be a significant threat to the job security of transit employees. DRT seems to have the greatest potential in areas that are not currently served by conventional transit. It is also noted that transit workers may gain expanded employment opportunities in combined DRT and conventional transit systems if unions maintain a flexible attitude and management problems can be resolved. The question of whether the cost of dial-a-ride transit could be reduced through effective integration with conventional transit is considered. It is emphasized that dial-a-ride can be more cost-effective if it is designed from the point of new systems efficiency. Such integration will require a great deal of flexibility on the part of both labor and management; if it is adopted, it may mean that the transit industry and transit unions will benefit from the growing interest in paratransit.

Mericle, KS (Massachusetts Institute of Technology) *Transportation Research Board Special Report* No. 181, 1978, pp 162-166, 4 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

32 176540 OVERCOMING IMPEDIMENTS TO TRANSIT INNOVATION. The workshop services established that there is no lack of innovative ideas in the areas of regulation, labor, and marketing, and the panels indicated the many innovative ideas in revenue-raising techniques and on intergovernmental relations. The sessions also pointed out several impediments to innovation. Some solutions are suggested here in the areas of labor, management, politics, regulation, innovation and grants. The suggestions put forward include the following: the establishment of full day's work for a full days pay; the improvement of managerial quality by provision good training, and guidance; the development of proposals that are responsive to constituents needs; the change of regulations based upon legislative change; the need for more research and learning from foreign experience; and grant programs that could be made to spur new solutions.

McDowell, BD (Advisory Commission on Intergovernmental Relations) *Transportation Research Board Special Report* No. 181, 1978, pp 257-258

This paper appeared in *Transportation Research Board Special Report* No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

32 176556 EMPLOYER VANPOOL PROGRAMS: FACTORS IN THEIR SUCCESS OR FAILURE. This research reflects the view that there are certain characteristics of some employers that made the operation of a vanpool service for their employees more successful than others. The focus of this study is only upon the employer operated vanpool programs, and the intent is to identify those conditions under which vanpooling operates best. This study aims to identify factors that have made for the success or failure of some employer vanpool programs. Information was obtained from lengthy questionnaires sent to managers of 58 different employer programs; the results of the 58 returns are documented herein. Results show that vanpooling occurs predominantly in outlying regions of the metropolitan areas, among professional and office workers, and not necessarily in organizations with many employees. Management interest played a key role in their existence, and usually no previous carpool program existed. Successful programs were motivated by factors which had some rewards to management. Failures occurred with user, more so than management, apathy.

Jacobson, JO ; Washington University, Seattle, (WA-11-0005) UMTA-WA-11-0005-78-3, June 1977, 81 pp; Sponsored by DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-276955/2ST

32 176557 ESTABLISHING INNOVATIVE TAXICAB SERVICES: A GUIDEBOOK. Similar to the dilemma facing transit operators, taxi operators face rising costs and disappearing profits. This report reflects the view that recent changes within both the taxi and transit industries have made transportation planners aware of the potential of taxis for alleviating urban mobility problems and taxi operations aware of the necessity of being a part of the local transportation planning process. This document is intended to serve as a guidebook for local planners and public officials who wish to integrate taxi services into the mix of local transit services. It attempts to outline how to establish innovative taxi operated paratransit services. The focus is on the problems which face local transportation/public officials rather than taxi operators. Both conventional and innovative taxicab services in the United States are examined. Based upon this examination, guidelines are developed for establishing similar innovative services elsewhere. This report is organized around four topics: Background information of the taxi industry (focus is on economics of taxi operations); Description of taxi service inno-

vations; Practical details of implementing innovative taxi services (focus is on contracts between public agencies and private operators); and Evaluation of innovative paratransit services.

Gilbert, G ; North Carolina University, (NC-11-0005) Final Rpt. UMTA-NC-11-0005-78-1, Aug. 1977, 69 pp; Sponsored by DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-278647

32 176559 FEASIBILITY STUDY OF SHARED RIDE AUTO TRANSIT. The objective of this report is to assess the feasibility of the implementation of shared-ride auto transit (SRAT), which is an innovative approach for increasing auto occupancy in rural and urban areas. The report focuses on operational concepts, potential usage, legal and regulatory issues, and insititutional issues. Formulation of the SRAT concept was motivated by several concerns, such as: (1) energy conservation; (2) transit service to areas unable to economically justify conventional transit services, and to travel disadvantaged groups; (3) transit service replacement to achieve greater efficiency and to reduce transit deficits; (4) provision of inexpensive transit service; and (5) and increase of safety and reliability of hitchhiking. Four case study sites (Boulder, Colorado; Boston, Massachusetts; Portland, Oregon; and Tidewater, Virginia), were used to identify the specific institutional issues likely to impact SRAT implementation for that site, and to identify the opportunities for designing, implementing and operating SRAT in a variety of institutional settings. The report includes Appendix A, which lists existing and proposed SRAT systems, and Appednix B, which shows the derivations of equations used in SRAT route and stop analysis. The study recommends that SRAT can provide sufficiently high levels of service. However, a number of potentially serious institutional barriers to SRAT exist, but by designing the system to reflect a site's particular institutional setting, it appears that in many instances, these barriers can be overcome.

Kocur, G Zaelke, D Neumann, L ; Cambridge Systematics, Incorporated, (IT-06-0144) Final Rpt. UMTA-IT-06-0144-77-1, Sept. 1977, 252 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-UT-70007; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-276539/ASS

32 176576 SHARED-RIDE TAXI COMPUTER CONTROL SYSTEM REQUIREMENTS STUDY. The technical problem of scheduling and routing shared-ride taxi service is so great that only computers can handle it efficiently. This study is concerned with defining the requirements of such a computer system. The major objective of this study is to develop the system requirements and perform a functional design of the computer control system (CCS) for an automated shared-ride taxi (SRT) system. A SRT operation using a CCS offers a potential for increased taxi dispatching efficiency, improved driver productivity and profitability, improved quality of service, integration of taxis into area-wide transit, and improved mobility for the transportation disadvantaged. This interim report describes progress on the study and indicates major findings to date. It is an executive-level summary, and it does not attempt to include all

information or justify all statements. Rather, it is an overview of accomplishments leading to a concluding section which outlines preliminary system design requirements. These requirements are subject to change since the work in many areas is not yet complete. The Appendices consist of a Bibliography and a Report of Inventions. /UMTA/

Fielding, GJ ; DAVE Systems, (DOT-TSC-UMTA-77-39) Intrm Rpt. UMTA-MA-06-0054-77-1, Aug. 1977, 53 pp; Sponsored by DOT, Urban Mass Transportation Administration. DAVE Systems under contract to DOT, Transportation Systems Center.; Contract DOT-TSC-1272; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-275335

32 176927 CHOICE-MODEL PREDICTIONS OF CAR-POOL DEMAND: METHODS AND RESULTS. The results of a number of car-pool strategies were predicted by using disaggregate choice models. Car pooling is explicitly considered as an alternative mode only for work trips. However, the effects of carpooling incentives on interdependent travel choices and vice versa are also predicted. Forecasts are made by applying the models to each household individually, using revised values of the appropriate independent variables to simulate the particular transportation alternative being analyzed. These household predictions are then summed to represent predicted areawide changes in travel behavior. Before and after data from the implementation of car-pooling incentives and transit-service improvements were used to test the validity of the model's forecasts. Three such tests are reported. The results indicate that the work-trip modal-choice model successfully captures the effects of changes in level of service on modal choice. The predicted effects of several significant car-pooling strategies are presented. In general, traveler response to many car-pooling incentives is small. The most significant changes in travel behavior are predicted for those parking-related policies that combine disincentives for driving alone with incentives for car pooling. /Author/

Ben-Akiva, M (Massachusetts Institute of Technology) Atherton, TJ (Cambridge Systematics, Incorporated) Gendell, DS, Discusser (Federal Highway Administration) Brand, D, Discusser (Massachusetts Executive Office) *Transportation Research Record* No. 637, 1977, pp 13-17, 3 Tab., 7 Ref.; This article appeared in the *Transportation Research Record* No. 637, Forecasting Passenger and Freight Travel. Discussions and Authors' Closures follow this article.; ORDER FROM: TRB Publications Off

32 177125 ANALYSIS OF INTEGRATED URBAN PUBLIC TRANSPORTATION SYSTEMS. Dramatic increases in transit patronage will require a major restructuring of present transit and paratransit operations to achieve integrated regional systems capable of changing as traffic increases and new markets are penetrated. The integration of new public transportation options such as dial-a-ride, jitney, and subscription bus with conventional mass transit promises significantly improved overall levels of service without increased total system costs. Integrated systems and expansion policies require that the individual service and cost attributes of each system component be modeled and the

synergisms that result from various service combinations must be evaluated. Integrated system design is significantly more complex than the conventional bus routing and scheduling problem because of the increased number and complexity of available modes. This paper examines a case in which various service policies are evaluated, for parametrically varied demand levels, by using a combination of manual and automated procedures. Major conclusions are that significant economies of scale develop at relatively low levels of increased transit use and that major redesign of system operating policies is required to sustain desirable service levels and costs.

Batchelder, JH (Multisystems, Incorporated) Kullman, BC (Cambridge Systematics, Incorporated) *Transportation Research Record* No. 639, 1977, pp 25-29, 10 Fig., 10 Ref.; This article appeared in *Transportation Research Record* No. 639, Transportation System Evaluation Techniques.; ORDER FROM: TRB Publications Off

32 177212 PARATRANSIT PROSPECTS-- FILLING A GAP. Urban travel habits in the United States will change in the next decade in response to energy, environmental, and economic problems and may create a wider gap between what the automobile does well and what conventional public transportation does well. Paratransit can limit the gap and could be serving more passengers than conventional transit in the 1990's. Paratransit is shared riding. It consists of many forms of service between conventional, scheduled, fixed-route public transit, and the private use of the automobile.

Keith, RA (Voorhees (Alan M) and Associates, Incorporated) Skinner, RE *High Speed Ground Transportation Journal* Vol. 11 No. 3, Sept. 1977, pp 245-259; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 177327 DIAL-A-RIDE WITH CUSTOMER OPERATED DISPATCHING. Demand responsive bus operation generally requires some type of manual dispatching. If the volume of traffic is low and few vehicles are in service, the cost of dispatching relative to the total operating costs will be substantial. Consequently, many operators hesitate to introduce a dial-a-ride system. In a joint project between Gothenburg Transport Authority (GS) and Volvo, the latter has designed a device to be fitted to the general telephone system whereby a telephone dial can be used to transmit coded information over the public telephone network to a central recorder. In a dial-a-ride service this device can be used as a "robot" dispatcher. During a period of 11 weeks in 1976 this device was tested in practical operation in the northeastern part of Gothenburg, the second largest city of Sweden. During the same period a prototype Volvo vehicle for low volume demand was also tested in this dial-a-ride service. During this experiment it appeared that customers easily adjusted to the new procedure of getting their bus. These promising results have led GS to continue the development of this system for large scale operation. /Author/

Elmberg, CM (Greater Stockholm Transport, Sweden) *Transportation (Netherlands)* Vol. 7 No. 1, Mar. 1978, pp 35-43, 4 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 233666)

32 178344 PARATRANSIT. The topics that are presented in this issue include among others a

discussion of labor protection coverage under section 13 c of the Urban Mass Transportation Act to taxicab employees. The Lehigh and Northampton Transportation Authority (LANTA) have been awarded a rural transportation demonstration grant whereby LANTA will contract with a taxi company to provide feeder service to fixed-route LANTA buses. The UMTA paratransit demonstration program seeks to test and document the results of innovative transportation services. The University of Tennessee has put out a report on insurance for demand-responsive vehicles that outlines some of the basic problems so that government agencies, the insurance industry, and the legislature and courts can understand each perspective. Pennsylvania has recently enacted a new law, Act 10, that enables PENN DOT to aid rural public transportation systems. San Diego's Commuter Computer ride-sharing program is directed to employers with large concentrations of employees who live in specific areas. The matching program is expected to provide cost savings to commuters and contribute to decreased air pollution and energy conservation. The University of California at San Francisco through its paratransit services, has significantly reduced the level of traffic. The transportation program was developed to address neighborhood concerns about campus traffic growth.

Paratransit May 1978, 4 pp

32 178584 CARPOOLING; EXPERIENCES FROM TEST PROJECTS IN OSLO [Organisert kameratkjoering; med erfaringer fra proeveprosjekt i Oslo-området]. This report describes carpooling in general including three basic types of matching methods, and the experience with carpool matching programmes run with two larger firms in Norway. A survey of existing car occupancy gave 1,4 persons per car at firm a and 1,8 persons per car at firm b. The matching process started with questionnaires being sent to all employees containing questions regarding interest in joining a carpool and on what terms they wished to join. At a 7% and at b 9% of the employees wanted to join a carpool on certain conditions. Only 2/3 of these could form an acceptable carpool. The two programmes each resulted in a 1% reduction in the total number of private cars used for work trips. There were no use of incentives to influence decisions. /TRRL/ [Norwegian]

Groenroed, E Joys, C ; Institute of Transport Economics, (82-7133-158-2) Monograph Nov. 1976, 32 pp, 5 Fig., 7 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-232799), Norwegian State Highway Laboratory

32 178710 DIAL-A-RIDE TRANSPORTATION: A MICRO EXPERIENCE. This paper reports a 22-month examination of Michigan city to determine the costs and benefits of the DART (dial a ride transportation) system. This system carries about 225 passengers per week at an operating subsidy of about \$1.30 per passenger. Experiments have shown that a fixed route system met with overwhelming disapproval and high operating subsidies which exceed \$4 per passenger. DART's basic schedule is essentially a 12-hour schedule, six days a week and a 5-hour morning schedule on Sunday. It was found that many of the persons who were benefiting from this program were not elderly or handicapped and

also that the system was too costly given the level of ridership. A combination of a fixed route system in conjunction with a demand responsive service was recommended to better serve the community at less cost per passenger. This, however, was not successful and led to a return to an all demand-responsive DART service.

Knotts, US (Georgia Southern College) Peterson, TC (Central Michigan University) *Transit Journal* Vol. 4 No. 2, Apr. 1978, pp 21-30, 1 Fig., 3 Tab.

32 178800 VANPOOLS FOR URBAN TRANSPORTATION: THEIR LEGISLATIVE BASE, PROMOTION AND POTENTIAL. This research report reflects the view that vanpooling has emerged as a viable and new form of commuter transportation that can help meet public goals of reduced fuel consumption, air pollution, and congestion while affording benefits to individuals and employers; it is worthy of state attention. The report aims to serve as a general assessment of current legislative interest and state promotional development in vanpooling. Information herein should be useful to the following: federal and state regulatory and legislative bodies; federal, state, and local transportation related agencies; university research groups; and employer organizations with or without ridesharing programs for employees. The objectives of this report are as follows: to draw attention to state vanpool development and legislative action; to catalogue how the fifty states approach their regulation of vanpool operations; to present a compendium of state legislative interest, promotion, and development in vanpooling in a scenario format for use by other states; to present a case study documentation of Minnesota's response to promoting and developing vanpooling as a viable commuter mode; and to offer a package list of employer, legislative, and regulatory actions which should be taken to promote the development of shared-ride services like vanpooling. This report contains a comprehensive bibliography on vanpooling to date. Appendix A contains a glossary of terms; Appendix B is a compendium of state legislative interest, promotion, and development of vanpooling activity; and Appendix C contains the letters sent to State Transportation Committees (50 states), DOT personnel, and Regulatory Body Personnel. /UMTA/

Ford, RH ; Washington University, Seattle, (WA-11-0005) UMTA-WA-11-0005-78-4, June 1977, 264 pp; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-279590

32 179056 COMPARATIVE DEMAND ESTIMATION MODELS FOR PERIPHERAL PARK-AND-RIDE SERVICE. In this study, the usage of peripheral park-and-ride transit service is viewed as a modal split problem between the transit mode and the auto mode. Three types of demand estimation tools are investigated, namely the aggregated linear models, the aggregated non-linear models and the disaggregated non-linear models. These models are developed based on information from a license plate survey conducted in the two peripheral park-and-ride lots in Albany, New York. Results of this study indicate that the linear models yield the largest estimation errors and sometimes produce negative estimations of transit usage. On the other hand, the

non-linear models appear to have more reliable predictive ability. A comparison is also made between the aggregated non-linear modelling approach and the disaggregated non-linear modelling approach, and their suitability in predicting park-and-ride demand of potential service lots. /Author/

Liou, PS ; New York State Department of Transportation Res. Rpt. 71, Sept. 1974, 21 pp, 12 Tab., 6 Ref.

32 179058 MOBILITY CLUB: A GRASS-ROOTS RURAL AND SMALL TOWN TRANSPORT CONCEPT. The dispersion of relatively small numbers of people in rural environments is a substantial barrier to collective means of travel, such as conventional bus service or demand-responsive transit. Accordingly, this paper proposes and analyzes an approach based on ride-sharing in private autos that might provide significant relief for the problems of rural immobility. This solution, termed Mobility Club, can be implemented within the manpower and financial resources of most small towns and rural communities. Trip desires of autoless individuals are matched to the trip-making intentions of persons with autos, by the Mobility Club telephone dispatcher or ride-broker. A companion feature is the method proposed for increasing the number of travel friends, i.e., the number of persons who are well enough acquainted to be trusting enough to travel together. This paper discusses the operational, administrative, and institutional aspects of the Mobility Club concept. A case example is presented to illustrate the magnitude of the potential driver-member supply and tripmaking desires of autoless residents in a sample rural and small town environment. Operating expenses, fare structures, and subsidy considerations are outlined. Finally the paper lists some simple steps to assist individuals who may wish to start a Mobility Club. /Author/

Yukoubusky, R Fichter, D ; New York State Department of Transportation Res. Rpt. 69, Aug. 1974, 39 pp, 6 Fig., 8 Tab., 1 App.

32 179093 DIAL-A-RIDE AS AN ELEMENT IN TRANSPORTATION SYSTEM MANAGEMENT. The Ann Arbor Transportation Authority has been practicing transportation system management since 1973. The most important program element is the incremental implementation of demand-responsive services that operate in close coordination with the line bus system. Ridership has tripled during the past 3 years. Management of such a system is difficult. Political leaders are not easily satisfied; some want a high-efficiency, high-capacity line bus system; others want a small, stable, unchanging system. Neither side can always accept that constant incremental change is the proper way to achieve the desired end state. The Ann Arbor Transportation Authority must also work with other transportation agencies to ensure coordination and within its own staff to maintain the momentum that has been responsible for its success. This paper describes the Ann Arbor Transportation System and the planning philosophy behind that system as it relates to TSM. /Author/

Hackley, T Guenther, KW (Ann Arbor Transportation Authority) *Transportation Research Board Special Report* No. 172, 1977, pp 91-94; From TRB Special Report No. 172, Transporta-

tion System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

32 179717 PARA TRANSIT IN THE DEVELOPING WORLD: NEGLECTED OPTIONS FOR MOBILITY AND EMPLOYMENT--VOLUMES I AND 2. This report is presented in two volumes. Volume I is intended to provide the reader with a basic understanding of the topic area and to report on the findings and principal recommendations of the assembled group of experts. It is divided into four main parts as follows: The background; para-transit in the developing world; proceedings; and proposed work program and project structure. Volume II brings together fifteen background documents and reports presenting a general statement and overview of the target area. Part I addresses some of the broader issues concerning the role of the automobile and public transport systems in the developing countries, and discusses some specific investigations and points of view concerning individual systems and technologies. Part II includes two papers giving the reader an understanding of some of the leading trends and issues in the OECD countries. It is noted that these countries have in the past been largely responsible for most of the transportation expertise and council that have in turn effected investment and policy decisions in the lesser developed countries (LDC).

Organization for Economic Cooperation and Devel July 1977, 311 pp, 5 Fig., 2 Tab., 5 App.

From First International Para Transit Workshop Abbaye de Royaumont, Asnieres-sur-Oise, France, June 30-July 2, 1977.

32 179847 THE KNOXVILLE TRANSPORTATION BROKERAGE PROJECT--VOLUME II: OPERATIONS AND MANAGEMENT. This report is a description of the operational development of the commuter transportation brokerage system that was in operation in Knoxville, Tennessee through 30 June 1977. When the Knoxville Commuter Pool (KCP) was established, the concept of a transportation broker came into effect with the intention that if it proved workable, it would become an arm of the proposed City Department of Transportation. The initial purpose of this research was to develop and operationalize a multi-modal public and private transportation service throughout the Knoxville metropolitan area. The instrument through which the project objectives would be obtained was the transportation broker who could coordinate all modes of transportation. The broker would not promote one mode of transportation over another, but would promote all modes in order that the broad objectives of the community would be met. Each individual commuter or group requesting service would be provided with a series of transportation alternatives that permitted the highest level of service at the lowest possible cost. These alternatives included vanpooling, which this study addresses extensively. KCP is now working under the City Department of Transportation, and its future

plans include a continued effort to find better ways to promote all forms of ridesharing. There was not time to realize the full potential of the brokerage concept by 30 June 1977. However, sufficient accomplishments were achieved to show that the brokerage concept has the potential of solving many of the transportation problems with which cities are now faced. /UMTA/

Beeson, JD Davis, FW, Jr Wegmann, FJ ; Tennessee University, Knoxville, (TC 77-023) Final Rpt. UMTA-TN-06-0006-77-2, Oct. 1977, 142 pp; Contract TN-06-0006; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-28248/AD

32 180418 A QUEUEING MODEL OF AIRPORT PASSENGER DEPARTURES BY TAXI: COMPETITION WITH A PUBLIC TRANSPORTATION MODE. A Poisson queue with random clearing of all customers is formulated for the purpose of studying the interaction between taxicabs and buses at an airport. The analytical model is validated by comparison with a detailed simulation model calibrated from actual airport data. The operating characteristics of this transportation system are studied. The mean daily and mean peak period expected waiting times and the probabilities of modal switching as a function of the number of taxis in service and bus frequencies are exhibited. Taxis are discovered to be a highly effective transport mode, substituting at the rate of one daily cab to one additional daily bus trip for equal mean peak period passenger wait.

Curry, GL (Texas A&M University) *Transportation Research* Vol. 12 No. 2, Apr. 1978, pp 115-120, 9 Ref.; ACKNOWLEDGMENT: EI, TRRL (IRRD 233928); ORDER FROM: ESL

32 180520 PARATRANSIT--THE IDEA MAY BE NIFTY, BUT . . . Contents: Paratransit overview; Role of taxis in urban transportation (Taxis in Minnesota, Insurance perspective, General public perspective, Taxi service, Taxis for the handicapped, Taxis for the elderly); Vanpooling and carpooling; Paratransit around the world--ideas and leads for U.S. transportation; Metropolitan and urban transportation; Rural and small urban transportation; Planning considerations and problems in the delivery of paratransit services; Program, policy, funding information and operating regulations.

Pickrel, LJ Rogers, WC ; Minnesota University, St Paul Special Rpt. 68-1978, May 1977, 202 pp Report based on a conference held in Minneapolis, Minnesota on May 18-20, 1977. Library of Congress Catalog Card no. 78-620654.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279429/5ST

32 180606 GUIDELINES FOR TRAVEL DEMAND ANALYSES OF PROGRAM MEASURES TO PROMOTE CARPOOLS, VANPOOLS, AND PUBLIC TRANSPORTATION. This manual provides worksheets and a set of simple procedures for analyzing the energy conservation potential of transportation-related measures being considered to increase carpooling, vanpooling, and transit. It is intended for use by states and metropolitan planning organizations to calculate their localized energy impacts from implementation of various transportation policies. (ERA citation 03:018381)

Cambridge Systematics, Incorporated, Department of Energy Nov. 1976, 112 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; FEA/B-77/331

32 180809 AIR QUALITY IMPACTS OF TRANSIT IMPROVEMENT, PREFERENTIAL LANE, AND CARPOOL/VANPOOL PROGRAMS. The report has been prepared in accordance with Section 108(f) of the Clean Air Act, as amended, August 1977. It is intended to assist urban areas in developing State Implementation Plans and integrating their transportation system management and air quality planning programs as required by FHWA, UMTA, and EPA. The report analyzes the air quality, travel, energy consumption, economic, and cost impacts of three types of transportation programs: priority treatment for high occupancy vehicles on freeways and arterials; areawide carpool and vanpool programs; and transit fare reductions and service improvements. Important factors (e.g., meteorological conditions, traffic volumes and speeds and changes in modal choice) likely to influence air quality and emissions for the above programs are also analyzed.

DiRenzo, JF Rubin, RB ; Peat, Marwick, Mitchell and Company, Engineering-Science, Incorporated, Environmental Protection Agency, Department of Transportation Final Rpt. EPA-400-2-78-002A, Mar. 1978, 125 pp; Prepared in cooperation with Engineering-Science, Inc., McLean, Va. Sponsored in part by Department of Transportation, Washington, D.C. See also PB-282.347.; Contract EPA-68-01-3912; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282346/6ST

32 180810 AIR QUALITY IMPACTS OF TRANSIT IMPROVEMENT, PREFERENTIAL LANE, AND CARPOOL PROGRAMS: AN ANNOTATED BIBLIOGRAPHY OF DEMONSTRATION AND ANALYTICAL EXPERIENCE. In accordance with the Clean Air Act Amendments of 1977, the Environmental Protection Agency is evaluating the use and cost-effectiveness of alternative short-range transit fare and service improvement strategies, carpool and vanpool strategies, and strategies involving the preferential treatment of high occupancy vehicles to improve air quality in urban areas. The evaluation of individual strategies and combinations of the above strategies includes their emission and air quality impacts and their related energy, noise, and economic impacts. A comprehensive literature review was also conducted, as part of this evaluation, to identify both observed and projected travel, emission, air quality, energy, noise, and economic impacts of the short-range low-cost strategies of interest.

DiRenzo, JF Rubin, RB ; Peat, Marwick, Mitchell and Company, Engineering-Science, Incorporated, Environmental Protection Agency, Department of Transportation Final Rpt. ERA-400-2-78-002B, Mar. 1978, 88 pp; Prepared in cooperation with Engineering-Science, Inc., McLean, Va. Sponsored in part by Department of Transportation, Washington, D.C. See also PB-282346.; Contract EPA-68-3912; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282347/4ST

32 180820 RIDE SHARING AND PARK AND RIDE: AN ASSESSMENT OF PAST EXPERIENCE AND PLANNING METHODS FOR THE FUTURE. VOLUME I. CAR POOL PLANNING MANUAL. The document is a planning package (guidelines, estimating procedures, examples and computer software) for the highway oriented para-transit modes of car pooling, van pooling, and park and ride. The package is designed to be a reference to the planner who, for example, must assess the regional or sub-regional potential of one of these modes for TSM planning, or who, at a later stage, must estimate the costs and benefits of implementing that mode or, still later, must target specific companies, stations or areas for actual implementation. The package contains four individual reports, a Service Area Identification Methodology computer program, and an Executive Summary. The reports are the following: The Car Pool Planning Manual; The Van Pool Planning Manual; The Park and Ride Planning Manual; The Service Area Identification Methodology Report (SAIM).

Sen, AK Johnson, C Kerchowskas, K ; Illinois University, Chicago, Department of Transportation Final Rpt. DOT-RSPA-DPB-50-78-9, Nov. 1977, 174 pp; See also Volume 2, PB-282409. Also available in set of 4 reports PC E11, PB-282407-SET.; Contract DOT-OS-60131; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282408/4ST

32 180821 RIDE SHARING AND PARK AND RIDE: AN ASSESSMENT OF PAST EXPERIENCE AND PLANNING METHODS FOR THE FUTURE. VOLUME II. THE VAN POOL PLANNING MANUAL. Contents: Service and operating characteristics; Socioeconomic characteristics of van poolers; Estimating the costs of van pooling; Estimating the benefits of a van pool program; Regulatory barriers to van pooling; Institutional incentives to van pooling; Implementing a company-sponsored van pool program; Van pool costs; Some tax considerations for van pooling; Selected state legislation regarding van pooling. (Portions of this document are not fully legible)

Johnson, C Sen, AK ; Illinois University, Chicago, Department of Transportation Final Rpt. DOT-RSPA-DPB50-78-10, Nov. 1977, 136 pp; See also Volume 1, PB-282408 and Volume 3, PB-282410. Also available in set of 4 reports PC E11, PB-282407-SET.; Contract DOT-OS-60131; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282409/2ST

32 180822 RIDE SHARING AND PARK AND RIDE: AN ASSESSMENT OF PAST EXPERIENCE AND PLANNING METHODS FOR THE FUTURE. VOLUME III. THE PARK AND RIDE PLANNING MANUAL. Contents: Service characteristics; User characteristics; Trip characteristics; Overview of park and ride planning; Demand for park and ride services; Costs; Benefits and impacts of park and ride; Establishing joint-use park and ride facilities; Designing the park and ride facility.

Kerchowskas, K Sen, AK ; Illinois University, Chicago, Department of Transportation Final Rpt. DOT-RSPA-DPB50-78-11, Nov. 1977, 73 pp; See also Volume 2, PB-282409 and Volume 4, PB-282411. Also available in set of 4 reports PC E11, PB-282407-SET.; Contract DOT-OS-60131; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-282410/OST

32 180823 RIDE SHARING AND PARK AND RIDE: AN ASSESSMENT OF PAST EXPERIENCE AND PLANNING METHODS FOR THE FUTURE. VOLUME IV. A SERVICE AREA IDENTIFICATION METHODOLOGY (SAIM). Contents: The general shape of service areas; Estimating parameter values; SAIM output; SAIM input; The searching algorithms; Adaptation of census journey-to-work data; Users guide to ride sharing SAIM on sample data set; Program listing.

Soot, S Yanos, G Johnson, C Thomas, E Sen, A Illinois University, Chicago, Department of Transportation Final Rpt. DOT-RSPA-DPB50-78-12, Nov. 1977, 100 pp; See also Volume 3, PB-282410. Also available in set of 4 reports PC E11, PB-282 407-SET.; Contract DOT-OS-60131; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282411/8ST

32 181398 EXEMPLARY PROGRAMS INVOLVING THE USE OF SCHOOL BUSES. The operation of safe pupil transportation programs is the subject of the present investigation. The objective of this project was to identify and describe in a report exemplary activities involving the use of school buses. This final report is the result of an in-depth field study of pupil transportation safety programs in twelve (12) jurisdictions. The report includes forty-three (43) detailed descriptions of exemplary activities involving the use of school buses. The exemplary nature of an activity is based on the criteria of safety/efficiency, innovation and replicability. Exemplary activities which enhance the character and quality of pupil transportation safety programs appear in ten categories: driver training, field trips, pupil instruction, special education, public relations, maintenance, record-keeping, community services, safety techniques and administration. This report is a resource for current information on pupil transportation safety programs and the innovative use of school buses, and will be useful to state and local administrators of pupil transportation departments across the country. As a resource, the report will encourage states and communities to improve in all areas attendant to the operation of a safe pupil transportation program.

Miller, JP ; Johnson (Lawrence) and Associates, Incorporated, National Highway Traffic Safety Administration Final Rpt. DOT-HS-803-383, Feb. 1978, 145 p.; Contract DOT-HS-7-01618; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283403/4ST

32 181952 RIDE SHARED VEHICLE PARATRANSIT SYSTEM. The project has been concerned with developing strategies to utilize the existing resources of the taxi industry and other paratransit service organizations. The major emphasis has been to develop the Ride Shared Vehicle Paratransit (RSVP) System, which provides hardware and software support for computer-based fare calculation and display within the existing institutional and regulatory framework of the taxi industry. The project has utilized Peoples Cab Company, an operating taxi company owned by the Center for Entrepreneurial Development, a non-profit corporation affiliated with Carnegie-Mellon University. Taxi service from the RSVP System is requested either

through a telephone call or street hail. The operator enters trip data via the RSVP Operations Console and initiates a routine which calculates the fare and the estimated trip time; the results are displayed on the Operations Console and communicated to the customer prior to the trip. If either exclusive ride or shared ride service is desired, the operator specifies which vehicle will provide the service and initiates transmission of trip data to the appropriate vehicle. The concept of computer-based point-to-point fare calculation and the discount rates based on such fare calculation for various classes of group ride services have been approved by the Pennsylvania Public Utility Commission.

Au, T Baumann, DMB ; Carnegie-Mellon University, Department of Transportation Final Rpt. DOT/TST-77/86, July 1977, 89 p.; Contract DOT-OS-40081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284167/4ST

32 181983 COME TOGETHER RIDESHARING PROGRAM OPTION SUMMARIES. The document provides technical summaries of the transportation options under consideration. These include (1) transportation facility improvements (e.g., exclusive lanes for high-occupancy vehicles; park and ride service; park-pool service), (2) non-facility transit service improvements (e.g., revised operation strategies, commuter bus service), (3) paratransit, (4) public sector information, legislative and administrative support, and (5) employer-incentive programs. These option summaries provide background material for identifying and evaluating strategies that encourage ridesharing.

Southern California Association of Governments, Urban Mass Transportation Administration, Federal Highway Administration, (UMTA-CA-09-0059) May 1978, 57 p.; Sponsored in part by Federal Highway Administration, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284550/1ST

32 182687 PUBLIC TRANSPORT PROBLEMS AND INITIATION OF SOLUTIONS. PLANNING AND REALISATION OF PUBLIC TRANSPORT SYSTEMS AS AN EXERCISE IN INTERDISCIPLINARY RESEARCH AND DEVELOPMENT [Der Nahverkehr--Probleme und Loesungsansatze. Planung und Realisation von Nahverkehrssystemen als Aufgabe Interdisziplinärer Forschung und Entwicklung]. In this handbook, 18 competent practical and academic men from areas of industry, economy, transport and development report on the planning and realisation of public transport systems as an exercise in interdisciplinary research and development, as seen from their own field of experience. The contributions deal with economic and town planning aspects as well as sociological demands of the local traffic systems. In particular new modes of transport such as cabin taxis, elevated railways, compact railways, dual-mode buses and buses directed by computer according to requirements, all of which are currently at the stage of industrial development and testing, are dealt with in respect of their goals and their state of technical development. The handbook gives, in brief, a very good general view of the present development tendencies in public transport, whereby the questions of the reliability of traffic systems and the demand for them must remain open. /TRRL/ [German]

Dettmering, H (Krupp (Fried.) Gmbh, West Germany) ; Verlag W. Givardet, (3773601581) No. 28, 1976, 211 pp, Figs., Tabs., Photos., 91 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 306842), Federal Institute of Road Research, West Germany

32 183107 HUMAN SERVICE AGENCIES PROVIDING TRANSPORTATION IN THE CAPITAL DISTRICT. Human service agencies in the four New York Counties in the Capital District were surveyed to determine which of these agencies provided transportation for the persons they serve. This directory is a result of that survey. It lists agencies that provide transportation and gives names, address, contact person, present transportation activity, eligibility requirements and transit resources. /GMRL/

New York State Department of Transportation, New York State Department of Mental Hygiene Oct. 1974, 68 pp; ACKNOWLEDGMENT:

32 183116 METHOD FOR ESTIMATING PATRONAGE OF DEMAND RESPONSIVE TRANSPORTATION SYSTEMS. This study has developed a method for estimating patronage of demand responsive transportation (DRT) systems. This procedure requires as inputs a description of the intended service area, current work trip patterns, characteristics of the served population, and the major design choices, such as the vehicle fleet size, changes in fleet size over the day, types of vehicles being used (buses or taxis), and the fare level. Using these data, the model predicts patronage and service levels for each user-specified interval during the day. The modern system has been developed as a software package which includes a set of disaggregate demand models, a set of analytic supply models, and an equilibration procedure. In addition, a simple sketch planning procedure has been developed which can be used for quick, preliminary analysis of DRT sites. /GMRL/

Lerman, SR Flusberg, M Wilson, NHM Pecknold, WM Nestle, RE ; Cambridge Systematics, Incorporated, Multisystems, Incorporated Final Rpt. DOT-TST-77-77, Dec. 1977, 290 pp; Prepared for the Department of Transportation, Transportation Systems Center.; Contract DOT-TSC-977; ACKNOWLEDGMENT:

32 183120 PARK-AND-RIDE PLAN FOR TEXAS URBAN MASS TRANSPORTATION SYSTEMS IS BEING STUDIED. Park-and-ride represents a means of providing mass transportation that has demonstrated its applicability to major Texas cities. It is an approach that increases the person movement capability of existing streets and highways. Park-and-ride systems utilize both the private auto and the transit bus; the auto serves as the collection-distribution vehicle while the bus provides the line-haul transit service. /GMRL/

Texas Transportation Researcher Vol. 12 No. 1, Jan. 1976, pp 7-8ACKNOWLEDGMENT:

32 183429 POSSIBILITIES FOR DEMAND RESPONSIVE BUS OPERATION IN OUTER SUBURBS. This paper outlines as background the problems of bus operation in outer-eastern suburbs of Melbourne, and includes data on factors which contribute to these problems. It covers the setting-up and operation of an

experimental demand-responsive bus service introduced, with financial assistance from the Victorian Transport Ministry, to meet these problems. Data collected on the operation up to the end of March, 1978 is included. Comment is made on the difference between costs and revenue, and how the operation may be developed to possibly reduce costs and increase patronage. /Author/TRRL/

Usher, J (Invicta United Bus Services); Director General of Transport, Western Australia, (0313-6655) 1978, pp 161-178, 6 Tab., 6 Ref.; Australian Transport Research Forum. Fourth Annual Meeting, May 24-26, 1978, Perth, Forum Papers.; ACKNOWLEDGMENT: TRRL (IRRD-234192), Australian Road Research Board

32 183434 REPORT ON CAR POOLING RESEARCH PROJECT FOR SYDNEY, STAGE 1. Stage 1 of the study involved a comprehensive literature search and attitude surveys of employees and employers in different areas of Sydney. The attitude surveys showed that 11% of commuters currently car pool; between 60% and 70% of commuters might join car pools given certain incentives to do so; the incentive which attracted most people was a direct cost saving. The employers surveyed were generally indifferent to the role that they could play in a car pooling programme, suggesting that the support role should be taken by a lead agency or matching bureau to promote the programme, solicit applications and match applicants into car pools and monitor results of the programme. The anticipated cost of a matching bureau directed programme could be offset by only the savings measured in terms of a reduction in vehicle miles travelled. It was calculated that to break even on this basis it would be necessary to attract only 0.7% of the Sydney Workforce into car pools. The conclusion from the stage 1 benefit-cost analysis was that car-pooling would be an economically justifiable para-transit technique. The appendices, bound separately, contain the bibliography, and tabulations of and commentary on the survey results. /TRRL/

New South Wales Dept of Motor Transport, Australia, Development Planning and Research Proprietary Ltd, Eugene Smith and Hone Proprietary Ltd Monograph Apr. 1976, n.p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD-234204), Australian Road Research Board

32 183435 REPORT ON CAR POOLING RESEARCH PROJECT STAGE 2. Stage 2 of the study was a car pooling experiment, known as "Share-a-Car", conducted in the Ryde (Suburb of Sydney, N.S.W.) corridor involving both residents (area programme) and workforce (employer programme). Promotional material and application forms were distributed and a matching bureau was formed. Results showed that: 354 applications were received, of which 68% were from the area programme and the remainder from the employer programme; 71% of all applicants lived in the study area, representing less than 0.4% of the estimated workforce; only 50 applicants were matched (30 from the employer programme); only 10 applicants formed 5 car pools, (all of these from the employer programme); the restriction of freedom was seen as the main disadvantage of the car pooling. The appendices, bound separately, contain additional references to those listed in the stage 1 report, details of the promotional efforts, operations

manual, financial analysis and detailed tabulations of data collected during the experiment. /TRRL/

New South Wales Dept of Motor Transport, Australia, Development Planning and Research Proprietary Ltd, Eugene Smith and Hone Proprietary Ltd Monograph Feb. 1977, n.p., Figs., Tabs., 82 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234205), Australian Road Research Board

32 183463 MULTIPLE HIRE ALTERNATIVES FOR AUSTRALIAN TAXI CABS. Multiple hire, as opposed to single hire of taxi cabs is a concept often propounded by the community as desirable, yet seldom acknowledged by the taxi industry as practicable. Multiple hire is frequently claimed to have the following potential impacts: 1) an easing of existing under-supply of taxi-cab services, where and when this occurs; 2) a decrease in the cost of travel by taxi-cab thereby both improving the potential to satisfy latent demand and reducing the cost to those currently using taxi-cab transport; 3) an increase in vehicle occupancy, with consequent benefits of reduced congestion, increased efficiency and so on. This paper reports an investigation of the general desirability of introducing multiple hire of taxi-cabs to Australian cities. /Author/TRRL/

MacLean, S Segal, L (Clark (Nicholas) and Associates); Director General of Transport, Western Australia, (0313-6655) 1978, pp 399-429, 4 Ref.; Australian Transport Research Forum. Forum Papers. Fourth Annual Meeting 24-26 MAY 1978, Perth, Australia.; ACKNOWLEDGMENT: TRRL (IRRD 234180), Australian Road Research Board

32 183474 PUBLIC RESPONSIBILITY FOR THE PRIVATE SECTOR OF TRANSPORT. A plea is made for better rationalisation of transportation resources. The role of the taxi cab in modern urban society is examined and suggestions made for increased public responsibility in relation to the industry. /Author/TRRL/

Rochfort, P (New South Wales Taxi Council); Director General of Transport, Western Australia, (0313-6655) 1978, pp 139-159; Australian Transport Research Forum Fourth Annual Meeting, May 24-26 1978, Perth. Forum Papers.; ACKNOWLEDGMENT: TRRL (IRRD 234195), Australian Road Research Board

32 183502 SMALL SCALE URBAN PUBLIC TRANSPORT: LESSONS FROM THE INDONESIAN EXPERIENCE? Small scale motorised vehicles carrying seven to eleven passengers constitute the backbone of public transport in most larger Indonesian cities. This paper describes the technology of the bemo, the organisation under which it operates, and its role in the public transport systems of East Javanese cities of Malang and Surabaya. The impact of the recent introduction of city buses to Surabaya is discussed. In the light of Indonesian experience, suggestions are made for some simple innovations in Australian public transport systems, in particular for the introduction of unscheduled shared taxis on semi-fixed routes. /Author/TRRL/

Dick, HW (Newcastle upon Tyne University, England); Director General of Transport, Western Australia, (0313-6655) DA-0678R, 1978,

112 p.; Australia Transport Research Forum, Fourth Annual Meeting, May 24-26, 1978, Perth, Forum Papers.; Contract MA-7-38026; ACKNOWLEDGMENT: TRRL (IRRD-234193), Australian Road Research Board; ORDER FROM: PB-283474/5ST

32 183699 COMMUNITY BROKERAGE OF TRANSPORTATION SERVICES FOR THE ELDERLY IN MOUNTAIN VIEW, CALIFORNIA. This document reports on a unique way of providing transportation and transportation-related services (e.g., information and scheduling) to elderly and handicapped individuals in a small geographic area. In the Mountain View Community Broker project, a community broker furnished his clients with individualized primary service information and scheduling assistance. He also drove these clients to their destinations in a 12-passenger van. The project was intended to demonstrate the economic and operational feasibility of combining these functions in one role. The report describes the community broker concept and project operations; assesses the economic feasibility of the idea; discusses the project's impact on the target group; and provides some commentary on ways a community-broker type of project could be integrated into the existing network of social services for the handicapped and elderly. /Author/

Cooper, T; Crain and Associates, (DOT-TSC-UMTA-78-20) Final Rpt. UMTA-CA06-0002-78-1, Feb. 1978, 110 pp, 13 Fig., 26 Tab., 2 App.; Sponsored by DOT, Urban Mass Transportation Administration under contract to DOT, Transportation Systems Center.; Contract DOT-TSC-1081; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-285234/1ST

32 184050 SPECIAL TRANSPORT [Special transports (.11)]. Details are given of four special forms of public transport: (1) dial-a-bus in Saint-Cloud; (2) demand-responsive system operating with minibuses in the Paris region (Conflans-Sainte-Honorine, Andresy, Maurecourt); (3) non-guided dual-mode bus in Esslingen, Germany; (4) three electric buses in new towns. /TRRL/ [French]

Nicolas, P Servant, L Fradin, JR Jacob, C *Cahiers LAURIF* Vol. 43 Oct. 1976, 16 p., Figs., Tabs., Photos.; IAURIF: Institut d'Aménagement et d'Urbanisme de la Région d'Île de France.; ACKNOWLEDGMENT: TRRL (IRRD-105214), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

32 184192 TAXICAB FEEDER SERVICE TO BUS TRANSIT. The use of taxicabs as feeders to fixed-route transit is discussed. Reasons for involving privately operated taxicabs as feeders to publicly subsidized systems are presented and three existing systems are described to illustrate some of the benefits and problems associated with this innovative type of operation. The major questions about feeder service pertaining to economics, quality of service, and demand are reviewed, and the institutional issues that may inhibit using taxicabs as feeders are discussed. A proposal is outlined for an experimental demonstration for a large urban area. /Author/

Miller, GK (Urban Institute) *Transportation Research Record* No. 650, 1977, pp 1-7, 2 Fig., 5 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.;

ORDER FROM: TRB Publications Off

32 184195 METHODOLOGY FOR THE ANALYSIS OF LOCAL PARATRANSIT OPTIONS. A system of models has been developed that is capable of predicting the performance characteristics of transit service for the purpose of analyzing a wide range of local transit-service alternatives. Patronage and demand forecasting issues are treated parametrically. Local transit is designed to serve access and egress trips bound to and from a regionally oriented line-haul transit system as well as shorter local circulation trips. The model system presented is capable of treating a wide range of modes that can offer such local transit service. In addition to conventional transit and jitney services, which follow fixed routes, point-deviation and checkpoint route-deviation transit can be investigated. More flexible modes, such as checkpoint subscription bus, doorstep subscription bus, and doorstep many-to-many dynamically routed transit (dial-a-ride), can also be examined. Comparisons can be made both between alternatives and between operating policies (such as vehicle size and route spacing) within any single alternative. The model system has been designed to predict four important consequences of implementing local transit service: user level of service, operator cost, pollutant emissions, and energy (fuel) consumption. Results from a sample model application are presented. Use of the system would allow a wide range of alternatives to be tested before significant demonstration and experimentation efforts or implementation funds are committed. Such tests can be integrated with corridor and regional analyses on both policy and planning levels of detail. /Author/

Englischer, LS Sobel, KL (Multisystems, Incorporated) *Transportation Research Record* No. 650, 1977, pp 18-24, 10 Fig., 9 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184196 SATELLITE-CITY DEVELOPMENT THROUGH IMPROVED PASSENGER TRANSPORTATION SERVICE. The lack of adequate transportation services has been a major impediment to the development and growth of satellite communities outside of major metropolitan areas. This paper presents an approach for selecting and organizing transportation services for commuting trips between satellite communities and metropolitan areas. The services of interest are designed as "commuter clubs" in which most of the administrative functions are performed by volunteers. This approach allows inexpensive services to be offered when travel demand is low and supports gradual development of services for a small start. An analytical technique that makes use of the commuter-club approach is presented for formulating, describing evaluating, and comparing alternative transportation services. Analytical results suggest that van-pooling and subscription bus services are attractive for a wide range of satellite cities. Other services—car pooling, commuter rail, and air—can be attractive in special situations. All require a coordinating function for providing advice, support, and help with problems. This function can best be performed within the satellite-city government. /Author/

Bers, EL (Sverdrup and Parcel and Associates, Incorporated) Jones, PS (Georgia Institute of

Technology) *Transportation Research Record* No. 650, 1977, pp 25-30, 3 Fig., 2 Tab., 8 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184197 PLANNING PROCESS FOR THE DESIGN OF INTEGRATED FIXED-AND FLEXIBLE-ROUTE BUS SERVICE IN ROCHESTER. Demand-responsive transportation is an accepted form of transportation in small and medium-size cities. However, as these types of systems are introduced into larger urban areas that already have fixed-route services, the systems and the preceding planning process necessarily become more complex. This paper describes the planning process that was used in the design of an integrated fixed-and flexible-route system in one suburb of Rochester, New York. The system is one component of a federal demonstration project designed to evaluate the feasibility of such systems in major metropolitan areas. A description is given of the planning approach taken and the methodologies and analyses used. The use of a simulation model to determine the extent of the dial-a-bus service area in the suburban and a logit model to predict the expected demand for such service is described. In addition, the methodology developed for the system integration design, i.e., the combination and coordination of existing bus service with flexible-route services, is explained. Provision of opportunities for public involvement during the planning process is also described. /Author/

Meyer, M (Massachusetts Institute of Technology) *Transportation Research Record* No. 650, 1977, pp 31-36, 4 Fig., 9 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184198 FINDINGS OF A STUDY TO ESTIMATE THE EFFECTIVENESS OF PROPOSED CAR-POOL-INCENTIVE POLICIES. This paper summarizes the findings of a car-pooling impact study conducted for the Federal Energy Administration. The aim of the study was to estimate the impacts of various proposed car-pool-incentive policies on work travel. A market research methodology was adapted to estimate modal-split impacts under various policy conditions and corresponding estimates of vehicle kilometers of travel and fuel consumption. A trade-off model was used to simulate modal behavior under 14 representative car-pool-incentive policies and nine travel-time sensitivity tests. Paired-comparison responses on work-trip preference collected by a specially designed survey were the primary input to the trade-off model. The study produced two major sets of results: (a) tabulations and cross tabulations of the survey data and (b) estimates of the impact on modal split, vehicle kilometers of travel, and fuel consumption from policy simulations of the trade-off model. Gasoline rationing was found to be the most effective policy for reducing vehicle kilometers of travel and fuel consumption. Substantial surcharges on gasoline sales and parking in the central business district or in facilities of major employers were moderately effective. Purely incentive policies such as tax rebates to car-pool members and car-pool matching programs were not very effective. If

practical policies for achieving significant discriminatory travel-time advantages for high-occupancy vehicles could be implemented, they would be moderately effective. /Author/

Bruggeman, JM Rubin, RB (Peat, Marwick, Mitchell and Company) Griffiths, F (Market Facts, Incorporated) *Transportation Research Record* No. 650, 1977, pp 36-43, 7 Fig., 5 Tab., 2 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184199 TRANSPORTATION EFFICIENCY AND THE FEASIBILITY OF DYNAMIC RIDE SHARING. This paper defines the theoretical limits imposed on rider sharing by the spatial and temporal structure of urban travel demand. Differences in market potential between prearranged ride sharing as it is used in car pooling and dynamic ride sharing as it is used in, for example, shared taxis are given. The paper presents the results of the simulation of a hypothetical shared-ride transit system that used various operational policies of dynamic ride sharing and identifies the improvements in transportation efficiency and the economic and technological savings that result from ride sharing. Data on the dynamic ride-sharing taxi system operating at Union Station in Washington, D.C. establish the feasibility of implementing dynamic ride sharing. /Author/

Kornhauser, AL Mottola, P Stephenson, B (Princeton University) *Transportation Research Record* No. 650, 1977, pp 43-48, 10 Fig., 1 Tab., 4 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184200 CAR-POOLING PROGRAMS: SOLUTION TO A PROBLEM? Information from 26 car-pool programs is reported that suggests that appeals to self-interest made through work organizations are more effective than other means of encouraging car pooling because employees of work organizations from a known population with a common destination and, typically, a similar work schedule. It is proposed that such appeals should focus on the benefits of car pooling for the individual rather than on general values such as patriotism. Interviews of selected long-term car-pool participants (2 or more years) indicated that work organizations provide a setting in which personal information about potential participants can be obtained and that this information facilitates the formation of car pools. These interviews further suggested that the intimacy of the private automobile may limit the size of car pools as well as the willingness of some individuals to participate in them. Ride-sharing programs that present alternative transportation modes may be more effective than car-pool matching programs in changing current patterns of work travel. /Author/

Kurth, SB Hood, TC (Tennessee University, Knoxville) *Transportation Research Record* No. 650, 1977, pp 48-52, 1 Tab., 18 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184203 INTEGRATING TRANSIT AND PARATRANSIT (ABRIDGMENT). The major impacts of expanded paratransit services appear to be: improved mobility for people permanently

or temporarily without access to private automobiles or high quality transit service (e.g., elderly or handicapped); reduced total cost of transportation for commuters, taxi users, and other individuals; and reduced congestion or parking requirements at individual employment or activity centers. However, paratransit can be fairly expensive (over \$3 per ride in some cases), especially in low density areas. Fortunately, there are several possible approaches to controlling costs and subsidies. Among these are limiting the coverage and roadways of local fixed-route service, limiting those eligible to use demand-responsive service, providing service on limited days, requiring reservations and using taxis. Others include use instead of service subsidies and marginal-cost fare policies to limit the subsidy without restricting the system to selected users. Shared-ride services can increase productivity of taxi services by 50 to 1000 percent. However, the much greater complexity of shared-ride operations (particularly scheduling which would require use of computers and digital communication equipment) seems to be rather intimidating to taxi operations and there is a reluctance to change to such a system on their part. The most promising opportunities for the near future appear to be: expanding services to the elderly and handicapped and coordinate social service transportation; the use of subscription commuter service; expanding operations through side sharing, formalizing vanpooling, and the use of feeders to line-haul transit.

Ziegler, E (Urban Mass Transportation Administration) *Transportation Research Record* No. 650, 1977, pp 66-69, 1 Tab.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

32 184584 MODELING DEMAND-RESPONSIVE FEEDER SYSTEMS IN THE UTPS FRAMEWORK. For the transit planner considering alternative future transit designs, there has been little in the way of analytical tools available to assess the impact of demand-responsive transportation (DRT) systems. The intent of this report is to provide the Urban Transportation Planning System (UTPS) user with a methodology for incorporating DRT feeder systems in transit network analysis. The focus is on the use of DRT systems to provide feeder services to fixed transit routes in low density areas. A methodology for considering such services within the framework of UTPS modeling is presented herein. A set of previously developed DRT supply models, representing many-to-many service, many-to-one cycled service, and many-to-one subscription service have been refined for the purposes of this report. These services are discussed and general guidelines for designing feeder services offered. The models themselves are described in detail (Appendix A), and program listings provided (Appendix C). In addition, a series of nomographs (Appendix B) based on model results have been developed to enable the analyst to predict the service levels of DRT feeder systems under a range of conditions. Examples of the use of these nomographs, and the overall approach to modeling DRT feeder systems within UTPS, are also included in Appendix B. This report also provides a bibliography and a glossary of terms. /UMTA/

Menhard, HR Flusberg, M Englisser, LS ;

Multisystems, Incorporated, (MA-06-0049) Final Rpt. UMTA-MA-06-0049-78-9, DOT-TSC-UMTA-78-23, July 1978, 168 p.; Contract DOT-TSC-977; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-285763/9ST

32 184697 COMPUTER-ANIMATED SIMULATION OF TAXI-DISPATCHING STRATEGIES. A conversational, animated modeling environment implemented on a minicomputer is used to build and experiment with models of taxi-dispatching systems and strategies. The implications of each strategy are portrayed by the production and playback of an animated movie that depicts the simulated system as if it were real. The modeler can observe the system, modify the strategy, and immediately see the effects of the change. Use of the technique to assist in verifying the correctness of the simulation program, to enhance human intuition and aid strategy formulation and testing, and to facilitate technical communication about the model is described. /Author/

Hauer, E Baecker, RM Bunt, PD (Toronto University, Canada) *Transportation Research Record* No. 657, 1977, pp 14-20, 6 Fig., 3 Tab., 4 Ref.; This paper appeared in *Transportation Research Record* No. 657, Applications of Interactive Graphics.; ORDER FROM: TRB Publications Off

32 184928 STATE-OF-THE-ART DEMAND-RESPONSIVE SYSTEMS FOR THE TRANSPORTATION HANDICAPPED. This paper describes some relevant data gathered from a recent survey of six state-of-the-art demand-responsive systems for the transportation handicapped. Data described include trip rates, registration rates, productivities, user characteristics, and costs. Based on the data, conclusions are drawn which might be of help to planners designing similar types of systems. Conclusions are reached about balancing supply and demand, about how to increase productivities and about how to reduce costs. /Author/

Teixeira, D (Applied Resource Integration Limited) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministere d'Equipment (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

32 184929 DEVELOPMENT OF AN AGENT/BROKER COORDINATED PARATRANSIT SERVICE FOR ELDERLY AND HANDICAPPED PERSONS IN ALLEGHENY COUNTY, PENNSYLVANIA. The Port Authority of Allegheny County, in cooperation with the Southwestern Pennsylvania Regional Planning Commission and Carnegie-Mellon University, is implementing a coordinated paratransit system to serve elderly and handicapped persons in Allegheny County, Pennsylvania using the agent/broker concept. This paper describes the project design that is being used to implement the concept in this major

urban county which includes the City of Pittsburgh. This discussion outlines the project objectives and work program and details two of the most important aspects of the project: the use of scrip for trip payment and the envisioned marketing and consumer relations activities. /Author/

Millar, WW, Special Assistant to the Executive Director (Port Authority of Allegheny County) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministere d'Equipment (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

32 184934 COORDINATIONAL TRANSPORTATION FOR HUMAN SERVICE AGENCY CLIENTS. Because elderly, handicapped and other transportation disadvantaged persons have not had their travel needs met by the conventional transit operator, diverse transportation operations have been initiated by human service agencies throughout the United States. These systems have developed in a policy vacuum and are fragmented, overlapping and uncoordinated. Large public expenditures on these special transit services have caused decision makers to look to coordination as a way of providing more efficient agency client transportation service. This paper traces the development of these systems and the coordination problems they have encountered. One solution to the coordination problem is to contract with a conventional transit operator for special services; another solution is to establish a separate social service transportation agency to provide this service. The arguments for and against each of these organizational options are presented. Finally, the local decision making process is discussed. Factors which influence agencies to provide direct transport services or contract with an outside organization are reviewed. /Author/

Saltzman, A, Director of the Transportation Institute (North Carolina Agricultural and Technical State U) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministere d'Equipment (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

32 185861 VANPOOLING: AN OVERVIEW. The report is intended to provide information on vanpooling as it exists in the United States. It is not a comprehensive treatise, rather the report emphasizes key features of vanpooling, with special attention being paid to implementation of vanpool programs and legal and insurance issues pertaining to vanpooling. Organizations in industry and government who are considering implementing or expanding vanpool programs will find the report useful. Topics covered are vanpool program designs, vanpooling experience, insur-

ance and legal issues, vanpooling costs, benefits, and the National Association of Vanpool Operators.

Kircher, D Wapensky, L ; Environmental Protection Agency Final Rpt. EPA/908/1-78/001, Mar. 1978, 62 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283275/6ST

32 185863 AN OVERVIEW OF RIDESHARING AND MASS TRANSIT EMPLOYER INCENTIVES. The report reviews the incentives currently being used by public and private sector employers to encourage employee use of ridesharing and mass transit as an alternative to the single occupant vehicle and identifies a few successful incentive programs. The legal and institutional aspects of employer sponsored incentive programs are discussed in some detail. Existing carpool matching systems and costs are briefly discussed.

Tucker, JWJ ; Environmental Protection Agency Final Rpt. EPA/908/1-78/002, Mar. 1978, 58 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283277/2ST

32 185996 SHARED RIDE SERVICES: A MAJOR OPPORTUNITY, AND AN ALTERNATIVE WAY FOR PEOPLE TO GET TO WORK. Public policy in the Twin Cities area is moving toward a conclusion that solution to transportation problems will require high-service, low-capital, cost-effective systems. Development of additional ways for people to get to work is, with the energy shortage, a matter of urgency in the area. The shared ride in small vehicles, or 'para-transit', has emerged as an attractive alternative to driving alone. The focus in developing alternatives to the automobile must be to determine which system-car or van pool, taxi, bus or other mass transit-is cost competitive with the automobile and best serves work trips going to specific locations. Small vehicle, door-to-door systems complement the system of large buses in serving the downtown area and could be additionally attractive for up to 40% of the estimated 830,000 daily work trips. The savings and benefits from a major effort at shared ride systems could be substantial for the employee, employer, and for the public. These low cost shared ride systems are available, but steps must be taken to resolve certain issues and make them more widely available.

Shallbetter, C Herzberg, GG ; Public Service Options, National Science Foundation NSF-RA/G-75-078, July 1975, 74 p.; Grant NSF-DI-42621; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284780/4ST

32 186190 TAXICAB OPERATING CHARACTERISTICS. The report presents the combined results of two mail questionnaire surveys of the taxicab industry conducted in 1974 and 1976. The focus is on taxicab operating characteristics such as types of operations, vehicles, and services provided; industry structure; passenger operations; utilization of employees and vehicles; cost and revenue relationships; and fare structure.

Control Data Corporation, Wells Research Company, Department of Transportation Final Rpt. DOT/TPI/10-77/22, Mar. 1977, 110 p.; Prepared in cooperation with Wells Research Co., Silver Spring, MD.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287295/0ST

32 188048 CARPOOLING: TWO SURVEYS INVESTIGATING FOUNDATIONS FOR ITS APPLICATION. Questionnaires and results relating to two surveys dealing with the potential application of carpooling are presented. The first survey was concerned with the potential interest in carpooling among employees at a major factory in Leicester. The results indicate that carpooling potential with respect to a major work site would be approximately double that obtained for access to city centre zones (17% for this study as opposed to 7-8% for the analysis of the Sheffield-Rotherham land use transportation study). In practice, rates of carpool usage substantially below the potential figures would be expected, assuming no untoward external factors which prompt a sudden upsurge in interest. The second survey dealing with the attitudes of bus operators to defined policies encouraging carpooling led to the perhaps not surprising conclusion that the operators approached did not apparently favour any policy promoting carpooling. They are clearly more in favour of other approaches towards traffic restraint. The present survey was concerned solely with general policies. If bus operators can see that a scheme for carpooling will have advantages of a positive nature for bus operations (e.g. allowing an extension of bus lanes) they may be prepared to show a little acquiescence. Certainly, bus operators appeared aware of the potential use of data collected for carpool matching as a means of monitoring the suitability of public transport services in relation to the potential market of users. /TRRL/

Tomlinson, RW Kellet, JS ; Loughborough University of Technology, England, (0140-9751) Monograph Report TT 7804, July 1978, 68 p., Tabs., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 234506)

32 188978 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT. UMTA PROJECT EVALUATION SERIES, PHASE II (REPORTS II-1 TO II-4). The UMTA Project Evaluation Series evaluates a three and a half year demonstration project in Miami, Florida, established in 1973 to develop more efficient people-moving capabilities in the I-95/NW 7th Avenue corridor. The basic transit concept of this Project was to provide fast, line haul service with express buses operating between a major residential area (market area) and four specific areas of employment concentration (service areas). Phase I of this project involved the implementation and evaluation of a reserved bus carpool lane in each direction of Interstate 95 (I-95). Express bus operations on the new priority lanes on I-95 in March 1976 constitute Phase II of this project. Phase II is presented in four separate reports: Report II-1 "Evaluation of the I-95 Express Bus and High Occupancy Vehicle Priority Systems," Report II-2 "Evaluation of the Effects of the I-95 Exclusive Bus/Car Pool Lane Priority System on Vehicular and Passenger Movements," Report II-3 "Evaluation of the Effects of the I-95 Bus/Car Pool System." This report, Report II-1, presents a summary of the evaluation of Phase II of the project, and it consists of the evaluation of the effect of the exclusive bus/car pool lanes on the I-95, Golden Glades Park'nRide facility, and a direct flyover connector between the facility and the reserved lanes on I-95. /UMTA/

Wattleworth, JA ; Florida University, Gainesville, (FL-06-0006) Final Rpt. UMTA-FL-06-0006-78, Sept. 1978, 511 p.; Sponsored by the Urban Mass Transportation Administration. Phase II includes four reports numbered consecutively UMTA-FL-06-0006-78-10 thru UMTA-FL-06-0006-78-13, and may be ordered through NTIS as PB-291146 thru PB-291149 respectively.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-291145-149

32 189228 EVALUATION OF TAXI SYSTEMS BY THE USE OF SIMULATION [Utvärdering av olika taxisystemens prestanda genom simulering]. The purpose of this project was to establish, through computer simulation, the savings that can be made by introducing sharing of taxis. The simulated taxi systems act in a city during peak hours. Two systems with the same type of computer allocated trips were simulated, one system with shared taxi and another without. To examine the accuracy needed in the vehicle locator, some different degrees of accuracy have been simulated. An attempt to simulate the present taxi system was also made. The simulations have shown that a system with organized shared riding manages to serve a given amount of customers with a considerably lower number of vehicles than the corresponding system without shared riding. To serve the simulated amount of customers (about 1400 trips per hour) the systems used the following number of vehicles: shared taxi-320, un-shared taxi-410, present system-500. In addition, the vehicles in the system with shared taxi will drive a shorter total distance. This will mean a decreased fuel consumption. The following driving times for the vehicles were obtained (in hours per 1000 trips): shared taxi-223, un-shared taxi-253 and present system-300. Vehicle localization accuracy ranged from 0 to plus or minus 500 M. The effect of different inaccuracies was hardly noticeable compared with precise localization. /TRRL/ [Swedish]

Andersson, H Almen, KG Otteblad, A ; Chalmers University of Technology, Sweden Monograph Report R77-01, Apr. 1977, 45 p., Figs., Tabs., 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 235959), National Swedish Road & Traffic Research Institute

32 189348 THE MINNEAPOLIS RIDESHARING COMMUTER SERVICE DEMONSTRATION--EVALUATION PLAN. In April 1977, the Metropolitan Transit Commission initiated a two-year ridesharing brokerage demonstration project designed to increase work trip-vehicle occupancy at three employment sites located outside the Minneapolis/St. Paul Central Business District: South Central Minneapolis, Pentagon Park/Normandale, and Central Bloomington. The key elements which differentiate this ridesharing demonstration from previous efforts are the use of a regional transit agency to serve as a broker in marketing, coordinating, and monitoring the program; the promotion of a wide range of ridesharing services; and the choice of multi-employer sites. The program is marketed under the name "Commuter Services" and provides carpooling, vanpooling, subscriptions and regular bus services to commuters to and from the employment sites. The marketing strategy is to make personal calls to the largest employers and to use an audiovisual presentation for smaller

employers and business groups. The major objectives of this project is to provide a detailed, chronological process description of brokerage service and a statistically sound assessment of the results of the demonstration project. Issue areas to be analyzed include level-of-service changes; demand shifts; and the costs, productivities, and economics of the ridesharing modes promoted. While all of the demonstration elements cited in the study should serve to stimulate ridesharing activity, they should be viewed against several off-setting factors that are discussed in the report, and which may discourage significant increases in work trip-vehicle occupancy. However, overall, the study should serve as a reference guide to interested agencies, indicating the type and range of issues they may confront. This report contains a "Listing of References" and a "Report of New Technology". /UMTA/

Sherman, L ; Cambridge Systematics, Incorporated, (DOT-TSC-UMTA-78-12) Final Rpt. UMTA-MN-06-0008-78-1, May 1978, 139 p.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract DOT-TSC-1405.2; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-289798/AS

32 189414 TAXIS: A PUBLIC TRANSPORT MODE OF INCREASING IMPORTANCE [Les taxis: un mode de transport public de plus en plus important]. In the course of recent years, the bus has suffered a certain decline compared to the taxi. The author studies the new services supplied by taxis, such as those in London, New York, Hong Kong. Certain taxi operating companies have succeeded in outwitting the regulations governing taxis, to offer new types of services. Thus, taxi pirates have made their appearance. Transport on demand or 'dial-a-ride' system, such as the 'busphone', although little used in Europe, has spread in the United States, but the system appears to be a costly one. The shared taxi, a controversial system, which is well established in the cities of Central America and the middle east, is generally forbidden in Europe and the USA. Taxis play an increasingly large role in urban transport but one important problem remains: that of the regulation of the number of taxis. /TRRL/ [French]

Bendixson, T *Transport Environment Circulation* No. 20, Jan. 1977, pp 18-23, 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105306), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

32 189533 CAR POOLING: ITS POSSIBLE ROLE AND LIMITATIONS. Car pooling is one mechanism by which many of the problems of modern traffic might be reduced, but its application poses many problems. This report discusses these difficulties under the following headings:- (1) the psychology of car use and attitudes towards it, (2) incentives that might be incorporated to make carpooling attractive, and (3) the legal restraints that restrict the adoption of car pooling and the changes necessary. In addition, car pooling is compared to other methods of traffic restraint. A comparative study of the effects of traffic restraint on fuel consumption is made in an appendix. /TRRL/

Tomlinson, RW Kellett, JS ; Loughborough University of Technology, England, (0140-9751) Monograph TT7801, Mar. 1978, 71 p., 4 Fig., 3 Tab., 41 Ref.; ACKNOWLEDGMENT: TRRL

(IRRD 233625)

32 189821 DEMAND RESPONSIVE TRANSPORTATION AND THE TRANSPORTATION DISADVANTAGED: A MARKETING CASE STUDY FOR FREEPORT, NEW YORK. This report examines both the needs and the existing transportation opportunities of the transportation disadvantaged in a suburban community where these individuals constitute a significant part of the population. The travel patterns of individual segments including school transportation (including parochial and private) handicapped students, housing authority residents, co-op social service activities center, the elderly, medicaid, and welfare transportation) are examined. The capabilities of the Dial-a-Ride in meeting the needs of the above groups are assessed. The report also presents an analysis which is used to indicate geographically, which sections of the Freeport area should have the greatest propensity to use Dial-a-Ride. The economic aspects of demand-responsive-transportation in Freeport are also analyzed.

Yedlin, MB Falcocchio, JC ; Polytechnic Institute of New York Final Rpt. Nov. 1978, 65 p., Tabs., Apps.; Contract NY-11-0014; ACKNOWLEDGMENT: UMTA; ORDER FROM: UMTA

32 190213 STATEWIDE STUDY OF THE FEASIBILITY OF COORDINATING OR CONSOLIDATING SPECIALIZED TRANSPORTATION SERVICES. The objectives of this study are to identify: current and latent demands for specialized transportation in New York State; current State and Federal programs applicable to specialized transportation; a methodology to measure the effectiveness of coordination/consolidation in demographic areas; as well as to develop modifications to existing State and Federal legislation and regulations to assist coordination/consolidation efforts. This report outlines a procedure to plan, develop, and implement coordination/consolidation options. The study developed consolidation scenarios for typical locations within an urban, suburban, and small urban/rural setting. Poughkeepsie (Dutchess County) was selected for the urban scenario, Hempstead for the suburban, and Tompkins County for the small urban by the NY State Department of Transportation and the Project Advisory Committee based on the following five criteria: availability of data; evidence of concern, presence of public transit provider; community conditions amenable to proposed consolidation options; and no comparable effort underway. It has been estimated that \$80-100 million in public funds is spent per year on specialized transportation services in NY State in addition to \$25 million per year for reduced fares for the elderly and handicapped on public transit systems. The author estimated the client group for this study as 2,694,000 individuals and that specialized transit systems in NY State supply 175,000 trips/day; latent demand is estimated as 1,945,000 trips/day. This report summarizes the study's findings, conclusions, and recommendations; it states that the conclusions herein should be broadly applicable to all governmental levels in a variety of locations. /UMTA/

Institute for Public Transportation, (NY-09-8001) Final Rpt. UMTA-NY-09-8001-79-1, Oct. 1978, 113 p., Refs., 2 App.; Sponsored by the Urban Mass Transportation Administration.;

ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291705/AS

32 190854 PARATRANSIT SERVICES. Contents: Taxicab feeder service to bus transit; Commuter information system--A new ride-sharing tool; Impact of dial-a-ride on transportation-related energy consumption in small cities; Methodology for the analysis of local paratransit options; Satellite-city development through improved passenger transportation service; Planning process for the design of integrated fixed-and flexible-route bus service in Rochester; Findings of a study to estimate the effectiveness of proposed carpool-incentive policies; Transportation efficiency and the feasibility of dynamic ride sharing; Car-pooling programs: solution to a problem; Use of a quantitative marketing model to estimate impacts of car-pooling policies; Reductions in automobile use in four major cities as a results of car pooling and improved transit; Integrating transit and paratransit.

Miller, GK Glazer, L Courington, W Barnett, D Ross, S ; Transportation Research Board, Washington, DC. TRB/TRR-650, 1977, 75p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288423/7ST

32 190856 APPLICATIONS OF INTERACTIVE GRAPHICS. Contents: Interactive graphics sketch-planning model for urban transportation; Volvo approach to computer-aided transportation planning; Computer-animated simulation of taxi-dispatching strategies; Computer graphics human-figure system applicable to transportation.

Kornhauser, AL Hess, JL Andreasson, I Hauer, E Baecker, RM ; Transportation Research Board, Washington, DC. TRB/TRR-657, 1977, 29p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288462/5ST

32 190880 VANPOOL IMPLEMENTATION HANDBOOK. The handbook is a detailed guide outlining the necessary steps for establishment of successful vanpool programs in the state of Illinois. The guide serves as a manual introducing and outlining preliminary considerations, administrative methods, and legal considerations, as well as supplying sample forms which may be used for the administration and operation of privately sponsored vanpool programs.

Dynis, JA ; Illinois Institute of Natural Resources ILLDOE-78/12, 1978, 45 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289694/2ST

32 190935 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT I-4. MODAL SHIFT ACHIEVED ON THE NW 7TH AVENUE EXPRESS BUS SYSTEM. The purpose of this report was to evaluate the modal split achieved by the Orange Streaker express bus system. Screen-line studies and a home interview were conducted to obtain the data necessary to establish a proportional relationship producing modal split of project trips. The project modal split increased with early ridership increases but leveled off with a leveling trend in ridership. The significant increases in modal split achieved in the early months of the study period could not be directly attributed to the attractiveness of the Orange

Streaker service due to the impact of other factors, such as the energy crisis. The fact that modal split did not decline at the end of the energy crisis indicates patron satisfaction and suggests that the service provided represented a viable alternative to the automobile to make project trips.

Wattleworth, JA Wolfe, RS Wallace, CE Siegel, RL Courage, KG ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-4, Sept. 1978, 73 p.; See also Rept. No. 5, PB-291141. Sponsored in part by Florida State Dept. of Transportation, Tallahassee.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291140/2ST

32 191177 VANPOOLING INSTITUTIONAL BARRIERS. The current interest in van pooling has raised numerous institutional problems. This report addresses several of the more apparent state and Federal institutional issues, describes current progress in resolving the problems, and suggests alternatives for removing the inhibiting factors. The report will conclude by listing specific recommendations. The discussion of institutional issues will focus on three types of pooling. These include employer-sponsored pools, in which the company owns or leases the vehicle which transports their employees, i.e., TVA, 3M Company, and the Continental Oil Company programs; employee-owned and operated pools, in which an individual operates a van just as he would a shared-expense carpool; and third-party programs, in which a government, lease firm, or company supplies the vehicle and coordinates groups of commuters as a business activity or as a public service, such as, Commuter Computer or Pinetree Transportation of Los Angeles, Vango in Maryland, or the Knoxville Commuter Pool.

Davis, FW Burkhalter, DA ; Davis, Burkhalter & Associates Transp Consultants, Department of Energy May 1978, 146 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HCP/M5812-01

32 191231 BALTIMORE CITY'S HUMAN SERVICES TRANSPORTATION: ANALYSIS AND RECOMMENDATIONS. The eleven agencies with 30 divisions were providing services to handicapped and non-handicapped children and adults, elderly persons, and infirmed residents. Trips were both individual and group. The types of trips provided include medical, personal business, shopping, recreation, social, nutrition, education, child day care, elderly day care, and volunteer service trips. Trips were provided with 155 City-owned, donated, and shared vehicles and through various purchase of service arrangements. The following problems were found with the transportation system as it existed at the time of the study: under-utilization of city-controlled vehicles (hours of use per vehicle per week, miles traveled per day per vehicle, and percent passenger capacity utilized per vehicle per one-way trip); use of professional and para-professional staff as drivers; path duplication; minimal service provided to the physically handicapped; interruption of service when a vehicle was undergoing maintenance or repair; high administrative costs; duplication of administrative support staff across divisions; and overall high costs per passenger trip and per mile. The study recommended consolidation of many of the divisions' transportation services to eliminate the aforementioned

problems. An incremental consolidation effort is currently underway.

Katz, DC ; Baltimore City Department of Planning, Maryland Department of Transportation, Baltimore Mayor's Office of Human Resources, Baltimore Region Unified Transp Planning Program Final Rpt. Nov. 1978, 37 p.; Sponsored in part by Maryland Department of Transportation, Baltimore Mayor's Office of Human Resources, and Baltimore Region Unified Transportation Planning Program.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288639/8ST

32 191296 ANALYSIS OF COMMUNITY RESOURCES. Changing patterns of resource allocation in five human service agencies in Jefferson County, Kentucky, were studied over a three-year period from July 1, 1974, to June 30, 1977. Four major questions were addressed: how many agencies at which locations provide what kinds of services. Have the kinds of services provided changed over time. How much service is provided and how quickly and at what cost to clients. Has there been a change in the number of unique or distinct services available to clients. Information from about 500 agencies and on 357 unique services was analyzed. The county has experienced a trend toward more decentralized services. The number of agencies and sites providing financial resources, food and clothing, housing services, and family planning and problem pregnancy service sites have increased. Transportation agencies and sites, and community education and information services related to alcohol, drugs, and developmental disabilities have decreased. The proportion of emergency services has increased in the areas of protection from abuse, neglect, and exploitation; substitute living arrangements; community safety and justice; and social / emotional development and adjustment. Two-thirds of the agencies are open only during daytime hours, and nine out of ten sites are accessible to public transportation. More than half of the agencies do not charge fees for the services provided. Overall, the number of different services has increased. Implications related to accessibility and availability of service are examined.

Human Services Coordination Alliance, Inc., Louisville, KY.*Department of Health, Education, and Welfare, Washington, DC. June 1977, 62p; See also companion documents, SHR-0002031; SHR-0002033. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002032/ES.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002032

32 191402 I-95/NW 7TH AVENUE BUS/CAR POOL SYSTEMS DEMONSTRATION PROJECT REPORT II-4. EVALUATION OF CHARACTERISTICS OF USERS AND NON-USERS OF THE I-95 BUS/CAR POOL SYSTEM. Express bus operations on the new priority lanes on I-95 in March 1976 constitute Phase II of a project. This report, Report II-4, presents the findings of three surveys administered to obtain data on the socio-economic, travel, and attitudinal characteristics of two types of users, express bus passengers and non-users from the target market population. The survey instruments are in Appendixes B, C, and D of this

report. Both users and non-users wanted the exclusive lanes to be retained on I-95. Many respondents favored exclusive lanes on all urban freeways.

Long, G Scherbarth, JA Reaves, DP Wattleworth, JA Wallace, CE ; Florida University, Gainesville, Urban Mass Transportation Administration, Florida Department of Transportation, (UMTA-FL-06-0006) Final Rpt. UMTA-FL-06-0006-78-13, Sept. 1978, 132 p.; Sponsored in part by Florida Department of Transportation. See also PB-291148.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291149/3ST

32 192352 CARPOOLS, VANPOOLS, AND HIGH OCCUPANCY PREFERENCE LANES: COST EFFECTIVENESS AND FEASIBILITY. The report looks at the reductions in vehicle miles traveled (VMT) and air pollution that can be accomplished with voluntary transportation control measures. The measures studied are carpool/vanpool programs and preferential highway lanes for buses and other high occupancy vehicles (HOVL). The report examined transportation control programs in four major metropolitan areas to analyze what factors affect the programs' effectiveness. Based on empirical data and use of a computer model, the report predicts that carpools, vanpools, and HOVL's may reduce car use 2-3% and save travelers millions of dollars. The costs of these programs are generally small compared to their benefits, except where new highway lanes are built for use as potential lanes. However, the study concludes that major reductions in air pollution may not be accomplished unless mandatory traffic controls are also used. The study also describes how people travel to work in 124 major metropolitan areas and includes case studies of carpool, vanpool and HOVL programs in use in both urban and less-densely populated areas.

Cromwell, WH Bloch, AJ Sewell, GH Ingram, GK Bentz, EJJ ; Environmental Protection Agency, Council on the Environment of New York City, Hart (Fred C) Associates, Incorporated, Harvard University May 1977, 344 p.; Prepared in cooperation with Council on the Environment of New York City, Hart (Fred C.) Associates, Incorporated, and Harvard University, Department of Economics.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292722/6ST

32 193611 PARATRANSIT INVENTORY ST. LOUIS REGION. An inventory of paratransit services was performed as part of a larger transportation research effort to address concerns regarding congestion, air quality and energy consumption. A mail survey was used to gather information concerning service area, operations characteristics and cost, ridership and vehicle type for all paratransit modes. Follow-up interviews were conducted with operators in some categories to insure that an adequate sample was obtained. The services covered included taxicabs, commercial auto rental and leasing, limousines, shuttle services, school bus, church service, subscription service and special transportation services for the elderly and handicapped. The inventory revealed that while many transit dependent individuals and groups are served through paratransit that are not sufficiently served by fixed-line services and areas that are yet lacking in

any services. For the future the paratransit services must be coordinated followed by fitting to-together paratransit and fixed line transit together to give one intergrated system to meet the needs of St. Louis.

East-West Gateway Coordinating Council Final Rpt. EWG-TS-0370.10.0, Sept. 1978, 123 p., 6 Fig., 3 Tab., 9 App.; Sponsored by the Urban Mass Transportation Administration, Federal Highway Administration.; Contract UMTA-IT-090090FHWA; ORDER FROM: East-West Gateway Coordinating Council, 112 North 4th Street, Suite 1200, St Louis, Missouri, 63102

32 193616 THE KNOXVILLE TRANSPORTATION BROKERAGE PROJECT. VOLUME III: AN EIGHTEEN MONTH EVALUATION. The transportation brokerage approach has as its basic objective to identify and match transportation demand/supply on an individual basis. The broker acts to publicize the benefits of ridesharing through the media by experimenting with vans or negotiating special services with local transit operators. The objective of this report is to document the results of the Knoxville Transportation Brokerage Service (KTBS) project while operated by the University of Tennessee Transportation Center (January 1976-June 1977). This evaluation is restricted to an analysis of KTBS's commuter arm--the Knoxville Commuter Pool (KCP), and the major focus of the KCP effort revolves about vans rather than carpool formations. Highlighted herein is the fact that this demonstration introduced a new mode of commuter transportation--vanpooling. Currently, 47 KCP vans are operating daily serving over 450 commuters working at 12 different firms. With 36 percent of the vanpoolers having formerly driven alone, the broker has served to eliminate 10,056 daily miles of travel. The demonstration's contribution extended beyond the successful deployment of seed vans and the removal of institutional barriers restricting the legal operation of commuter vans in Tennessee. The project demonstrated the ability to survey commuter needs and to match them to the available supply of transportation on a community-wide basis. Over the 18-month project, 234 firms were surveyed and over 18,000 match lists distributed. The project achieved an increased level of rideshare awareness in the community with 67 percent of the general population recognizing the name of the project and 41 percent knowing how to contact KCP. /UMTA/

Wegmann, FJ ; Tennessee University, Knoxville, (TN-06-0006) UMTA-TN-06-0006-78-1, Nov. 1978, 144 p.; Sponsored by the Urban Mass Transportation Administration. Other reports of this project are: "Volume I: Philosophy and Institutional Issues," UMTA-TN-06-0006-78-3; "Volume II: Operations and Management," PB-282248; and "Interim Report," PB-270103.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-292593/1ST

32 193617 THE KNOXVILLE TRANSPORTATION BROKERAGE PROJECTS. VOLUME I: PHILOSOPHY AND INSTITUTIONAL ISSUES. This report is designed to describe the theoretical concepts behind the Brokerage Project and to describe the institutional problems involved in implementing the concepts. The Knoxville Brokerage Project,

which evolved over a five-year period, was not the promotion of a single transportation mode, but the promotion of a philosophy and approach to coordinate various forms of transportation to meet the many diverse needs of urban and rural areas. The purpose of the broker is to locate areas of surplus (willing suppliers/sellers) and areas of needs (willing buyers/consumers), to resolve institutional barriers (contracts, financing, transportation, etc.) and to consummate sale. This report, one of a series of reports, discusses the evolution of the brokerage concept; it describes pre-project experiences, project activities, and some planned activities. Topics discussed herein are: the availability of alternative suppliers; the transportation markets; institutional barriers; and an overview of the accomplishments and conclusions reached during the first 19 months of the project. The authors state three reasons why the brokerage approach works, namely: it is easy to find a solution to individual transportation needs given the full resources of the community; the brokerage approach would not be possible if people were not creatures of habit; and the brokerage approach is possible because of the development of new technology. This report provides a list of references and the following appendixes: Origins of the Brokerage Concepts; Knoxville Taxicab Ordinance; Test Market Legislation; and Citizen Transportation Areas Legislation. /UMTA/

Davis, FW, Jr Beeson, JD Wegmann, FJ ; Tennessee University, Knoxville, (TC 78-006) Final Rpt. UMTA-TN-06-0006-78-3, Nov. 1978, 115 p.; Sponsored by the Urban Mass Transportation Administration. Other reports of this project are: "Volume II: Operations and Management," PB-282248; "Volume III: An Eighteen-Month Evaluation," UMTA-TN-06-0006-78-3; and "Interim Report," PB-270103.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-292592/3ST

32 193691 URBAN TRANSPORT SERVICE INNOVATIONS. This volume amounts to a progress report on paratransit. The papers published here include some that were presented at the Transportation Research Board's Conference on Urban Transport Service Innovations in San Diego, December 5 to 8, 1977, and some that were presented at the Fifty-seventh Annual Meeting of the Transportation Research Board in January 1978. They review both American and Canadian experiences with shared-ride services such as car pools, van pools, shared-ride taxi services, subscription bus services, and dial-a-ride and demand-responsive services for special-need groups. One common characteristic of these services is their ability to respond flexibly to the spatial patterns and temporal rhythms of travel demand. Another common characteristic is a recent record of increased interest and relatively rapid program expansion. The pace of recent developments argues that this is an appropriate time to review the performance of shared-ride programs and the direction of paratransit innovations. /Author/

Transportation Research Board Special Report No. 184, 1979, 142 p., Figs., Tabs., Refs. ORDER FROM: TRB Publications Off

32 193692 RELATIONSHIP OF INNOVATIVE SERVICES TO A FAMILY OF URBAN TRANSPORTATION SERVICES. A mixture of different transportation services and providers

are required to serve the varied markets and needs in an urban area. Innovative services such as ride sharing and demand-responsive transportation provide new opportunities to serve markets that are currently not served by more traditional services. Communities such as Westport, Connecticut, have demonstrated that these services can be combined in a complementary fashion, so that the different services reinforce, rather than complete with, one another. By offering a range of services provided by different suppliers, a unique system has been created that has had a significant impact on the community. Westport shows what can be achieved by a single community, and the lessons of this and other communities with the family-of-services concept must be diffused on a much broader basis. To achieve this, changes are required on a local and federal level. These changes require an increased awareness of available options and approaches, incentives to adapt these options and approaches where appropriate, and new institutional arrangements to accommodate the changes. An increased emphasis on service implementation and coordination is required, and different relations between planning and operations are appropriate.

Roos, D (Massachusetts Institute of Technology) *Transportation Research Board Special Report* No. 184, 1979, pp 4-10, 2 Fig.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193693 SOCIAL SERVICE TRANSPORTATION. The nature and scope of social service transportation systems are summarized, and the benefits and limitations of coordination among such services are explored. The potential for improvements in coordination and a series of considerations for future improvements are identified. The increased interest in coordinating social service transportation is explained by the increasing funding constraints of the late 1960s and the 1970s as projects became more concerned about using their resources as effectively as possible. The nature of coordination is examined and the findings of a national survey of state agencies on aging are presented. The barriers to coordination are identified and classified into two broad categories: statutory and legal and administrative, institutional, and perceptual. The statutory and legal barriers include eligibility and user restrictions and franchise and labor problems; the administrative, institutional, and perceptual barriers include regulatory and administrative constraints, accountability requirements, insufficient information on Transportation costs, turf protection, preferential treatment of clients, discontinuity of funding, and public transit. The benefits of coordination include (a) reduced overlap and duplication, (b) increased service capacity, (c) improved vehicles productivity, and (d) cost reductions in purchases. Directions for improved coordination--in the areas of policy, planning operations, and research--in the future among transportation services provided by social service agencies are identified. /Author/

Revis, JS (Institute of Public Administration) *Transportation Research Board Special Report* No. 184, 1979, pp 10-20, Tabs., 8 Ref.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193694 COORDINATION OF HUMAN SERVICE AGENCY TRANSPORTATION: EVALUATION METHOD.

The topic of the coordination of transportation services among human service agencies has become very popular in the past years. The involvement of these agencies, whose initial mandates probably did not include transportation, creates the potential for such problems as duplication of services, higher than necessary costs, and equipment maintenance difficulties. While transportation service coordination is desirable, it is a difficult task. One of the major problems is the lack of experience in analyzing agency transportation programs. This paper presents and analytical methodology that should assist in service evaluation and, therefore, the development of coordination plans. Two fundamental questions that must be considered before any coordination plan is developed are addressed. First, how much coordination is good for any particular agency? Criteria were developed to assist in the determination of which agencies would benefit from service coordination and which would not. Agencies were found to vary greatly in the degree of coordination that is useful to them. Second, just what is meant by service coordination? Is it a motor pool of vehicles? Is it a centralized maintenance facility? Or is it a coordinated transportation service with especially designed vehicles and professional drivers? A method is presented for matching the needs of the agencies with the services provided through the concept of a transportation support center that can be developed in phases and offer a range of services to be purchased by agencies according to their need. /Author/

Weaver, VC (Northeastern Illinois Regional Transp Authority) *Transportation Research Board Special Report* No. 184, 1979, pp 20-25, 4 Tab., 1 Ref.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193695 PARATRANSIT AND THE JOURNEY TO WORK: STATUS REPORT.

Work-trip paratransit will flourish if the time and money costs of competing modes increase, whether due to price increases or taxation policies. It will also prosper if its time, money, and flexibility costs decrease as a result of operational economies or subsidies. In the short run, it appears that the competing modes will suffer only modest price inflation and largely escape the effects of energy taxation. It also appears that paratransit will receive little subsidization; it has only a weak institutional base and public officials are currently reluctant to embark on new spending programs. It follows that the growth of work-trip paratransit in the near term depends on the development of suitable, low-cost provider arrangements and on price reductions deriving from decreased insurance costs and improved vehicle operating efficiency for van pools. If successful adoption of these techniques produces significant market penetration at present price levels, public officials may find additional ride-sharing initiatives, in the form of price incentives or subsidies, both cost-effective and politically feasible as means of conserving energy, reducing emissions, and alleviating congestion. /Author/

Womack, JP (Massachusetts Institute of Technology) *Transportation Research Board Special Report* No. 184, 1979, pp 25-31, 2 Ref.; This paper appeared in TRB Special Report 184, Urban

Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193696 REDUCTIONS IN VEHICLE TRAVEL BY USE OF CAR AND VAN POOLS IN MAJOR METROPOLITAN AREAS. Techniques are developed for determining the car-and van-pool potential of major employment centers as functions of employee residential distribution and income level. The techniques are based on an automobile-occupancy model previously developed for the national capital area and an empirical van-pool model derived from the highly successful van-pool program by the 3M Company in St. Paul. Application of the techniques to private and government employment centers in the national capital area indicates a potential 10 percent reduction in peak-hour traffic and a potential saving of 3.5 percent of total gasoline consumption. /Author/

Miesse, CC (Environmental Protection Agency) *Transportation Research Board Special Report* No. 184, 1979, pp 34-38, 4 Fig., 3 Tab., 11 Ref.

This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193698 EVALUATION OF AN EMPLOYER-BASED COMMUTER RIDE-SHARING PROGRAM.

The commuter ride-sharing program developed by the Tennessee Valley Authority for its employees in Knoxville, Tennessee, uses a variety of transportation modes—express buses van pools and car pools. The program has been very successful with 2686 employees (79 percent of the total work force of 3400 employees) participating. The program has different implications for the employer, the employees, and the community; these implications for each interest group are quantified in terms of benefits and costs. The analysis shows that by supporting the ride-sharing demonstration program, the employer was able to avoid the cost of constructing a new parking structure for the employees and that the resulting annual savings are larger than the annual cost of the subsidies to the program that are paid as an incentive to participating employees. From the standpoint of the employees, the program resulted in a substantial reduction in commuting costs. The reduction in fuel consumption that can be attributed to ride sharing was quantified, and the consequences in terms of improved traffic operating conditions along a major travel corridor and the favorable impact on the local transit system were examined. /Author/

Wegmann, FJ Chatterjee, A (Tennessee University) Stokey, SR (Tennessee Valley Authority) *Transportation Research Board Special Report* No. 184, 1979, pp 43-49, 7 Tab., 5 Ref.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193699 COMPARISONS OF PRODUCTIVITY OF FOUR MODES OF SERVICE IN ORANGE, CALIFORNIA.

The Orange County Transit District has operated a community-service transit program in the city of Orange, California, since May 1975. Because of an adverse court ruling and a subsequent successful appeal, this service underwent four modal changes. These four modes provide a unique opportunity for

comparison. In order of implementation, they were a demand-responsive dial-a-bus, a three-loop fixed-route bus system, a two-loop fixed-route bus system, and a demand-responsive dial-a-taxi system. The four systems were compared by using five performance indicators. The two demand-responsive systems were found more efficient and effective than the fixed-route systems. The dial-a-taxi system, during its first 3 months of operation, compared very favorably to the dial-a-bus system, and continues to show monthly improvements on each indicator. The information gained in this study may be of limited transferability, but the data suggest that dial-a-taxi can be very efficient and effective in serving cities or suburban areas with population densities of 1900/sq km (5000/sq mi) or less. /Author/

Hollinden, A Blair, R (California University, Irvine) McKelvey, DJ, Discussor (National Transportation Policy Study Commission) *Transportation Research Board Special Report* No. 184, 1979, pp 49-55, 3 Fig., 4 Tab., 12 Ref.

This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193700 COST-REVENUE SQUEEZE IN CONVENTIONAL TRANSIT.

Transit ridership is increasing after more than 2 decades of decline. But the share of the travel market held by transit continues to decrease relative to that of the automobile, and the reverse of patronage decline has been achieved at enormous cost. Operating losses have escalated at a rate (more than 30 percent/year) that cannot be sustained. In part, this is due to inflation, the increasing cost of fuel, the aggressive bargaining posture of transit unions, and a policy of fare stabilization. But the more fundamental reasons are (a) the evolution of urbanization and social interaction patterns that are incompatible with the operating regime of conventional transit and (b) the introduction of costly and underused services stimulated by formula subsidy programs based on fair-share politics. The cost of transit deficits is evident in taxes. But there are other, less evident, costs of expecting too much from transit. These include the failure to develop a coherent national policy toward the future of the automobile and the highway system. Paratransit can be a part of the solution if it offers a way of lowering expectations and focusing attention on the cost-effectiveness and market potential of competing alternatives. It can be part of the problem if it creates new expectations that serve to establish the right to service regardless of need. The best possibility for restraining costs and matching services to needs seems to lie in the reform of the subsidy allocation process. If regional planning agencies or general purpose governments could be given greater discretion to allocate federal funds, competitive bidding arrangements could be used to secure quality service from the most efficient vendor. This would entail severing the direct connection from the federal treasury to the transit properties and designating nonoperating agencies as the recipients of federal operating funds. /Author/

Jones, DW, Jr (California University, Berkeley) *Transportation Research Board Special Report* No. 184, 1979, pp 58-63, 7 Ref.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193701 COSTS AND PRODUCTIVITIES OF INNOVATIVE URBAN TRANSPORTATION SERVICES. The aspects of supply and demand that determine the costs and productivities of paratransit services are described, the variations in performance of the services are explained, and ways of improving them are suggested. Publicly owned dial-a-ride services are observed to be very expensive operations and, although the potential for cost reduction exists, these trip costs will probably remain high. The current practices of ubiquitous dial-a-ride services and extremely low fares are questioned. It is also suggested that increased participation in paratransit operations by the private sector--the taxi industry--promises significant improvements in the cost performance. /Author/

Bhatt, K (Urban Institute) *Transportation Research Board Special Report No. 184, 1979, pp 63-71, 4 Tab., 4 Ref.*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193702 LEGAL AND INSTITUTIONAL CONSIDERATIONS IN PARATRANSIT INNOVATIONS. Transportation has a rigid background of laws, regulations, and business practices developed during the late 1800s that strongly influences the transportation options available today. This paper examines some of the assumptions on which these policies and practices are based. Several alternative approaches and ways in which they could be implemented are suggested. In addition, specific laws and practices that may need to be reevaluated are identified. /Author/

Davis, FW, Jr Burkhalter, DA, II (Tennessee University) *Transportation Research Board Special Report No. 184, 1979, pp 71-77*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193703 INSURANCE AS IT RELATES TO DEMAND-RESPONSIVE TRANSIT (ABRIDGMENT). At the present time, it is difficult to set insurance premiums for ride-sharing systems. The concept is relatively new. Therefore, carriers have been unable so far to identify adequately the exposure to losses for rating purposes. Compared with conventional taxicabs, ride-sharing systems do have higher passenger loads which would tend to raise insurance costs due to the increased liability limits required. However, they also have a lower accident frequency which tends to lower insurance costs. Premiums can also be kept in line through proper hiring procedures, safety programs, thorough claims-handling procedures, and curtailing medical fees.

Chalker, DB (LFC Insurance, California) *Transportation Research Board Special Report No. 184, 1979, p 78*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193705 LABOR, PARATRANSIT, AND SECTION 13C. There are many legal and institutional strategies that transit labor can use to protect itself from unwanted innovation; this paper examines the specific protection given by section 13c of the Urban Mass Transportation Act of 1964. The paper begins with a description

of the mass transportation system to which section 13c applies and then describes the use of competitive brokerage for the selection of new mass transportation services. It next discusses the historical context of section 13c and the application of this section to the acquisition of private mass transit companies by using Urban Mass Transportation Administration funds. Finally, the paper describes various applications of section 13c that affect paratransit innovation, including competitive brokerage, and recommends measures for ameliorating any adverse effects such applications may cause. /Author/

Zaelke, D (Environmental Law Institute) *Transportation Research Board Special Report No. 184, 1979, pp 84-91, 3 Fig., 6 Ref.*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193707 INFORMATION AND CONTROL SYSTEMS FOR PARATRANSIT SERVICES. The current uses of information and control systems in paratransit services are reviewed, and new applications that are currently being developed are discussed. Thus far, the greatest use has been by the conventional transit and taxi industries for accounting, payroll, and limited management information. In both of these industries, the larger operators have recognized that the costs of automating these clerical functions are readily justified by the benefits. However, for many other functions, the questions of whether automation will produce benefits and whether the costs can be justified are still open. In several functional areas, most strikingly brokerage and pooling services, advances in computer technology and reductions in computer costs are already making a stronger economic argument for automation. At present, however, the ability of many of the more innovative applications of computer technology to paratransit to provide real economic advantages is unproven. /Author/

Wilson, NHM Colvin, NJ (Massachusetts Institute of Technology) *Transportation Research Board Special Report No. 184, 1979, pp 95-102, 2 Tab., 9 Ref.*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193708 MANAGEMENT AND ORGANIZATION FOR PROMOTING THE USE OF PARATRANSIT. Before paratransit organizations can develop, it is necessary to demonstrate their capabilities to the community. This paper presents a strategy for implementing various paratransit services and integrating these services into the community. It also presents some of the philosophical issues on which paratransit programs may be structured. Finally, it suggests an organizational structure that can be used to promote these concepts and appropriate funding levels. /Author/

Davis, FW, Jr (Tennessee University) Aex, RP (Department of Public Transportation Services) Van Matre, P, Discussor (Southern California Rapid Transit District) *Transportation Research Board Special Report No. 184, 1979, pp 102-109, 1 Fig., 4 Ref.*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193709 INVOLVING THE PRIVATE OPERATOR. Issues related to the use of the excess capacity in paratransit resources provided by taxicab operators are discussed, and recommendations are made. The local nature of the daily surface transportation of people is stressed. The decisions regarding options available under federal and state public transportation programs that most directly affect efforts to more effectively use existing public transportation resources, including private operators, are local. The states should provide technical assistance to those local governmental entities that lack the staff and economic resources to support permanent public transportation research and planning. The states should also exercise leadership in harmonizing public transportation planning and optimizing state and local programs and funding mechanisms to supplement federal efforts. Before additional paratransit funding sources are approved, the states should identify and understand the use of the paratransit funds already available in their jurisdictions through federally funded categorical programs. They should seek to reallocate these existing monies to purchase paratransit services more effectively than in possible under present circumstances of fragmentation, duplication, and waste. Reforms at the federal level are ultimately necessary to achieve this. More must be done at the regional level to identify existing public and private paratransit services and resources. Advisory committees to metropolitan planning organizations are recommended composed of public transportation decision makers, users, and public and private providers. The need for local reregulation to implement innovations in meeting paratransit demand is addressed. The roles of independent owner drivers and lease drivers, shared-ride taxi services, and fuel-tax relief equal to that granted transit are discussed as reforms required to enable the private operator to gain control over operating costs and provide for easier entry into the taxi market for entrepreneurial drivers. Labor considerations under section 13c of the Urban Mass Transportation Act of 1964 need not have only negative connotations in the use of private operators for paratransit service. As taxicab operators move into shared-ride services and function as mass transportation companies, with or without Urban Mass Transportation Administration monies, their employees may qualify for section 13c protection whether or not they are unionized. /Author/

Leyval, ER (California Taxicab Owners Association) *Transportation Research Board Special Report No. 184, 1979, pp 109-116, 8 Ref.*; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193711 DIAL-A-BUS IMPLEMENTATION: A LIVING EXAMPLE. The process undertaken to transfer a demand-responsive dial-a-bus service from federally funded, experimental-demonstration status to permanent-operation status is described. The particular project described suffered from a local financial condition that was insufficient to support dial-a-bus services, technical difficulties, and problems in perceived attitudes toward the project. The strategy developed included an independent assessment of the program, consultant recommendations modified by local staff, expansion of the service to two additional areas, areawide service to the handi-

capped and elderly, attempts to negotiate the labor clearances necessary to permit competitive solicitation of service vendors, and approval of an extended demonstration by the Urban Mass Transportation Administration. /Author/

Silien, JS (Rochester-Genesee Regional Transportation Auth) *Transportation Research Board Special Report* No. 184, 1979, pp 124-128, 4 Ref.

This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193712 REVIEW OF PARATRANSIT ACTIVITIES IN CANADA. Canadian experiences with paratransit services--dial-a-bus services in 12 communities and five car-and van-pooling operations--are reviewed. In general, the Canadian operations have differed from those in the United States in the following ways. The Canadian operations are typically more productive and operate at lower costs per rider, and the demonstration projects have been more modest in scale and the use of new technologies. The introduction of computerized routing and scheduling techniques has usually been postponed until the operation has achieved stability. Dial-a-bus operations are usually treated as interim services to be replaced by fixed-route transit as soon as possible, and organized ride-sharing programs have been subordinate to dial-a-bus and mass transit services. /Author/

Suen, SL Lehuen, A (Canadian Surface Transportation Administration) *Transportation Research Board Special Report* No. 184, 1979, pp 128-135, 1 Fig., 5 Tab., 1 Ref.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 193713 IMPLEMENTATION AND PRELIMINARY IMPACTS OF SHARED-RIDE TAXI SERVICE AT BOSTON LOGAN INTERNATIONAL AIRPORT. On April 26, 1977, the Massachusetts Port Authority introduced a pilot shared-ride taxicab dispatching service called share-a-cab from Boston Logan International Airport to 21 cities and suburban towns to the west and northwest of the city of Boston. The service provides for the grouping of up to four passengers in one taxi for a flat fare known in advance to the passenger that is approximately half the average metered fare to the city or town to which he or she is destined. Share-a-cab passengers are grouped from five airport terminal locations by means of a central assignment and taxi dispatching system that is linked by telecommunications to personnel in the terminals. On July 19, 1977, the service was expanded to 117 additional eastern Massachusetts cities and towns and on September 19, 1977, service at reduced fares was guaranteed after a maximum 15-min wait even if only one passenger had requested service. Preliminary impacts for the service area of 138 communities indicate that the share-a-cab service has attracted approximately 3 percent of the total daily trips from Logan Airport to these cities and towns. Among the users of share-a-cab trips, approximately 42 percent had shifted from exclusive-ride taxi, 30 percent had shifted from private or rental automobiles, and about 28 percent had shifted from bus, limousine, or rapid transit services. Share-a-cab has significantly increased taxi rider-

ship and revenue. The service was implemented without any major operational problems, although its labor-intensity has resulted in subsidies per passenger that are relatively high. The expected demand levels and diversions from private automobile trips have not yet been reached. The early results have been evaluated to reach conclusions and provide recommendations for improvements to the initial service. /Author/

Greenbaum, DS Karash, KH Attanucci, JR Bornstein, JV (Massachusetts Port Authority) *Transportation Research Board Special Report* No. 184, 1979, pp 135-142, 3 Fig., 3 Tab., 2 Ref.

This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

32 194046 TELECOMMUNICATIONS AND TRAFFIC [Telekommunikation und Verkehr]. The relation between telecommunications and traffic is illustrated. After the electronic media brought an increasing separation of freight transport and information transport, a situation exists where there is an increasing entanglement of telecommunications and traffic. On the one hand, telecommunications act as support systems (e.g. car phones, dial-a-ride systems) and on the other hand, they are substitutes (e.g. business journeys-conference arrangements). The substitution potential of newer and enlarged telecommunication services for traffic is considerable: an extensive movement in favour of telecommunications is economically necessary and is in the public interest. /TRRL/ [German]

Peterson, H *Internationales Verkehrswesen* Vol. 29 No. 4, July 1977, pp 224-228, 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 307525), Federal Institute of Road Research, West Germany

32 194919 RIDESHARING KEY TO TRAFFIC MANAGEMENT IN GOLDEN GATE CORRIDOR. The paper reports in detail on bridge authority's efforts to promote shared riding in order to control vehicle counts. Objective is to accommodate increased commuter population during rush hours. /EI/

Shellenberger, J, Jr *Public Works* Vol. 109 No. 10, Oct. 1978, 10 p.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 195311 MODAL SPLIT MODEL CONSIDERING CARPOOL MODE. Modal split remains a primary concern of transportation planners as the state-of-the-art has developed from diversion curves to behavioral models. The approach taken here is to formulate the mode-choice decision for the work trip as a linear combination of real and perceived characteristics of the modes considered. The logit formulation is used with three modes being considered, i.e., two automobile modes (drive-alone and carpool) and a public transit mode (bus). The final model provides insight to what factors are important in travel decisions among these three modes and the importance of examining traveler's perceptions of the differences among modes relative to actual measureable differences.

Lyles, RW (Maine University) *ASCE Journal of Transportation Engineering* Vol. 105 No. 2, Mar. 1979, pp 149-163, 13 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 195331 SCHEDULING DIAL-A-RIDE TRANSPORTATION SYSTEMS. An analytic investigation into the fundamental aspects of scheduling "Dial-a-Ride" transportation systems is conducted. Based upon simple mathematical models that focus on the combinatorial nature of the problem, a class of algorithms is derived for which performance can be measured in a precise asymptotic probabilistic sense. It is concluded that the approach yields many qualitative insights and the resulting transportation schemes have modest computational requirements, are decentralized, and are easy to visualize and implement.

Stein, DM (International Business Machines Corporation) *Transportation Science* Vol. 12 No. 3, Aug. 1978, pp 232-249, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 195393 APPROXIMATE ANALYTIC MODEL OF MANY-TO-MANY DEMAND RESPONSIVE TRANSPORTATION SYSTEMS. This paper presents an analytic model to predict average waiting and riding times in urban transportation systems (such as dial-a-bus and taxicabs), which provide non-transfer door-to-door transportation with a dynamically dispatched fleet of vehicles. Three different dispatching algorithms are analyzed with a simple deterministic model, which is then generalized to capture the most relevant stochastic phenomena. The formulae obtained have been successfully compared with simulated data and are simple enough for hand calculation.

Daganzo, CF (California University) *Transportation Research* Vol. 12 No. 5, Oct. 1978, pp 325-333, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 195577 INTERIM EVALUATION OF THE MINNEAPOLIS RIDESHARING COMMUTER SERVICES DEMONSTRATION. This report presents an interim evaluation of the impacts of ridesharing brokerage project at three multi-employer work sites in the Minneapolis metropolitan area. The demonstration project is funded by the Urban Mass Transportation Administration as part of the Service and Methods Demonstration Program. In this demonstration, the Metropolitan Transit Commission is coordinating a variety of brokerage functions which are designed to encourage increased ridership in high occupancy vehicles to non-CBD work sites. The modes being promoted are carpooling, vanpooling, subscription and regular bus. This interim evaluation focuses on an analysis of pre-demonstration survey data. Site characteristics and work conditions are described in detail, including parking availability, observed variance in start-end times, worker overtime requirements and business need for a car. It is shown that these work conditions and the relatively short commute distances to the demonstration site impose major barriers to successful demonstration results. A series of market penetration measures are presented to evaluate the effectiveness of the broker's marketing efforts. The results suggest that formal employee presentations are much more effective than passive marketing tools in attracting commuter interest in ridesharing. This evaluation report is based on the project events up to September 1, 1978. As such, conclusions drawn in this report are strictly preliminary and subject to modification to reflect changes in the project during the remainder of the evaluation period. /UMTA/

Sherman, L ; Cambridge Systematics, Incorporated, (MN-06-0008) Inrm Rpt. UM-TA-MN-06-0008-79-1, Mar. 1979, 153 p.; Work performed under contract to the Transportation Systems Center.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-295189

32 195639 A DEMAND ESTIMATING MODEL FOR DIAL-A-BUS PLANNING PROCEDURES. Dial-a-bus demand estimating techniques often have overestimated patronage, and have contributed to deficits as unacceptable as the deficits incurred on the fixed-route system replaced by dial-a-bus. A simple demand model for estimating dial-a-bus ridership has been developed. The model takes into consideration the population, type of service operated, hours of service and distance to the major trip generator. A test application of the model estimated actual ridership within 10%. It has been concluded that the model is accurate enough for planning purposes and can, therefore, be used as a guide by transportation planners as input into the analysis of required funding for dial-a-bus installations. /TRRL/

King, JM (Saskatchewan Transportation Agency, Canada) Shortreed, JH Edens, HJ (Waterloo University, Canada) ; Roads and Transportation Association of Canada Monograph 1978, 19 p., 7 Fig., 6 Tab., 14 Ref.; Paper presented to RTAC Annual Conference, September 18-21, 1978, Ottawa.; ACKNOWLEDGMENT: TRRL (IRRD 240485), Roads and Transportation Association of Canada

32 196709 DEMAND RESPONSIVE TRANSPORT: THE FIRST SIX MONTHS. Two experimental demand responsive bus services were established in the Melbourne suburbs of Lilydale and St. Albans on the 24th October 1977. The services were initiated with the following objectives: (I) to measure level of demand, (II) to establish a relationship between the characteristics of an area and the likely success of a demand-responsive service, (III) to examine the operational aspects of a simple dial-a-bus service in a suburban environment. Both services were in operation for six months. The six months trial period ended on the 22nd April, 1978 and it was decided at that stage to continue both services for a further three months with significant alteration to fares, timetables and areas served. The conclusions reached was that the services as established required a subsidy beyond that which the Ministry could support throughout the state. The experimental period demonstrated the potential of demand responsive bus services and further development was encouraged by the existence of opportunities to reduce costs and increase revenue. /TRRL/

Victoria Ministry of Transport, Australia Monograph Aug. 1978, 30 p., 10 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 238000), Australian Road Research Board

32 196819 AN OVERVIEW OF PARATRANSIT ACTIVITIES IN CANADA. This paper reviews the development of paratransit services in Canada since 1970 in dial-a-bus, privately operated systems, transportation pooling options and specialized services for the handicapped. It also outlines the role of the federal, provincial and municipal governments as well as

the private operators in fostering paratransit systems implementation. The paper deals with the difficulties of evaluating paratransit projects since evaluation relies mostly on subjective judgement due to a lack of quantifiable performance criteria. It outlines a list of criteria against which all the Canadian paratransit projects are evaluated. These criteria can be summed up in five main categories: systems performance, operational efficiency, economics, social impact and environmental impact. Finally, the paper attempts to predict the future paths of paratransit development in Canada. /TRRL/

Lehuen, A Suen, L ; Department of Transport, Canada Monograph Apr. 1978, 59 p., 3 Fig., 13 Tab., 31 Ref.; Performed by the Canadian Surface Transportation Administration, Urban Transportation Research Branch.; ACKNOWLEDGMENT: TRRL (IRRD 240808), Roads and Transportation Association of Canada

32 196832 ROLE OF ELECTRIC VEHICLES IN MULTI-MODAL URBAN TRANSPORT SYSTEM. Electric vehicles are able to satisfy some of the urban transport needs. The ability of battery and guide-way-sourced vehicles are discussed and compared with internal combustion engines for a variety of vehicle types and journey characteristics. The factors which are significant are performance, energy source and efficiency of conversion and pollution. Existing urban transport policies will change the characteristics of city travel and the demand for vehicles. These factors are outlined, together with new government incentives which may be introduced if electric vehicles are shown to offer advantages. /TRRL/

Freeland, CW (Department of Transport, Australia) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 249-259; From: Electric Cars--Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236974), Australian Road Research Board

32 197117 USE OF TAXICABS FOR TRANSPORTING THE HANDICAPPED: DADE COUNTY EXPERIENCE. This paper describes the special transportation service program designed to provide transportation services to handicapped residents of Dade County, Florida. Private for-hire operators of taxis and lift-equipped vans transport approved handicapped users, who are too disabled to use regular public transit, anywhere in the county for \$1.00 for a one-way trip. This report reviews the program's initial concepts, stated goals, and objectives and describes how the program has worked. User application forms, user trip vouchers, vehicle travel records, and a telephone survey of a random sample of program users provided data to assess user characteristics and trip-making patterns during the first 10 months of operation. After 10 months, the program had over 3400 approved users, 45 percent of whom were 65 years old or over. Out of 56 552 trips, 17 percent of the trips were made by wheelchair-bound users, 74 percent by transfer able users, and 9 percent by companions. Disabled persons used a cab in 80 percent of the cases, and lift-equipped vans accounted for the remaining 20 percent of the vehicle trips. The average cost per person per trip was comparable with those reported in Atlanta and Denver for special handicapped services (\$9.56/person in Dade County). The special

transportation service program has proven to be successful in Miami and has the potential of being successfully implemented in other areas. The trip-making characteristics and operating data found for the 10-month monitoring period could prove useful to other communities planning transportation for handicapped residents. /Author/

Silverman, F LaPlant, S (Dade Co. Office of Transportation Administration) *Transportation Research Record* No. 688, 1978, pp 17-21, 2 Fig., 4 Tab.; This paper appeared in TRB Research Record No. 688, Transportation for Elderly, Handicapped, and Economically Disadvantaged Persons.; ORDER FROM: TRB Publications Off

32 197118 FACTORS AFFECTING THE USE OF TAXICABS BY LOWER INCOME GROUPS. This study investigates the propensity of poor persons to use taxicabs. An evaluation of existing data on the use of taxicabs by different income groups shows that in larger urban areas lower income groups display a relatively high rate of taxi use. A critical analysis of previous work suggests, however, that the data analysis contained therein actually underestimated the reliance of the poor on the taxi. An analysis of the limited work on taxi use in small- and medium-sized urban areas reveals an even greater dependence of the poor on the taxicab. This work is supported by a survey of taxi drivers and an analysis of the origins of taxi trips. The factors that create this pattern of use are also examined. Previous studies and our data suggest that the poor often choose taxis because they are the principal option when an automobile is not available. Taxis appear to be chosen over conventional transit (when it exists) because they offer greater service flexibility, convenience, and duration of service, as well as better meeting the security demands of the poor. Increased availability of taxi service by reduced market entry restrictions and reduced cost of taxi service by permitting group riding and providing subsidies would increase the mobility of the poor. /Author/

Allred, J Saltzman, A (North Carolina Agricultural and Technical State U) Rosenbloom, S (Texas University, Austin) *Transportation Research Record* No. 688, 1978, pp 21-27, 4 Tab., 18 Ref.; This paper appeared in TRB Research Record No. 688, Transportation for Elderly, Handicapped, and Economically Disadvantaged Persons.; ORDER FROM: TRB Publications Off

32 197119 SOCIAL SERVICE AGENCIES TRANSPORTATION SERVICES IN TEXAS: POTENTIAL FOR OTHER PARATRANSIT MODES. This study analyzes the current transportation operations of social service agencies in three prototype communities in Texas: urban, rural, and rural with urban interface. The study was designed to identify and analyze the costs of direct provision of client transportation by social service agencies and to develop comparative cost indexes for the same or similar classes of trips if delivered by alternative providers, including taxi operators, transit systems, and nonprofit providers. Common classes of trips are identified and categorized by major operational characteristics, and actual and perceived cost data are developed for trips provided directly by social service agencies to their own clients. Actual cost figures, including expenses borne externally or through

grants, are developed to allow policymakers to evaluate effectively the costs of direct transportation provision by social service agencies. Since federal and state subsidies exist and will be used, perceived cost figures are developed to allow social service agencies to compare the advantages of alternative service provision to their out-of-pocket costs. Although no other provider was found to be cost-effective for all client trips, some social service agencies are found to be operating inefficient or ineffective transportation systems and should, therefore, consider an alternative provider. Guidelines are developed to facilitate these decisions. /Author/

Rosenbloom, S (Texas University, Austin) Cox, W (Texas Commission on Humanities and Public Policy) *Transportation Research Record* No. 688, 1978, pp 27-32, 3 Tab.; This paper appeared in TRB Research Record No. 688, Transportation for Elderly, Handicapped, and Economically Disadvantaged Persons.; ORDER FROM: TRB Publications Off

32 197171 SYSTEM ANALYSIS OF AIRPORT DEMAND RESPONSIVE TRANSPORT (DRT). This report details the study that was conducted of the operation of a service offering door-to-door transportation between Mirabel airport and customer-specified addresses in selected suburban zones in Montreal. The simulated demand responsive transport (DRT) service was requested on demand at the airport and through a booking service at suburban locations. The study investigated the potential demand for such a transportation service, the optimum fleet and vehicle size combination, the economic costs of the system, and the levels of service offered to customers.

Department of Transport, Canada TP 953, May 1979, 51 p., 13 Fig., 11 Tab., 12 Ref.; ORDER FROM: Department of Transport, Canada, Urban Transportation Research Branch, P.O. Box 549, Montreal, Quebec H3A 2R3, Canada

32 197366 EVALUATION OF INCENTIVES FOR CARPOOLING AND BUS USE, BANFIELD FREEWAY. The report summarizes what has occurred on the Banfield Freeway Preferential Lanes for High Occupancy Vehicles Demonstration Project from November 1, 1977 through July 1978. Phase II of the project commenced November 1, 1977 and has a different emphasis than did Phase I. Phase I deals with evaluating the effects of adding preferential lanes for high occupancy vehicles on an existing facility, the Banfield Freeway, serving eastern Portland. Phase II, on the other hand, is concerned with the effects of adding new incentives for carpooling and riding the bus to the performance of an ongoing HOV lane on the Banfield Freeway.

Oregon Department of Transportation, Federal Highway Administration Final Rpt. FHWA-RD-78-207, Dec. 1978, 48 p.; See also report dated March 1978, PB-286694.; Contract DOT-FH-11-9127; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294844/6ST

32 197367 ASSESSMENT OF THE INCLINED ELEVATOR AND ITS USE IN STOCKHOLM. This is a study of the inclined elevators installed in the Stockholm mass transit system. The Stockholm experience, reported herein, with operation of inclined elevators in subway stations is intended to serve as a basis for

judgment of the feasibility of inclined elevator applications in U.S. mass transit systems. During a two-week inspection of the Stockholm subway system, five specialists studied the inclined elevator and its setting, including planning and architectural aspects, design, construction, maintenance, costs, and actual use. An onsite investigation was conducted by a multidisciplinary team through direct observation of equipment; interviews of personnel concerned with the development, operation, and use of the elevators; and review of source material. The inclined elevators are technically similar to vertical, counterweighted, mechanical traction-type automatic elevators, except for the inclined travel. Their installation within escalatorways integrates the travel path of elderly and handicapped elevator users with the escalator route of able-bodied passengers. Station arrangement is simplified where separate vertical elevator shafts and lateral connections to platforms can be eliminated. Inclined elevators are a possible alternative to vertical elevators in U.S. subway systems for new stations where escalator rise is greater than 40 feet, or greater than 25 feet and accompanied by a lateral displacement that prevents vertical connection.

Hansen, TB Worrell, JS King, J Reinsel, RE O'Brien, TO ; De Leuw, Cather and Company, General Services Administration, Massachusetts Bay Transportation Authority, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0172-79-1, Sept. 1978, 73 p.; Prepared in cooperation with General Services Administration, Washington, DC., and Massachusetts Bay Transportation Authority, Boston.; Contract DOT-UT-70097; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294854/5ST

32 197450 KNOXVILLE COMMUTER POOL. ANNUAL REPORT. The Brokerage Bureau, commonly known as the Knoxville Commuter Pool (KCP), came into being on October 23, 1975, through a formal agreement between the Urban Mass Transportation Administration and the City of Knoxville. Currently the KCP is a part of the City government; however, its services actually extend over a region comparable to the East Tennessee Development District. KCP has acted to integrate vanpools into the general ridesharing system which includes carpools, transit buses, and privately operated express buses. One of the most significant accomplishments of the KCP was the establishment of credibility and awareness among the local business community and the general public, concerning ridesharing. This annual report presents a concise description of the background, objectives, organization, and accomplishments of the Knoxville Transportation Brokerage Project. Special attention is given to details of employer/employee participation, concentrated program efforts in the Central Business District, and a telephone information and brokerage service. The vanpool program is described in detail, including maintenance, the transition of the vans to private ownership, and the formation of an association of private vanpool owner/operators. Other aspects of the project are also covered, including the development of computer matching capacity, social service brokerage, a downtown fare free bus zone, and promotion and advertising.

Beeson, JD ; Knoxville Commuter Pool, Urban Mass Transportation Administration UM-

TA-TN-06-0006-78-2, Nov. 1978, 80 p.; See also the report dated Nov 1978, Volume 1, PB-292592.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295046/7ST

32 197500 INTEGRATED PARA-TRANSIT TRANSPORTATION PLANNING FOR OFF-PEAK LOW DENSITY TRAVEL. The product of this research project is a three-report reference to aid in planning for off-peak transportation services. They constitute a comparison volume to a report entitled: Para-Transit: An Assessment of Past Experience and Planning Methods for the Future, Volumes 1 and 2 (available from NTIS), which describes the use of paratransit modes in the provision of journey-to-work transportation in low density areas. This present three-report volume provides guidelines for planning paratransit for off-peak and/or non-work travel. As a summary of off-peak trip characteristics, Report 1, provides the background for two subsequent reports: Report 2: Elderly and Handicapped Transportation and Report 3: Planning Methodology (available from NTIS). It is not intended to be comprehensive, but rather to furnish the basic nature of off-peak travel. With some exceptions, this report may be viewed as an examination of non-work trips, since most of the travel discussed here relates to other trip purposes. Most of the data in this report are based on the Chicago area, since this area is felt to be representative of many of the transportation problems facing urban areas today. (UMTA)

Cardoso, A Gallery, M Hamilton, N Lewis, D Soot, S ; Illinois Univ. at Chicago Circle. School of Urban, Sciences.*Urban Mass Transportation, Administration, Washington, DC., (IL-11-0023) Final Rpt. UMTA-IL-11-0023-79, Sept. 1978, 257 p.; Sponsored by the Urban Mass Transportation Administration. The three reports are published individually, as PB-295464/AS, PB-295465/AS, and PB-295466/AS, respectively.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295463-SET/ST

32 198203 THE ROCHESTER NEW YORK INTEGRATED TRANSIT DEMONSTRATION. VOLUME I: EXECUTIVE SUMMARY. The Rochester Integrated Transit Demonstration (RITD) was designed to assess the roles of demand-responsive transit services in a regionwide transit system that includes an extensive fixed-route bus network. The demonstration extended transit service into suburban areas by using integrated mixes of fixed-route and paratransit services. Four types of innovations were demonstrated: service; system integration; equipment; and fares, marketing, and promotion. This report describes the conduct of and the impacts resulting from the implementation of a family of demand-responsive transit services and several related innovations in Greece and Irondequoit, New York (two suburbs of Rochester). The report covers the time period beginning with the implementation of PERT (Personal Transit) services in August 1973 through July 1977. The report contains a description of the implementation process and the impacts of individual services and innovations on the level of service provided, transit demand, and transit productivity. The implications of the Rochester experience are summarized for the benefit of other localities considering the implementation of similar services.

Lave, RE Holoszyk, MA ; Systan, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NY-06-0048) Final Rpt. DOT-TSC-UMTA-78-51-1, Mar. 1979, 82 p.; See also Volume 2, PB-296876. Also available in set of 3 reports, PB-296874-SET.; Contract DOT-TSC-1084; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296875/8ST

32 198204 THE ROCHESTER NEW YORK INTEGRATED TRANSIT DEMONSTRATION. VOLUME II: EVALUATION REPORT. The report describes the conduct of and the impacts resulting from the implementation of a family of demand-responsive transit services and several related innovations in Greece and Irondequoit, New York, two suburbs of Rochester.

Lave, RE Holoszyk, MA ; Systan, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NY-06-0048) Final Rpt. DOT-TSC-UMTA-78-51-2, Mar. 1979, 383 p.; See also Volume 1, PB-296875, and Volume 3, PB-296877. Also available in set of 3 reports, PB-296874-SET.; Contract DOT-TSC-1084; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296876/6ST

32 198205 THE ROCHESTER NEW YORK INTEGRATED TRANSIT DEMONSTRATION. VOLUME III: APPENDICES. The report describes the conduct of and the impacts resulting from the implementation of a family of demand-responsive transit services and several related innovations in Greece and Irondequoit, New York, two suburbs of Rochester. Volume Three contains the appendices, including a glossary, copies of measurement instruments, and tabulations of survey results.

Lave, RE Holoszyk, MA ; Systan, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NY-06-0048) Final Rpt. DOT-TSC-UMTA-78-51-3, Mar. 1979, 197 p.; See also Volume 2, PB-296876. Also available in set of 3 reports, PB-296874-SET.; Contract DOT-TSC-1084; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296877/4ST

32 198747 PARATRANSIT REPORTING SYSTEM: A SYSTEM FOR COLLECTING AND REPORTING UNIFORM PARATRANSIT FINANCIAL AND OPERATING STATISTICS. In July, 1976, the Urban Mass Transportation Administration contracted to develop and test the implementation of a computerized system for collecting and reporting paratransit financial and operating statistics. The project objectives are: to expand/modify the computerized uniform system of accounts and records developed in project TAXISTATS so that it can be applied to all paratransit operations; to ensure that this reporting system is compatible with the reporting system developed for scheduled mass transit operations (FARE System) and to test and implement the computerized uniform reporting system in several paratransit operations to provide necessary information for large-scale implementation of the system. The report provides the documentation of the system and is divided into four chapters: Chapter I 'General description' presents an overview of the system,

how it relates to the required FARE System for transit operators, and discusses implementation issues; Chapter II 'Analytical reports' describes the reports that are generated for use by paratransit operators, UMTA, and the general public; Chapter III 'Instruction manual' contains definitions of the accounts and records and provides instruction to the paratransit operators as to how to fill out the data transmission reports; and Chapter IV 'Data processing procedures and program descriptions' provides the general documentation of the automatic data processing aspects of the system.

International Taxicab Association, Urban Mass Transportation Administration Final Rpt. UMTA-IL-06-0035-78-1, July 1977, 183 p.; Prepared in cooperation with Wells Research Co., Washington, DC., and Control Data Corp., Bethesda, MD.; Contract DOT-UT-60064; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298155/3ST

32 199018 IMPLEMENTING THE ROCHESTER COMMUNITY TRANSIT SERVICE DEMONSTRATION. The report describes the implementation process and the early impacts of the Rochester Community Transit Service demonstration in four suburbs of Rochester, New York. The demonstration project is an outgrowth of an earlier one which ended in October 1977. The new demonstration will continue until July 1979. In the first demonstration, a variety of demand-responsive services were operated in two Rochester suburbs--Greece and Irondequoit. In the new demonstration, the door-to-door dial-a-ride service was expanded in July 1978 to two additional suburbs--Brighton and Henrietta, and the handicapped service became a region-wide operation over a four-month period starting in July 1978. In addition, all four dial-a-ride service areas will eventually have computerized scheduling and dispatching using a dedicated minicomputer. The new demonstration is largely concerned with two institutional innovations developed by the Rochester-Genesee Regional Transportation Authority to deal with the problems of high operating costs and insufficient local funding availability. These innovations are the use of a competitively selected private operator and the shifting of the funding responsibility to the suburban towns served by dial-a-ride. The report describes the events leading to these innovations, their implementation, and their results and implications thus far.

Holoszyk, M Newman, DA ; Systan, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NY-06-0048) Intrm Rpt. DOT-TSC-UMTA-79-20, May 1979, 140 p.; See also report dated March 1979, PB-296875.; Contract DOT-TSC-1416; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298979/6ST

32 260220 POLICY-SENSITIVE MODEL FOR MODE SPLIT PLANNING. Urban transportation mode choice is critically dependent upon residential walk times, transit frequency, and out-of-pocket costs. A policy-sensitive model of these attributes account for a significant portion of mode choice variation among a set of commuters. A discrimination-classification model was generalized and used to simulate the probability that an individual would choose an abstract mode, k, of policy-sensitive variables.

The variables were used to define linear discriminant functions and mode choice probability was tested based on individual discriminant functions by a model. Data for calibration were provided by a hand out/mail back travel survey of commuters to the central business district of Vancouver, B.C. Presimulation tests showed that transportation system attributes were more important than socioeconomic characteristics in the mode choice decision.

Brown, GR (British Columbia University, Canada) *ASCE Journal of Transportation Engineering* Vol. 99 No. TE4, Proc. Paper 10123, Nov. 1973, pp 711-724, 7 Tab., 9 Ref., Apps.

32 260246 VAN, BUS POOLS OPERATE SUCCESSFULLY. The 3M Company's ride-sharing project in St. Paul, Minnesota which operates 41 vehicles on a profit-to-the driver plan is described. Drivers were selected to form and manage pools of at least 8 passengers. The company leased a van on a mileage-based fee which was calculated to recover all costs of vehicle insurance, maintenance and operation. The cost was estimated to be \$6.10 per day and 5.5 cents per mile. The fee charged to riders varies from \$19.50 per month for the shortest trip (seven miles) to \$29.50 monthly for the longest (40 miles). The driver, in addition to his own free transportation, keeps all income collected from passengers above 8 persons and may also use the van for private purposes for a charge of 7 cents per mile. The company absorbs administrative costs. Van drivers who must have a special Minnesota licence, have the responsibility of arranging for standby drivers, and must see that the company-paid maintenance is performed. Other firms are investigating van and bus pools as a means of reducing urban traffic congestion and lowering commuting costs. A bus may be used when a sizeable number of people live in the same general area or can collect at a common intermediate point and travel to the same destination. The most common arrangement is the chartering of a bus to serve one or more collector localities. Among the most successful programs are those of the Government Employees Insurance Company in Bethesda, Maryland which operates 8 buses, and the Atlantic Ritchfield Company program in Los Angeles which operates 14 buses.

Automotive Information Vol. 2 No. 11, 1974, p 2

32 260259 STATUS OF CARPOOLING IN THE HIGHWAY PROGRAM. Carpooling is one way of immediately reducing gasoline consumption without having to severely restrict personal mobility or expend large amounts of public funds, or do harm to other important and desirable national goals. One of the provisions of the "Emergency Highway Energy Conservation Act" was to permit Federal-aid highway funds, normally available for urban highway construction projects at a 70 percent Federal share, to be used for carpool demonstration projects at a 90 percent Federal share. The types of demonstration projects that are eligible for this bonus Federal share include those for (a) manual or computerized systems for locating and informing potential participants in carpools or buspools, (b) work necessary to designate existing highway lanes (whether or not the highway is on a Federal-aid system) as preferential carpool lanes or bus and carpool lanes, (c) traffic control

devices that are necessary to advise motorists and control the movement of carpools, (d) work necessary to designate existing publicly owned facilities as preferential parking for carpools, and (e) the risk or "abort" cost of making commuter driven vanpool service available. The directive implementing this provision gives the FHWA division engineers complete authority to approve projects and to use maximum discretion in working with the State highway agencies to develop meaningful projects. As of May 1974, 34 carpool demonstration projects involving \$5 million have been approved for funding under the 90 percent Federal funding provisions of the Emergency Highway Energy Conservation Act. The projects are located in 29 cities in 10 different States. In addition to these, there are many more that are being developed and are in the process of being approved. The author notes, however, that reports from field offices indicate that with the recently improved situation involving the availability of gasoline at the service stations, there is a general falling off of interest on the part of many groups for continued promotion of carpooling and other energy conservation programs. Citing the examples of the successes of Shirley Highway (northern Virginia), Reston Charter Bus Co. (northern Virginia, Long Beach, California, and the San Francisco-Oakland Bay Bridge, he concludes these projects are valueable and should be continued.

Morin, DA (Indian Institute of Technology) ; Western Association of State Highway & Transp Off June 1974, 5 pp; Proceedings of the 53rd Annual Meeting of the Western Association of State Highway Officials held at Portland, Oregon on June 6, 1974.; ACKNOWLEDGMENT: Federal Highway Administration

32 260268 SECRETS OF A CAR POOL. Carpooling reduces traffic, cuts down on vehicular pollution and saves gasoline. For individuals, carpooling can cut the cost of commuting dramatically. Three key factors must be taken into consideration when forming carpools: time, origin and destination of commute. Computer matching services are an efficient way of gleening this information and forming carpools. Once a carpool has been formed, other factors come into play; adequate insurance and the possibility of leasing a car for the pool. Human nature is a major consideration of any car pool and matters such as promptness, smoking and temperament should be discussed. A carpool with happy members does not happen automatically but the effort is worth it economically and ecologically. Smith, B ; Shell Oil Company 1974, 19 pp

32 260305 MINIBUS AND DIAL-A-RIDE: INITIAL EXPERIENCES WITH THE ABINGDON EXPERIMENT. A review of the first five months of this experiment is presented, together with the findings of user and household surveys. Some specific conclusions are drawn for the Abingdon situation, together with guidelines for further experiments elsewhere. The major problems are those of educating the public on how to use the new system, and of maintaining adequate access to the system for people who do not own a telephone. /Author/

Slevin, R Cooper, AE (Cranfield Institute of Technology, England) *Traffic Engineering and Control* Vol. 14 No. 12, 1973, pp 586-589, 4 Fig., 9 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 207368)

32 260307 TRRL'S MINITRAM-BIG PROMOTION JOB BUT NO FIRM ORDERS YET. A brief review of the personal rapid transit system developed by the Transport and Road Research Laboratory, the Minitram project, which was on display at the laboratory's conference "Moving People in Cities", is presented. Brief details are given of the system and of the proposals for an experimental full-scale project, possibly in Sheffield. /TRRL/

Wiseman, R *New Civil Engineer* No. 36, Apr. 1973, pp 22-23, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 206030)

32 260618 DEMAND-RESPONSIVE TAXI SYSTEMS: NEW YORK CITY EXPERIENCE. The medallion taxi industry in New York City, particularly with respect to two-way radio communications, has potential as a demand-responsive transportation system. A passenger is motivated to call a cab by a number of reasons, from simple convenience to extremes of need for dependable transportation. The business person going to or from work, daytime shoppers, elderly and handicapped people needing door-to-door arrangements, and travelers requiring rides to depots or airports during late evening and early morning hours when demand exceeds the general taxi supply often utilize radio-cabs. Requirements for ownership, operations and equipment for radio cabs are detailed here as well as the city's regulation of location of operations. Informal cab and fare sharing have long existed. A recent demonstration of Dial-a-Ride was conducted in an area of the city containing a high density of the aged population. A new ten-passenger "maxitaxi" vehicle is being considered with which to capitalize on a variety of group riding applications.

Mautner, AJ *Traffic Quarterly* Vol. 28 No. 3, July 1974, pp 453-465

32 260621 COMPARISON OF TAXI AND DIAL-A-BUS SERVICES. A probabilistic model of a conventional taxi service is formulated and analyzed. This model also applies to other queueing systems in which the servers must travel to the customers. The main assumptions are that demand is homogeneous and that the street network is uniform in a certain sense. Computer simulations incorporating these assumptions were made of both the taxi service and a many-to-many dial-a-bus system. It was found that small dial-a-bus vehicles (capacity 6-8) can serve 50 percent more people than taxis with only a slight increase in travel-time. An attempt to carry more passengers leads to steadily greater travel-times. However, dial-a-bus is generally less affected by changes in demand than taxis. The size of the region served has a pronounced effect on the efficiency of both dial-a-bus and taxi services.

Gerrard, MJ *Transportation Science* Vol. 8 No. 2, May 1974, pp 85-101

32 260637 COMMUNITY/SCHOOL BUS PROJECT. A PILOT PROJECT USING SCHOOL BUSES FOR PUBLIC TRANSPORTATION. The Community/School Bus Project, funded by a demonstration grant from UMTA, was designed to test the feasibility of using school buses for public transportation when not in school service, thus obviating formidable

capital investment in equipment. Klamath Falls, Oregon, is a small urban community (approximately 36,000) lying in the heart of a sparsely populated region. Prior to the commencement of this project the area has been without the public bus service since 1958. According to the 1970 Census, nearly 15% of the population was 62 years of age or older. The combination of a number of conditions, namely, a community without public transportation and a growing demand for such service, the resistance of taxpayers to local budget increases, and the existence of idle school buses led to the conception of this demonstration project. Three objectives were: (1) to test and report on feasibility of using school buses for public transportation during their idle hours; (2) to evaluate the need for public transportation in the area; and (3) to lay a foundation for continuing a public bus service after conclusion of the project. The two phases of the project were during the 1972-3 school year when service was part-time and during the summer of 1973 when buses were continually available. Organization, operations, community response, local versus state operation, legislation, conclusions and recommendations are discussed. Photographs complement the text and appendices include advertising techniques. /UMTA/

Klamath Area Transit, (OR-06-0001) Final Rpt. UMTA-OR-06-0001-73-1, Dec. 1973, 108 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233509/AS

32 261588 DIAL-A-BUS MANUAL, VOLUME 1. This report is the first of a two volume study of the Dial-a-Bus concept. It forms an introduction to the subject and its purpose is to provide members of city councils, transit managers, city managers, other municipal officials and interested citizens with a non-technical explanation of D.A.B. operation. It also highlights the attractiveness of D.A.B. in terms of the social and transportation objectives of a community.

Transportation Development Agency, Canada Vol. 1 Jan. 1974, 7 Fig.

32 261611 ELECTRICS TRY TO EASE AMSTERDAM CONGESTION. A new concept in the design and organization of rent-a-car fleets has been introduced in Amsterdam. Designed to serve as an alternative to private cars and the existing means of public transportation, the Witkar ("white car") differs from conventional car-rental systems in that all of the cars are two-passenger electric cabs intended for use only in the downtown area. Five stations and 35 cars are scheduled to go into service later this year, and 15 stations and 125 cars are planned for the near future. They are all electric vehicles, occupying only one-third the road surface of the average car. The cars are 86 inches high, and plastic construction limits total weight, including battery, to 858 pounds. They have a 55-inch-wide steel chassis and a 55-inch wheelbase. Because a number of important modifications remain to be made, it is still too early to predict the ultimate feasibility of the Witkar system. But its possibilities as an alternative to other means of urban transportation are already being studied by the city government of Rotterdam (The Netherlands), Luxembourg (Luxembourg) and Boston.

Senger, WM *Automotive News* Vol. 49 No. 4498, July 1974, pp 29-30

32 261655 MANUAL CARPOOL MATCHING METHODS. There are three basic types of manual matching for carpools; centralized, locator and roster. The roster technique is best applied to small groups of about one hundred. The Locator board method is most effective in an office building type of situation where it is a self service type of arrangement. More administrative work is required for the centralized technique but is the best method to use as a transition between manual and computer methods. Essential requirements for an effective matching technique are: good maps, standardized grid and questionnaires, commitment of the people involved, incentives, feedback and public information. Matching seems to work best in a work situation.

Department of Transportation Jan. 1974, 33 pp, 14 Fig., Photos., 1 App.; This report is part of a series. The full report is entered in HRIS as 263921. Prepared by Alan M. Voorhees and Associates, Inc.

32 261659 TRANSIT/TAXI COORDINATION. Potentially carpools, buspools and vanpools could threaten taxis and public transit by reducing ridership. As carpools are given priority treatment in terms of express lanes and special tolls it adds to their attractiveness over more traditional taxis and public transit. A coordinated program of both means of transit could be mutually beneficial. Taxi and Transit operators are already good resources on public transportation and could even be used to form and run carpools of act in an advisory capacity. As part of questionnaires in matching carpools, information could be gathered on using taxis as a feeder system, subscription services or willingness to join a bus or taxipool. Matching data could indicate where and when there is a need for more taxi and transit services or a group large enough for an transit pool rather than a carpool. The public information phase in coordination with transit could provide route maps and information on taxi areas. This also would enable the commuter to choose a convenient back up service for carpooling. Priority lanes could be opened to all multioccupancy vehicles above a certain minimum. Transit services could provided feeder services, demand responsive transit, shuttle services taxipools, group shared riding in taxis and jitney services.

Department of Transportation Jan. 1974, 26 pp
This report is part of a series. The full report is entered in HRIS as 263921. Prepared by Alan M. Voorhees and Associates, Inc.

32 261660 BUSPOOLS. Buspools are a transit service where the riders determine the routes, headway, origin destination and sometimes the fare. It can apply to any kind of trip (work, shopping, social) that is established on a weekly or monthly basis. Buspools can be instituted where there is a large group of people with the same origin and destination, a high volume collection point, buses for charter, a group to initiate the pool, a high level of service and a distance long enough to make buspooling more practical over carpooling. Use of the bus during nonpooling hours makes buspooling more economical and energy efficient. Successful buspools are operating in Reston, Virginia, Mantua, Virginia, Columbia, Maryland, Pittsburgh, Pennsylvania, Omaha, Nebraska, Tuxedo, Maryland, Rochester, New York, San Francisco and Long Beach, California.

Department of Transportation Jan. 1974, 18 pp

This report is part of a series. The full report is entered in HRIS as #261652. Prepared by Alan M. Voorhees and Associates, Incorporated.

32 261663 VANPOOLS. Vanpools are defined as vehicles used to carry from seven to fifteen passengers. This form of pooling on a wide scale can reduce traffic during peak hours, help alleviate air pollution and aid energy conservation. The vanpool participant profits by having door to door transportation and reduced travel costs. The employer profits by having a multipurpose vehicle. Large employers can implement their own vanpool systems. While smaller ones may find it convenient to use an outside agency. Vanpools sometimes grow out of two carpools serving the same area. Employees should be used for support and promotion of vanpools. The 3M Corporation's "Commute-a-Van" has been very successful.

Department of Transportation Jan. 1974, 13 pp, 1 Tab.; This report is part of a series. The full report is entered in HRIS as 263921. Prepared by Alan M. Voorhees and Associates, Inc.

32 261982 AUTO RAPID TRANSIT: BENEFITS COMMUTING DRIVERS, PASSENGERS, OTHER TRANSIT MODES AND THE ENVIRONMENT. A new modified jitney mode of transportation is proposed called Auto Rapid Transit (ART) that could become popular for peak period work travel in an energy conservation economy. Conceptually, it uses the services of citizens making work trips as transit drivers and their private cars as transit vehicles. The appeal is that drivers would supplement their regular incomes with transit fares from passengers and passengers could get a cheap, line-haul high frequency level transit service. The ART vehicles would not be allowed to operate in off-peak period between regional transportation centers. This new mode of travel should be considered as another low cost means of easing the available seating capacity in peak travel period transportation systems.

Mann, WW *Traffic Engineering* Vol. 44 No. 8, Apr. 1974, pp 6-11

32 262933 POTENTIAL DEMANDS OF A DIAL-A-BUS SYSTEM. THIS ARTICLE DESCRIBES THE ROLE DIAL-A-BUS MIGHT PLAY IN AN URBAN AREA WITH A POPULATION UNDER 1 MILLION. DIAL-A-BUS WAS FOUND TO BE MOST SUCCESSFUL WHEN COMBINED WITH MAIN-LINE SERVICES INTO AND OUT OF THE CENTRAL BUSINESS DISTRICT (CBD). RESIDENTIAL AREAS WOULD BE DIVIDED INTO SECTORS EACH SERVED BY ONE OR MORE 20-SEATER "JITNEYS", WHICH WOULD OFFER A SERVICE CONNECTING WITH MAIN-LINE BUSES. HIGH SPEEDS ON THE MAIN LINE WOULD BE ACHIEVED BY INFREQUENT ACCESS POINTS AND BUS ONLY LANES, WHICH WOULD ALSO FACILITATE SYNCHRONIZATION INTO THE JITNEYS AND NOT REQUIRE ADDITIONAL INVESTMENT IN BUSES. TO BE ATTRACTIVE TO POTENTIAL RIDERS, DIAL-A-BUS WOULD ALSO REQUIRE SUBSIDIES IN OFF PEAK PERIODS THE JITNEYS COULD BE USED FOR

CROSS MOVEMENTS BETWEEN AREAS OUTSIDE THE CBD AND NOT PASSING THROUGH IT. IT IS CONCLUDED THAT DIAL-A-BUS COULD BE SUFFICIENTLY CHEAP AND QUICK TO ENCOURAGE SUBSTANTIAL TRANSFERS FROM PRIVATE CAR TO PUBLIC TRANSPORT. /TRRL/

Soliman, AH Manastersky, R *Traffic Engineering and Control* Vol. 15 No. 8, Dec. 1973, pp 402-403, 1 Fig., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208435)

32 263361 HADDONFIELD DIAL-A-RIDE THIRD PROGRESS REPORT. The Haddonfield Dial-A-Ride Demonstration Project is one of more than 40 demand-responsive transportation systems currently being used throughout the world. The prime objective of this particular project is to obtain accurate and reliable data for evaluation of the Dial-A-Ride concept. This third progress report delineates project direction during Phase II, beginning February 1, 1973 and ending January 31, 1974. It details ridership trends, vehicle productivity, service quality, revenues, and costs of operation. The report includes a quantity of graphs, charts, and tables that show the effects of service-area expansion, fare reduction, fleet expansion and service innovation. The main objectives of the Project for the period covered by this report were to: (1) determine achievable performance maxima for the Haddonfield manually scheduled Dial-A-Ride system; (2) determine when the manually scheduled system should be abandoned in favor of computer scheduling; (3) develop the system constants required to implement a computer-based scheduling function; and (4) simultaneously expand the service areas and introduce new system concepts while maintaining or improving service quality. To meet these objects, the following changes were made: two service area expansions, addition of six 10-passenger buses, inauguration of a shuttle service and a basic and senior citizen fare reduction. /UMTA/

Mitre Corporation, (NJ-06-0002) UMTA-NJ-06-0002-74-4, July 1974, 68 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236094

32 263374 THE HADDONFIELD DIAL-A-RIDE DEMONSTRATION: DEMOGRAPHIC, SYSTEM AND USER CHARACTERISTICS. Data concerning the Dial-A-Ride demonstration in the Haddonfield, New Jersey area are presented in tabular and graphical form. This is a demonstration conducted by the Urban Mass Transportation Administration of the U.S. Department of Transportation, and the New Jersey Department of Transportation. The tables and graphs found in this report summarize the major characteristics of the area served, the attributes of the services provided and the characteristics of Dial-A-Ride users. Where it is possible to do so, comparisons are provided between the characteristics of the Dial-A-Ride users and those of the entire area served. The information used in this report was obtained from household surveys conducted during October 1971 and January 1973, from trip ticket data through October 1973, and from three on-board surveys conducted in January, July and September of 1973. /MITRE/ Medville, DM Arrillaga, B ; Mitre Corporation, (M73-228, Rev. 1) UMTA-VA-06-0012-74-4, Mar. 1974, 37 pp; Contract DOT-UT-10028;

ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235995

32 263570 PAST, PRESENT, AND FUTURE OF DEMAND-RESPONSIVE TRANSPORTATION. In a discussion on the development of and prospects for demand-responsive transportation, the panelists called for a cost-benefit justification of dial-a-ride and a state-of-the-art analysis of integrated system in order to determine cross subsidization and trade-offs in productivity of fixed-route and dial-a-ride systems. Consideration is also given to management and marketing techniques, labor problems, attitude of consultants, and funding. The necessity for complete integration of systems, expertise in dial-a-ride implementation and information dissemination methods is discussed.

Roos, D (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 147, 1974, pp 81-85; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

32 263572 DIAL-A-RIDE: OPPORTUNITY FOR MANAGERIAL CONTROL. Competent management requires the ability to perceive problems, the ability to conceptualize solutions, and the skill to communicate both the problem and the solution to those responsible for carrying out management directives. It also requires that managers infuse the issue with a sense of urgency so that the solution is implemented. For the most part, public transit has not been managed by these objectives. Rather transit management has been totally absorbed with service, maintenance, and escalating costs. Policy decisions in public transit are often based on inadequate, outdated, or incomplete information or have come too late to reverse system inefficiency. Costs rise, the level of service falls, and patronage drops to levels so low that many operations are in desperate financial situations. And yet transit systems continue to be managed by hierarchical control. Effective management through the control of information flow will reverse this trend. Dial-a-ride transit, with its capability of providing real-time information about system status, is an ideal medium in which innovative management techniques can be tested. This paper explores the opportunities dial-a-ride offers for developing innovative systems for the management, control, and interpretation of information and outlines information flow techniques that can be useful in the optimization of system efficiency.

Fielding, GJ Shilling, DR (Orange County Transit District, California) *Transportation Research Board Special Reports* No. 147, 1974, pp 69-77, 8 Ref.; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation System conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB Publications Off

32 263573 TECHNIQUE FOR SELECTING OPERATING CHARACTERISTICS OF DEMAND-ACTUATED BUS SYSTEM. As the number of applications of demand-actuated public transit systems increases, careful consideration

must be given to the selection of operating policies. It is not sufficient to merely determine that a demand-actuated system is better than a fixed-time operation. We should also attempt to select those operating characteristics that result in the optimal benefit to the user, operator, and community. In this paper, we explore the effect of several variables on the economic and service characteristics of demand-actuated systems. Comparative tables and charts describe a process for selecting the "best" system for prescribed service area and potential demand. The variables include scheduling dynamics and routing dynamics. The selection criteria include user statistics such as ride time and waiting time and operator statistics such as total capital cost, operating-hours, and vehicle productivity. The selection of a system will necessitate a trade-off between service and operating costs, and techniques for formalizing these decisions and results of applying these techniques are presented.

Taylor, WC (Michigan State University, East Lansing) Datta, TK (Wayne State University) *Transportation Research Board Special Reports* No. 147, 1974, pp 54-68, 16 Fig., 3 Tab., 8 Ref. Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

32 263574 ANALYTIC MODEL FOR PREDICTING DIAL-A-RIDE SYSTEM PERFORMANCE. Though much work has been done on the supply side of dial-a-ride systems, little has been done which allows for prediction of the demand aspects of such a system. In this paper a model is presented which includes both supply and demand, and allows transit planners to explore a variety of design and policy options. The model predicts the equilibrium operation of a dial-a-ride system and the outputs including revenues, costs, ridership and quality of service. The supply model considers trips to consist of two parts: wait time and travel time. The demand model considers the elasticity of modal split with respect to wait time, travel time, and fare.

Lerman, S Wilson, NHM (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 147, 1974, pp 48-53, 8 Fig., 1 Tab., 8 Ref.; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

32 263575 DEMAND, SUPPLY, AND COST MODELLING FRAMEWORK FOR DEMAND-RESPONSIVE TRANSPORTATION SYSTEMS. A comprehensive evaluation framework to aid in the implementation of demand-responsive transportation systems is proposed. The framework consists of demand, supply, and cost models that could be applied at general and detailed levels of decision. General-level models use information from existing demand-responsive operations in the United States and Canada. The models provide estimates of expected ridership, vehicle supply, ridership, and cost of operations as a function of system parameters such as population density, fleet size, fare, travel time, and control center requirements. The use of the models to obtain these estimates is

exemplified, and their sensitivity to parametric changes is discussed.

Arrillaga, B Medville, DM (Mitre Corporation) *Transportation Research Board Special Reports* No. 147, 1974, pp 32-47, 15 Fig., 3 Tab., 6 Ref. Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

32 263577 AUTOMATION IN DISPATCHING DEMAND-RESPONSIVE VEHICLES. The role of automation in dispatching demand-responsive transportation vehicles is discussed. Panelists discussed the justification for, and performance of the system. A computerized dispatch system alleviated two problem areas of the taxicab industry: piracy; and favoritism. Costs are considered in terms of time and money saved. The panelists are questioned on user and staff attitudes, and on the extent of automation and backup system. Future plans such as dial-a-ride application for cabs, computer digital systems and data communications between cab and dispatch center are discussed.

Shackson, RH (Ford Motor Company) *Transportation Research Board Special Reports* No. 147, 1974, pp 17-24; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

32 263579 DEMAND-RESPONSIVE TRANSIT SYSTEMS. INTRODUCTION. An overview is given of second-generation demand-responsive systems, and experiences of first-generation system (those from 1970-1972) are considered. The significance of these systems in public transportation as well as in demand-responsive transit is shown.

Roos, D (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 147, 1974, pp 1-2; Proceedings of the Fourth Annual International Conference on Demand-Responsive Transportation Systems conducted by the Highway Research Board on October 3-5, 1973, Rochester, New York.; ORDER FROM: TRB, Repr. PC

32 263670 PROCEEDINGS OF THE WORKSHOP ON MOVING WAY TRANSPORTATION SYSTEMS. Moving way transportation systems are described as constituting means for massive movement of people in cities and in such places as airports, sprawling university campuses, shopping centers, rapid transit stations and the like, where traffic congestion or considerable walking distances occur. Principal issues affecting the development and implementation of moving way systems in the U.S. and abroad are discussed at this workshop, with a view to exchanging related socio-economic and technical concepts among the participants, while within bounds set by proprietary considerations. Engineering and economic data are presented not only to report prior state-of-the-art which goes back to the 1880's, but also to stimulate aggressive research and development activities in the private and public sectors. Questions of need, safety, financing, public acceptance and implementation of

moving way transportation systems are discussed with the development of a regard for the difficult problems that remain to be solved. Optimistic attitudes are discernable, however, in the sense that vigorous action is already underway, contemplated and projected.

Northeastern University, Transportation Systems Center, (MA-11-0006) UMTA-MA-11-0006-74-1, July 1974, 313 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC., Microfiche; PB-236348

32 263921 TRANSPORTATION POOLING.

With the advent of impending energy shortages in the winter of 1973-74, the U.S. Department of Transportation embarked on an accelerated program to promote increased use of high-occupancy vehicles--transit and carpools. As part of this program a series of reports was prepared that summarized the major aspects of carpool programs designed to assist local areas in initiating successful pooling action programs. This report is a collection of the ten individual reports. The goal of the Carpool/Buspool program is to satisfy travel requirements more efficiently by increasing passenger occupancy in autos and buses, thereby reducing the number of vehicles using the streets and highways. Achievement of that goal calls for coordination among many institutions within a metropolitan region. The information and techniques presented in this report should be considered as a guide to the development of a sound program in a metropolitan area. The individual reports contained in this volume are: Review of Carpool Activities, Organization for Carpooling, Approaches to Matching, Legal and Institutional Issues, Incentives to Carpooling, Transit/Taxi Coordination, Vanpools, Buspools, Pooling for the Disadvantaged, and Carpool Backup Systems. /UMTA/

Voorhees (Alan M) and Associates, Incorporated, (IT-06-0092) UMTA-IT-06-0092-74-1, Jan. 1974, 283 PP, 24 FIG., 7 TAB.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236157

32 264035 DEMAND ACTIVATED TRANSIT.

This report focuses on the problem of estimating the ridership increase experienced when regular fixed-route and fixed-schedule bus systems adopt a Dial-A-Bus policy. The mathematical model used to accomplish such estimation is a modal split model. At the time this study was initiated (Jan. 1971) there were three distinct Dial-A-Bus operations: Columbia, Maryland; Bay Ridges, a suburb of Toronto Ontario, Canada; and Mansfield, Ohio. All three communities had conventional fixed-route and fixed-schedule bus systems prior to the introduction of Dial-A-Bus. A combination of published data, data specific to Dial-A-Bus (DAB) operations, and data collected for 3 surveys were used to develop a modal choice model which explained the transit ridership increases. The model development depended on an understanding of transit operations and the interaction of patrons with the system. The technique used to develop the model was a process of fitting empirical data, from diverse sources, into a relationship which was reasonable from transit operation experience and easy for a transit planner to use. The model was then tested using a stochastic demand process and the Bay Ridges study area. The test showed the applicability of the model for small area transit analysis. The

study also established relationships between attitudes held by people toward potential service of DAB. Many attributes of DAB were ranked relative to each other, thus providing insight into DAB operation. /UMTA/

Navin, FPD; Minnesota University, Minneapolis Univ. Res. UMTA-MN-11-0003-74-1, June 1974, 305 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236753

32 264621 THE VALLEY TRANSIT DISTRICT DEMONSTRATION.

The Valley Transit Demonstration project represents a comprehensive and far reaching effort to develop new flexible forms of integrated transit operations to serve the transportation needs of many small to medium-sized cities. This interim report summarizes the significant results and accomplishments of this innovative bus system which has been in public operation for approximately 6 months in the Southern part of Connecticut. The three year program began July 1971 and is currently beginning its third year. The first phase (18 months in duration) was devoted to the design and development of equipment and operations. The second phase is concerned with testing and demonstrating the system in public operation. Operations at present involve the use of 6 medium-sized buses owned and operated by the Valley Transit District (VTD) of Derby, CT. Transit services provided include door-to-door, rent-a-bus, and shuttle service. Major accomplishments to date include: ridership response has been overwhelming with the VTD now taking action to double fleet size; a new concept of fare collection based on the use of credit cards is now an operating part of the system; and vehicle modifications have been demonstrated in actual transit operations to be highly acceptable and effective means of solving bus entry/exit problems encountered by elderly/handicapped passengers.

RRC International, Incorporated, (CT-06-0003) Intrm Rpt. UMTA-CT-06-0003-73-1, July 1973, 28 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236816

32 264711 GUIDELINES ON THE OPERATION OF SUBSCRIPTION BUS SERVICES.

The purpose of this report is to provide guidelines on the planning, organization, and operation of subscription bus services. The report deals with identifying potential riders; obtaining vehicles and drivers; meeting regulatory requirements; setting routes, schedules and fares; revising routes and schedules as demand changes; and obtaining special privileges such as the use of express lanes, priority movement at intersections, and close-in parking. The term "subscription" has been applied to a variety of specialized bus services tailored to serve urban travelers who patronize them on a regular basis, usually for their daily trips to and from work. This report concentrates on services provided by large buses. Guidelines are presented which are critical to the successful operation of subscription bus services. These guidelines are based on detailed case studies of subscription services in Wentzville, MO; Fredericksburg, VA; Huntington Beach, CA; Reston, VA; the San Francisco Mid-Peninsula; Gaithersburg, MD; Los Angeles, CA; Golden Gate Bridge, Highway and Transportation District "Commuter Clubs"; Flint, MI; and Peoria, IL.

The report concludes with a discussion of the potential impacts of subscription services on the congestion, pollution and fuel consumption associated with urban travel. A glossary and a bibliography are furnished.

Kirby, RF Bhatt, KU; Urban Institute, (UI-5021-4) UMTA-DC-06-0093-74-1, Aug. 1974, 75 pp; Sponsored by Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237076

32 264753 HIGHWAY'S POTENTIAL THROUGH CARPOOLING.

A cross-section of successful programs are reviewed ranging from public and private carpool programs to commuter bus operations, and the basic ingredient required by all carpool and buspool programs is identified as the matching of commuters sharing common Time-Origin Destination (TOD) needs into potential carpools or buspools. Other facets of a comprehensive carpool service are public information on the benefits of carpools and buspools, incentives for parking priorities, priority lanes, and continuing programs to provide carpool locator assistance. The data processing phase closes the information gap now existing between the potential ride sharers by making TOD information readily available. A computer program based on a grid system and developed by the FHWA is outlined. The public information phase which is a critical portion of a carpool program must stress the factors of time, cost, convenience and environment. The review of carpool matching programs for employee concentrations in specific residential areas, could provide valuable information to bus companies or citizen groups for establishing buspool routes. Implementation of these programs requires relatively short lead time and are low in cost as they essentially utilize existing facilities more effectively.

Pratsch, L (Federal Highway Administration); Tennessee University, Knoxville Proceeding Bulletin No. 40, Jan. 1974, pp 29-38, 4 Fig.; Proceedings of the 55th Annual Tennessee Highway Conference, 1973.

32 264839 THE CAB-TAXI-LOCAL TRANSPORTATION SYSTEM OF THE FUTURE

[Das Cabinen-Taxi-Nahverkehrs-System der Zukunft]. The article is a report of a project by demag foerdertechnik called the cab taxi (CAT); this hovers on supports above the road and does not affect other traffic. By means of a computer ticket the passenger determines his destination himself. The functioning of the CAT system, plans for its introduction and the construction of a test installation are described.

Hebe-und Ferdertechnik 114 pp, 2 Phot.AC. KNOWLEDGMENT: TRRL (IRRD 301246)

32 265202 CARPOOLS: THE UNDERUTILIZED RESOURCE.

The widespread adoption of carpools which can have a benefit/cost ratio of 47 to one, and the advantage of speedy implementation with little or no capital outlay, could help ease the current environment and energy-related problems. Rush hour congestion will be reduced, overall travel speed will be increased, and emissions and fuel consumption will be reduced. Urbanwide carpool programs implementable by 1975 can produce reductions in emissions far exceeding the absolute reduction in vehicle miles of travel. The smog generation problem between

6 a.m. and 9 a.m. is discussed in relation to speed and vehicle emissions. Whereas park-ride and kiss-ride facilities will not solve the problem of high emissions generated during the cold-start/hot-soak cycle of pollution controlled automobiles, vehicle pooling will offer a solution. Adding 2 or 3 more people with similar time-origin-destination to a vehicle, dramatically reduces the energy consumed per mile. An increase of rush hour auto occupancy by 30 percent can save 5 percent of the total highway fuel and 3 percent of the nations transportation fuel needs. Studies have shown that acceptable service is the most important factor in ride sharing. To optimize carpool formation, a comprehensive program consisting of 3 phases: carpool patching, public information, and incentives are recommended. The most successful incentive is identified as parking privileges for carpools. Other incentives (priority freeway lanes, higher tolls for single occupancy) are briefly reviewed. Comments are made on the increase in taxi use.

Pratsch, L (Federal Highway Administration) *ASCE Civil Engineering* Vol. 44 No. 1, Jan. 1974, pp 49-52, 4 Fig.

32 265302 DIAL-A-BUS MANUAL, VOLUME II. Dial-A-Bus is a demand-responsive transportation system in which the customer requests and receives personal transportation service. It is of benefit in areas where public transport does not offer regular service. This volume of the Dial-A-Bus Manual gives general guidelines for the principles of the system, since each system is unique and should be adapted to local conditions. Part I consists of the historical background of Dial-A-Bus, and presents comparisons of eight such systems in operation. Part II deals with design considerations, financial expenditures, fares, demand, site selection, and community factors. Aspects of implementation such as licenses, personnel, communication systems, and vehicle selection, are dealt with in Part 3. A bibliography of pertinent publications in 1972 comprises Part 4.

Transportation Development Agency Vol. 2 Mar. 1974, 168 pp, 41 Fig., 13 Tab., 1 App.

32 265322 URBAN LAND USE PLANNING: IMPLICATIONS OF A TELEBUS SYSTEM. The implications of urban transportation for land use planning are considered and illustrated in this article by examining the Telebus public transit concept recently introduced in Regina, Canada. The fact that so many riders use Telebus to travel within their communities, suggests a broad base of public utility and appeal. It further confirms the significant role which Telebus may play in contributing to the social interactions and physical design in neighborhoods, larger communities, and entire cities in terms of neighborhood design, community development, and physical structure of the city. A practical alternative to the private automobile, such as Telebus, can offer wide possibilities for people to move within and between neighborhoods to meet, discuss, barter and exchange goods and ideas.

Sherman, LC *Management Controls* Vol. 21 No. 12, Dec. 1974, pp 253-263

32 267009 DEMAND-RESPONSIVE TRANSPORTATION SYSTEM PLANNING GUIDELINES. Based on the limited empirical information of 12 demand-responsive transporta-

tion systems, preliminary planning guidelines have been developed to aid in the design of new demand-responsive systems. These guidelines facilitate the estimation of ridership, fleet size, staff requirement and costs. A summary is also presented of the major characteristics of these 12 demand-responsive systems that are operating in the United States and Canada. This summary illustrates the types of systems that have been recently implemented. They include many-to-many, many-to-few, many-to-one and route deviation systems.

Arrillaga, B Mouchahoir, GE ; Mitre Corporation, (MTR-6659) UMTA-VA-06-0012-74-6, Apr. 1974, 41 pp; Contract DOT-UT-10028; ACKNOWLEDGMENT: UMTA (VA-06-0012); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232970/AS

32 267010 SUMMARY OF AN AUTOMATED SCHEDULING SYSTEM FOR DEMAND RESPONSIVE PUBLIC TRANSPORTATION. The Dial-A-Ride Automated Scheduling System is a package of computer programs developed on a Westinghouse 2500 minicomputer by the MITRE Corporation under sponsorship of the Urban Mass Transportation Administration. The system contains an automated scheduler that dynamically assigns customer requests for trips to vehicle tours and dispatches the vehicles through their stops; data analysis programs that produce statistical reports on system performance; and programs to generate and maintain the data files required by the scheduler, such as the file of related street names. The automated scheduler accepts messages from control room personnel through computer terminals. The messages are processed by an interactive message editor that verifies the message and initiates the appropriate function. Functions performed by the real-time scheduler include the assignment of trip requests, deferment of trip requests to be assigned later, cancellation of trip requests, vehicle dispatching, vehicle positioning, reassignment of stops of a disabled vehicle, and complete monitoring capabilities. In addition, the system supports a file containing trip requests that are automatically scheduled on a periodic basis. During scheduling, vehicle tours are printed in the event of failure of the automated system and a tape file is created for use by the data analysis programs.

Rebibo, KK Scott, RL Ferrantino, JR Hartzler, RE Klopfenstein, RC ; Mitre Corporation, (M74-26) 2 UMTA-VA-06-0012-74-2, Mar. 1974, 28 pp; ACKNOWLEDGMENT: UMTA (VA-06-0012); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232419/AS

32 267014 DOOR-TO-DOOR BUSPOOLS: RECOMMENDATIONS FOR PUBLIC POLICY. Buspools, based on a partnership between a group of riders and a privately-owned bus company, provide potentially higher efficiency for commuter travel than traditional bus service. Pickup and discharge close to home and office eliminate necessary of transfer. Routes and schedules may be tailored to a specific group of commuters. Overcrowding is reduced. Multiple-trip tickets diminish demand for exact change and offer discount fares. Personnel is on-board, in addition to the driver, to generally make the trip more comfortable. For these reasons, this report suggests that buspools be given serious consider-

ation in formulating public transportation policy relating to commuter travel. The purpose of the report is to aid that consideration by first, describing the planning, implementation, expansion, refinement and problem areas of 2 previously undocumented community initiated and operated buspools based in Columbia, Maryland, servicing Washington, D.C. and Baltimore, Maryland, and then, by identifying ways that public policy can encourage creation of buspools. Buspools in Columbia; Reston, Virginia; Flint, Michigan; and Peoria and Decatur, Illinois, are compared. Indicated are overall advantages of having riders participate in operations and of having privately-owned companies rather than public transit authorities, provide buses and drivers. Public policy could encourage consumers' attempts to develop buspools by facilitating matching of time-origin-destination data, providing seed money to cover deficits in the initial period of operation and devising pricing policies for the charter of public transit equipment and drivers. Data on rider surveys, routes and scheduling, population characteristics and location maps are provided.

Truby, TJ (American University); Consortium of Universities, (UTC-11-73) Final Rpt. UMTA-DC11-0003-73-11, Nov. 1973, 57 pp; Appendix contains WMATA's Proposed Pricing Policy for "Community Type Regular Route Transit Service". References furnished.; ACKNOWLEDGMENT: UMTA (DC-11-0003); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231136/AS

32 267016 DOWNTOWN CIRCULAR SERVICE IN KANSAS CITY AN EVALUATION OF DIME-A-TIME. Since a number of cities have or are considering adopting some kind of downtown circulator service, it is useful to describe and analyze a specific bus circulator service such as Dime-A-Time in Kansas City, Missouri. This study describes Dime-A-Time and its history and then goes on to analyze Dime-A-Time by comparing its operations and characteristics with similar service in Cleveland and Denver. It is shown that by eliminating rush hour service (as in Denver), Dime-A-Time could cut its operating deficit although at the price of providing less service. A multiple regression model is used to test several hypotheses and estimate the value of the relationships among ridership, fare policy and external conditions. The estimates obtained from this regression model make it possible to evaluate the impact of fare changes. It is shown that a somewhat higher fare would increase total revenue but not substantially. The conclusions are that Dime-A-Time has been set up and operated in a reasonable manner, given its situation. Other cities may wish to adopt alternative systems such as the shorter hours used in Denver or the provision of circulator service with regular route buses. Benefits and costs of various alternatives are discussed.

Veatch, JF ; Urban Transportation Study Group UMTA-MO-11-0001-74-1, Feb. 1974, 81 pp; ACKNOWLEDGMENT: UMTA (MO-11-0001); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231911/AS

32 269939 WHITECAR SOON FOR HIRE [Witkar gaat Rijden]. In Amsterdam a three-month experiment will shortly take place to test a first station at the Amsterveld with seven

so-called whitecars. These cars are to be considered as small self-drive electric hire cabs for use in the city. Their users, driving from one station to another, are always sure to find a parking-place at the station of destination, which is reserved through a processor. In the first stage of the project, starting after the experiment, five stations and 35 cars are planned. Ultimately the network might comprise 150 stations in Amsterdam. This article contains a description of the whitecar-system. /Author/

Visser, C *Verkeerstechiek* Vol. 25 No. 1, Jan. 1974, pp 30-32, 3 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 209321)

32 272070 PUBLIC TRANSPORTATION PROBLEMS IN URBAN AREAS. The immediate problems facing the taxicab industry are: the inability to increase the productivity of the taxicab driver and service personnel; the inability to control the increased cost of doing business; and the inability to increase revenue sufficiently to offset higher costs. The high rate of turnover of taxicab drivers in a major problem in increasing productivity. The driver population includes employees, independent contractors and independent drivers in local associations. A 1972 report by the U.S. DOT states that a typical trip length for a sample survey was 5.8 miles of which 2.95 were paid miles. The number of passengers per trip was 1.3 persons and the receipts were 1.95 per trip. Cost analysis studies reveal that under the present rate structure, a company must achieve 60 percent paid-mile/operating ratio to remain profitable. A factor of great importance is the cost of doing business imposed on the industry by the government. An inconsistent pattern of tax levies has been imposed on the industry, and new administrative law has altered government-taxicab industry relations. Overregulation and underregulation by government damage the ability of companies to perform efficiently. At the present time, there are an estimated 7,200 fleet taxicab operations in the U.S. A fourth of these operate 10 taxicab or fewer, mainly in rural and suburban area. A study revealed that the rate increases are granted approximately every 3.5 years. The industry estimates that there is a 3 percent decrease in passenger trips each time a new rate is put into effect. Another study indicates that computerized dispatching offers the most immediate opportunity to increase productivity in the industry. Improved urban traffic conditions (restriction of private vehicle and the use of special lanes for buses, and hopefully, taxis) will further contribute to increased productivity.

Gallagher, RV (International Taxicab Association) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 20-23, 1 Ref.; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

32 291122 FUTURE DEVELOPMENT IN PERSONAL TRANSIT. Personal rapid transit systems are now under development in the U.S.A. These systems, comprising small capsules to transport family-sized groups of passengers, would operate on special guideways under full automatic control. Although it is foreseen that the initial installations of these types of systems in the next three to five years will be small in scale,

typically a few miles of guideway, the potential exists for area-wide urban systems that will gradually take over many of the transport functions of the automobile and conventional urban transport. In this paper the existing forms of land transport are reviewed to provide perspective for a discussion of advanced forms. The opportunities for advanced systems are seen in applications where existing modes are particularly deficient; for example, in high-density activity centres. It is shown that improvements in urban transport may be made by using more advanced technologies, or by a fundamental revision in the system concept, or both. The personal rapid transit concept is seen as a basic system innovation that offers a major departure from the mass transit concepts of the past. It is shown that it can be implemented either with conventional technology or may use advanced technology to reduce costs and improve performance. Three representative types of systems are described to illustrate hardware approaches by different industrial groups. The discussion emphasizes the possibilities of advanced technologies, an approach that appears to provide a better implementation of these systems and extend their potential. Possible long-range future developments in this new mode of land transport are reviewed. /TRRL/

Ross, HR (Transportation Technology Incorporated) *Institution of Mechanical Engineers Proceedings* Proceeding Vol. 184 No. 25, pp 28-53, 6 Fig., 4 Tab., 8 Phot., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 203066)

32 300031 OPTIONS FOR SUBURBAN PARATRANSIT SYSTEMS. Once a public authority has decided on a paratransit service for suburban public transport, it has valuable lessons to learn from overseas experience. This is particularly true of the "second generation" demand responsive systems that followed early dial-a-rides. These are less flexible in scheduling, but maintain route flexibility which raises dependability, eases co-ordination with other services, and lowers dispatching costs. /Author/TRRL/

Adam, WM (Planning Workshop Proprietary Limited); New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 723-740, 2 Fig., 9 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239213), Australian Road Research Board

32 300034 POSSIBILITIES OF SEMI PUBLIC TRANSPORT/PARA-TRANSIT (2) [De mogelijkheden van semi-openbaar vervoer/para-transit (2)]. The author concludes his contribution on para-transit with an indication of the possibilities in more developed countries for systems that operate in third world countries nowadays. He concludes that more opportunities should be made for small scale initiatives and experiments. /TRRL/ [Dutch]

Stevens, GCJ *Verkeerskunde* Vol. 30 No. 4, Apr. 1979, pp 167-169, 1 Tab., 3 Phot., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240967), Institute for Road Safety Research

32 300040 PRIVATE BUS OPERATIONS IN URBAN AREAS-THEIR ECONOMICS AND ROLE. This paper is concerned with the role that privately-operated bus services might play in urban areas of Australia, vis-a-vis services pro-

vided by public operators. It shows that a given level of bus service can be provided substantially more cheaply by private than public operators, and that the majority of the cost savings arise from better utilisation of staff and lower wage rates and associated on-costs. Expansion of the role of private services is therefore a possible means of reducing the levels of urban public transport subsidies. The principles which should underlie subsidy schemes for private operators are discussed. /Author/TRRL/

Wallis, IP (Travers Morgan (R) Proprietary Limited); New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 705-722, 1 Fig., 4 Tab., 7 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239183), Australian Road Research Board

32 300070 TECHNICAL AND OPERATIONAL AIDS FOR TAXICAB ORGANIZATIONS [Tekniska och operativa hjalpmedel foer taxi]. This report is divided into the following chapters: technical equipment for taxi, taxi systems and cost and benefits. The first chapter describes present and future technical aids for improvement of taxi effectiveness such as: radio, taximeter, vehicle time recorder, vehicle monitoring, call-diverter, new public telephone exchanges, telephone exchange for taxi, answering and recording devices for telephone, mobile telephone, the new national public paging system, taxicab stations with direct telephone and computers with peripherals. The second chapter describes various kinds of smaller taxi systems with or without dispatching offices. The technical conditions for a regional dispatching office are discussed. A manual system featuring various kinds of computer aided dispatching systems is described in detail. Such questions as different system functions, data communication system, function of the operators, reliability and ergonomics are discussed. In the third chapter, costs are presented in figures when possible. Benefits are presented in general terms. However, the intention of this chapter is to give a basis for decisions regarding investments in new systems. Finally benefits are discussed that can be reached with the aid of measures other than purely technical. These are new and different tasks and ways of transit (e.g. shared-ride) for taxi. /TRRL/ [Swedish]

Boerjesson, J Lejdal, JO Solnestam, L; Teleplan Monograph RTA D20115, Sept. 1978, 89 p., 22 Fig., 1 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 241027), National Swedish Road & Traffic Research Institute

32 300147 CAR POOLING-TRAVEL TO WORK AT AN ISOLATED SITE. As part of a study of the use of cars in peak periods, staff at an isolated rural workplace were surveyed to determine how they travelled to work. The survey concentrated on the choice between driving alone and car-pooling in which two or more people travel together, taking it in turns to drive their own car and give a lift to the other(s). Information was obtained in two ways: a questionnaire (90 percent response), and a follow-up telephone survey of car-poolers. Car-poolers came predominantly from urban areas and travelled medium distances (5-25 km) to work-for short journeys the inconve-

nience of car-pooling is greater than the saving, and at long distances people are unlikely to live close enough together to form a convenient car-pool. The survey results were modelled using a logit model to try to quantify the factors involved. This showed that diverting 1 km was perceived to be about as undesirable as driving an extra 5 km. However, all the model results should be treated with caution as they are subject to large errors and based on data from only one site. /Author/TRRL/

Wood, K ; Transport and Road Research Laboratory Monograph Supple Report SR462, 1979, 17 p., 6 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241105)

32 300711 SMALL BUS MARKET. ABRIDGMENT. The apparent instability of the small bus market is attributed to 2 major factors. The major automobile manufacturers do not see this area as an economically sound market, and small bus manufacturing is carried out by school and recreational vehicle companies which cannot afford to do the research and engineering design to produce a better bus. Social issues combined with government standards also contribute to the instability. The situation could be improved by improvement of the purchasing process as well as short-term improvements in the life expectancy of the vehicle. With regard to the purchasing process efforts are underway to use lifecycle costing to evaluate bids. Also road testing of the first vehicles off the line combined with detailed final inspection could be used to set a standard for the rest of the purchase. With regard to improvements in vehicle life expectancy, vehicles should be purchased with proper engine-drive-train combination. Attention should be paid to maintenance, storage and cleaning aspects. Productive service runs should be maintained and buses that make empty runs should be eliminated. Good driving habits should be reinforced by periodic retraining.

Grimes, G (Michigan Department of State Highways & Transport) *Transportation Research Record* No. 696, 1978, pp 81-82; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

32 300712 TAXIS AND SUBSIDIZED PROGRAMS IN RURAL AREAS. The taxi industry in rural communities is undergoing scrutiny, especially as it relates to the transportation of special groups within a community--the elderly, handicapped, and others who do not have access to automobiles or to public transit. A major concern of the taxi operators is the survival of small taxi operations of 10 vehicles or fewer in communities with populations of 25,000 or less. This paper describes ongoing small-taxi programs in Lancaster County, Pennsylvania; Houston, Texas; and Indianapolis, Indiana. Possible solutions to the problems of the taxi operator in rural areas, such as direct subsidies, mergers with a centrally located operation, and support through social service agency transportation contracts are examined. /Author/

Gallagher, RV (International Taxicab Association) *Transportation Research Record* No. 696, 1978, pp 82-84, 4 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

32 300713 USING TAXIS TO SERVE THE ELDERLY AND HANDICAPPED. Three user-side subsidy demonstration projects funded by the Urban Mass Transportation Administration are described, along with an evaluation of six locally sponsored subsidized taxi programs in the San Francisco Bay area. Although these programs are not located in decidedly rural areas, the techniques and methods employed are applicable to the provision of services to the elderly and handicapped living in rural and small-town communities. The study concluded, for example, that subsidized taxi service is especially well suited to low-volume, scattered demand as in smaller communities; that taxi operators are willing to participate in subsidized programs to transport the elderly and handicapped; and that user-subsidized taxi service is a workable, economically viable transportation mode for the elderly and handicapped. /Author/

Sahaj, L (Urban Mass Transportation Administration) *Transportation Research Record* No. 696, 1978, pp 85-87, 3 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

32 300762 THINKING SMALL: TRANSPORTATION'S ROLE IN NEIGHBORHOOD REVITALIZATION. "Thinking Small" is a relatively new concept for transportation planning, for citizens and professionals alike. Transportation planners have tended to think big, devising comprehensive plans to meet regional needs. The new trends in cities, and the increased understanding of the importance of livability, call for neighborhood impacts to inform transportation planning at every level. This document is based on a national conference on transportation's role in neighborhood revitalization sponsored by the Urban Mass Transportation Administration in order to seek advice from citizen leaders and state and local officials. This report presents the proceedings of a conference held in Baltimore, Maryland, in February 1978 to discuss small-scale transportation solutions as a means of revitalizing urban neighborhoods. The report is divided into two sections. Section one discusses the major issues involved in planning for these improvements, including citizen involvement, the role of local governments, and the many forms of pedestrian, paratransit, parking, and street-improvement strategies available to the transportation planner. The second section consists of three case studies discussed at the Baltimore Conference. Successful projects involving a number of very different techniques, in Boston, St. Louis, and Seattle are described in some detail. The appendixes herein contain a list of participants and a bibliography related to citizen participation and transportation planning.

Myers, P Binder, G ; Conservation Foundation, (UMTA-UPP-78-7) Final Rpt. UMTA-DC-06-0188-79-1, May 1979, 166p, Figs., Refs., 3 App.; Sponosred by Department of Transportation, Urban Mass Transportation Administration.; SPONSORING AGENCY; RESPONSIBLE INDIVIDUAL: Cohen, R (UPP-10); Contract DC-06-0188; ORDER FROM: NTIS; PB-296979

32 300966 COMMUNICATION AND COMPUTER SYSTEMS FOR SHARED TAXI [Maet-och datasystem foer samaakning med taxi]. The purpose of this study is to determine whether shared taxi rides can produce profits

sufficient to pay for the additional equipment (computer and communication systems for traffic control) necessary for better utilization of the vehicles. At present there is a great gap between public transport systems and taxi systems in regard to price and service level. This study is based on the hypothesis that there is a market for a middle-of-the-road system, ie a system that will provide a transport from door to door, but not always the shortest way. The main chapters of the report: a survey of existing public transport systems; computerized route planning; techniques and methods for vehicle location; aspects on computer and communication systems. /TRRL/ [Swedish]

Sundberg, H ; Chalmers University of Technology, Sweden Monograph Rapport E 76-05, 1976, 53 p., 13 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 241309), National Swedish Road & Traffic Research Institute

32 300968 COMPUTER SIMULATION OF SHARED TAXI SYSTEMS [Datorsimulering av Samaakningssystem foer Taxi]. The purpose of this project has been to develop the model used in a previous project for shared taxi rides, (report r77-01) and to establish through computer simulation the savings that can be made by shared taxi rides. In order to make a shared taxi system efficient a central traffic control is needed. The traffic control receives all requests for taxi services, allocates trips and dispatches the cars. To determine what savings are made by the shared taxi system and what by the central traffic control, a corresponding taxi system without shared riding was simulated. To serve the present number of customers in a large city (400000 inhabitants), it was found that the system would manage with about half as many cars as today. For a smaller town, the savings were not as large. The total driving time was reduced by 30 percent in the shared taxi system, compared with the present system. /TRRL/ [Swedish]

Andersson, H Almen, KG Otteblad, A ; Chalmers University of Technology, Sweden Monograph Rapport R78-03, June 1978, 55 p., 15 Fig., 15 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 241308), National Swedish Road & Traffic Research Institute

32 301011 PROCESS COMPUTER SIMULATION OF TAXI SYSTEMS [Simulering paa processdator av taxisystem]. The purpose of the project described in this paper is to find ways to improve existing taxi systems, and to create models for computer simulation in order to evaluate the improvements. The systems are compared in regard to customer waiting time, taxi vacant driving time and load. The simulated system uses computerized central traffic control for location and dispatching of the cars. It was found, that in a system with taxi stations using zone location, customer waiting time was shorter than for systems using no taxi stations. And for a system able to locate the cars exactly, it was found that by letting the car wait where the last trip ended, vacant driving time would be significantly reduced. /TRRL/ [Swedish]

Andersson, H Almen, KG ; Chalmers University of Technology, Sweden Monograph Rapport E76-12, Sept. 1976, 30 p.; ACKNOWLEDGMENT: TRRL (IRRD 241310), National Swedish Road & Traffic Research Institute

32 301029 STOP-GAP OR GAP FILLER? FRIEDRICHSHAFEN TESTS DIAL-A-RIDE SYSTEM [Lueckenfueller oder Lueckenueesser? Friedrichshafen Erprobt Rufbusse]. Since December 1977 the first computer controlled dial-a-ride system in Europe has been in trial operation. Where it is not profitable to run bus schedules with few passengers through an area, the dial-a-ride bus system comes into its own. It acts as a feeder to the scheduled buses and releases these from unremunerative journeys. It is particularly advantageous in rural areas with their low numbers of passengers where it fills a gap in the available transport left between scheduled buses and taxis. How does one deal with the passenger requests? The incoming passenger requests are processed in the central telephone operated control centre and transmitted through data processing equipment to the computer. This computer arranges the requests in accordance with the most suitable vehicles available at the time, oversees the arrival and departure times and reports faults. The manager in the control centre is at all times informed of the current state of the transport availability. The stopping points and the routes of the individual vehicles appear continuously on a screen. The driver is also continuously in contact with the control centre. When the driver arrives at a stopping point, he activates the "arrival" signal. The destination of the boarding passengers and the number of passengers appears on a screen installed in the vehicle. When all the passengers have boarded, the driver presses the 'depart' button. The control centre then informs them of the next pick-up point. Only the faultless interaction of passenger, call point (or telephone instruction), control centre, driver and vehicle will guarantee the smooth running of a computer controlled dial-a-ride bus system. /TRRL/ [German]

Stoefges, P *Lastauto - Omnibus* Vol. 55 No. 4, Apr. 1978, pp 888-891, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 307900), Federal Institute of Road Research, West Germany

32 301249 CARPOOLS DOUBLE EXPRESS LANE PRODUCTIVITY. Carpools in combination with buses on the express lane of two freeway projects have doubled the person-moving productivity of the express facilities. The results have been obtained on the Shirley Highway in the Washington, D.C., area and the San Bernardino Freeway in Los Angeles where physically separated express lanes for high-occupancy vehicles (HV's) have been built within the existing rights-of-way. On Shirley Highway, the express lane currently carries almost 40,000 passengers (21,600 bus riders and 17,785 carpool riders) during the morning rush hour, as opposed to the 14,000 bus riders carried prior to the late 1973 opening of the express lane to carpools. On the San Bernardino Freeway, peak period passenger service volumes on the 11-mile San Bernardino have doubled since October 1976 when the priority lanes were opened to carpools even though bus ridership has not been affected. (Bus ridership had had its spectacular rise after 1973 when the express lane was first opened from 1,000 to 18,000 passengers per day). The two projects demonstrate that properly designed express lanes for HV's can serve passenger volumes as high as those carried by many rail rapid transit lines, and at a far lower cost.

Newsletter No. 8, July 1979, p 2

32 301256 PARA TRANSIT REPORTING SYSTEM: A SYSTEM FOR COLLECTING AND REPORTING UNIFORM PARATRANSIT FINANCIAL AND OPERATING STATISTICS. In July, 1976, the Urban Mass Transportation Administration contracted to develop and test the implementation of a computerized system for collecting and reporting paratransit financial and operating statistics. The project objectives are: to expand/modify the computerized uniform system of accounts and records developed in project TAXISTATS so that it can be applied to all paratransit operations; to ensure that this reporting system is compatible with the reporting system developed for scheduled mass transit operations (FARE System); to satisfy the requirements of Section 15 (a) of the UMTA Act of 1964, as amended; and to test and implement the computerized uniform reporting system in several paratransit operations to provide necessary information for large-scale implementation of the system. This report provides the documentation of the system and is divided into four chapters: Chapter I: General Description presents an overview of the system, how it relates to the required FARE System for transit operators, and discusses implementation issues; Chapter II: Analytical Reports describes the reports that are generated for use by paratransit operators, UMTA, and the general public; Chapter III: Instruction Manual contains definitions of the accounts and records and provides instructions to the paratransit operators as to how to fill out the data transmission reports; and Chapter IV: Data Processing Procedures and Program Descriptions provides the general documentation of the automatic data processing aspects of the system. /UMTA/

International Taxicab Association, (IL-06-0035) Final Rpt. UMTA-IL-06-0035-78-1, July 1977, 183 p.; Sponsored by Department of Transportation.; Contract DOT-UT-60064; ORDER FROM: NTIS; PB-298155

32 301450 EV BUS OPERATION LOOKS GOOD IN NEW YORK. This paper discusses the use of electric minibuses on Roosevelt Island New York. The buses have enabled this model city to achieve its primary objective of creating a pollution-free, low traffic density environment. The route of the minibuses is approximately 1 1/2 miles long with a current passenger loading of approximately 35,000 per week. The minibuses complete more than 150 trips each day and cover an average of 1500 miles each week. They have adequately served the transit needs of the city's 6,000 residents. The operation of electric buses poses many operating constraints and unique maintenance problems. Since the model 20 Electrobuses used on Roosevelt Island is no longer manufactured, spare parts are difficult to obtain. During the two years of operation, it has been necessary to develop sources of substitute and/or replacement components and to otherwise improve maintenance and repair procedures. Maintenance costs over the past year were approximately \$22,000. Operation of an electric bus requires certain driver skills and knowledge to cope with the unique characteristics of the electric traction system. During the two year operation of electric buses on Roosevelt Island, passenger acceptance has been very favorable. The paper concludes with a synopsis of future prospects for electric buses.

Loughlin, RG (Roosevelt Island Special Services Corporation) *Electric Vehicle News* Vol. 8 No. 1, Feb. 1979, pp 4-7, 1 Tab., 1 Phot.

32 301794 TAXI COMMUNICATION SYSTEM. This paper covers an integrated computer controlled booking and dispatching system for taxicabs in which the cabs receive printed orders by means of mobile radio data communication. The system is being developed for the three major cities in Sweden and will be introduced in 1981.

Billstrom, O (SRA Communications, Sweden); Institute of Electrical and Electronics Engineers Conf Paper 79CH1378-9VT, 1979, pp 307-308; Presented at the 29th IEEE Vehicular Technology Conference, held in Arlington Heights, Ill., March 27-30, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 301866 COMPETITION AND SUPPLY IN LONDON TAXIS. The article examines reasons for the expansion of the London taxi trade and assesses the influence of tourist demand and competition from the hire car trade. The trend of real prices for taxis is compared with that of buses and underground rail services. The author considers the influence of changes in productivity, shifts to input prices, and innovation. This study involves an exploration of supply, especially of drivers, and of the cost structure underlying fares. A principal feature is found to be the radical changes in labour contracts for London taxis associated with free entry subject to quality constraints. /TRRL/

Besley, ME (London Graduate School Of Business Studies) *Journal of Transport Economics and Policy* Vol. 13 No. 1, Jan. 1979, pp 102-131, 1 Fig., 10 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241343)

32 302111 COMPARISON OF ORGANIZATIONAL AND OPERATIONAL ASPECTS OF FOUR VANPOOL DEMONSTRATION PROJECTS. The purpose of this report is to describe in detail the organizational and operational aspects of four Service and Methods Demonstration projects involving vanpooling. The projects are located in San Francisco, California; Minneapolis, Minnesota; Knoxville, Tennessee; and Norfolk, Virginia. All of the projects involve third party providers and multiple employment locations. This report compares the projects with respect to: management and administration; target group focus; marketing procedures; driver and rider application and selection procedures; van acquisition and provision arrangements; and financial aspects such as cost structures, driver lease fees, passenger fares, and project funding. By highlighting the similarities and differences among project designs, the authors state that the information herein is relevant not only to the ongoing evaluations of these projects, but also to organizers of similar vanpooling projects in other locales. Appendix A of this comparative report contains a table summarizing the project characteristics; and Appendices B and C contain driver, passenger, and other types of agreements used in the four demonstration projects. /UMTA/

Heaton, C Jacobson, J Poage, J; Transportation Systems Center, (UM927/R-9742) Final Rpt. UMTA-MA-06-0049-79-6, Apr. 1979, 114 p.; ORDER FROM: NTIS; PB-299720

32 302378 REPORT OF THE THIRTY-FIFTH ROUND TABLE ON TRANSPORT ECONOMICS HELD IN PARIS ON 28TH AND 29TH OCTOBER 1976 ON THE FOLLOWING TOPIC: ORGANISATION OF REGIONAL PASSENGER TRANSPORT. This paper was presented as a basis for discussion among transport economists taking part in a round table on transport economics organised by the European Conference of Ministers of Transport. The author advanced a number of theses, related to regional transport needs, the organisation of undertakings, the role of the authorities, regular special-purpose services, the function of national railways, intermediate modes of transport and fares. A summary of the discussion is presented, which concluded that in many cases, the methods of providing transport needed to be revised, and that the money spent on running scheduled services would often suffice to finance a system which was more individualised and better suited to meet demand. A list of participants to the round table is appended. (TRRL)

Ruehl, A ; European Conference of Ministers of Transport Monograph No. 35, 1977, 40 p.; ACKNOWLEDGMENT: TRRL (IRRD 241853); ORDER FROM: Organization for Economic Cooperation and Devel, Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006; P7905059

32 303475 TSM MEASURES FOR MAJOR ACTIVITY CENTERS. Transportation Systems Management (TSM) measures, originally conceived as a tool applicable on a region-wide scale, can be successfully applied at major activity centers to avoid, minimize or postpone the need for more capital-intensive transportation improvements. The results from two case studies (an urban university campus and a suburban industrial park/regional shopping center) are presented and analyzed to illustrate how traffic reduction and improved vehicular flow can be achieved by low-cost measures such as ride-sharing programs, parking management policies, transit service improvements, marketing and others. The effectiveness of the university's on-going program, which has reduced traffic generated by the campus by almost 8%, is assessed and a recommended expansion of the program which potentially can double this reduction by 1985 is described. While conditions at the suburban industrial park/shopping center are such that a traffic reduction of 4% to 10% is considered the upper limit of what can be achieved, a comprehensive TSM program for maximizing the efficiency of existing facilities was also developed and is described.

Kennedy, MA (DKS Associates) Kudlick, W *ASCE Journal of Transportation Engineering* Vol. 105 No. 5, Sept. 1979, pp 499-511, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

32 303911 PARATRANSIT: 1979. PROCEEDINGS OF A WORKSHOP. The proceedings are presented of a Conference that synthesized and evaluated the significant paratransit services across the U.S. and Canada, and assessed their relevance for other communities. The Conference was organized to provide results that would help the Urban Mass Transportation Administration (UMTA) to understand the problems and potentials of paratransit. Comprehensive resource papers were presented on six major issues: labor protections and labor standards; appropriate

institutional framework for paratransit development; evaluation and measurement of service effectiveness; competitive opportunities in paratransit; coordination of social-service-agency transportation; and technology requirements. Workshop reports and plenary session transcripts on these major issues are also presented. Introductory articles briefly discuss current conditions, briefly review the resource papers, and present some considerations on the changing environment of paratransit.

Transportation Research Board Special Report No. 186, 1979, 89 p., Figs., Tabs., Refs. ORDER FROM: TRB Publications Off

32 303913 CHANGING AND COMPLICATED ENVIRONMENT OF PARATRANSIT: SOME CONSIDERATIONS. The differences between the first and second Williamsburg Paratransit Conferences are noted. The lack of overt controversy at this second conference may represent a greater understanding of opposing positions rather than agreement on those positions. The Conference, showed far less expectation that the federal government would solve many of the conflicts and problems of paratransit. Also, participants at this conference are concerned with many more government agencies, statutes and regulations. The reports of each of six workshops at this second conference are reviewed, and attention is focused on four significant issues: efforts at the local level; technology transfer; realistic measures and evaluation of costs; and clarification of federal policies. Unresolved issues discussed here include labor and organizational responsibility.

Rosenbloom, S (Texas University, Austin) *Transportation Research Board Special Report* No. 186, 1979, pp 3-6; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

32 303914 LABOR PROTECTION, LABOR STANDARDS, AND THE FUTURE OF PARATRANSIT. The changing roles played by various transportation providers and the changing balance among different components of the urban public transportation sector, coupled with changing federal policy toward the public subsidization of both different modes and competitive modes have created two significant conflicts: (a) the competition between different conventional and paratransit modes for a limited market and (b) the competition among different labor forces. This paper focuses on the implications for the development of paratransit services of statutory labor protections and prevailing labor standards. The paper examines the recent evolution of federal policy in the labor-protection area and then seeks to identify the broad implications of current arrangements and philosophies. The present policy and practices serve as serious constraints to the natural development of paratransit. The paper concludes that several legislative options are open that would clarify and define key labor protection issues. (Author)

Alschuler, DM (Multisystems, Incorporated) *Transportation Research Board Special Report* No. 186, 1979, pp 8-20, 5 Ref.; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

32 303915 INSTITUTIONAL DYNAMICS OF PARATRANSIT IMPLEMENTATION. This paper argues that recent federal policy incorporates a normative theory of administration and planning that highly values coordinated efforts, comprehensive plans, and regional decision-making structures. It also argues, however, that the key planning question for paratransit should not be how to achieve service coordination and organized planning but rather what institutional factors and frameworks lead to successful paratransit implementation. Three major types of paratransit projects are examined--demand-responsive services, vanpooling, and special-client services--and it is concluded that, in each case, successful implementation has been linked to local community and business factors, individual labor-management agreements, and the involvement of existing service providers and local institutional frameworks. The paper further concludes that increasing federal involvement can significantly increase the cost of paratransit services and reduce the chance for implementation. Thus the federal government is challenged to develop rules and funding criteria that will, by making clear that paratransit is a legitimate competitor for federal funds, effectively accommodate the diversity of existing local governmental structures, political bargaining, and service providers. (Authors)

Jones, DW, Jr (California University, Berkeley) *Transportation Research Board Special Report* No. 186, 1979, pp 21-26, 5 Ref.; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

32 303916 ASSESSING THE EFFECTIVENESS OF PARATRANSIT SERVICES. The information and procedures required for the assessment of the effectiveness of paratransit options as part of a comprehensive evaluation of public transportation alternatives are reviewed. Recent paratransit projects directed toward three major travel markets--high-density home-to-work travel, special-user-group travel, and general-purpose travel--are used to illustrate the discussion. Although these examples provide useful insight into the effectiveness of paratransit modes and their relationship to conventional transit, they also draw attention to some important information gaps and some major shortcomings in current evaluation procedures. Suggestions are made for filling these data gaps and improving overall evaluation procedures for paratransit and other public transportation modes. (Author)

Kirby, R Miller, GK (Urban Institute) *Transportation Research Board Special Report* No. 186, 1979, pp 27-43, 3 Fig., 8 Tab., 21 Ref.; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

32 303917 OPPORTUNITIES FOR INCREASING COMPETITION IN THE PROVISION OF PARATRANSIT SERVICES. The goals and objectives are examined that could be served by encouraging competition among various paratransit providers in a community. It is argued that subsidy mechanisms could be used to enhance such competition but that two major factors--statutory labor-protection provisions and local regulatory environments--act as barriers

to this approach. Several instances in which paratransit implementation attempts have been affected by state or local restrictions are described, and the experiences, benefits, and problems of three methods for increasing competition among service providers—expanding services under existing regulation, requiring bidding for price and service contracts, and user-side subsidies—are discussed. Finally, it is concluded that equity between private providers and publicly subsidized systems should be studied. (Author)

Rechel, RE (Institute of Public Administration) *Transportation Research Board Special Report No. 186, 1979, pp 44-51*; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

32 303919 EVALUATION OF AUTOMATED DISPATCHING FOR FLEXIBLY ROUTED PARATRANSIT SERVICES. Computerized dispatching systems may be appropriate for flexibly routed paratransit systems if they can reduce the cost of vehicle dispatching, improve vehicle productivity, or increase the quality of service provided to riders. This paper compares the performances of computerized, computer-assisted, and manual dispatching based on recent experiences in several systems and analyzes the cost parameters of each under various vehicle, rider, and service-area constraints. Although relative data are too limited to allow major conclusions about the cost or effectiveness of different dispatching processes in varying environments, it is concluded that automated dispatching appears to be more expensive than manual dispatching for the present scale of shared-ride, flexibly routed services. However, it is also noted that improvements in the cost, capability, and flexibility of new computers, as well as the growing need for extensive rider and trip-information processing, will be important factors in the future. (Author)

Hendrickson, CT (Carnegie-Mellon University) *Transportation Research Board Special Report No. 186, 1979, pp 56-62, 4 Fig., 1 Tab., 22 Ref.* This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

32 303951 FEASIBILITY OF COMBINING PUBLIC TRANSIT AND SCHOOL BUS SYSTEM SERVICES IN DADE COUNTY, FLORIDA (ABRIDGMENT). The objective of this study was to examine the appropriateness of joint use of public transit and school bus services in Dade County, Florida, which includes the city of Miami as well as other urban, suburban, and rural areas. Four alternatives for joint use of transit services were examined: home-to-school and return transportation of public school students by the public transit system, known as the Metropolitan Transit Agency (MTA); field-trip transportation of public school students by the MTA; after-school transportation of public school students by the MTA, and maintenance of school-board buses by the MTA. It was concluded that there are very limited opportunities for joint utilization of transit services in Dade County. The home-to-school transportation of students should continue to be provided by the school board's transportation unit—primarily because of the inability of MTA to guarantee seats on its vehicles, the significantly lower operating

costs of the school board's vehicles, and the more flexible labor contract of the school board in terms of guaranteed hours for drivers. The school board should also continue to provide field-trip transportation for students, primarily because its cost is significantly lower than the charter rates of MTA. MTA maintenance of school board vehicles is not feasible under federal regulations, nor is it desirable. However, MTA provision of after-school service for students should be explored.

Cooperman, MJ Martin, JA, Jr (Cresap, McCormick and Paget, Incorporated) Silverman, FJ (Dade County Off of Transportation Administration) *Transportation Research Record Vol. N No. 19, 1979, pp 41-43*; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

32 304452 TAXICAB TRANSPORTATION (A BIBLIOGRAPHY WITH ABSTRACTS). The role of taxicab services as another means of public transportation is cited including services of large taxicab vehicles, multi-origin destination taxi systems responding on demand, and shared ride taxi systems. Vehicle monitoring systems for centralized management to provide location for fleet vehicles are described as are user characteristics and taxi traffic in urban areas. Regulations and ordinances, policies, operating and economic characteristics of the urban taxicab industry including fare structure, computer applications and market studies are covered. (This updated bibliography contains 65 abstracts, 14 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Bibliog. Sept. 1979, 71 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0886/6ST

32 304535 OPTIMIZATION IN DIAL-A-RIDE SYSTEM ANALYSIS: A COMPARISON OF RECENT MODELLING AND AN EXPECTED VALUE MODEL. A literature review of optimization models for small bus system designs is presented. Maximization algorithms are briefly discussed for project CARS at Massachusetts Institute of Technology, project BUSTOP at Northwestern, a model developed by Tapan Datta at Wayne State University, and a mean value model developed at Ford Motor Company and programmed at The University of Michigan. The design features of the models are presented and suggestions are offered as to the applicability of the models to the transit authority planning environment.

Wallace, NE ; Highway Safety Research Institute, Michigan Department of Transportation, Michigan State Highway Commission Final Rpt. UM-HSRI-78-32, Aug. 1978, 24 p.; Sponsored in part by Michigan Dept. of State Highways and Transportation, Lansing, and Michigan State Highway Commission, Lansing.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298851/7ST

32 304618 VEHICLE LONGITUDINAL CONTROL AND RELIABILITY PROJECT. VOLUME 5. VLCR ENTRAINMENT AND PLATOONING ANALYSIS AND DESIGN. PARTS A AND B. The U.S. Department of Transportation's Automated Guideway Transit Technology Program (AGTTP) is directed towards the development of critical technologies

which provide the foundation for the successful deployment of Automated Guideway Transit (AGT) systems. The program is not directed towards development of complete deployable systems, but towards system elements which may be used in a variety of advanced urban transportation systems. As part of the AGTTP, a project was established to address two critical areas where technological improvements at the subsystem level can substantially improve the deployability of AGT systems: vehicle longitudinal control and reliability. One of the efforts discussed in this report deals with the longitudinal control aspects of automatic entrainment and platooning concepts. The project objectives were to: (1) develop functional and performance specifications for longitudinal control systems for AGT systems using automatic entrainment or platooning; (2) perform an analytical and experimental evaluation of an automatic coupling and decoupling system suitable for trained vehicle operation and failed vehicle pulling and pushing; (3) establish design concepts and specifications for automatic coupling systems which meet the requirements in a cost-effective manner; and (4) perform an analytical assessment of the platooning concept and establish platooned vehicle operation. Work in this report includes review of status of existing technology, specification of design goals and requirements, detailed mathematical modeling, analysis and simulation, development and specification of design concepts and their mechanization, and some experimental validation of the design. The latter will be reported in Volume 6 of the final report.

Lorenz, D Lindgren, C ; Otis Elevator Company, Urban Mass Transportation Administration, (UMTA-IT-06-0148) Final Rpt. OTIS/TTD/VLAC-058, UMTA-IT-06-0148-79-5, Feb. 1979, 534 p.; See also RRIS 11 197631, Appendix B; Bulletin 8001 and Volume 3, Part A, PB-298766.; Contract DOT-UT-70048; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299798/9ST

32 304655 GOLDEN GATE VANPOOL DEMONSTRATION PROJECT. The report evaluates the Golden Gate Vanpool Demonstration Project activities begun in October 1977. The objective of the demonstration is to successfully promote commuter ridesharing through vanpools. The project grantee, the Golden Gate Bridge, Highway and Transportation District, is a multi-modal transportation agency which operates buses and ferries and sponsors club buses, with control of a toll bridge and joint control of a High Occupancy vehicle (HOV) highway lane that feeds into it and leads to the San Francisco employment area. The Golden Gate Corridor presents a set of conditions ideal for vanpool formation: a single congested traffic corridor with an exclusive HOV lane leading into a major employment center via a toll bridge. The vanpool facilitator controls the toll booth and actively promotes ridesharing by allowing free bridge passage for 3-person or larger carpools and for vanpools. The report describes operating characteristics and documents planning implementation stages. Analyses of service levels, demand, productivity, marketing strategies, and vanpool demographics are presented. The report points out that the Golden Gate Project clearly demonstrates that a public transit authority can facili-

tate vanpool formation and that issues once viewed as constraints, such as 13(c) agreements and reasonable insurance coverage, can be negotiated.

Dorosin, E FitzGerald, P Richard, B ; Crain and Associates, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-CA-06-0095) Intrm Rpt. UMTA-CA-06-0095-79-1, July 1979, 310 p.; Contract DOT-TSC-1081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300685/5ST

32 304670 HUMAN SERVICE AGENCY TRANSPORTATION COORDINATION. The objectives of this study were to compare the costs of independent special purpose transportation services with the costs of combined transportation services and to study the reability of coordinating existing transit to satisfy the transportation needs of human service agencies in various sized communities. This report contains the California Department of Transportation's (Caltrans) study of the feasibility of coordinating human service agency transportation in three areas of California, namely: Pittsburg; Fairfield-Suisun City-Vacaville areas; and the National City-Chula Vista areas. Cost and ridership data were collected from these agencies by means of inventories, interviews, and questionnaires. The resulting data were analyzed to determine cost and ridership factors. The cost data indicated that combined transportation costs are approximately equal to the average of the costs of independent special purpose transportation.

Hunter, JP ; California State Division of Mass Transportation, Urban Mass Transportation Administration, (UMTA-CA-09-8001-79-4) Final Rpt. DMT-047, 64-120-631060, June 1979, 101 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300891/9ST

32 304756 PARATRANSIT RESOURCE GUIDE. The report is one element of a set of curriculum materials to support university classroom and professional short course training in local paratransit planning. This Paratransit Resource Guide is structured to provide the reader with sources of information, including personal contacts, on paratransit development at the Federal, state, and local levels, with emphasis on Federal sources and national information sources. The Guide includes definitions of paratransit, pertinent Federal policies, annotated introductory overview literature, other information sources such as TRISNET and NTIS, Federal legislation, Federal agencies with contact persons, UMTA and FHWA regional offices, professional organizations and other associations, consulting firms and research organizations, foreign sources of information, and a paratransit educator resource list.

Cook, AR ; Oklahoma University, Urban Mass Transportation Administration, (UMTA-OK-11-0001) UMTA-OK-11-0001-79-1, July 1979, 114 p.; See also PB80-103245.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-103237

32 305753 VANPOOL RESEARCH: STATE-OF-THE-ART REVIEW. A wide dichotomy of viewpoints currently exist regarding the growth of employer-based, third-party, and owner-operator vanpool programs. The purpose of the report is to identify existing vanpool research activities of Federal, state, and local

governments, private organizations, and universities; to assess the current state of knowledge, based on this research, of vanpool operating characteristics, institutional issues, and ridership; to determine areas where additional vanpool research may be needed; and to provide guidance in future vanpool-related demonstration projects. The authors state that although the assessment of vanpooling that emerges from both a review of available material and discussions with those active in the field is mixed, an examination of available vanpool information indicates a lack of reliable and objective evaluation data on the relative costs and effectiveness of different vanpooling arrangements. The study implies that the success of vanpool programs should be evaluated over a three-to five-year period. The proposed research needs herein are oriented to those individuals attempting to operate vanpool programs by increasing the current state of knowledge of vanpooling as a travel mode, by developing improved operational techniques in support of program management, and by relating vanpooling to other urban area transportation activities. Suhrbier, JH Wagner, FA ; Cambridge Systematics, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. UMTA-MA-06-0049-79-5, Apr. 1979, 117p; Contract DOT-TSC-1405; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-119613

32 305779 COMPUTER DIAL-A-RIDE SOFTWARE INSTALLATION GUIDE, VOLUME 1. Computer Dial-A-Ride is a software system designed to automate scheduling and dispatching of vehicles. The system consists of a real-time program that controls all aspects of operating the transportation service and various support programs used for file maintenance and statistical analyses. An understanding of the operation of the software is the key to its successful installation. Section IV details the process of unpacking and installing the software system. The software is not self-installing, and it is not a 'turn-key' system; it will require technical support in its installation and operation. The purpose of the document is to assist systems programmers in the installation of the Computer Dial-A-Ride Package. The functions, composition, and form of the package are described and the activities and operations related to the installation of the software at a user site are defined. The software is most suitable for installation on a 36-bit or greater (e.g., a 48-bit) computer. Installation on 16-bit, 24-bit, and 32-bit computers requires modifications to the software system.

Harper, SH Hughes-Caley, L ; ADP Network Services, Inc., Washington, DC., Federal Systems Div.*Urban Mass Transportation, Administration, Washington, DC. Office of, Technology Development and Deployment., (UMTA-DC-06-0141) DOT/DF-79/004A, n, Jan. 1978, 65p; nFor system on magnetic tape, see PB80-115736. See also Volume 2, PB80-115751. n; Contract DOT-UT-70010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-115744

32 305780 COMPUTER DIAL-A-RIDE OPERATORS HANDBOOK AND REFERENCE MANUAL, VOLUME 2. This document is a complete guide to operating the real-time Dial-A-Ride program. All commands and system messages are described in detail.

Harper, SH Hughes-Caley, L ; ADP Network Services, Inc., Washington, DC., Federal Systems Div.*Urban Mass Transportation, Administration, Washington, DC. Office of, Technology Development and Deployment., (UMTA-DC-06-0141) DOT/DF-79/004B, n, Jan. 1978, 350p; nFor system on magnetic tape, see PB80-115736. See also Volume 1, PB80-115744, and Volume 3, PB80-115769. n; Contract DOT-UT-70010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-115751

32 305781 COMPUTER DIAL-A-RIDE STREET NAME FILE BUILDING SYSTEM, VOLUME 3. This document addresses the street name file system that the real-time program uses for translating addresses to a set of coordinates and zone. The major portion of the data necessary to build the street name files originates with the Census Dime Files. Addresses may be in the form of house number and street name, store names, mall names, intersections, etc. This document supplies user documentation and a functional description of the software provided for building the various files that comprise the street name file system. Detailed information for executing each of the steps of the building process is given in addition to message descriptions, input data file descriptions and sample values, and a description of the structure of each of the files created. A detailed functional description is given of the major data bases and the procedures included in the software.

Harper, SH ; ADP Network Services, Inc., Washington, DC., Federal Systems Div.*Urban Mass Transportation, Administration, Washington, DC. Office of, Technology Development and Deployment., (UMTA-DC-06-0141) DOT/DF-79/004C, n, Jan. 1978, 87p; nFor system on magnetic tape, see PB80-115736. See also Volume 2, PB80-115751, and Volume 4, PB80-115777. n; Contract DOT-UT-70010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-115769

32 305782 COMPUTER DIAL-A-RIDE SOFTWARE DESIGN AND FUNCTIONAL DESCRIPTION, VOLUME 4. This document consists of the following three reports: A Software Design and Functional Description of Dial-A-Ride; Dial-A-Ride Input Parameter Files; and Building, Maintaining, and Listing the Advance Customer File. The first report introduces and briefly discusses the hardware and software comprising the Dial-A-Ride system and the general capabilities of the real-time program. An in-depth functional description is given for each subsystem of the real-time program. The Dial-A-Ride Input Parameter Files report gives a detailed description of the real-time program's parameter files' contents and structure and gives suggested input values suitable for initial program testing purposes. The remaining report included in this document discusses the file structure and the programs that create and maintain the Advance Customer file.

Harper, SH Hughes-Caley, L ; ADP Network Services, Inc., Washington, DC., Federal Systems Div.*Urban Mass Transportation, Administration, Washington, DC. Office of, Technology Development and Deployment., (UMTA-DC-06-0141) DOT/DF-79/004D, n, Jan. 1978, 486p; nFor system on magnetic tape, see PB80-115736. See also Volume 3, PB80-115769,

and Volume 5, PB80-115785. n; Contract DOT-UT-70010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-115777

32 305783 COMPUTER DIAL-A-RIDE TERMINAL HANDLING SYSTEM. VOLUME 5. This document describes the Terminal Handling System used by the Dial-A-Ride system on the Interdata 8/32. Each module and common block is described in detail. The Terminal Handler for the Interdata 8/32 Dial-A-Ride System is in two parts--the Terminal Interface Subsystem in Dial-A-Ride and a Terminal Handling System operating separately from Dial-A-Ride. The Terminal Interface Subsystem communicates with the Terminal Handling System in order to perform terminal functions--input, output, checking for I/O complete, etc.

ADP Network Services, Inc., Washington, DC., Federal Systems Div.*Urban Mass Transportation, Administration, Washington, DC. Office of Technology Development and Deployment., (UMTA-DC-06-0141) DOT/DF-79/004E, n, Sept. 1978, 11p; nFor system on magnetic tape, see PB80-115736. See also Volume 4, PB80-115777. n; Contract DOT-UT-70010; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-115785

32 305827 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. No abstract available.

Multisystems, Inc., Cambridge, MA.*Transportation, Systems Center, Cambridge, MA. Sept. 1979, 845p-in 6v; nSet includes PB80-125479, PB80-125487, PB80-125495, PB80-125503, PB80-125511, and PB80-125529. n; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125461

32 305828 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 1: EXECUTIVE SUMMARY. Integrated Paratransit (IP) is a concept which involves the integration of conventional fixed-route transit with flexibly routed paratransit services to provide the most effective area-wide transit coverage. The report estimates the benefits and costs associated with different IP options in different settings and compares these results with those of other transportation alternatives. Based on the results of the various components of analysis in this study, a variety of conclusions about IP service can be reached. The conclusions suggest that in some circumstances integrated paratransit may be an effective strategy for improving overall mobility.

Flusberg, M Menhard, HR Walker, J Sobel, K ; Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-79-39-1, Sept. 1979, 73 p.; See also Volume 2, PB80-125487. Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125479

32 305829 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 2: INTRODUCTION AND FRAMEWORK FOR ANALYSIS. The study represents the first systematic attempt to estimate the potential impacts of a wide range of IP options in different settings. The output of this

study should provide local decision-makers with a better understanding of the varied impacts an IP system might have. In addition, the study has attempted to identify potentially promising IP options and policies (as well as those options which show little promise), which may lead to the next round of paratransit demonstrations. Finally, the study has identified those instances where IP is, and those where it is not, the most appropriate way to improve public transportation services in a given area.

Flusberg, M Menhard, HR Walker, J Sobel, K ; Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-79-39-2, Sept. 1979, 77 p.; See also Volume 1, PB80-125479 and Volume 3, PB80-125495. Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125487

32 305830 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 3: SCENARIO ANALYSES. This is the third volume of a six-volume report documenting the results of a study entitled "Benefit-Cost Analysis of Integrated Paratransit Systems." This volume provides detailed results of a series of scenario analyses designed to determine the impacts of various integrated paratransit (IP) configurations and other, more conventional, alternatives in a variety of settings. These transportation options are analyzed for the year 1980; the IP scenarios are also analyzed for the year 2000.

Flusberg, M Menhard, HR Walker, J Sobel, K ; Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-79-39-3, Sept. 1979, 358 p.; See also Volume 2, PB80-125487 and Volume 4, PB80-125503. Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125495

32 305831 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 4: ISSUES IN COMMUNITY ACCEPTANCE AND IP IMPLEMENTATION. The report describes various factors which influence community acceptance of integrated paratransit (IP) systems. In order to fully explore past events in those communities which have already accepted IP, a case study approach has been used. Seven well known IP systems were selected for analysis, based on system size, extent of community acceptance, and availability of data. Given the experiences in each case study, certain generalizations have been made about factors which seem common to each site, and comparisons have been made to show the resultant influences of different policies or other factors at the local level.

Flusberg, M Menhard, HR Walker, J Sobel, K ; Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-79-39-4, Sept. 1979, 122 p.; See also Volume 3, PB80-125503 and Volume 5, PB80-125511. Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125503

32 305833 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS. VOLUME 6: TECHNICAL APPENDICES. This last volume, includes five technical appendices which document the methodologies used in the benefit-cost analysis. They are the following: Scenario analysis methodology; Impact estimation; Example of impact estimation; Sensitivity analysis; Aggregation of impacts to national levels.

Flusberg, M Menhard, HR Walker, J Sobel, K ; Multisystems, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-79-39-6, Sept. 1979, 137 p.; See also Volume 5, PB80-125511. Also available in set of 6 reports PC E19, PB80-125461.; Contract DOT-TSC-1334; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125529

32 305900 THE WESTPORT CONNECTICUT INTEGRATED TRANSIT SYSTEM. The purpose of the project was to demonstrate the feasibility of combining shared-ride taxi and other paratransit service with conventional fixed-route bus service in Westport, Connecticut. The project focused on the Westport Transit District (WTD) playing a major brokerage role which involved contracting with private operators for the provision of shared-ride service. The report is an evaluation of the Westport Demonstration implementation, operations, and impacts; it covers a six month planning period and two full years of service operations. The planned and actual project implementation is described including important Federal litigation initiated against the project by one of the two local taxi operators. The report also describes the integrated fleet management and vehicle deployment strategies utilized by the WTD to provide regular fixed-route, supplemental fixed-route, shared-ride taxi, and special markets services. Arrangements for system integration in the areas of maintenance, marketing, public information, and fare structure are also discussed. The evaluation examines ridership markets, system productivity, service economics, and community impacts.

Furniss, RE ; CACI, Incorporated, Urban Mass Transportation Administration UM927/R9742, UMTA-CT-06-007-79-1, July 1979, 211p; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-129877

32 307592 MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM. VOLUME XVI. MULT-MODAL ANALYSIS: DIAL-A-RIDE. Because of increased public demand for such service as Dial-a-Ride coupled with the necessity of using every tax dollar to the fullest measure, multi-modal planners have a responsibility to the public to use all available information in choosing communities in which they plan to spend money. The process documented in this report is offered as a possible first step in providing an additional dimension in Dial-a-Ride site selection. A process of this nature could also be useful in formulating a statewide Dial-a-Ride plan. This report should be regarded more as a working paper than as a finished product. Feedback from potential users, it is hoped, will strengthen it until it can be used as a day-to-day planning tool. /Author/

Gotts, TL *Statewide Transportation Analysis and Research Monog Ser Vol XVI*, Aug. 1977, 80 p., Figs.; Originally published January 1976.; ACKNOWLEDGMENT: Michigan Department of

Transportation; ORDER FROM: Michigan Department of Transportation, 425 West Ottawa, P.O. Box 30050, Bureau of Transp Planning, Lansing, Michigan, 48909

32 307701 BIG OPPORTUNITIES FOR INTELLIGENT BUS-SYSTEMS [Grosse Chancen fuer Intelligentes Bussystem]. In July 1976 the results of the "Feasibility Study for Demand-Controlled Bus Systems" were published. According to this, the two system concepts of 'retax' (computer-controlled taxi-bus) and 'rufbus' (call-bus) were found to be technically possible and workable. Demand-control means that the passenger can call a public service vehicle either from his own telephone or from a street-corner call box. Further development work and the testing of components are to follow. /TRRL/ [German]

Bus und Bahn Vol. 10 No. 107, 1976, pp 4-5, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD 307709), Federal Institute of Road Research, West Germany

32 307717 FEASIBILITY STUDY FOR A PRT (CAB TAXI) SYSTEM IN MARL [Durchfuhrbarkeitsstudie fuer ein Cabintaxi-System in Marl]. The feasibility study for the application of DEMAG/MBB taxis is being undertaken in the town of Marl. Since public passenger transport in Marl is not attractive, the results have more than usual significance. The social acceptability of such a network was investigated, its costs were estimated and a comparison was made with another system (a comfortable version of a v-bus). The results showed the prt/taxi system to be more attractive, therefore possibly leading to a recovery in public transport, but more expensive. Which system is "better" is a political decision. /TRRL/ [German]

Pieper, F Ilgmann, G *Internationales Verkehrswesen* Vol. 30 No. 1, Jan. 1978, pp 53-55, 1 Fig., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 307724), Federal Institute of Road Research, West Germany

32 307750 WHEN THE BUS COMES AS IT IS CALLED [Wenn der Bus Wie Gerufen Kommt]. The experimental service for the dial-a-bus system in Friedrichshafen on Lake Constance is beginning to operate. It should contribute towards improving the attraction of local public passenger transport. The minibus operates according to requirement and represents to some extent the middle place between taxis and service buses. Operational control is electronic. In the dial-a-bus control centre the computer has already taken over 85% of the operational control. Two problem areas have crystallized: the difficulties in calling a bus by means of a keyboard at the call-point and the numerous misunderstandings caused when the bus does not travel immediately to the requested destination, but often starts off in the opposite direction because of other instructions issued to it and then sometimes waits at these stops for several minutes using up its buffer time. The control terminal in the bus and the unorthodox entry conditions place a heavy strain upon the driving personnel. Here it is necessary to make improvements. Improved legibility of the particulars on the display screen would help towards this. One effect which strongly influences the economy of the dial-a-bus is the proportion of

"non appearances" among the callers. At over 10% at present it is still too high. /TRRL/ [German]

Schmitt, H *Omnibus-Revue* Vol. 29 No. 4, Apr. 1978, pp 172-175, 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 307904), Federal Institute of Road Research, West Germany

32 307921 PUBLIC TRANSPORT PLAN 1980-1981 DRAFT.. This report gives a history of public transport planning with particular reference to the traffic act 1930 and the transport act 1968. A description follows of current trends in public transport and its operation, including the responsibilities of the local authority. Clwyd CC's public transport policy is discussed and key objectives are listed. Explanations are given of policies to meet these objectives. An overall description is included of the public transport system in Clwyd, including reference to supplementary services such as minibuses and post-buses. The transport problems and needs within the county are considered both for urban and interurban services, and the resulting proposed programme is presented. Changes from the previous public transport plan are indicated. (TRRL)

Clwyd County Council, Wales Monograph 1979, 56 p., 2 Fig., 14 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 242758)

32 307964 COLONIAL TAXI COMPANY OF BETHEL PARK, PENNSYLVANIA--PRIVATE ENTERPRISE IN PARATRANSIT. The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. This curriculum material consists of 6 separate documents--a guide and 5 paratransit case studies--titled: Paratransit Resource Guide; The Seattle/King County Commuter Pool Program--Paratransit and Rush Hour Congestion; Colonial Taxi Company of Bethel Park, Pennsylvania--Private Enterprise in Paratransit; The Paratransit Services of the Choanoke Area (North Carolina) Development Association--Rural Transit in Coordinated Human Services Transportation; The Dial-A-Bat Paratransit Service of Brockton, Massachusetts, Area Transit--Public Transit in Coordinated Human Services Transportation; and Knoxville, Tennessee, Commuter Pool--Matching Markets to Modes with Paratransit Brokering.

Oklahoma University, Urban Mass Transportation Administration, (OK-11-0001) UMTA-OK-11-0001-79-3, June 1978, 60 p.; Report 3 of 6, Paratransit Case Studies.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-103252

32 307965 KNOXVILLE, TENNESSEE COMMUTER POOL-MATCHING MARKETS TO MODES WITH PARATRANSIT BROKERING. The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. Knoxville Commuter Pool was a significant national experiment in community-wide transportation brokerage, particularly in its broad scale implementation of an owner/operator van pool program (47 van pools at the end of 1978), its aggressive promotion of all forms of ridesharing among employers and employees in the area,

and in the resolution of barriers (notably state regulations and insurance) to ridesharing brokerage. Knoxville Computer Pool engaged in limited amounts of human service agency transportation brokerage through 1977. Comparisons are made with the local Tennessee Valley Authority ridesharing programs, which is a successful model of an employer-based commuter work trip brokerage.

Cook, AR Barb, CE, Jr ; Oklahoma University, Urban Mass Transportation Administration, (OK-11-0001) UMTA-OK-11-0001-79-6, Dec. 1978, 55 p.; Report 6 of 6, Paratransit Case Studies.; ORDER FROM: NTIS; PB 80-103286

32 307966 THE PARATRANSIT SERVICES OF THE CHOANOKE AREA (NORTH CAROLINA) DEVELOPMENT ASSOCIATION--RURAL TRANSIT IN COORDINATED HUMAN SERVICES TRANSPORTATION. The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. This study gives background information on the Choanoke Area Development Association (CADA) and area, and reviews CADA's paratransit operations in 1978. Over 7,000 patrons use the service each month at a total cost to CADA of \$0.60 per vehicle mile, including capital and administrative overhead. The study documents the planning and implementation of news services, reviews current management and operating practices, and concludes with commentary on the local and national significance of the service. CADA has significantly increased the mobility of low income and elderly and handicapped residents of the Choanoke area and local human service agencies appear to have benefited from the availability of the CADA transportation service. The rural fixed-route bus services with feeder vans have been and should continue to be a model for rural public transportation programs.

Cook, AR ; Oklahoma University, Urban Mass Transportation Administration, (OK-11-0001) UMTA-OK-11-0001-79-4, June 1978, 48 p.; Report 4 of 6, Paratransit Case Studies; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-103260

32 307968 THE SEATTLE/KING COUNTY COMMUTER POOL PROGRAM--PARATRANSIT AND RUSH HOUR CONGESTION. The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. The Seattle/King County Commuter Pool program evolved from a 1973 energy crisis carpool program into a multi-faceted paratransit, paratransit incentives development and planning program focused upon reducing peak hour traffic congestion. The program has been involved in twenty-two recognizable activities, including operating a computer rider-match system and buspool program; development of paratransit incentives, including preferential parking, lane access and tolls; planning and employer consulting, including vanpooling and parking programs, transit strike contingency planning, state legislative lobbying for ridesharing legislation, special commuter and transporta-

tion studies, and Federal research into vehicle occupancy monitoring; flexible work hour promotion; and media promotion and educational program development.

Barb, CE, Jr ; Oklahoma University, Urban Mass Transportation Administration, (OK-11-0001) UMTA-OK-11-0001-79-2, June 1978, 75 p.; Report 2 of 6, Paratransit Case Studies.; AC-KNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB 80-103245

32 308036 FACTORS AFFECTING RIDE-SHARING BEHAVIOR. Recent research has shown that ridesharing is not basically an economic phenomenon but a complex social and psychological one influenced by numerous factors, as well as demographic and situational variables. The purposes of this study are (1) to determine which factors influence ridesharing, and (2) to develop appropriate strategies to encourage non-ridesharers to switch to ridesharing. Using a survey of 901 employees of New York State government, AID analysis and two-stage least squares regression were used to test for causal relationships between demographics, attitudes and ride-sharing behavior. Four market segments based on distance and travel time to work were identified. The segments were analyzed to determine which attitudes about carpooling influenced behavior. Results and strategies vary among the segments. For commuters traveling over 3 miles one-way, an overall carpool rating, dependent on an individual's perception of salient attitudes, was found to influence, and be influenced by, behaviour. In addition, attitude toward crowding in carpools was found to influence the behavior of long-distance (greater than 10 miles) commuters using expressways. No relationships were found in the segment of commuters traveling less than 3 miles. The research concluded that in order to account for such differences, it is necessary to have a carpool coordinator probe the prospective ridesharer and assess which set of attitudes are more important to each prospective carpooler's overall view of carpooling.

Brunso, JM Kocis, MA Ugolik, WR ; New York State Department of Transportation Report No 165, Aug. 1979, 31 p., 7 Fig., 3 Tab., 24 Ref.

32 308045 THE CAR LEFT HOME. Much of the recent emphasis of transportation planning has been on short-term, TSM-type actions intended to induce mode shifts from auto driver to carpooling and transit, particularly for the work trip. However, these actions subsequently free up a vehicle for use by other family members during the day. They also disrupt the worker's normal routine and may force that person to change the time at which he takes a trip. The result may be an increase in the household's nonwork VMT offsetting a portion of the work trip VMT saving. Using data collected during three home interview surveys conducted in New York State, it was concluded that the mode shifts away from vehicle driver for the work trip will result in a net VMT reduction less than work trip length. The net saving will be in the range 55-60% of the work trip VMT. It was also found that though the availability of a vehicle during the day for non-work trips does alter the distribution by purpose of the household's vehicle driver trips, it has little impact on the distribution by purpose of the household's total trips. The additional non-work

travel must be included in the analysis of any of these transportation actions or else the picture will be incomplete and overly optimistic. In addition transportation actions must be advanced which impact non-work travel if total VMT is to be reduced and subsequently congestion, energy consumption and air pollution lessened. /Author/

Gross, JM ; New York State Department of Transportation Aug. 1979, 19 p., 4 Tab., 5 Ref.

32 308206 THE ONTARIO SHARE-A-RIDE PROGRAM. The Ontario Share-A-Ride program is designed to achieve widespread use of car and vanpooling across the Province of Ontario. The paper describes the three phases of the program, study, demonstration and broadscale implementation. A number of preliminary results are presented. These results show a 10% to 20% increase in pooling activity and substantial cost savings for the participants in the vanpool program. A cost comparison is made between the total costs of operating carpools and vanpools and of providing bus service in which buses are shown to be four times and the average car five times as expensive as a vanpool. The data is used to perform a benefit analysis for creating new car and vanpools and to calculate benefit/cost ratios for the ongoing pilot projects. Potential community and social benefits from the creation of each new car and vanpool are shown to total \$800 and \$4000 a year, respectively. Including personal benefits and subtracting time costs brings the total benefits per pool to approximately \$2500 and \$7700, respectively with individual cost savings of \$1000 to \$1300 per year per person. The future program will consist of a broadscale outreach effort across the Province in which technical advice and guidance will be provided from the experience gained in the demonstrations. In addition, implementation handbooks and publicity material have been developed for large scale distribution and other incentive measures to promote high occupancy vehicle use are being studied. The program goal is to create 400 vanpools and 5000 new carpools in the Province by 1983.

Dalton, P (Ontario Ministry of Transportation & Communic, Can) Harmelink, M (Ministry of Transport, England) Smith, D Wong, J (Ontario Ministry of Transportation & Communic, Can) ; Roads and Transportation Association of Canada Preprint 1979, pp 67-79, 4 Tab., 6 Ref.; Annual Conference Preprints.

32 308207 CAR AND VANPOOLING IN CANADA-ITS IMMEDIATE PAST AND PROSPECTS FOR THE FUTURE. This paper examines the past experience of the Transportation Development Agency program in carpooling and current developments in the promotion of vanpooling under the sponsorship of Transport Canada, Energy Mines and Resources and the provinces. The main thrust of the TDA carpool program was the sponsorship of a two year, large scale, areawide carpool demonstration program carried out in Vancouver. While this project was very professionally conducted it failed to draw the hoped for public support for carpooling and consequently was discontinued. An evaluation of the project carried out at its conclusion revealed that the excellent transit system in Vancouver, the absence of adequate incentives for carpooling and

the lack of credibility of the energy crisis made it impossible to get commuters to switch to carpooling. A detailed analysis of the carpool market based on the Vancouver experience showed that only through fairly draconian disincentives to driving alone could a significant shift to carpooling be achieved. Furthermore it was found that due to the alternative use by other family members of carpool vehicles left at home, the energy saving of carpooling was only 10% per carpooling household. The carpool program proved unsuccessful for central areas well served by transit and it was concluded that future promotion of pooling should aim to service remote industrial sites and areas with poor transit service. Building on this knowledge, the Strategic Studies Branch of Transport Canada, Energy Mines and Resources and the provinces have initiated a program to encourage vanpooling in such circumstances. The paper concludes with a description of this program and the lessons Canadians can learn from the entire carpool/vanpool experience to date including its utility as one component of a contingency plan to meet any future energy crisis.

Johnson, WF McCoomb, LA (Canadian Transport Commission) ; Roads and Transportation Association of Canada Preprint 1979, pp 81-97, 1 Fig., 1 Tab.; Annual Conference Preprints.

32 308523 COORDINATING PARATRANSIT AND HEAVY RAIL SERVICE. Paratransit, when fully integrated and complimentary to existing public transit services, provides a flexible and necessary dimension to intermodal coordination. This is illustrated by the successful public transit system in Westport, Connecticut, an affluent community of 28,000 people. The Westport Minnybus carries approximately 600,000 persons/year in its daytime and commuter bus services, while the Maxytaxy, a shared ride, demand-responsive Urban Mass Transportation Administration service and methods demonstration project, carries 160,000 persons/year. The Maxytaxy has successfully integrated goods movements and elderly and handicapped services into generally available, demand-responsive public transportation while achieving a vehicle productivity of five to six passengers per operating hour. Westport residents utilize public transportation services to the extent of 25 trips per capita per year. The Minnybus and Maxytaxy provide general supportive services to the rail system during the entire day by routing schemes and operational practices to make all parts of the Westport community accessible by public transportation modes to and from the railroad station.

Aoyagi, G (Westport Transit District) *Transit Journal* Vol. 5 No. 4, 1979, pp 73-78; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

32 308550 JITNEY PARATRANSIT SERVICES: AN APPRAISAL OF PRESENT AND FUTURE OPERATIONS. Jitney, one of the oldest paratransit modes and one of the few that are privately owned, is examined to ascertain its present and future viability. Land use, population, travel patterns, and transportation system characteristics are drawn from field observations and census sources for jitney corridors in Atlantic City, Chicago, and San Francisco. These corridors are prototypes of two different types of jitney operations: (a) taxicabs operating as jitneys and

(b) specially licensed jitney vans. Jitney and bus operations are compared to differentiate the relative start-up and operating cost advantages of each mode. An advantage of the jitney is its low start-up cost. Corridors appraised to be suitable for jitneys are those that have a mix of intense land uses that generates a consistent demand for intracorridor travel, low rates of automobile ownership, and travel demand that is evenly dispersed spatially and temporally to reduce deadheading. However, the future viability of jitney could be endangered if fare increases instituted to provide adequate wages for drivers threaten jitney's competitiveness with publicly subsidized transit services. (Author)

Heramb, C (Chicago Department of Public Works) Sen, A Soot, S (Illinois University, Chicago) *Transportation Research Record* No. 724, 1979, pp 1-8, 3 Fig., 4 Tab., 8 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308551 DIAL-A-RIDE IN ROCHESTER: SEARCH FOR A VIABLE SUBURBAN TRANSIT ALTERNATIVE. The evolution of the federally assisted demand-responsive transportation demonstration in Rochester, New York, is examined. The history of dial-a-ride in Rochester is divided into four phases: (a) the growth period, from 1973 to late 1975; (b) 1976, the transition period, during which growth of dial-a-ride service ended and reassessment began; (c) 1977, the period of drastic cutbacks; and (d) the new demonstration, which began in November 1977. The problems and achievements of the program in each of these phases are evaluated, and the implications of the Rochester experience for suburban transit services in other cities are cited. (Author)

Holoszye, M (Systan, Incorporated) *Transportation Research Record* Vol. 724 1979, pp 8-15, 1 Fig., 4 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308552 HYBRID PARATRANSIT SERVICE. Hybrid paratransit, which combines features of conventional bus service and demand-responsive transportation, is examined. Hybrid paratransit sacrifices some of the flexibility of demand-responsive transportation to attain improved productivity and cost savings but retains some of that flexibility to achieve the levels of service necessary for adequate market penetration. One example of hybrid paratransit is checkpoint subscription service, a prearranged operation in which groups of passengers gather at common locations for collection and passengers are distributed only to those locations. Checkpoint and doorstep subscription service were analyzed and compared by applying models that predict cost and performance. The results show not only that the expected productivity increases accrue to the hybrid operation but also that, under many circumstances, the level of service of hybrid paratransit is superior. In addition, for any level of ridership, there may be a vehicle size that minimizes the operating costs of both subscription services. It is concluded that hybrid paratransit may offer service and cost characteristics that dominate demand-responsive transportation under a variety of conditions and may be the most

appropriate option for service areas of moderate population density. (Author)

Sobel, KL (Cambridge Systematics Europe) *Transportation Research Record* No. 724, 1979, pp 15-22, 9 Fig., 19 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308553 INTEGRATED PARATRANSIT: MYTHS AND REALITIES. A study that involved a systematic attempt to estimate all of the potential impacts of a range of integrated transit-paratransit options in a variety of settings is reported. The study concluded that, in some but not all instances, the benefits of integrated paratransit—in terms of improved service levels and mobility, reduced automobile expenditures, and other impacts—may justify system deficits. Necessary conditions for this include (a) high paratransit productivity, which could possibly be achieved by implementing hybrid fixed-route and demand-responsive service (such as checkpoint many-to-many), and (b) low operating costs, which might be achieved by contracting with private operators. Integrated paratransit was found to have a positive but insignificant impact on automobile use and ownership and no measurable impact on vehicle kilometers of travel, fuel consumption, or emissions. Areas that have population density of 1160-2300 persons/sq km (3000-6000 persons/sq mile) and limited existing transit service are promising locations for implementation of integrated paratransit service. (Author)

Flusberg, M Menhard, HR Walker, JM (Multi-systems, Incorporated) *Transportation Research Record* No. 724, 1979, pp 22-29, 5 Tab., 9 Ref.

This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308554 REVIEW AND ASSESSMENT OF PARATRANSIT MODELS. The development of integrated paratransit systems has been accompanied by the development of a wide range of modeling and analytic activities designed to shed light on the delicate balance between supply, demand, and cost in a paratransit network. Modeling and analytic approaches have ranged from complex situations to simple rules of thumb. Of the wide range of theoretical models developed so far by academics, researchers, and consultants, relatively few have been applied in a practical planning context, and the results of these limited applications have been mixed. A comprehensive survey of the analytic procedures and tools developed to address paratransit planning and evaluation problems is presented. Modeling procedures are described and classified, the historical development of the models is traced in the context of the parallel development of paratransit systems, the performance of existing models is compared, and the attributes and publication potential of several general classes of models are summarized. (Author)

Billheimer, JW Lucas, GR Wilmuth, RW (Systan, Incorporated) *Transportation Research Record* No. 724, 1979, pp 29-35, 6 Fig., 1 Tab., 37 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308556 TECHNOLOGY TRANSFER IN PARATRANSIT: FIVE CASE STUDIES. The evolution and adaptation of paratransit from the perspective of technology transfer are examined. Three key factors in successful technology transfer and local adoption are the presence of necessary prerequisites (local paratransit-program mandates, a service patron, and entrepreneurial staff skills), the resolution of barriers (recognized as including local transportation planners, government agency staff, and federal programs and policies), and the transferability of the situation (unique local program or community characteristics that militate against the successful duplication of case study experiences). Five case studies are used to represent the major paratransit modes and mandates and substantial operating experience: the Seattle-King County Commuter Pool; the Knoxville Commuter Pool; Colonial Paratransit and Taxi Company of Bethel Park, Pennsylvania; Dial-a-Bat of Brockton, Massachusetts; and the Choanoke Area Development Association, Inc., of Murfreesboro, North Carolina. All five programs have evolved toward successful examples of technology adaptation and are characterized by broadly conceived mandates and multiple service activities. The case studies underscore the significance of the noted local prerequisites, particularly the role of the patron. (Author)

Barb, CE, Jr Cook, AR (Oklahoma University) *Transportation Research Record* No. 724, 1979, pp 39-45, 1 Fig., 1 Tab., 6 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308557 ESTIMATING THE COSTS OF A SUBSCRIPTION VAN SERVICE. The development and results of a model that examines in detail the costs associated with supplying subscription van service in a small urban community are discussed. The service is assumed to consist of a number of vehicles that travel fixed routes for an extended period of time. Start-up costs, equipment replacement, system growth, and other variables are incorporated in the analysis. The effects of depreciation, taxes, purchasing and leasing of equipment, and other parameters are monitored. Possible savings to participating commuters under service cost-recovery criteria are also investigated. The procedure developed was implemented by a series of interactive computer routines coded in APL and simulated in hypothetical demand situation for the Fredericton, New Brunswick, area, and a sensitivity analysis of the major variables and assumptions was performed. The analysis indicated that the model produced reasonable estimates of the results of introducing subscription van service in the Fredericton area. The development of the model is described, and a representative module is provided to show the level of detail undertaken in the analysis. Results of the simulation runs are presented, and variables in the sensitivity analysis that were found to have major impacts on the economic viability of subscription van service are discussed. (Author)

Fleming, DS Wilson, FR Stevens, AM (New Brunswick University, Canada) *Transportation Research Record* No. 724, 1979, pp 45-52, 7 Fig., 1 Tab., 4 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308558 ECONOMICS OF VANPOOLING.

The concept of commuter vanpooling and the incentives that make it financially advantageous to the rider, the driver, and the company are examined. The primary incentive for riders is the money they can save on the commute to and from work. The farther the commute is, the greater are the savings. Convenience and camaraderie are also found to be important inducements for riders. For the driver, the incentives are a free commute to work, the possibility of getting rid of a second automobile, and personal use of the van on weekends. The incentives for 20 Texas firms that are currently operating approximately 310 vanpools are found to vary. Some companies initiated vanpooling to expand their labor market, some as a means of providing an increase in disposable income to employees, and some to save on parking costs. A detailed comparison of commuting and parking costs for automobile and vanpool is presented. Conditions in the state of Texas that have encouraged the use of vanpooling and future prospects for vanpooling in Texas are summarized. (Author)

Maxwell, DA (Texas A&M University) McIntyre, JP (Texas Governor's Office of Energy Resources) *Transportation Research Record* No. 724, 1979, pp 52-57, 3 Fig., 5 Tab., 8 Ref.; This paper appeared in TRB Record No. 724, Current Paratransit and Ride-Sharing Activities.; ORDER FROM: TRB Publications Off

32 308635 TAXI. REQUIREMENTS AND DEVELOPMENT POSSIBILITIES [Taxi. Krav och utvecklingsmoejligheter].

The traditional use of taxi is mainly the transportation of people to and from railway stations and airports, and transportation of people to and from different public places e.g. places of entertainment, hospitals, etc. The use of taxi as a means of transportation in areas such as school children transport, and substitution for time scheduled collective traffic, especially in rural areas, has lately increased considerably. The dominating business form of taxi transport is one license one owner. The owner then has drivers in his employment. Presently there are ca. 9000 licenses for taxi traffic in Sweden and only 400 to 500 taxi companies have more than one licence. The taxi companies often run a co-operative local calling station. This organization can effectively cope to a small extent with the fluctuating demands especially in densely populated areas. In the report the author describes alternative company organization such as: (1) the big company, which would own and control all its taxi cabs and licenses, (2) the association of license holders, and (3) competing taxi companies. The author describes the development of the utilization of taxi cabs in the collective transportation, along with the distribution of taxi licenses. The possibilities of a collective taxi transport, e.g. jitney services is discussed, along with the simplification of the construction of the taxi fare. The increasing illegal taxi traffic is becoming serious and should be dealt with by more severe punishment. (TRRL) [Swedish]

Kommunikationsdepartementet Monograph DS K 1979:4, 1979, 113 p., 6 Fig., 7 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 243610), National Swedish Road & Traffic Research Institute

32 308789 PARATRANSIT-THE ANSWER.

Transport planners have shown increasing interest in the application of 'unconventional' or

paratransit forms of public transport services in situations where conventional rail or stage carriage bus services are not practical. Various experimental bus services have been introduced as exemplified by the UK Rutex programme. Many developing countries have such transport systems which have developed over a long period rather than as a result of sophisticated transport planning. Mostly privately owned, these systems perform satisfactorily with respect to local conditions and needs. The article describes a number of these minibus and shared-taxi systems and examines their operating characteristics. (TRRL)

Silcock, DT *Chartered Institute of Transport Journal* Nov. 1979, pp 417-420, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 244024)

32 309147 INCREASING THE ROLE OF TAXIS IN URBAN PUBLIC TRANSPORT.

The plea that taxis should be playing a greater role in urban public transport has been heard for many years. In Australian cities the only note-worthy attempt to facilitate this aim has been the introduction of some limited multiple-hire schemes. Innovative taxi operating schemes have been introduced in overseas cities aimed at reducing expenditure by the publicly operated transport organisations and at the same time increasing the revenue of the taxi industry. One of these schemes involves replacing buses with taxis on routes experiencing low passenger demand. This concept, known as "route-taxis", can be implemented in a number of different schemes. A theoretical study was undertaken for a specific bus route in Perth and a methodology was developed to ascertain the order-of-magnitude costs and benefits of replacing the bus service, at certain times, with a route-taxi. The study also identified a number of administrative and operational constraints that could hamper the introduction of route-taxi schemes. These constraints and a number of other issues relating to route-taxis are discussed in this paper. (TRRL)

Koltasz, E; Institution of Engineers, Australia No. 79/11, 1979, pp 5-9, 2 Tab., 5 Ref.; This paper was presented at the Transportation Conference, Adelaide, November 14-16, 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239406)

32 309186 TAXIS AS AN ALTERNATIVE FORM OF COMMUNITY BASED TRANSPORT.

This paper presents a critical examination of community based transport for elderly people in urban areas. Many elderly people are transport disadvantaged. A common response of local area planners is to provide some form of subsidised mini bus service for use by elderly people. A study was made which examined a number of such mini bus services and concluded that, in terms of satisfying the transport needs of elderly people, mini bus services are generally inferior to commercially operated taxi car services on both efficiency and equity criteria. (TRRL)

Skinner, RC (Victoria Department of the Premier, Australia); Institution of Engineers, Australia, (0 85825 119 1) No. 79/11, 1979, pp 1-4

This paper was presented at the Transportation Conference, 1979, Adelaide, 14-16 November 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239412), Australian Road Research Board

32 309821 DIAL-A-RIDE FACES A FINANCIAL CRISIS.

The article reviews the present position of the sale dial-a-ride service in greater

Manchester. Of the many similar services introduced in the UK only this service survives in its original form. Although the service carries 120000 passengers annually this must be increased to 180000 to eliminate an annual deficit of 20000. The six Bedford cf340-based minibuses in the fleet have suffered reliability problems and may be replaced with Dodge 50-series vehicles. The service includes many regular bookings such as home-to-school for children and home-to-clinic for old people. This type of operation has allowed the drivers to build up social contacts within the community. It is essential that the operating economies planned be successful if the system is to survive. (TRRL)

Commercial Motor Vol. 150 No. 3837, Dec. 1979, pp 46-48, 7 Phot. ACKNOWLEDGMENT: TRRL (IRRD 244456)

32 310025 THE ORGANISATION AND ROLE OF PRIVATE BUS AND COACH COMPANIES.

A study of the organisation and operating methods of privately owned bus and coach companies is reported. It shows that the industry is a growing one dominated by relatively small companies which play a significant role in providing local road passenger transport. Notable features of private bus and coach companies are their apparently low overheads, the flexibility of their full-time staff and the extent of use of part-time drivers. Peak school contracts form the main basis of their work and many have all their vehicles committed to at least one such contract during peak periods. This peak work is supplemented by a smaller number of works contracts. Off-peak work is more limited and varied, consisting of a mix of other school services, transport of shift workers, social services work, licensed road service operation, various one-off contracts and, in the case of minibus operators, parcel and school meals deliveries. At the weekends and during the summer holidays many operators run day outings or licensed services to the coast or other places of entertainment and interest. Their costing methods lead many private operators to charge comparable prices for both peak and off-peak work. Such methods contrast with that used by many publicly-owned companies which lead to a much higher level of pricing in the peak. (a) (TRRL)

Jackson, RL Martin, PH; Transport and Road Research Laboratory Monograph SR485, 1979, 18 p., 2 Fig., 3 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244402)

32 310137 A STUDY TO ASSESS THE FEASIBILITY OF USING TAXI CABS FOR SERVICE TO THE AMBULATORY HANDICAPPED.

This report is an assessment of the feasibility of providing door-to-door transportation for the ambulatory handicapped, by taxi. The rationale for the study is primarily financial, with the prospect of providing such service using a standard taxicab at less cost than the special van-type services now operating in a number of Canadian cities. Comparative programs in five American cities are outlined. (TRRL)

Department of Transport, Canada Monograph TP2012, 1979, 39 p., 3 Fig., 2 Tab., 15 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244439), Roads and Transportation Association of Canada

32 310245 CAR POOLING IN THE USA: A BRITISH PERSPECTIVE. The present US ride-sharing programme was initiated as an emergency measure during the 1973 crisis and, in the heat of the moment, perhaps rather over-zealous claims were made for its likely effectiveness within transport policy as a whole. The emergency conditions then prevailing precluded the establishment of an adequate monitoring framework. Attempts are now being made to establish the true impact of ride-sharing and to make realistic forecasts of its future effects. Perhaps the most important lesson to be learned from the US experience of organised ride-sharing is that unless petrol prices are raised dramatically, and in the absence of clear incentives, the reduced personal flexibility associated with organised ride-sharing schemes makes them an unattractive option to all but a minority of commuters. Differences between the US and Britain, particularly in terms of car ownership and work journey characteristics, suggest that ride-sharing might fulfil a quite different role in Britain from that which it has in the US. Its major justification could well lie in an improvement in the operating environment of public transport (through skimming the peak load and providing basic mobility in small communities) rather than in its more widely publicised effects on energy consumption and road congestion. (a) (TRRL)

Bonsall, PW (Leeds University, England); Transport and Road Research Laboratory, (0305-1315) Monograph SR 516, 1979, 15 p., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244392)

32 310702 CHOICE OF ACCESS MODE TO INTERCITY TERMINALS. Disaggregate demand models are developed for Canada's national capital region (Ottawa-Hull and vicinity) for the choice of access mode to intercity transportation terminals. Models that consider a choice of five alternative access modes are reported for the airport, railroad station, and intercity bus terminals. The results show that considerations of convenience (walking time, schedule frequency, and baggage handling) and dominant factors in the choice of access mode. The models are applied to test passenger preference for several proposed strategies for improving access to intercity transportation terminals in the region. The evaluation indicates that, although more direct and faster public limousine and transit services will produce a modest increase in mode share, shared-ride taxi services offer a better compromise between the low cost of public transportation and the convenience of the private automobile and conventional taxi service. (Authors)

Sobieniak, J (Lea (ND) and Associates, Limited) Westin, R Rosapep, T Shin, T (Toronto Univer-

sity, Canada) *Transportation Research Record* No. 728, 1979, pp 47-53, 1 Fig., 4 Tab., 3 Ref.; This paper appeared in *TRB Research Record* No. 728, *Passenger Travel Forecasting*; ORDER FROM: TRB Publications Off

32 311312 BENEFIT-COST ANALYSIS OF INTEGRATED PARATRANSIT SYSTEMS, VOLUME 1: EXECUTIVE SUMMARY. Integrated paratransit (IP) service is a concept which involves the integration of conventional fixed-route transit services with flexible, demand-responsive services in order to best serve emerging urban development patterns. To learn more about the capability of IP to meet the transit needs in the urban/suburban environment, the Urban Mass Transportation Administration sponsored a study to identify and define the benefits due to and the costs associated with the deployment of various hypothetical IP systems. This study systematically estimates potential impacts of a range of integrated transit/paratransit options and policies in a variety of settings and compares them with impacts of transportation alternatives. This study concludes that, in general, IP with fares closer to fixed-route transit than exclusive-ride taxi will result in net paratransit operating deficits. However, in some instances, the benefits of IP options in terms of improved service levels and mobility, reduced auto expenditures and other impacts appear to offset these operating deficits. Necessary factors for this include high paratransit productivities, possibly achieved by implementing hybrid, fixed-route/demand responsive service; and low operating costs, possibly achieved by contracting with private operators. IP was found to have a positive but insignificant impact in reducing automobile usage and ownership, but no measurable impact on vehicle miles traveled, fuel consumption, or emissions. Promising locations for paratransit implementation are those areas with population densities between 3,000 and 6,000 persons per square mile and limited transit service. The most promising paratransit concepts appear to be checkpoint many-to-many service, route deviation service, automated doorstep service with high vehicle densities, and vanpool service. The results of the study further suggest that paratransit service is sensitive to fare. Fare increases above \$.25 were determined to be counterproductive, while free transfers from feeder services to line haul became an inducement to use paratransit. The study also concluded that digital communications and automated dispatching systems are potentially cost-effective technological innovations. (UMTA) above \$.25 were determined to be counterproductive, while

Flusberg, M; Multisystems, Incorporated, Urban Mass Transportation Administration, (DTS-721) Final Rpt. UMTA-MA-06.0054-79-5, Sept. 1979, 73p; Other volumes in the study are Volume 2: "Introduction and Framework for Analysis;" Volume 3: "Scenario Analyses;" Volume 4: "Issues in Community Acceptance and IP

Implementation;" Volume 5: "The Impacts of Technological Innovation;" and Volume 6: "Technical Appendices", with respective report numbers of UMTA-MA-06-0054-79-5 through UMTA-MA-06-0054-79-10; Contract DOT-TSC-1334; ORDER FROM: NTIS; PB80-125479

32 311875 INTERACTIVE FIXED-ROUTE BUS AND DIAL-A-BUS SYSTEMS [Samverkan mellan linjebuss och taxibuss]. This report describes a simulation study of combining fixed-route bus systems with dial-a-bus systems. The report also describes and discusses the methods used and the factors influencing costs and travel time of a dial-a-bus system. Two alternatives were studied: (1) max travel time; the dial-a-bus system takes care of all journeys, which in the fixed-route system have travel times longer than 45 minutes and 55 minutes respectively. (2) higher charge; the dial-a-bus system can be used for all trips within the city but the charge for this system is considerably higher than for the fixed-route system. Two levels of investment have been studied, 10 and 20 buses respectively. These levels correspond to the charges 30 skr/trip and 20 skr/trip. The high standard of the dial-a-bus system creates problems by greatly raising the travel demand compared to that of the fixed-route bus system. The dial-a-bus system attracts travellers that previously used cars, bicycles or walked. The alternative max travel time gives reduction of travel times up to 30 min, and the costs increase by 0-40% (45 min) and 35-80% (55 min). The alternative higher charge gives hardly any reduction in travel time and would in practice work as a more efficient taxicab system. The charges would easily finance the increased costs. (TRRL) [Swedish]

Falkborn, K Holmberg, B; Lund University of Technology, Sweden Monograph, MONOGRAPH No. 32, 1979, 37p, 19 Fig., 5 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244658), National Swedish Road & Traffic Research Institute; ORDER FROM:

32 312485 NEW WAYS FORWARD, PUBLIC TRANSPORT ALTERNATIVES IN CLWYD (2ND EDITION). This edition outlines schemes introduced by the Clwyd County Council over the last four years, showing how they were put into practice; it also contains a report on the development and progress of the new Air Wales service and outlines the operation of a post-bus scheme in an area of very difficult terrain. Details are given of an experiment to determine the effect of a fare reduction on bus usage and revenue. The operation of a voluntary social car service in three districts of Glyndwr is discussed. This service is designed to provide supplementary transport for rural areas ill-served by traditional forms of transport. This scheme has been expanded to form a voluntary essential car service, aimed at

areas where no public transport is available, or where passengers are unable to use public transport through age or infirmity. The development of an experimental community bus scheme in the Cerrigydrudion area is described. Results show that a 50 per cent reduction in off-peak fares produced a passenger gain of 22 per cent and a revenue loss of 28 per cent. The highest increase in passengers occurred where the actual amount of the discount was largest. (TRRL)

Davies, ER ; Clwyd County Council, Wales
Monograph No Date, 117p, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRKD 246111)

32 313175 VANGO ANNUAL REPORT, 1978-79. VANGO is a non-profit, government-funded corporation committed to the organization of commuter vanpools in Maryland. Its services eliminate the financial risk to companies and vanpoolers, simplify getting started and are provided at no cost to the users. The 1978-79 annual report describes the successful attainment of VANGO's goals of proving the feasibility and marketability of the third party leasing approach as well as of promoting the basic concept of vanpooling in general. VANGO's incredible growth rate of 636% has made the corporation the recognized leader in vanpool promotion in the United States.

VANGO, Maryland Department of Transportation BTL/VAN-79/01, Sept. 1979, 63 p.; Sponsored in part by Maryland Dept. of Transportation, Baltimore, and Maryland Energy Policy Office.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-138290

32 313971 THE KNOXVILLE TENNESSEE TRANSPORTATION BROKERAGE DEMONSTRATION: AN EVALUATION. The Knoxville Tennessee Transportation Brokerage Demonstration was conducted from October 1975 through December 1978. In this first metropolitan, multi-modal implementation of the brokerage concept, an organization known as the Knoxville Commuter Pool (KCP) attempted to identify and match transportation demand and supply across a variety of users and providers, and to effect legal and regulatory reforms conducive to the improvement of transportation services. Primary emphasis during the demonstration was on serving the commuters and social service agencies. A major aspect of KCP's commuter-oriented activities was the large scale surveying of employees at their worksites and their subsequent computer matching with buses and with other commuters having similar travel patterns. KCP purchased 51 vans and leased them to individual commuters as part of an operational vanpool program designed to encourage the growth of a large private vanpool fleet. Implementation of the vanpool program and its resulting impact on state regulatory law and vanpool insurance is discussed, as well as the resulting changes in Tennessee laws affecting other public transportation modes as well.

Juster, RD Kruger, JA Ruprecht, CF ; Multisystems, Incorporated, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-TN-06-0006) Final Rpt. UMTA-TN-06-0006-80-1, Aug. 1979, 300p; Contract DOT-TSC-1083; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-169337

32 314096 THE INNOVATION PROCESS FOR DIAL-A-RIDE [Rept. on Phase 1]. The purpose of the investigation is to examine policy-relevant issues regarding the Federal role in the diffusion of urban mass transportation innovations, and to arrive at an understanding of the innovation process in organizations. This report is Phase I of a three-phase research project, and it documents the nature of the innovation process in organizations that adopted Dial-A-Ride. Dial-A-Ride is a form of demand-responsive transportation characterized by the traveler's telephoning for a bus, van, or cab, as he or she needs a ride. During Phase I, a series of ten in-depth case studies were conducted for the purpose of identifying the general stages of the innovation process in organizations dealing with mass transportation, and specifying those factors in that process pertinent to the adoption of Dial-A-Ride by those organizations.

Rogers, EM Magill, KP Rice, RE ; Stanford University, Urban Mass Transportation Administration UMTA-CA-06-0115-79-1, June 1979, 295p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-185093

32 314710 CAR-SHARING-WHERE ARE WE NOW? This article results from an informal seminar held at Leeds University in November 1979. The seminar, open to all those organisations and individuals contributing to British car-sharing research, reviewed knowledge on current levels of car-sharing and the likely consequences of increasing those levels. It was revealed that the impacts of car-sharing on the complete transport system are unlikely to be very large but examples were given of successful schemes at particular sites, usually those poorly served by public transport. Results from several experimental car-sharing schemes in Britain are being used to examine current car-sharing behaviour and forecast possible reductions in trip mileage. Provision of special incentives for car-sharers (such as free-reserved parking space) does not greatly increase the percentage of car-sharers. The author suggests that, before useful advice can be given to potential organisers of car-sharing schemes, the complex secondary effect that car-sharing can have on public transport patronage should be investigated to supplement the available data on model prediction, attitude surveys and patronage of existing schemes. (TRRL)

Bonsall, P (Leeds University, England) *Traffic Engineering and Control* Vol. 21 No. 1, Jan. 1980, 2p, 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 245604)

32 316482 PARATRANSIT STUDY. The Urban Mass Transportation Administration (UMTA) and the Federal Highway Administration (FHWA) recognized the importance of paratransit modes in serving urban travel needs and decided to initiate a Paratransit Program Design Study. This study defined the role of paratransit modes in an integrated transportation system, considered the potential of these modes for providing feeder service to regular transit systems as well as their potential as substitutes for the private automobiles and mass transit systems. This report will review operational experience of paratransit modes accrued to date in the Shreveport-Bossier City area, assess their potential for serving urban transportation needs, and propose a design program for identifying innovations in

providing paratransit services which will be beneficial to the citizens of Shreveport and Bossie City. Service is considered adequate, the only disadvantage being the cost of fare. Perhaps in the future, regulations permitting taxicab service could be coordinated with the transit system and serve as a feeder mode of travel. If all dial-a-ride services were coordinated as one, the possibility of these services being able to provide both feeder service and local door-to-door service at a lower cost than could the taxicab, would be a desirable alternative. Currently there is very little pooling in the study area. Carpooling and vanpooling participation should be encouraged by the local jurisdiction as a viable transportation alternative relieve traffic congestion, lower parking requirements, and provide savings in commuter cost to members participating in shared riding. The existing services provided by SporTran is considered excellent, with the exception of West Shreveport and the Cooper Road areas. With implementation of paratransit services to those areas, SA-COG concludes public transit services would then be accessible to all local residents in need of public transportation. The Shreve Area Council of Governments is recommending a combined express bus route/paratransit system for the West Shreveport area. The express buses are an alternative to alleviate potential transportation problems incurred by increased traffic to AMI, GM, GE, and the remainder of the West Shreveport Industrial Park. The Shreve Area Council of Governments recommends that the two jitneys presently in operation be phased out and replaced with a fixed-route paratransit van system. The proposed paratransit van system for this area would lessen walking distance to SporTran's bus stop for Cooper Road residents. Broadmoor and South Bossier are two areas SA-COG feels should be further studied for possible extension of transit service and/or inclusion of some form of paratransit service at a later date. At this time SporTran is not providing Sunday service at all on the two Bossier City routes and the Cooper Road route. A survey would need to be conducted to establish a "need" for Sunday service in these areas. (Author)

Shreve Area Council of Governments, Urban Mass Transportation Administration Proj No. LA-09-0036, June 1979, 122p, Figs., Tabs., Refs.

32 316491 PARATRANSIT HANDBOOK, A GUIDE TO PARATRANSIT IMPLEMENTATION VOLUME 11--PARTS 4&5. This Paratransit Handbook has been developed to aid public officials, planners and system operators in planning, designing, implementing, operating and evaluating integrated paratransit systems. The Handbook represents a compendium of techniques and experience drawn from existing dial-a-bus and shared-ride taxi paratransit systems. Five interrelated sections in two volumes comprise the Handbook: Volume I; Part 1, the Introduction, summarizes the current state-of-the-art of integrated paratransit systems; Part 2, Creating the System, contains prescriptive guidance for the individual tasks required in planning, designing, implementing operating and evaluating integrated systems. Each element of this key section contains overview flow diagrams showing the major relationship of individual tasks, cross-references to more detailed examples contained in other sections of the Handbook, and a summary

of pitfalls to be avoided. Part 3, System Characteristics, summarizes the operating characteristics of over 100 dial-a-ride and shared-ride taxi systems, and presents specific guidance regarding target market systems for the elderly and handicapped. Volume II; Part 4, SCRAPS, contains detailed information on Service Components, Regulations, Analytical Procedures, and Sources to complement the planning and design process. Part 5 contains Appendices, including references, a glossary, summaries of individual system characteristics and other technical material. (UMTA)

Billheimer, JW Lave, RE Jones, P Fratessa, C Newman, D Holoszy, M Fondahl, G ; SYSTAN, Incorporated, Department of Transportation, (DTS-721) Final Rpt. UMTA-MA06-0054792,II, Jan. 1979, 378p; Contract DOT-TSC-1392-Task 2; ORDER FROM: NTIS

32 316492 PARATRANSIT HANDBOOK, A GUIDE TO PARATRANSIT IMPLEMENTATION VOLUME I-PARTS 1-3. This Paratransit Handbook has been developed to aid public officials, planners and system operators in planning, designing, implementing, operating and evaluating integrated paratransit systems. The Handbook represents a compendium of techniques and experience drawn from existing dial-a-bus and shared-ride taxi paratransit systems. Five interrelated sections in two volumes comprise the Handbook; Volume I; Part 1, the Introduction, summarizes the current state-of-the-art of integrated paratransit systems; Part 2, Creating the System, contains prescriptive guidance for the individual tasks required in planning, designing, implementing, operating and evaluating integrated systems. Each element of this key section contains over-view flow diagrams showing the major relationship of individual tasks, cross-references to more detailed examples contained in other sections of the Handbook, and a summary of pitfalls to be avoided. Part 3, System Characteristics, summarizes the operating characteristics of over 100 dial-a-ride and shared-ride taxi systems, and presents specific guidance regarding target market systems for the elderly and handicapped. Volume II; Part 4, SCRAPS, contains detailed information on Service Components, Regulations, Analytical Procedures, and Sources to complement the planning and design process. Part 5 contains Appendices, including references, a glossary, summaries of individual system characteristics and other technical material. (UMTA)

Billheimer, JW Lave, RE Jones, P Fratessa, C Newman, D Holoszy, M Fondahl, G ; SYSTAN, Incorporated, Department of Transportation, (DTS-721) Final Rpt. UMTA-MA06-0054-791,I, Jan. 1979, 450p; Contract DOT-TSC-1392-Task 2; ORDER FROM: NTIS

32 319395 CHANGING PERSPECTIVES ON TRANSPORTATION ENGINEERING EDUCATION. The role of the university, and especially of civil engineering programs, in the education of transportation professionals is assessed in a discussion that focuses on paratransit training needs. A survey of 110 university representatives of the Transportation Research Board indicated that paratransit education is lagging behind in addressing the broader issues of paratransit. It was also found in the survey that most transportation faculties are small (50 percent have

one or two people) but that most offer graduate programs. Paratransit may be a harbinger of trends toward a short-term, service-oriented approach to transportation development by people who lack or do not need the traditional transportation engineering and planning skills. Case-study analysis of five leading, experienced paratransit organizations disclosed that individuals with entrepreneurial skills and a motivation to innovate were key factors in the success of local paratransit systems. A set of paratransit curriculum materials that consists of five case-study documents and supporting documents (a case-study overview, a set of selected readings, a paratransit resource guide, and a curriculum guide) is described. These materials are intended for use by faculty, students, and professionals interested in paratransit, can be used in a variety of course formats or by students alone, and are intended to address some of the educational needs in the paratransit field while presenting the broader dimensions of it. Finally, a brief commentary on educational issues is presented. (Author)

Cook, AR Barb, CE, Jr West, LB, Jr *Transportation Research Record* No. 748, 1980, pp 1-5, 2 Tab., 18 Ref.; This paper appeared in TRB Research Record No. 748, New Directions in Transportation Education.; ORDER FROM: TRB Publications Off

32 319589 PERFORMANCE MODELS OF FLEXIBLY ROUTED TRANSPORTATION SERVICES. This paper critically reviews models to predict the performance of flexibly routed transportation services such as taxi and dial-a-ride. Models of these services have been developed to assist in system design, in evaluation of alternatives, and in regulation. The approaches to modelling such services have been simulation, empirical, deterministic queuing and stochastic processes. Application of several models is illustrated by forecasting the level-of-service on six existing systems. While a good deal of effort has gone into model development and while some of the models appear to be quite accurate, an open question remains as to the acceptance and use of these models by planning and operating agencies. (Author/TRRL) (TRRL) ratio was found. An acceptance criterion for flowing concrete is proposed.(a)

Wilson, NHM *Transportation Research Part B: Methodological* Vol. 14B No. 1/2, Mar. 1980, pp 67-78, 2 Tab., 31 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247701)

32 320132 EFFECTIVENESS OF CARPOOLING, OCTOBER 1974. The objective is to monitor effectiveness of carpooling by: determining extent of carpool usage, identifying area of high potential for carpooling, and determining detriments to carpooling.

Federal Highway Administration No Date, n.p. Geographic-State Metropolitan Area, Basic Analysis Unit-Household, Vehicle and Road Section. Fuel Use-Total.; ACKNOWLEDGMENT: Transportation Statistical Reference File, TSC (132); ORDER FROM: Federal Highway Administration, 400 7th Street, SW, Washington, D.C., 20590

32 322059 MICROSIMULATION OF ORGANISED CAR SHARING-MODEL PREDICTIONS AND POLICY IMPLICATIONS. This paper presents the results of a range of tests

funded by TRRL of organised car sharing schemes. The performance of the schemes is predicted using a sophisticated microsimulation model. A brief resume of the model is followed by a description of the tests and an analysis of their results. Conclusions are drawn on the place of organised car sharing within broader transport policies, the performance of the model when compared to the available empirical data and directions for public research. The tests here presented include: a series of sensitivity analyses; tests of organisational strategies for car sharing schemes; tests of schemes in a variety of locations and at a variety of scales and finally a batch of tests which investigate the effect of major changes in the operating environment of car sharing schemes-changes in the price of fuel and public transport fares and the provision of parking space incentives for car sharers for example. (TRRL)

Bonsall, P Kirby, R ; Leeds University, England Monograph Working Paper 114, July 1979, 53p, 6 Fig., 7 Tab., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 248440)

32 322283 THE INNOVATION PROCESS FOR DIAL-A-RIDE. PHASE I. The purpose of this investigation of the innovation process for Dial-A-Ride is to examine policy-relevant issues regarding the Federal role in the diffusion of urban mass transportation innovations, and to arrive at an understanding of the innovation process in organizations. This report is Phase I of a three-phase research project, and it documents the nature of the innovation process in organizations that adopted Dial-A-Ride. Dial-A-Ride is a form of demand-responsive transportation characterized by the traveler's telephoning for a bus, van, or cab, as he or she needs a ride. During Phase I, a series of ten in-depth case studies were conducted for the purpose of identifying the general stages of the innovation process in organizations dealing with mass transportation, and specifying those factors in that process pertinent to the adoption of Dial-A-Ride by those organizations. Six major areas were researched in the case studies: 1) the actors involved in the innovation-decision process for Dial-A-Ride; 2) the primary factors motivating the decision to adopt a mass transportation innovation such as Dial-A-Ride; 3) the communication channels that provide information and external influence in the local public organization's innovation-decision; 4) the degree to which an innovation such as Dial-A-Ride is re-invented; 5) the sequential scale with which an urban mass transportation innovation is implemented by an organization; and 6) the direct/indirect effects of UMTA-sponsored demonstrations of Dial-A-Ride in the innovation-decisions of potential adopters of Dial-A-Ride. (UMTA)

Rogers, EM Magill, KP Rice, RE ; Stanford University, Urban Mass Transportation Administration, (CA-06-0115) UMTA-CA-06-0115-79-1, June 1979, 295p; Phase II of this research will investigate the innovation process in areas other than Dial-A-Ride; and Phase III will examine alternative means of information dissemination (such as films, conferences, implementation manuals, federal regulations, etc.); ORDER FROM: NTIS; PB80-185093

32 324457 CARE AND FEEDING OF VANPOOLERS: A DRIVER'S VIEWPOINT. A TRB staff member and experienced vanpool

driver gives an account of the conditions he has found necessary for maintaining a successful vanpool operation. He points out the problems involved, then discusses the factors on which potential riders will base their decision to join a vanpool and to remain in a vanpool. These factors include commuting costs, service, reliability, comfort, and convenience.

MacGregor, LM *Transportation Research News* N91, Nov. 1980, pp 5-6; ORDER FROM: TRB Publications Off

32 326223 LIMITS ON CIL CONSERVATION IN THE US TRANSPORTATION SECTOR. Conservation measures in the transportation sector are expected to significantly reduce oil consumption to help meet the national goal to reduce oil imports by about 4 million bbl/day (MBD) by 1990. These measures include increased carpooling, increased use of mass transit, enforced 55-mph speed limit, and the introduction of more fuel-efficient autos. This paper attempts to quantify the effectiveness of each. Increased carpooling and mass transit, by themselves, are inadequate conservation measures. The key to transportation energy conservation is the introduction of the efficient auto. However, because of the difference between EPA-tested new car mileage and that obtained under actual driving conditions, it is unlikely that oil consumption will reduce as expected. It is estimated that, at best, we can expect only a 1.8 to 2.7-MBD oil savings in 1990—a considerable shortfall. (ERA citation 05:008782)

Austin, AL ; California University, Livermore, Department of Energy Oct. 1979, 29p; Contract W-7405-ENG-48; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; UCID-18291

32 326269 SHARED RIDE TAXI SERVICES AS COMMUNITY PUBLIC TRANSIT. This report examines the use of taxi firms as the providers of publicly supported demand responsive transit (DRT). The use of taxi firms as DRT providers raises a number of important institutional and performance issues. Accordingly, the primary purposes of this study are: (1) to analyze the issues associated with taxi firm provision of publicly sponsored community transit services, including the institutional reasons for contracting, competition for contracts, and contractual arrangements and their effects; and (2) to evaluate the performance of taxi-based community transit systems and the consequences for taxi firms becoming public transit providers, including legal implications, operational changes, labor-management relations, impact of subsidization, and effects of contracting on the firm's financial situation and future plans. Shared ride taxi (SRT) performance is evaluated in terms of cost-efficiency and effectiveness, and is also compared to that achieved by other forms of community level transit.

Teal, RF Fielding, GJ Giuliano, G Marks, JV Goodhue, RE ; California University, Irvine, Urban Mass Transportation Administration, (UMTA-CA-11-0017) Final Rpt. UMTA-CA-11-0017-80-2, Mar. 1980, 242p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226475

32 326272 PARATRANSIT CASE STUDIES: OVERVIEW. The report is one element of a set of curriculum materials to support university

class and professional short course training in local paratransit planning. In an attempt to capture some of the diverse elements of paratransit and move toward a synthesis of paratransit development, the authors have developed five case studies of local paratransit organizations which have successfully implemented paratransit services. They encompass a broad range of modes, market applications, and institutional structures. Each case study was developed around a common analysis framework, and all facets to service development were investigated. The purpose of this overview is principally to introduce the analysis framework for these case studies and provide pertinent historical background information. It also summarizes the case study experiences, and comments on technology transfer in paratransit service development. In addition, the case study experiences are compared with national statistics and experiences.

Cook, AR Barb, CEJ ; Oklahoma University, Urban Mass Transportation Administration Summary Rpt. UMTA-OK-11-0001-80-1, Nov. 1979, 97p; See also report dated July 79, PB80-103237; Contract DOT-OK-11-0001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226988

32 327205 EVALUATION OF THE STATE ENERGY CONSERVATION PROGRAM FROM PROGRAM INITIATION TO SEPTEMBER 1978. FINAL REPORT. The State Energy Conservation Program was established in 1975 to promote energy conservation and to help states develop and implement their own conservation programs. Base (5) and supplemental (3) programs required states to implement programs including: mandatory thermal-efficiency standards and insulation requirements for new and renovated buildings; mandatory lighting efficiency standards for public buildings; mandatory standards and policies affecting the procurement practices of the state and its political subdivisions; program measures to promote the availability and use of carpools, vanpools, and public transportation; a traffic law or regulation which permits a right turn-on-red; and procedures to carry out a continuing public education effort to increase awareness of energy conservation; procedures which promote effective coordination among local, state, and Federal energy conservation programs; and procedures for carrying out energy audits on buildings and industrial plants. All 50 states and Puerto Rico, Guam, the Virgin Islands, American Samoa, and the District of Columbia participated in the program. The total 1980 energy savings projected by the states is about 5.9 quadrillion Btu's or about 7% of the DOE projected 1980 baseline consumption of just under 83 quads. The detailed summary is presented on the following: information the SECP evaluation; DOE response to the SECP; DOE's role in the program management process; the effectiveness of the states in managing the SECP; the status of program measure implementation; innovative state energy conservation programs; and the evaluation methodology. (ERA citation 05:024191)

Energy and Environmental Analysis, Incorporated, Department of Energy Mar. 1980, 234p; Contract EM-78-C-03-1697; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; DOE/CS/1697-01

32 327357 TAXICAB TRANSPORTATION. 1964-JULY, 1980 (CITATIONS FROM THE NTIS DATA BASE) [Rept. for 1964-Jul 80]. The role of taxicab services as another means of public transportation is cited including services of large taxicab vehicles, multi-origin destination taxi systems responding on demand, and shared ride taxi systems. Vehicle monitoring systems for centralized management to provide location for fleet vehicles are described as are user characteristics and taxi traffic in urban areas. Regulations and ordinances, policies, operating and economic characteristics of the urban taxicab industry including fare structure, computer applications and market studies are covered. (This updated bibliography contains 85 citations, 20 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service., Springfield, VA. Aug. 1980, 70p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-813918

32 328280 PASSENGER TRANSPORT INNOVATION IN ADELAIDE: TAXI-CABS [Final rept.]. The report describes further study of passenger transport innovation in Adelaide. A broad understanding was given of the objectives of passenger transport, and potentially valuable transport innovations were isolated in another volume. Among the many possibilities discussed were those relating to innovative use of taxi-cabs. In the present study, the way in which taxi-cabs are and could be operated is further examined, with particular emphasis given to innovative operation and usage.

MacLean, S Segal, L ; South Australia Director-General of Transport., Adelaide. July 1976, 214p; Prepared in cooperation with Nicholas Clark and Associates, South Melbourne (Australia); ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-125460

32 343603 USER-SIDE SUBSIDIES FOR SHARED-RIDE TAXIS IN KINSTON, NORTH CAROLINA. The Kinston User-Side Subsidy Demonstration Project began operation in September 1977 and involved the provision of reduced-fare conventional taxi service to the elderly and handicapped (E&H). This report summarizes the findings of the independent evaluation of the Kinston project. In Kinston, user-side subsidies were found to be administratively feasible and were utilized almost exclusively by the most mobility-disadvantaged segments of the eligible population. These individuals, of low incomes or few travel alternatives, used the project to increase their frequency of total trip making by 3-4 percent, and to make some trips by taxi that otherwise would have been made by a less preferred mode (e.g. walking). The resulting changes in taxi-use frequency caused some changes in the supply of taxi service, though these were mainly with firms that had a large portion of E&H riders prior to the demonstration. Overall, the Kinston project provides evidence that user-side subsidies can be a viable and practical technique for facilitating the mobility of the E&H.

Charles River Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-NC-06-0002) Final Rpt. UMTA-NC-06-0002-80-1, Oct. 1980, 224p; Service and Methods Demonstration Program.; Contract DOT-TSC-1406; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB81-209710

32 345239 THE TAXI INDUSTRY-PRIVATE ENTERPRISE IN PUBLIC TRANSPORT.

This paper was presented at session 5: Regulation Versus Competition in the eighties. The secondary private enterprise operator faces problems, which force him to compete with the primary public transport oriented system, instead of working as a complement to that system. Outmoded regulations stand in the way of progress, but is deregulation the answer? World transport systems are changing to accommodate the different needs of the individual. The fuel conscious society is beginning to place more importance on transport alternatives, as private motorists are finding it increasingly difficult to compete with transport systems which are being progressively updated and hence becoming more efficient, as witnessed in the modernisation of the Japanese rail system. Australia must not and cannot be left behind. It is crucial that Australia keep pace with the changing world emphasis. To do this, it is

necessary to critically analyse existing transport systems. Future recommendations will result as a consequence of this analysis (a). The number of the (TRRL)

Collins, G (New South Wales Taxi Council) ; Queensland Metropolitan Transit Authority, (0313-6655) 1980, pp 265-277, Figs., Tabs., Phots., 5 Ref.; Papers from the 6th Australian Transport Research Forum, Brisbane, October 22-24, 1980.; ACKNOWLEDGMENT: TRRL (IRRD 250632), Australian Road Research Board; ORDER FROM: Australian Road Research Board, P.O. Box 156, Bag 4, Nunawading, Victoria 3131, Australia

32 345466 A DIAL-A-RIDE BUS-AN INDISPENSABLE CONCEPT [DER RUFBUS IST NICHT MEHR WEGZUDENKEN]. The dial-a-ride bus service in the eastern lake constance region is the largest operator of dial-a-ride sys-

tems in the world. Up to now some 700000 passengers have been carried (1600 per week day), the growth rate amounts to 30% to 150% (sundays). The first extension of the area served has covered the suburb of Friedrichshafen. The second from 1.11.1979 linked the neighbouring town of Markdorf. The attractiveness of the system made possible tariff increases; numerous suggestions for improvements to eliminate weaknesses in the system are under consideration. The bus system which has been installed now for over two years can now be regarded as indispensable. Political decisions are required. (TRRL) [German]

- *Omnibus-Review* Vol. 30 No. 2, 1979, pp 738-740, 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 312639), Federal Institute of Road Research, West Germany; ORDER FROM: Verlag Heinrich Vogel, Kreuzstrasse 14, 8 Munich 2, West Germany

33 083716 WAYS TO MEET NATION'S RURAL TRANSPORTATION NEEDS ANALYZED IN RECENT SENATE STUDY. In an effort to solve the severe rural transportation needs and problems, a two-part study has been published which reflects a number of policy changes which might be needed to insure a sound transportation system for the nations outlying areas. Several means for preventing future crises, such as improvements in the use of rail equipment and increases in rail equipment capacity are examined. Wide year-to-year variations in agricultural demand for transportation services might be prevented by locating storage facilities for surplus food grains near ports, and the flexible pricing of rail services could prove a more satisfactory solution than equipment allocation mechanisms currently in use. The study also discusses the diverse and changing rural interests, and summarizes the more significant concerns of rural interest groups. A system is described for representing rural interests in the formulation and administration of federal rural transportation policy. The report also assesses rural highways and trucking, general freight service, transportation of people, the effect of federal rural development policies, and rural mass transit.

Area Development Interchange Vol. 5 No. 4, Feb. 1975, pp 1-2

33 084317 INTERCITY BUS TRANSPORT: THE TENNESSEE EXPERIENCE. Interstate carriers, using the familiar over-the-road vehicles, provide regular route passenger service and charters and constitute the primary supply line to small communities providing fast delivery of such items as automobile parts, drugs, newspapers and films, and cut flowers. Intrastate carrier provide small rural communities with access to interstate terminals in larger urban areas (feeder lines) or to major employment centers (commuter lines). The future of interstate bus service will be determined largely by public transportation policy in the following areas: allocation of charter activity, abandonment of non-profitable routes, assessment of taxes and fees, restriction on use of the 102-inch-wide bus, and highway system plans which would facilitate the interchange of passenger and vehicle in the design of limited access highways. Rural communities are now beginning to request funds to develop rural transportation systems to replace the intrastate services that current regulatory taxing and insurance policies are eliminating.

Davis, FW, Jr ; Tennessee University, Knoxville Nov. 1974, 129 pp; ORDER FROM: Tennessee University, Knoxville, College of Business Administration, Knoxville, Tennessee, 37916 Orig. PC

33 084777 THE MIDWESTERN ONTARIO-BRUCE PUBLIC TRANSPORT STUDY-PARTS I, II, III. This three-part study which examines the problem of public passenger transport in a low-density, semi-rural region, describes (in Part I) the economic and demographic characteristics of the region and its relations to nearby major cities. The evolution and current status of the region's public transport system are also outlined. Part II presents and analyzes the performance and cost of four alternatives for providing public transport in the region. The possibility of creating a public transport marketing organization is also discussed. Part III

presents the results and implications of an extensive transport consumer survey.

Canadian Transport Commission Dec. 1973; Part I-Review of the Public Transport System (Report #75), December 1973. Part II-Comparative Analysis of Some February 1974. Part III-Transport Consumer Preferences (Report #77),

33 090180 RURAL TRANSPORTATION IN THE SOUTHEAST. The report was prepared by the Expanded Metro Mobility Task Force, an interagency group of the Southeastern Federal Regional Council in Atlanta. Part I of the report examines rural transportation systems in Boone, North Carolina, and Sumter, South Carolina, and makes specific and general recommendations which are applicable to the establishment and operation of any rural system. Appendices provide helpful information in the form of sample operating rules and regulations, routing and scheduling techniques, typical costs, state roles and statutes, and a bibliography.

Southeastern Federal Regional Council, Department of Transportation Final Rpt. Nov. 1974, 113 pp, Refs., App.; See also PB-238 881.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238880/9ST

33 090181 RURAL TRANSPORTATION IN THE SOUTHEAST. PART II, APPENDIX D, TRANSPORTATION SERVICES INVENTORY FORMS. Part II of 'Rural Transportation in the Southeast' is a companion document to the basic report and comprises Appendix D, Transportation Services Inventory Forms, of that report. Part II documents the statutory and regulatory authorities in the programs of the U.S. Departments of Health, Education and Welfare, Labor and Transportation, and the Office of Economic Opportunity which may be used to provide support (dollars and/or services) for rural transportation. The inventory is specifically geared toward Southeastern region states and omits information on those programs of supporting staffing, training, pure research activities, student financial aid, planning and administration, and specific cash benefits programs such as Social Security.

Southeastern Federal Regional Council, Department of Transportation Final Rpt. Nov. 1974, 134 pp; See also PB-238 880.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238881/7ST

33 090458 NEEDS AND POTENTIALS FOR TRANSIT IN RURAL AREAS, RICHMOND, VA. REGION. Many rural areas, even those fairly close to large cities, suffer from lack of employment centers, health facilities, and the like. This dearth of local opportunities can be made up, in part, through better public transportation services. The study summarizes the 'needs' and potentials for transit in several rural counties in the Richmond (Va.) region. The 'needs' are specified in terms of lack of employment centers, banks, hospitals, health services (including doctors and hospitals), libraries, recreation programs, and, of course, existing transit services. Car ownership is also considered. It is concluded that several counties have a high potential for transit based on the above factors.

Chavis, LK ;

Virginia Interuniv Transportation Study Group, Department of Transportation Intrm Rpt. VITSG-74/3, July 1974, 68 pp; Contract DOT-OS-30097; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239851/9SL

33 090459 ANALYSIS OF THE NEED FOR A RURAL TRANSPORTATION SYSTEM. Travel in rural localities has received little attention to date. Recent legislation has pointed to the possibility of financial aid to public transit systems set up in such areas. The study defines and develops tools for analyzing the 'need' for rural public transportation. Using Madison County, Virginia as an example case, the study first defines travel demand, latent demand, travel 'wants,' and diverted travel. Five techniques then are analyzed for making demand and need forecasts (accessibility, gap analysis, attitude surveying, committee estimates, demonstration projects). It is concluded that full-scale O-D surveys and analyses are too expensive and that a combination of committee estimates and demonstration projects may be the best forecasting method.

Mix, CVS Dickey, JW ; Virginia Interuniv Transportation Study Group, Department of Transportation Intrm Rpt. VITSG-74/4, May 1974, 58 pp; Contract DOT-OS-30097; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239852/7SL

33 090573 A THEORETICAL COMPARISON OF FIXED ROUTE BUS AND FLEXIBLE ROUTE SUBSCRIPTION BUS FEEDER SERVICE IN LOW DENSITY AREAS. A parametric variation of demand density was used to compare service level and cost of two alternative systems for providing low density feeder service. Supply models for fixed route and flexible route service were developed and applied to determine ranges of relative efficiency. It was found that flexible route bus exhibited a lower sensitivity of cost to level of service provided than did fixed route bus. Flexible route bus can provide better service at the same or higher level of productivity at all demand levels below about 100 passengers per square mile per hour, except when minimal service only is to be provided.

Ward, DE ; Transportation Systems Center Final Rpt. DOT-TSC-OST-75-2, Mar. 1975, 71 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240808/6ST

33 091655 RURAL MASS TRANSPORTATION FEASIBILITY STUDY. The study report is an examination of transit related problems of the six Appalachian counties within the Bluegrass Area Development District (Clark, Estill, Garrard, Lincoln, Madison, and Powell). It outlines steps for the implementation of a rural mass transit system including cost analysis and forecasted benefits during a four year phased period.

Brown, NA ; Bluegrass Area Development District, Incorporated, Appalachian Regional Commission Final Rpt. June 1973, 127 pp; Grant ARC-73-67/KY-2297; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. CP, Microfiche; PB-241186/6ST

33 093345 FORT BERTHOLD INDIAN RESERVATION BUS DEMONSTRATION PROJECT. A demonstration project was designed to develop and evaluate a transit system in

a growing urban-rural Indian Region in Central North Dakota. Fort Berthold is a reservation of about 650 square miles, with an Indian population of approximately 2,774. The people reside mainly in five small towns. The distance from the main town to the most distant community is 110 miles. The primary concern of the project was to support the economic and social development of the entire region by interconnecting the various, and sometimes isolated communities with employment, commercial, medical, educational, and other centers of activity. An element of the project was to search for ways of incorporating all the transit services in the region into a package that would sustain the system at a point where it would become economically self-sufficient.

Crain, JL Fitzgerald, PG Stoffel, FC ; Three Affiliated Tribes, Urban Mass Transportation Administration, Crain and Associates, (UMTA-ND-06-0001) Final Rpt. UMTA-ND-06-0001-75-1, Jan. 1974, 203 pp; Prepared by Crain and Associates, Menlo Park, Calif.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245211/8ST

33 095586 ESTIMATING LATENT DEMAND AND COST FOR STATEWIDE TRANSIT SERVICE. In 1968, the U. S. Department of Housing and Urban Development commissioned a series of studies to define the potential demand for new systems of urban transportation. Among these was a study of latent demand for urban transportation to focus specifically on urban groups who have transport needs that are not met by existing systems. Emphasis was placed on the needs of the elderly, the poor, the young, and the handicapped. Need was identified through a series of questionnaires of select groups in Pittsburgh & Baltimore. In a Minnesota study, transit needs were established through a latent demand survey conducted to determine the extent of travel that would occur under various levels of transit system improvement. The survey also developed information on the perceived needs of individual travelers. The analysis of latent demand at various levels of transit service for rural communities is the subject of this paper.

Anderson, RB (General Analytic, Incorporated) Hoel, LA (Carnegie-Mellon University) *Transportation Research Record* No. 519, 1974, pp 26-35, 2 Fig., 4 Tab., 61 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

33 095589 RURAL PUBLIC TRANSPORTATION IN VIRGINIA. Travel in most rural areas is now confined to one mode: the private automobile. Those who cannot own or operate cars either do not travel or must arrange, sometimes paying high prices, for others to take them where they need to go. Public transportation should be made available to those in rural areas. This paper analyzes the rural transportation problem in Virginia and suggests how public transit systems can be developed and operated in rural areas of the state. A number of projects are reviewed that are in operation or are proposed for rural areas in other states. The study concludes that, although scattered, sufficient resources are available in Virginia for the planning and development of rural public transportation systems.

Mix, CVS Dickey, JW (Virginia Polytechnic Institute & State University) *Transportation Research Record* No. 519, 1974, pp 56-65, 26

Ref.; ORDER FROM: TRB Publications Off, Orig. PC

33 095745 TO AND FROM CAMPUS: CHANGING STUDENT TRANSPORTATION PATTERNS. This study analyzes past student transportation patterns at the University of California—conditions which helped to create the patterns, and policies that have been initiated to change them. The publication reports on factors which are most influential in shaping university student transportation patterns, summarizes changes in student travel modes and student vehicle ownership rates from the period 1965-66 through 1971-72, and describes student transportation on pedestrian, bicycle, automobile, and public transportation oriented campuses. The report also examines student vehicle use in relationship to student vehicle ownership.

Fink, IS ; California University, Berkeley Oct. 1974, 298 pp

33 096146 PEOPLE AND THE PARK: REACTIONS TO A SYSTEM OF PUBLIC TRANSPORTATION IN MT. MCKINLEY NATIONAL PARK, ALASKA. In 1972 the National Park Service greatly restricted the use of private automobiles in Mt. McKinley National Park, Alaska. As a substitute for private transportation, the Park Service offered free bus service for visitors. Also for the first time in 1972, the Park Service required that visitors have advance reservations for campsites in the five campgrounds located well inside the park. This study revealed that the vast majority of people who visited the park approved of the new transportation policy. Eighty-four percent of the 1,094 people who responded to the key question regarding the policy indicated their approval. The same percentage thought that the shuttle bus service was good. Seventy percent of the sample of people with campground reservations approved of the new reservation requirement. However, a mailed survey suggests that the resident population of Alaskans in Anchorage and Fairbanks may divide nearly 50/50 on their opinion of the new policy.

Harrison, GS *Journal of Leisure Research* Vol. 7 No. 1, 1975, pp 6-15

33 098977 RURAL PUBLIC TRANSPORTATION. Rural public transportation demonstration funds are authorized by the Federal-Aid Highway Act of 1973. To determine rural public transportation needs and evaluate parameters of service the Pennsylvania Department of Agriculture operates such a demonstration project. Essentially a dial-a-ride minibus service, the system has recently been expanded to serve 21 counties and has the following objectives: to collect relevant cost data; to determine efficiency measures, including optimum procedures for scheduling and dispatching; and to enhance the effectiveness of interagency coordination of transportation alternatives. The ultimate goal is to develop a statewide rural transportation network. In a discussion of rural transportation system needs, alternative systems, administrative and legislative developments and future models are considered.

Larson, TD Lima, PM *Traffic Quarterly* Vol. 29 No. 3, July 1975, pp 369-384

33 125119 RURAL TRANSPORT: IS THE LONG WAIT OVER?. This article is concerned with the problems of rural transport, particularly in Cambridgeshire and Hertfordshire. The problems of rural transport under present conditions are discussed and details are given of the proposed dial-a-ride service to be based at Sawtry, which will provide a service running at fixed times through the larger villages, but which will also call in at remote villages and individual homes via a pre-booking facility. It is also planned to provide a service to meet commuter trains and may be extended to pick up shopping and prescriptions. Reference is also made to other car and bus social services in Cambridgeshire particularly in relation to the new system of transport supplementary grants, and to the possibility of opening a number of possible railway lines. The author next discusses the total approach being adopted by Hertfordshire, which is based on a comprehensive survey of rural bus needs. Details of the survey are given and of the options being considered. These include minibus operation, postbus services, "rural special" buses, new rural services and the combining of works (or school) buses with a stage service on the return trips. Drastic overhaul of present services in some areas is also being considered. The remainder of the article briefly deals with alternative systems with particular reference to the postbus and proposals for a tramway network for the lake district. /TRRL/

Milne, R *Surveyor - Public Authority Technology* Vol. 145 No. 4311, Jan. 1975, pp 12-15, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 212683)

33 128811 RECREATIONAL TRAVEL AND THE RECREATION ACCESS STUDY. This study which provided a perspective comprising both objective case studies and subjective views of users and nonusers alike, included study of specific recreation resources and their access system together with surveys of the recreation interests and attitudes of people in Boston and Atlanta. The methodology involved a study of trips people make to specific places and the information is oriented toward major outdoor recreation sites, to urban parks, and to major sports and cultural facilities. The findings of the study are categorized in the following classes: data relating to recreation areas, data relating to users and nonusers of such areas, and findings concerning institutions and legislation. Automobile/highway access, internal circulation systems, public mass transportation, commercial and common-carrier transportation to recreation areas are covered. Findings concerning the general public and low mobility groups are discussed, and issues related to regulations, and planning processes are briefly reviewed.

Birnbaum, ME (Department of Transportation) *Institute of Traffic Engineers, Proceedings* Vol. 45 Aug. 1975, pp 18-23; Proceedings of the 45th Annual Meeting held in Seattle, Washington, August 17-21, 1975.

33 133213 SMALL CITY TRANSIT: EUGENE/SPRINGFIELD, OREGON. EXTENSIVE COUNTY-WIDE TRANSIT COVERAGE. Eugene/Springfield, Oregon is an illustration of a fixed-route transit service with extensive county-wide coverage. This case study is one of thirteen examples of a transit service in

a small community. The background of the community is discussed along with a description of the implementation process and operational characteristics of the transit service. The process through which the community responds to the specific needs for transit service within the local content is stressed.

Kendall, D Reed, D ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-76-5-8, UMTA-MA-06-0049-76-8, Mar. 1976, 18 pp; See also PB-251 509.; Contract MA-06-0049; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-251508/8ST

33 134684 MOBILITY CLUB: A GRASS-ROOTS SMALL-TOWN TRANSPORT CONCEPT. The dispersion of relatively small numbers of people in rural environments is a substantial barrier to collective means of travel such as conventional bus service or demand-responsive transit. Accordingly, this paper proposes and analyzes an approach based on ride sharing in private automobiles that might provide significant relief for the problems of rural immobility. This solution, termed a mobility club, can be implemented within the work-force and financial resources of most small towns and rural communities. Trip desires of individuals without automobiles are matched to the trip-making intentions of persons with automobiles by the mobility club telephone dispatcher or ride broker. A companion feature is the method proposed for increasing the number of "travel friends," that is, the number of persons who are well enough acquainted to trust traveling together. This paper discusses the operational, administrative, and institutional aspects of the mobility club concept. An example is presented to illustrate the magnitude of the potential driver-member supply and trip-making desires of residents without automobiles in a sample rural and small-town environment. Operating expenses, fare structures, and subsidy considerations are outlined. Some simple steps to assist individuals who may wish to start a mobility club are given.

Yukubousky, R Fichter, D (New York State Department of Transportation) *Transportation Research Record* No. 559, 1976, pp 89-100, 5 Fig., 4 Tab., 4 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

33 137363 INTEGRATED ANALYSIS OF SMALL CITIES' INTERCITY TRANSPORTATION TO FACILITATE THE ACHIEVEMENT OF REGIONAL URBAN GOALS. INTERCITY TRANSPORTATION IN RURAL REGIONS: VOLUME I. INVENTORY AND ANALYSES. Published in two volumes the research is a continuation of that presented in a report, June 1974 with the same title. The research focuses upon intercity transportation and its relationship to socioeconomic characteristics in rural regions. The study area consists of nine administrative planning regions in Iowa that do not include a community of 50,000 or more population. The objective was to relate the intercity transportation system of small urban communities to their ability to attract and absorb growth. This volume reports on an inventory of the transportation system in the study regions, including an update of data presented previously on bus and rail passenger movements and air

transportation. The inventory includes water transportation and additional forms of public passenger transportation, motor truck and rail freight transport, and an investigation into expansion in the transportation role of agricultural cooperatives.

Ring, SL Millett, ML Carstens, RL Meeks, HD Thompson, WH ; Iowa State University, Ames, Department of Transportation Final Rpt. ISU-ERI-AMES-76090, ISU-ERI-AMES-76179, Dec. 1975, 176 pp; See also reported dated June 74, PB-236612 and Volume 2, PB-254931.; Contract DOT-OS-30106; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254930/1ST, DOTL NTIS

33 137970 PROBLEMS OF TRAFFIC MANAGEMENT ARISING FROM THE RECREATIONAL USE OF THE MOTOR-CAR IN THE COUNTRYSIDE, WITH PARTICULAR REFERENCE TO THE 'PARK AND RIDE' TECHNIQUE. The earlier chapters of this thesis attempt to bring together from disparate sources data on the nature and extent of recreational motoring in the British countryside. Problems of accommodating this activity are described and in an appendix to the main study the concept of recreational capacity is examined for its value as an aid to determining traffic management policy. One of the more radical and controversial of the proposed traffic management techniques is the 'park and ride' method associated with a motorless zone. The use of private cars is banned and visitors are required to walk or use public transport if they wish to gain access to the area. The middle chapters of this study are an account of a traffic management experiment in the upper Goyt Valley, Derbyshire, which was designed to test the suitability of 'park and ride' as a method of recreational traffic management in rural areas. This experiment was sponsored jointly by the countryside commission and the peak park planning board during the summers of 1970 and 1971. The work described was undertaken by the author while research officer for the experiment, with further analysis done by him subsequent to leaving that post. Results of the experiment have been used to examine the wider role of the 'park and ride' technique with special reference to the lake district national park. The study concludes by advancing principles which should govern the design of traffic management for popular rural areas. /TRRL/

Miles, JC ; Leeds University, England Thesis Jan. 1975, 271 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-219190)

33 138455 NONURBANIZED PUBLIC TRANSPORTATION: A FEDERAL PERSPECTIVE. A selected number of demonstration projects are described which were identified for funding by the Federal Highway Administration and the Urban Mass Transportation Administration. This study of 45 projects which were designed to demonstrate how the mobility of nonurbanized residents may be improved, provides information that will be useful to both federal and state governments in framing future policies and programs to meet the public transportation needs of rural areas. The projects represent a wide variety of schemes ranging from fixed-route, scheduled general services to an assortment of demand-responsive van operations and an institutionalized volunteer transportation

concept. The New York, Pennsylvania, Tennessee, Oklahoma, North Dakota, California, and Oregon projects reviewed here, indicate that the question of the provider of the service depends on many local conditions and experiences. The importance of the state's role as coordinator is emphasized. Localities must explore all existing transportation resources particularly because federal assistance programs will be service oriented and will emphasize improvement of services to meet the needs. Comments are made related to the planning required to develop service-oriented approaches. Comments are also made on the nature of the financing. The studies show that paratransit because of its ability to adapt to various needs, will contribute significantly to the effort to provide public transportation in rural and nonurbanized areas.

Reichart, BK (Federal Highway Administration) *Transportation Research Board Special Reports* No. 164, 1976, pp 157-162; Paratransit: Proceedings of a conference held November 9-12, 1975, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration.; ORDER FROM: TRB Publications Off

33 139843 TRANSIT NEEDS IN SMALL CALIFORNIA COMMUNITIES. A study is reported which was designed to identify several rural sites as candidates for rural highway public transportation demonstration projects. This report describes the status of the continuing study of transportation needs of rural and small urban areas and draws general conclusions which will be helpful to a study of needs in other areas of California. The study which covered all Caltrans transportation districts and, therefore, most of the rural and small urban areas, was designed to determine the location and magnitude of public transport needs and to recommend public transportation legislation and implementation programs. The study is developing methodology that may be used to determine needs in other areas, and is providing training for transportation personnel in public transportation planning activities. Details are given of the organization of the study, the model that was developed, data collection and data analysis. Major findings to data of this ongoing study are discussed. These findings relate to the strategy of site paving and the use of a data envelope.

Millikin, NH Drosdat, H Dean, D Rae, JW ; California Department of Transportation Intrm Rpt. DMT 013, Apr. 1976, 117 pp, Figs., 15 Ref., 5 App.; Grant CA-09-8001

33 141142 REVITALIZATION OF SMALL COMMUNITIES: TRANSPORTATION OPTIONS. VOLUME 2: APPENDICES. This is a final report of a two-year policy-oriented, interdisciplinary study of the long-range trends affecting small towns in non-metropolitan areas, the effects of transportation availability and systems on their viability and vitality, and their needs and problems related to transportation. The study concludes that the role and functions of rural small communities are changing as America becomes a "post-industrial" society. The majority of small towns were found to be viable as a human habitat offering a quality of life desirable to many Americans, but vulnerable over the long term to structural changes in society and the economy

which may result from rising energy costs or energy shortages. Lack of mobility (local transportation alternatives) for those who lack access to an automobile was identified as the most severe Transportation problem for small towns at present. The study also concluded that rural areas need special consideration in formulating national energy policy, transportation policy, and welfare policy. The research project is categorized as Technology Assessment. /Author/

Coates, V Weiss, E ; George Washington University, (600-220) Final Rpt. DOT-TST-76-81, Dec. 1975, 76 pp, Figs., Tabs., 5 App.; RESPONSIBLE INDIVIDUAL: Weil, R (TPI-33); Contract DOT-OS-30122; ORDER FROM: NTIS

33 141932 ECONOMICS OF RURAL PUBLIC TRANSPORTATION PROGRAMS. Rural transit systems cannot be expected to be self-supporting. Revenue rarely comes close to the 7 cents/mile (4.4 cents/km) that is typical of the costs of the system. Costs are high because low population density and the great number of destinations in most rural areas cause high per-passenger cost for driver salaries and management. Ridership on subsidized systems that have been set up under the Office of Economic Opportunity and similar auspices tends to be a small fraction of the general population and even the disadvantaged population. Competition from automobile alternatives (car pooling and ride sharing) diminishes the effective demand for transit solutions. Getting programmatic consensus on destinations is difficult because of conflicting alternatives; therefore, ridership is low. A subsidy large enough to provide minimum service levels to all the disadvantaged in a region is beyond what appears to be the fiscal capacity of local governments in rural areas. Few of the original Office of Economic Opportunity experiments have been picked up for sustained local funding. In light of these findings, restricting new expenditures of money for rural transportation demonstration programs to low-cost innovations such as (a) systematized car pooling, (b) transportation vouchers for specific target populations, or (c) consolidating social-service transportation and service delivery programs may be useful.

Kidder, AE (North Carolina Agr and Tech State University) *Transportation Research Record* No. 578, 1976, pp 1-7, 3 Tab., 13 Ref.; ORDER FROM: TRB Publications Off

33 141933 ESTIMATING COST OF PROVIDING RURAL TRANSPORTATION SERVICE. The issue of rural transportation has attracted the attention of public policymakers. Now that the general need has been recognized, decision makers want to move to the important questions of demand and cost. Despite the existence of hundreds of small-scale transportation systems, many of which are rural, very little research on demand is available to guide the would-be designer of a rural transportation system. This paper reports work done by the Governor's Rural Transportation Task Force in Pennsylvania. Among the task force objectives was estimating demand for and cost of transportation in all rural areas of Pennsylvania. Based on what little documentation of demand for public transportation systems in rural areas is available, a range of demand estimates is produced. Alternative service options are introduced to show their influence on final costs. These 2 factors-level

of demand and level of service appear to be the most significant determinants of the cost of rural transportation systems.

Burkhardt, JE (Ecosometrics, Incorporated) Millar, WW (Pennsylvania Department of Transportation) *Transportation Research Record* No. 578, 1976, pp 8-15, 4 Tab., 5 Ref.; ORDER FROM: TRB Publications Off

33 142165 PLANNING OF URBAN TRAFFIC. COORDINATION WITH RURAL TRAFFIC [Planering av Taetortstrafik. Sambordning med Landsbygdstrafik]. The object of this study was to devise a planning method for public transport in towns of 20-50000 population, and to coordinate urban traffic with traffic in surrounding areas. Nykoping (30000) was chosen as the subject of study. Statistics were collected concerning the population and workplaces in the town and surrounding areas. The existing routes were studied with regard to interchanges between urban and rural services, as well as travelling standards, travel requirements and service frequencies. Economic aspects were taken into consideration. Comparisons were made with other towns of similar size. An analysis of problems showed that existing routes are not altogether appropriate, and that peak loads on urban and rural routes occur at the same time, which precludes sharing of vehicles. In the short term, some improvements in standards are possible by using existing resources; special workmen's buses can be provided. A doubling in frequency would raise costs by about 30%. In the long term, new services to expansion areas must be provided. An improvement with the same resources is possible by staggering working hours and school times. /TRRL/ [Swedish]

Wiklund, L Lundin, I Axelsson, B ; K-Konsult Monograph 1976, 3 pp, Figs., 5 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (IRRD-220895), TRRL

33 144137 A PUBLIC TRANSPORTATION IMPROVEMENT PLAN FOR THE AMHERST-FIVE COLLEGE AREA. This study presents a short-range public transportation improvement plan for the Amherst-Five College Areas--12 suburban-rural communities (population approximately 105,000) in Hampshire and Franklin Counties, Massachusetts. By use of a generalized methodology, residential and commercial areas (termed potential service areas) and distinct demographic segments of the Study Area (termed potential service groups) are identified for (1) conventional fixed-route, scheduled bus transit and/or (2) para-transit public transportation services. Patronage levels are estimated with ridership, "reach," and "penetration" data gathered during an UMTA fare-free bus service Research and Demonstration Project at the Amherst campus of the University of Massachusetts (UMass). A total of 15 potential service areas are identified in the Study Area as deserving of fixed-route, scheduled bus transit service, where the frequency of bus service proposed for the potential service areas ranges from a high of six bus-trips per hour to a low of seven bus-trips per day. Para-transit public transportation services find justifiable application for many of the potential service groups identified in the Study Area, including the worker-commuter, the midday shopper, and the limited mobility potential ser-

vice groups. Para-transit is also justifiably applicable in those rurally-located potential service areas with relatively low predicted patronage levels. Moreover, it is concluded that the market applications of the many public transportation modes considered in this study are not mutually exclusive but rather intersecting (or overlapping) sets. A list of policy-oriented recommendations is included in the report. The Appendix contains a detailed analysis of the costs of operation. /FHWA/

Butler, LB Goss, WP ; Massachusetts University, Amherst UMTA-MA-06-006-75-1, Dec. 1975, 140 pp; Sponsored by Department of Transportation, Urban Mass Transportation Administration.; MA-06-0006; ACKNOWLEDGMENT: Federal Highway Administration, NTIS; ORDER FROM: NTIS; PB-258146

33 145399 RURAL TRANSPORT. INFORMATION FROM R.C.C'S-WHAT IS THE ALTERNATIVE? The purpose of this document is to disseminate information about new ideas, experiments, schemes, etc., concerning public transport in rural areas. Examples of schemes being tried are post buses, school buses, minibus, car schemes, works buses carrying fare paying passengers, railway re-openings, etc. The report is arranged alphabetically by rural community council, and for each such council, brief details are given of type of transport scheme, where it is operating, by whom, and with what success. Also briefly mentioned are any surveys conducted in the rural communities which have helped to establish a new transport scheme or project. /TRRL/

National Council of Social Service Jan. 1976, 25 pp, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-222917)

33 147650 THE PROBLEM OF RURAL TRANSPORT. A survey of 1200 households in Merioneth undertaken to identify the demand for transport showed that over 64 percent of households had the use of a car. Data on trip behaviour showed that fewer than 10 percent of all trips were made by public transport, while over 65 percent were made by car. Forecasts of future transport usage predicted a further decline in public transport trips. However, although few people used public transport, the study showed that there was still a social need to maintain the service if hardship was to be avoided. An appraisal of public transport operations showed that for small passenger flows the railways of rural Wales were inefficient and not the least cost solution. For the bus industry large variations in costs and efficiency were found between the national bus company and independent operators. A number of policy options to improve the efficiency of public transport were examined. These indicated that for external trips a specially designed bus service was preferable to the present rail system. For internal trips improvements to the bus service might be made at little social cost, but large savings in resource costs. This paper was one of four given at a symposium--"Transportation--Problems and Solutions"--held in September 1975. /Author/TRRL/

Rees, GL (Wales University) Wragg, RFW *Highway Engineer Analytic* Vol. 23 No. 6, 1976, pp 14-19, 3 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-221206)

33 149838 METHODS OF PREDICTING RURAL TRANSIT DEMAND. The Pennsylvania Department of Transportation, under Executive Order from the Governor, is responsible for developing a plan for a comprehensive rural transportation system for Pennsylvania. The research and methodology included in this report is a crucial part of the development of a comprehensive rural transportation program. There is a pressing need for public transit systems in rural areas. In order to operate such systems efficiently and effectively, local planners must have accurate projections of the number of riders that will demand service. Using data from 100 existing rural transportation systems, simulation models of factors influencing the number of riders were developed. The Report provides demand estimation models for both total system-wide and route specific transit systems. Separate models are developed for fixed route and demand responsive systems. The report also includes guidelines necessary to properly utilize these models. The text is presented in a way that local and regional planning staffs can easily determine the demand for rural public transportation by knowing the population characteristics of the area being studied and the characteristics of the proposed transit system.

Burkhardt, JE Lago, AM ; Ecosometrics Incorporated Final Rpt. RR-101, Apr. 1976, 168 pp, 5 Fig., 36 Tab., Refs., 5 App.; Sponsored by Pennsylvania Department of Transportation and conducted in cooperation with DOT, Federal Highway Administration.; Contract Penn DOT Agr #54113; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264907/7ST

33 150469 TOURIST TRAFFIC IN SMALL HISTORIC CITIES: ANALYSIS, STRATEGIES, AND RECOMMENDATIONS. EXECUTIVE SUMMARY. The report summarizes the state of the art in reference to transportation to and within small cities with historic/scenic sites. It postulates a field of tourist travel having five components: travel behavior; impacts on communities and areas arising from that behavior; alternative strategies for dealing with those impacts; projects and policies chosen from these alternatives; and an institutional system within which these activities occur.

Teal, R Wood, EJ Loudon, W ; Tufts University, Department of Transportation Tech Rpt. DOT/TST-77/2, Apr. 1976, 23 pp; Contract DOT-OS-50045; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261931/OST

33 151173 PROCEEDINGS OF THE NATIONAL CONFERENCE ON RURAL PUBLIC TRANSPORTATION (1ST) HELD AT GREENSBORO, N.C. ON JUNE 7-9, 1976. The proceedings comprise the addresses, presentations and resource papers given at the conference, with summaries of problems and recommendations developed in the workshop sessions. Subjects include planning; feasibility and demand estimation; securing funding and support; use and coordination of public and private systems and resources; federal, state and local programs, regulatory and legal considerations; vehicle and equipment specifications, purchase maintenance and depreciation; marketing and promotion; administration and management; cost control; performance monitoring and evaluation; research and education. (Portions of this document are not fully legible.)

McKelvey, DJ ; North Carolina Agricultural and Technical State U, Department of Transportation Proceeding DOT/TST-77/11, Oct. 1976, 251 pp; Contract DOT-OS-50115; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262808/9ST

33 152551 FOURTH ANNUAL SEMINAR ON RURAL PUBLIC TRANSPORT, 21 NOVEMBER 1975. The following papers were presented at the seminar on rural public transport: Medium Distance Inter-Urban Passenger Transport--The Role of the Limited-Stop Bus Service, Williams, SR and White, PR; Potential for Selective Diversion of Conventional Bus Services--Demand Responsive Diversions on a Rural Bus Service, Gallop, KR; A Probabilistic Approach to Rural Network Scheduling, White, PR; External Trip Making in Rural Wales, Kilvington, R and Wragg, R; Further Progress with Public Transport in Devon, Awdas, D; and, Measuring Accessibility in a Rural Context, Daly, A.

Polytechnic of Central London, England 1975, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-220052)

33 152728 SERVICE LEVELS FOR REGIONAL AND COUNTRY BUS SERVICES [Het voorzieningsniveau van streekbuslijnen]. The study has two aspects: 1. Judgment of frequencies offered, planned or potentially viable for regular public bus services other than local town routes; 2. Prediction of effects any alterations on frequency of service, scheduled trip time, and routing, will have on passenger volumes and prognosis of passenger volumes for new routes. Frequencies will be judged against either actually measured or potentially expected passenger volumes. Aim is a normative system in which the passenger volume is the decisive factor for the frequency to be offered on the route under consideration. For prognosis of passenger volumes on projected routes, a methodology is being developed which leads to a formula which is in between a polar formula and the gravity model. Consequently information required can be produced quickly and at low cost. Moreover the procedure remains a clear one. Obviously such a prognosis methodology is essential for a proper judgment concerning the effect that any reduction or improvement of frequency will have on passenger volume. /TRRL/ [Dutch]

Denerslag, RH Vanerslag, RHS (Centrum voor Vervoesplassen Utrecht, Netherlands) ; Colloquium Verkeersplanologisch Spuurwerk Analytic 1976, pp 315-336, 13 Fig.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV55014E), TRRL (IRRD 221566)

33 157181 SMALL CITY AND RURAL TRANSPORTATION PLANNING: A REVIEW. The mobility needs of the carless (the poor, handicapped, elderly and the youth) are examined in this review. The characteristics of the special mobility groups are studied. The emphasis of the review is on the planning process and operation of public transportation services in the small cities and rural areas. A summary of the characteristics of existing nonmetropolitan transportation services is also presented. The state of the art in nonmetropolitan transportation planning is one of considerable disjointed effort. Although there has been careful planning related

to the implementation of public transportation operations in the rural areas and small cities, little systematic development of goals, objectives, policies, and criteria could be found. The high capita costs of providing transportation services to a small disadvantaged group require careful analyses with respect to the equity and efficiency of costs and benefits. In view of increasing competition of various public and social services for very limited funds, there will be greater demand for careful accounting and justification of public transportation services in small cities and rural areas. /Author/

Tardiff, TJ Lam, TN Dana, JP ; California University, Davis, California University, Irvine Jan. 1977, 38 pp, 31 Ref.; Funds were provided by the State of California.

33 157380 FUTURE LANDSCAPES. The book examines the changing countryside under the influence of regional development and changing land use patterns. Chapters discuss such topics as changes in farming, the landscape and the rural community. One chapter 'transport in the countryside' examines the effect of a gradually changing transport system on a rural community. The increasing use of private transport, offering increased mobility to rural communities, has reduced the remoteness of rural areas. This in turn has led to the withdrawal of bus and train services so depriving the non-car owning section of the population of transport facilities. The effect of policies designed to encourage the concentration of shopping and employment facilities is discussed as well as the direction of financial support to encourage public transport in rural areas. The effect of increasing tourist traffic accessibility and highway construction on the countryside is also examined. /TRRL/

Macewen, ME ; Chatto and Windus Limited Monograph 1976, 224 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 224913)

33 158573 EFFECT OF THE VALLEY TRANSIT SYSTEM ON THE UTILIZATION OF SELECTED HEALTH SERVICES IN THE NAUGATUCK VALLEY. A study of the impact of the Valley Transit District (VTD) on the use of selected health resources in the Naugatuck Valley of Connecticut is detailed. It is pointed out that, in general, public transportation within the Naugatuck Valley is inadequate. Prior to the initiation of VTD service in 1972, there was no internal transportation system in the region except for limited bus service provided by the Connecticut Company. Funding for the VTD project came from the Urban Mass Transportation Administration, the State of Connecticut, the four towns served by the system, and DHEW. DHEW's purpose in funding was to extend outreach activities of health and social service agencies through the subsidization of riders and to evaluate the impact of the VTD on the utilization of services provided by these agencies. Information was collected to provide demographic and transport data on users of each facility studied. Data were collected on a retrospective basis for the months of January, April, July, and October 1973. Data were obtained from the emergency department, outpatient department, and department of physical medicine at the Griffin Hospital in the valley. Data were also collected from visits to the Pleasant View Hospital's outpatient department. A sample was made of all medically

related trips by valley police cars and ambulance companies for the study months, along with a sample of valley residents who used public health nursing and homemaker services. It was apparent from data analysis that transportation patterns in the valley identified in 1972 remained essentially constant during the subsequent year. Supporting tabular data are appended.

Pearson, DA Bisbee, GE Webb, SB Trudell, T McLemure, A ; Lower Naugatuck Valley Community Council, Inc., Ansonia, Conn.*Department of Health, Education, and Welfare, Washington, D.C. June 1974, 110p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0012192/1ST

33 163923 RURAL PUBLIC TRANSPORTATION: ALTERNATIVE SYSTEMS (ABRIDGMENT). Alternative transportation systems for rural areas which use either existing vehicles or the purchase of new vehicles with a wide range of operating and capital costs are examined. Systems requiring new equipment include: A demand responsive system; fixed route system; feeder system; subscription service system; rural family transportation system; and institutional commuter vans. Systems using existing vehicles include: Neighbor compensation system (the owner of a vehicle shares rides with a neighbor who does not have access to a vehicle); volunteer driver and vehicle system; leased personal vehicles; social service provider system; group trips (charger service); intercity bus system (would provide transportation on a fixed-route and fixed-schedule basis within a rural regional setting); and a combined school bus system. The authors conclude that having some form of public transportation available, people who were previously restricted in their travel opportunities would be able to make trips to obtain education and employment to increase their income, and would have more freedom to travel because they would no longer be dependent on other individuals for transportation.

Marin, RL Oppermann, MC (Kimley-Horn and Associates, Incorporated) *Transportation Research Record* No. 619, 1976, pp 5-7, 5 Ref.; This article appeared in *Transportation Research Record* No. 619, Innovations in Transportation System Planning.; ORDER FROM: TRB Publications Off

33 164029 ARKANSAS SMALL-URBAN AND RURAL AREA TRANSIT EVALUATION WORK PLAN. Work is described that was undertaken to provide a basis for defining principal transportation planning tasks that need to be undertaken at the State level, to ensure that such planning is as effective and responsive as possible to the needs of small urban and rural areas throughout the state. Attempts were made to quantitatively define the specific problems associated with the delivery of transit services, to explore possible avenues of solution and to examine organizational working relationships. A survey of organizations showed that there is a high level of agreement that financial problems are the overriding consideration, and service design and operational considerations are the least important problems. Working relationships within the state is the next most important issue. The desirability of state action to support local effort is also indicated. The development of a

planning methodology is discussed and recommendations are made regarding the installation of the fare chart. A work plan is recommended for transportation in small urban and rural areas.

Chase, Rosen, and Wallace, Incorporated, Community Sciences, Incorporated UMTA-AR-09-8001, May 1977, 26 pp, 3 Fig., 3 App.; Prepared for the State of Arkansas Department of Local Services and financed in part through a grant from DOT, Urban Mass Transportation Administration

33 164342 TRANSPORT PLANNING IN SMALL URBAN AREAS. The relevance of transport planning for small urban areas in Australia is discussed in the context of experience in Australia and elsewhere. /TRRL/

Golding, S (Queensland Main Roads Department, Australia) Wigan, MR ; Australian Road Research Board Analytic 1977, pp 101-119, 3 Fig., 3 Tab., Refs.; Proceedings of the 14th Regional Symposium.; ACKNOWLEDGMENT:

33 166430 EVALUATING RURAL PUBLIC TRANSPORTATION. The report includes case studies, baseline data, and summaries of the Section 147 demonstration planning process for four rural public transportation systems: the Appalachian Ohio Regional Transportation Association (AORTA), Athens, Ohio; the Qualla Public Transportation System, Cherokee, North Carolina; the Progress for People Human Resource Agency (HRA), Dunlap, Tennessee; and the Pee Dee Regional Transportation Authority (PDRTA), Florence, South Carolina.

McKelvey, DJ ; North Carolina Agricultural and Technical State U, Department of Transportation, of Transportation, Washington, D.C. Office of Final Rpt. DOT/TST-77-42, Feb. 1977, 177 pp; Contract DOT-OS-50115; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269287/9ST

33 167586 FEASIBILITY OF DEVELOPING LOW-COST MEASURES OF DEMAND FOR PUBLIC TRANSPORTATION IN RURAL AREAS. The Appalachian region has many rural areas of limited accessibility. To improve the accessibility of the rural carless (poor, elderly, young, inform) public transportation has often been suggested. The objective of the research is to develop a low-cost methodology for determining latent demand for public transportation in rural areas, i.e., to develop a data base of key socioeconomic, highway network, and geographic variables which can be used to estimate latent demand along possible rural transit routes. Data have been collected on existing rural transit operations in Planning Region VI of West Virginia (Monongalia, Taylor, Marion, Harrison, Doddridge, and Preston counties) by means of an on-off survey and an on-board questionnaire survey. Using these as indicators of demand, this information will be related to census data for the affected region to determine if a simplified modeling approach to estimate rural public transportation demand is feasible. /Author/

Byrne, BF Neumann, ES ; West Virginia University Final Rpt. DOT-TST-77-70, Dec. 1976, 93 pp, 26 Fig., 23 Tab., 26 Ref., 3 App.; Sponsored by DOT, Office of University Research.; Contract DOT-OS-50127; ACKNOWLEDGMENT; ORDER FROM: NTIS; PB-273519/9ST

33 168122 RURAL MIDIBUS PROJECT. PHASE 1 MAY-DECEMBER 1976. This report deals with the introduction and initial operating results of a joint project by Eastern Counties Omnibus Company, Cambridgeshire and Northamptonshire county councils to test more flexible ways of providing rural public transport using a 25-seater 'midibus'. Various types of service were provided for several villages lying between Peterborough, Oundle, Huntingdon and St. Ives. The report mentions the publicity given to the scheme and the results of surveys to ascertain the level of use. Changes made to the original services, due to public demand, are recorded. The use or non-use of the services, the value of the project for testing different methods of operation and types of demand and the advantages of using a "midibus" are considered in the conclusions of the report. /TRRL/

Cambridgeshire County Council, England Monograph Mar. 1977, 11 pp, 2 Fig., 1 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 227808)

33 177136 RURAL PUBLIC TRANSPORTATION: NORTH DAKOTA CASE STUDY (ABRIDGMENT). A rural public transportation program has been developed for west-central North Dakota which consists of two levels of service. One level is the formation of local transportation associates which would coordinate the travel demands of those in need of transportation and the automobile drivers in the community who are willing to provide transportation and which would actively pursue the expansion of a pool of volunteer drivers who would be willing to provide rides for those in need. The other level is specialized transportation vehicles, (designed for the handicapped) being leased by the community to institutions such as nursing and retirement homes in order to serve groups such as the elderly and handicapped whose needs cannot be met by the private automobile service.

Weaver, VC Lundberg, BD (Barton-Aschman Associates, Incorporated) *Transportation Research Record* No. 638, 1977, pp 44-46, 1 Fig., 1 Ref.; This article appeared in *Transportation Research Record* No. 638, Transportation Planning Techniques for Small Communities.; ORDER FROM: TRB Publications Off

33 178711 IMPROVING TRANSIT USAGE IN SMALL URBAN AREAS. A demonstration program is reported which offered free rides to anyone working in the Downtown Salem (Oregon) area. The response to the program is enthusiastic, but it remains to be seen what impact a resumption of full or partial fares would have on the new riders. A significant number of new riders came from single-occupant autos. Only 37% of the new bus riders reported they previously paid for parking. However, a new program to reduce the amount of close-in free parking in the downtown area is expected to further increase bus ridership. The key factor in creating this program was the availability of excess peak-hour bus capacity. The relative cost, travel time and convenience of auto vs. transit travel has kept transit at a competitive disadvantage in the Salem area. However, at very little expense, it has been demonstrated that the cost impact can have a disadvantage on ridership. The public relations value of the program is also

noted. The Transit service has gained increased exposure and acceptance among the business community as a positive force in downtown redevelopment. The no-cost fringe benefit to both employers and employees has turned transit services from a social service for the captive rider to a community service for everyone.

Walker, KR (Mid Willamette Valley Council of Governments) *Transit Journal* Vol. 4 No. 2, Apr. 1978, pp 41-50, 5 Tab.

33 178739 RURAL HIGHWAY PUBLIC TRANSPORTATION DEMONSTRATION PROGRAM EVALUATION-PROGRESS REPORT. Section 147 of the 1973 Federal-Aid Highway Act established the Rural Highway Public Transportation Demonstration Program which authorized funds to encourage the development, improvement, and use of public transportation for residents of non-urban areas, so as to improve access to employment, health care, retail centers, education, and public services. Total funding of \$24.65 million for FY 1975 and 1976 permitted the selection of 102 projects from more than 500 applications. Ninety-eight of the projects have been authorized to proceed with about three-fourths in actual operation. A variety of organizational arrangements, service types, and sizes are being demonstrated. There is a significant evaluation component to the program which will provide needed information for future decisions regarding possible national programs for rural transportation. The results of the first two quarters' evaluation, although preliminary, show performance measures comparable to or better than previous rural public transportation projects. It is significant to note that over half of the initial projects studied were performing according to pre-project estimates of ridership and service. /Author/

Poka, E Maring, G Davison, P Benacquista, R (Federal Highway Administration) *Transportation Research Record* No. 661, 1978, pp 28-31, 10 Ref.; This article appeared in the *Transportation Research Record* N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

33 179371 THE ROLE OF MASS TRANSIT IN SMALL URBAN COMMUNITIES: A CASE STUDY OF WATERTOWN. The objective of this study is to investigate the social and economic viability of mass transit in small sized urban areas. Examinations of information collection techniques, transit problems, historical trends, and improvement proposals of transit systems in smaller urban areas all around the country are included. Numerous information gathering techniques are incorporated in an effort to uncover the exact dimensions of the need for mass transportation services in Watertown and to determine the shortcomings of the present Community people moving systems. The inventories, surveys, interviews, and other observations conducted in this study provide information about the existing conditions of the Watertown City Bus Lines, the Watertown Cab Company, and the local School Bus Systems which are utilized in the multi-stage transit alternative generation and selection process. This study by step compilation of lists of management-ownership, financial, operations, equipment, fare structure, and marketing alternatives effectively dispals most of the realistic transit improvement options. Public takeover

of the existing privately owned City Bus Lines with the eventual formation of a City Transit System is recommended in this study. A combined demand-responsive, fixed-route transit operation with modern mini-bus type vehicles appears to be the most promising system for Watertown in the future. The peak hour fixed-route, non-peak hour demand-responsive service should be ambitiously promoted locally. The system could be financed by state and federal assistance programs as well as from local sources.

Wesemann, L Holzner, L Beimbom, E; Wisconsin University, Madison June 1974, v.p., 10 Fig., 15 Tab., 4 App.; Sponsored by DOT, Urban Mass Transportation Administration.

33 179821 PROCEEDINGS OF THE SECOND NATIONAL CONFERENCE ON RURAL PUBLIC TRANSPORTATION. These proceedings are divided into two major parts. The first part consists of the formal presentations made at the plenary sessions of the conference, under the general headings of overview of rural transportation activities; the state's role in rural transportation; maximizing the use of existing resources; the role of taxes in rural transportation; marketing and behavioral aspects of rural public transportation; and, experiences gained in implementing and operating rural public transportation systems. The second part includes the resource papers presented at each of the eight workshops and brief summaries of the workshop discussions. Topics include, among others, integration of services; using intercity bus transportation; demand estimations and system design; efficiency and coordination in rural public transportation; and, policy considerations in rural transit.

Miller, JH Mullen, SS; Pennsylvania Transportation Institute, (PTI 7805) Proceeding June 1977, 188 pp, 5 Fig., 1 Tab., 2 App.; Sponsored by DOT, Office of the Secretary.; Contract PS-70369; ORDER FROM: NTIS

33 184387 TRANSPORT STANDARD IN TOWNS AND RURAL AREAS [Transportstandard i stæder och paa landsbygd]. Roads are a community resource. They are essential for our living conditions. Public debate pays surprisingly little attention to the importance of road traffic for national production and economy, and concentrates instead on its negative consequences. In most cases, road transport offers the best transport standard. In Norway, over 80% of goods tonnage is transported by road. 90% of passenger transport is by road. In towns, however, 20% of journeys to work are on foot, and foot traffic is therefore as important as cycle traffic and public transport put together. About 80% of national roads have a paved surface at present; this will be raised to 90% in the next 8 years. Only 10% of roads have permitted axle loads of 10 tonnes; this will be raised to 40% by 1986. A large proportion of the road network is shared by vehicular, cycle and pedestrian traffic, and by local and fast long-distance traffic. To raise transport standards and at the same time reduce the negative consequences of road transport, separation and differentiation are the main tasks. The standard of public transport must be improved. The cost of motorways can be reduced by designing them for a lower speed. /TRRL/ [Norwegian]

Krogsaeter, K; National Swedish Road Administration 1977, pp 91-97, 10 Fig.; Nordiska

Vaegtekniska Foerbundets 12. Kongress, Finland, 13-17.6 1977. Direct inquiries to Herbert Nordin, National Swedish Road Administration (Centralfoervaltningen); ACKNOWLEDGMENT: TRRL (IRRD 233082), National Swedish Road & Traffic Research Institute

33 184443 THE DEVELOPING ROLE OF RURAL PUBLIC TRANSPORT. Of the many inherited public transport problems currently facing county councils, one of the foremost concerns the future of public transport in rural areas. The paper outlines the background of the current problems of rural public transport which have been gradually eroded over a long period and the factors which led to this decline, together with the effects it is having on the rural counties and the policy of the county councils. Against this background, the paper describes the way in which the counties are setting about solving the problem of rural public transport by examining the policies adopted within the present legal and financial restraints and looks at possible solutions for the future, including the role of unconventional forms of transport and the need for modification in the legal framework. /Author/TRRL/

Hawkins, MR (Devon County Council) *Highway Engineer* Vol. 25 No. 5, May 1978, pp 19-24, 2 Fig., 5 Tab.; Institution of Highway Engineers North National Conference, Highways and Transportation Problems 1977/78, held in London, Decemver 8-9, 1977.; ACKNOWLEDGMENT: TRRL (IRRD-233211)

33 184846 ESTIMATING THE EFFECTS OF ALTERNATE SERVICE LEVELS ON RURAL TRANSIT RIDERSHIP. Estimating demand is an essential step in rural transit planning. Several techniques have been developed in other studies for estimating demand. This paper deals with the need to assess public response to alternate service levels and travel flexibility on proposed rural transportation systems. A public opinion survey was conducted in rural Otsego County, New York (56,000 pop.) among 339 households, thirty of which had no telephones. The survey presented three public transportation options, fixed route, dial-a-bus, and mobility club, and asked various questions regarding possible use of such services at different fare and service levels, (reservation time, travel flexibility, etc). The survey questionnaire was designed to minimize non-commitment bias and responses were separated on the basis of car availability to minimize the need for non-commitment adjustment. Some non-commitment adjustment was necessary, particularly for the car available group. This adjustment was based on the trip rate of the existing dial-a-bus system operating in Oneonta (pop. 16,000) the county's largest city. Matrices relating potential ridership to fare, service levels, and travel flexibility were developed for each transit option. While no suggestion is made that the demand estimates developed for Otsego County are transferable to other areas, the relative changes in demand resulting from changing fare, service levels, and travel flexibility should be generally useful. /Author/

Ugolik, WR Knighton, RG; New York State Department of Transportation Prelim Res Rpt 144, Aug. 1978, 26 p., 5 Tab., 1 App.; ACKNOWLEDGMENT: New York State Department of Transportation; ORDER FROM: New York State Department of Transportation, Planning Divi-

sion, Albany, New York, 12232

33 185391 A REALISTIC ASSESSMENT OF MASS TRANSIT SYSTEMS IN A LOW DENSITY REGION: THE CASE OF SAN DIEGO.

This article outlines several major reasons why a fixed-route system of mass transit in a low density region is not a viable mode of transportation for the vast majority of residents. After establishing the problems associated with such a system, attention is focused upon a proposal to implement a fixed-guideway system in the San Diego region. It is demonstrated by reference to a Mass Transit Survey that San Diego residents by and large do not intend to use the newly proposed system although they would finance its construction. It is concluded that the attitudes of these residents are typical of commuters who live in an exceedingly auto-oriented and decentralized urban setting. The land use configuration is used to illustrate basic problems which confront fixed-route mass transit systems in cities like San Diego. The dynamics of speed and frequency of service in rapid mass transit systems, and the relationship between price and service capability are discussed, and criticism is offered of the transit element of the Comprehensive Plan for San Diego Region. The observation is made that unless a transit system is capable of providing the average traveller with the same flexibility and demand-responsive potential as the automobile, it is not hopeful that the transit system will draw a substantial number of riders from the automobile to make the construction and operation of the new system economically feasible.

Clapp, JA Rea, LM (San Diego State University) *Transportation Perspectives* Vol. 1 No. 1, July 1976, pp 3-14, 1 Tab., Refs.; ACKNOWLEDGMENT: Transportation Perspectives

33 188390 SYMPOSIUM ON RURAL TRANSPORT, HELD AT THE OLD HALL, UNIVERSITY COLLEGE OF WALES, ABERYSTWYTH, ON SATURDAY 18TH JUNE, 1977.

The papers presented at the symposium were as follows: Accessibility as a Consumer Standard in Rural Areas, Radford, D; Conventional Transport Services in Rural Areas, Meredith, DJ; The Problems and Challenges of Operating Rail Services in Rural Areas, Aston, D; The Role of the Welsh Office in Local and National Transport Planning, Jones, B; The Role of Unconventional Modes/Rutex, Dredge, AS; Cerrigydrudion Community Bus Service, Gylee, M; Social Car Schemes Sponsored by Clwyd County Council, Gylee, M; The WRVS Role in the Clwyd Social Car Service, Edwards, E; Postbus Services, Brewer, DV; State Carriage Services by Mini-Bus in Gwynedd, Hutchinson, IM; Public Transport Experiments in Gower, Heys, JS; The Use of School Bus Services by the Public in Dyfed, Winfield, RC. /TRRL/

Welsh Office, Transport and Highway Group Monograph July 1978, 137 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 235807)

33 189345 TRANSIT PROBLEMS IN SMALL CITIES AND NON-URBANIZED AREAS: INVENTORY OF TRANSPORTATION SERVICES IN PLACES LESS THAN TEN THOUSAND POPULATION OUTSIDE OF URBANIZED AREAS. This report summarizes the type and level of transportation services (taxi,

specialized transportation services, intracity and intercity buses) available in places between 2,500 and 10,000 population outside of urbanized areas in 48 contiguous states and the number of such services serving these communities. It also includes a section summarizing information on places under 2,500 population. In places (2,500-10,000), the inventory highlights the following unexpected results: Taxi-75% of total companies serve 3 or 4 places, 18% had contracts with agencies, and State is second most common regulator and City government is the least common; Specialized Transportation Services--13% of all vehicles were equipped for non-ambulatory, 9% of the places had more than one specialized service, 50% provided demand-responsive service, and local governments operated 23% of the systems; Intercity Buses Service-service provided to only 42% of places sampled, and 7% had contracts received a subsidy; Intracity Bus Service--5% of the systems were large metropolitan systems, 52% were privately owned, and only 21% were countywide. Of the 291 sample places with population between 100 and 2,500, 27 sample places were served by 40 taxi systems; 47 were served by 54 specialized transportation systems, and 32 had intercity bus service. Four of the systems (13%) stated that they had passenger service contracts or subsidies from state or local governments. Of the 32 systems reporting capital funding assistance, two received 16 (b) 2 funding. This inventory report contains many charts/fact sheets regarding the transportation services examined. /UMTA/

Jackson, AF McKelvey, DJ ; North Carolina Agricultural and Technical State U, (NC-11-0004) UMTA-NC-11-0004-79-1, Apr. 1978, 99 p.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, UMTA; ORDER FROM: NTIS; PB-291402/6ST

33 191375 PROCEEDINGS OF THE NATIONAL CONFERENCE ON RURAL PUBLIC TRANSPORTATION (2ND) HELD AT UNIVERSITY PARK, PA. ON JUNE 1-3, 1977. The proceedings comprise the addressees, presentations, and resource papers given at the conference. Subjects include maximizing the use of existing resources, the state's role in rural transportation, the role of taxicabs and intercity bus services, marketing and behavioral aspects, organizational options, demand estimation and system design, securing and maintaining support, and policy considerations in rural public transportation.

Miller, JH Mullen, SS ; Pennsylvania Transportation Institute, Department of Transportation Proceeding PTI-7805, June 1977, 194 p.; See also PB-262808.; Contract DOT-PS-70369; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292154/2ST

33 196954 THE FUTURE FOR TRANSPORT IN RURAL AREAS. PROCEEDINGS OF A CONFERENCE HELD ON 19 NOVEMBER ORGANISED BY THE DEPARTMENT OF TOWN PLANNING, OXFORD POLYTECHNIC, IN ASSOCIATION WITH THE OXFORDSHIRE COUNCIL FOR VOLUNTARY SERVICE. The following papers were presented at the conferences: The potential for Public Transport in Rural areas, (White, PR); The Transport Needs of Special Interest Groups,

(Nettleton, D); Village Viewpoints for Rural Transport, (Cripps, A, Worth, R and Williamson, L); The Appraisal of Rural Transport-A Summary, (Moseley, M); The legislative and Administrative Context of public Transport in the United Kingdom, (Jones, M); Notes on the Role of Traffic Commissioners, (Bodger, JM); The Cuckmere Community Bus Experiment, (Jones, M); Public Transport in Rural Areas--A Thumbnail Sketch, (Powell, RW); A Place for secondary Transport (Para-Transit) in Britain, (Jones, M); the Hertfordshire Study, (Bainbridge, G); Car Sharing Schemes--Some Case Studies; Some thoughts on Fares Policies, (Jones, M); Methods Used in a Six-Village Survey.

Oxford Polytechnic, England Monograph Mar. 1978, n.p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 240907)

33 198697 RURAL DEVELOPMENT INITIATIVES: IMPROVING TRANSPORTATION IN RURAL AMERICA.

The report outlines ways in which transportation in rural America can be improved. Items discussed include social service and public transportation, commuter air service, railroad branchline rehabilitation, and ridesharing. These improvements in rural transportation are designed to help rural and small town residents overcome the problems of isolation, gain full access to essential human services, and meet the transportation requirements of healthy, growing economies.

Executive Office of the President June 1979, 56 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296920/2ST

33 300687 OVERVIEW OF PROBLEMS AND PROSPECTS IN RURAL PASSENGER TRANSPORTATION.

This overview of the state of the art in rural passenger transportation focuses on lessons that have and have not been learned during the past decade. Significant progress has been made on certain technical issues such as planning techniques, resource requirements, and performance standards. At the same time, very little progress is evident in some nontechnical areas--particularly in the areas of political leadership and financial stability. Future developments in rural passenger transportation will vary significantly. /Author/

Burkhardt, JE (Ecosometrics, Incorporated) *Transportation Research Record* No. 696, 1978, pp 3-6, 2 Tab., 15 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

33 300688 STATE ROLE IN RURAL PUBLIC TRANSPORTATION.

This paper reports on the efforts of various states to be more deeply involved in providing transit services in rural and small-town areas. Current state involvement, innovative programs initiated in a few states, existing problems, and future programs are discussed. Most of the information presented in this paper was obtained from a survey of all states by the North Carolina Department of Transportation. The survey results suggest that one of the most significant problems to be solved is the fragmentation of services due to the multiplicity of federal programs funding rural transportation--until now an issue usually dealt with at the local level. /Authors/

Garland, AD Garrity, R (North Carolina Department of Transportation) *Transportation Research Record* No. 696, 1978, pp 6-10, 2 Ref.; ORDER FROM: TRB Publications Off

33 300689 RURAL DEVELOPMENT POLICY AND RURAL PUBLIC TRANSPORTATION.

The transportation systems that serve rural people and their communities continue to dwindle. Local communities affected by the diminution of these transportation resources are under pressure to raise local money to subsidize, almost simultaneously, air service, rail service, and intercity bus lines, to maintain their off-system roads and bridges in usable condition, and to provide whatever forms of public transit may be achievable. The competition for local funds is among the problems to be faced if a small-town and rural-area public transit program is, as seems likely, at last obtained from Congress. Because the lack of accessibility to jobs, training, and other essential services will continue to be an obstacle to a rational rural development policy, comprehensive plan and the maximum feasible coordination of transportation resource must be given high priority. /Author/

Kaye, I (Department of Agriculture) *Transportation Research Record* No. 696, 1978, pp 10-14, 15 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

33 300691 TRANSPORTATION PLANNING AND IMPLEMENTATION IN SMALL CITIES AND RURAL AREAS.

The Indiana Mass Transportation Improvement Project is responsible for public transportation planning in the small urban and rural areas of Indiana. The goals of the Indiana Public Transportation Advisory Committee emphasize the public transportation system. In Indiana a unique working arrangement is established in which the mass transportation improvement project serves as the staff for local public transportation operators. The project attempts to combine planning and operations into a total management assistance program. Work currently is being done in nine cities of less than 50,000 population and 26 counties in the state. In rural areas, the transportation advisory committee plays a dominant role in local transportation planning and evaluation. It addresses the community's total transportation needs rather than having local social service agencies think only of their own transportation needs. The Indiana Mass Transportation Improvement Project is establishing transportation advisory committees in all of the state's 18 planning regions. Transportation problems must be addressed by the service or market area, not by political boundaries such as counties. The success of the transportation improvement project is defined by how well it designs and helps implement a public transportation system that serves public transportation needs in the state. /Author/

Flynn, EJ (Indiana University, Bloomington) *Transportation Research Record* No. 696, 1978, pp 16-20, 2 Fig., 2 Tab.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

33 300697 PRIVATE ENTERPRISE TECHNIQUES IMPROVE PRODUCTIVITY OF RURAL TRANSIT SYSTEMS IN IOWA. The primary objective of the Iowa Department of

Transportation rural transit program is increased productivity--to be able to produce more output (passengers carried) while using less input (money). When the department assumed control of rural transit in 1976, it became obvious that traditional methods of developing rural transit would hinder, if not actually negate, progress toward the objective of improved productivity. Consequently, the private enterprise philosophy of management was implemented. This philosophy dictated the consolidation of the 275 rural transit systems into 16 systems and the elimination of nonproductive systems, provided authority equal to responsibility, holding specific people and agencies responsible for results, and implemented management and business decisions into an area of social work. The results, after 3 years of effort on a statewide basis, show that the output has increased by 33 percent and the input has decreased by 10 percent. The implications of these results are that transit in general (urban, rural, or intercity) can benefit from consolidating authority and responsibility, managing by objectives, and making decisions that are based on economic and productivity analyses. /Author/

Fritz, TL (Trailways, Dallas) *Transportation Research Record* No. 696, 1978, pp 34-38, 1 Fig., 4 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

33 300706 PROCEDURES AND EXPERIENCES IN EVALUATION OF RURAL HIGHWAY PUBLIC TRANSPORTATION DEMONSTRATION PROGRAM. The Rural Highway Public Transportation Demonstration Program projects funded under section 147 of the Federal-Aid Highway Act of 1973 are being evaluated on the basis of an extensive reporting procedure. Three categories of information--statistical, narrative, and detailed passenger survey data--are being collected. Statistical data on project operating characteristics are collected monthly, and narrative reports are submitted each quarter, at the end of the first year, and as a final report. After Federal Highway Administration analysis, the monthly statistical data are summarized quarterly in computer-tabulation form and distributed back through the field offices and the states to the project personnel. One year (January-December 1977) of statistical data have been reported back to the projects by this mechanism. Peer groups have been established that contain projects that, based on population density and size of vehicle fleets, are similar. Although all projects are required to be able to meet the service needs of elderly and handicapped riders, some projects have been more successful than others. The predominant one-way trip purposes were work, shopping, and school and education. Data for the fourth quarter of 1977 showed that drivers' wages account for more than half of the operating costs. Eighty percent of the funding comes from federal sources, the states contribute 13 percent, and local and private agencies contribute 7 percent. The statistical-evaluation results were remarkably steady throughout 1977; no significant fluctuations were identified. /Author/

Benacquista, RJ (Federal Highway Administration) *Transportation Research Record* No. 696, 1978, pp 69-71, 1 Tab., 7 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.;

ORDER FROM: TRB Publications Off

33 300707 RURAL HIGHWAY PUBLIC TRANSPORTATION DEMONSTRATION PROGRAM: INTERGOVERNMENTAL RELATIONS, ABRIDGMENT.

The use of the resources and expertise of the state transportation agencies in the administration of projects at the local level and the provision of needed technical assistance are described. Activities in Michigan included technical assistance to applicants in the development of a service plan, advertising and conducting of public hearing, preparation of a contract between the state and applicant agency, as well as assistance in other areas. The Florida DOT'S technical and financial assistance to the Suwannee Valley Transit Project is outlined. The efforts of these and many other state and local groups have led to viable rural transportation operations. These projects have been successful in providing for the needs of the transportation handicapped. Statistics are beginning to show improved economic efficiencies over time, and several operations, especially those supported by state and local governments, may be able to continue operations without federal financial support.

Morgan, RD (Federal Highway Administration) *Transportation Research Record* No. 696, 1978, pp 72-73; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

33 300710 ROLE OF THE INTERCITY BUS IN RURAL PUBLIC TRANSPORTATION.

ABRIDGMENT. The intercity bus industry services over 14,000 cities and communities which have no alternative form of common carrier transportation. This comprehensive service is provided by 1000 independent bus companies which cater to the personal travel market, providing greater mobility to the less affluent, the handicapped, the elderly, and the young. However, the intercity bus industry's position in the market is insecure and unstable. The results are discussed of a comprehensive study by the Interstate Commerce Commission (ICC) which shows that the general growth and prosperity of the industry has been dimmed by shrinkage of passenger demand and reduced profitability, particularly on regular route passenger service. The conclusions and recommendations of the ICC report are also discussed. It is noted that the need for operating and capital assistance for transportation in rural areas can no longer be ignored. Legislation is being considered in Congress, and a Highway Mass Transit Bill has been approved which contains a provision for specific designation of \$20 million annually over 1 years to subsidize operations of intercity bus service in small urban and rural areas. A bill (S2441) has been adopted in the Senate which provides that the private intercity bus industry would be eligible for participation in the \$100 million annual assistance program for rural and small urban areas. Meanwhile planners should investigate the feasibility of using the potential of 1000 or so already operating private bus companies in solving some intracommunity transportation problems on a subcontracting basis.

Lewis, AD (American Bus Association) *Transportation Research Record* No. 696, 1978, pp 79-81, 1 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.;

ORDER FROM: TRB Publications Off

33 301857 A BORDER TRIAL. The article describes a development in rural area transport introduced in the border region of Scotland by the Scottish bus group in conjunction with the Border Health Board. Operated by eastern Scottish, the border courier minibuses run throughout the region carrying health board and council goods and supplies. They are also routed to cover 11000 miles per year on passenger services such as schoolchildren and old people attending day centres. The vehicles used for these services are 13-seat Bedford CF340's fitted with Reebur 17 bodies having 110 cu ft capacity goods compartments. The services will be evaluated over the next two years for possible application in other rural areas with similar transport problems. /TRRL/

Millar, A. *Commercial Motor* Vol. 149 No. 3814, June 1979, pp 78-79, 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 2415354)

33 301964 PUBLIC TRANSPORT FOR COUNTRYSIDE RECREATION-A REPORT TO THE COUNTRYSIDE COMMISSION. Following the monitoring of experimental bus services in three national parks, a study was undertaken of public transport in countryside recreation. Recreation facilities in the countryside are placed in four categories: specific sites such as parks; linear features such as coasts, waterways and footpaths; accessible land such as commons and royal parks; and, the general countryside. The distinct implications for flows of recreational transport movement for these categories are discussed. Chapters examine the development and recreational use of public transport. Case studies are discussed in which relevant public transport facilities were examined in eight areas of recreational interest in the United Kingdom. /TRRL/

Her Majesty's Stationery Office Monograph Dart Publ. No. 21, May 1976, 52 p., 14 Fig., 13 Phot., 36 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241291)

33 302240 RESORT TRANSPORTATION IMPROVEMENTS: CASE OF LITTLE COTTONWOOD CANYON, UTAH. The objective of this study was to adopt a practical methodology for short-range transportation improvements that are fully responsive to the typical problem of recreational resources near an urban area. The methodology was applied to alleviate the transportation and related problems of ski resorts of Little Cottonwood Canyon of Utah. Specific evaluation data related to the canyon; however, the breadth of the system considered, the parameters developed, and the decision-making process suggested were structured so that the concept could be adopted as a consistent planning tool to resolve problems in similar recreation resorts. Emphasis was placed on simplicity and practicality of the developed methodology as well as on maximum accessibility and minimum negative environmental impacts. A specific park-and-ride bus transit system has been recommended for the study resort on the basis of economic factors and community responses. Application of the suggested methodology stressed intangible factors as well as strictly monetary factors. /Author/

Yu, JC Farzard, F (Utah University) *Transportation Research Record* No. 710, 1979, pp 14-19, 1

Fig., 2 Tab., 4 Ref.; This paper appeared in TRB Record No. 710, Current Issues in Statewide Transportation Planning.; ORDER FROM: TRB Publications Off

33 302252 TRANSIT SERVICE AND ORGANIZATIONAL ALTERNATIVES FOR A LOW DENSITY SUBURBAN-RURAL AREA: A STUDY OF PUBLIC TRANSIT OPTIONS FOR ALBERMARLE COUNTY, VIRGINIA. The intent of this study is to provide planning options for public transportation in Albemarle County and the City of Charlottesville, Virginia. The results are intended to provide a range of planning options for community service, but not a comprehensive plan for implementation. The options are intended for review in a future study by citizens and officials of the Charlottesville-Albemarle area to be refined according to local opinion as an aid to developing a plan for implementation. The options cover future transit demand scenarios depending on energy availability and price, alternative transit systems, and alternative organizational formats for coordinating low density rural and suburban transit and paratransit services. Special attention is given to the institutional issues affecting coordinated transit. This study approaches the basic problem of transportation in low density areas from the institutional perspective of an operating organization. This approach is reflected in the study objectives which are: 1) to define the public transportation needs and demand in the Charlottesville-Albemarle area; 2) to design alternative transit and paratransit services for the Charlottesville-Albemarle area; and 3) to define and evaluate alternatives to coordinate transit services. The findings of the study are based on local transit and demographic data, state-of-the-art transit and paratransit information, and Commonwealth of Virginia laws and regulations. In addition, two local surveys were conducted. One survey measured transit behavior and attitudes in Albemarle County, and the other assessed community preferences for transit coordination. The conclusions of the study are presented corresponding to the three major areas of investigation. Suggestions for community action are presented. (UMTA)

Hoel, LA Demetsky, MJ Morris, D Hargroves, BT Stone, JR Cottrell, BH Goldberg, A; Virginia University, Urban Mass Transportation Administration, (UVA/529132/CE79/101) Final Rpt. UMTA-VA-11-0006-79-1, May 1979, 182 p.; Contract VA-11-0006; ORDER FROM: NTIS; PB-299475/AS

33 302926 THE TOURIST AND HIS TRAFFIC. The paper argues that the pattern of holiday development and of countryside recreation in East Anglia is almost entirely attributable to changing modes of transport. With the improved accessibility of the region, a continued increase in car-based pressures on the coast and the countryside is inevitable. Traditional traffic and land-use planning provide inadequate frameworks for coping with the resulting problems. There is a strong case for a process of co-ordinated management which has conservation as its prime objective. /Author/TRRL/

Shaw, JM *Highway Engineer* Vol. 26 No. 6, June 1979, pp 14-17, 3 Fig., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241863)

33 303940 ANALYSIS OF VOLUNTEER DRIVER SYSTEMS IN RURAL PUBLIC TRANSPORTATION (ABRIDGMENT). The purpose of this study is to evaluate the potential for continuing, and even expanding, volunteer driver systems in rural areas. Case studies of volunteer driver systems in two Wisconsin counties are used to test the hypothesis that volunteer driver systems can be cost-effective, feasible means of providing high-quality, specialized transportation service in rural areas. In addition, the role of volunteer drivers systems in relation to paid driver systems that use vans or buses is examined in terms of an optimum mix of service types. Finally, the implementations of the rural public transportation operating assistance program (Section 18 of the Surface Transportation Assistance Act of 1978) are examined. The two case studies show that volunteer driver systems can provide high-quality, cost-effective transportation for the elderly in rural areas. Volunteer driver systems can provide lower costs per trip than all but the most productive van systems. Only a high-cost, taxi-like van system can approach the high-quality, door-through-door service of the volunteer driver system. Even then the volunteer system provides superior service because of the potential for personal assistance to passengers at their destination.

Smith, RL, Jr (Wisconsin University, Madison) *Transportation Research Record* No. 718, 1979, pp 39-42, 1 Tab., 10 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

33 305456 BUS AND RURAL TRANSIT. Contents: Prediction of effects of bus-priority schemes by using computer simulation techniques; Evaluation of active bus-priority signals; Impact of short-term service changes on urban bus transit performance; Evaluation of bus and carpool operations on the San Bernardino Freeway express busway; Analysis of bus systems to support rail rapid transit; Evaluation of the Greenwood Drive fringe parking facility; Bus route analysis model (BRAM) summary report; Estimating the effects of alternative levels of service on rural transit ridership; Analysis of volunteer driver systems in rural public transportation; Forecasting experiments for rural transit policymakers; Maintenance planning for small transit systems; and Overview of accessible bus services.

Salter, RJ Shahi, J Richardson, AJ Ogden, KW Bhandari, AS; Transportation Research Board, Washington, DC. ISBN-0-309-02968-6, 1979, 57p; Library of Congress catalog card no. 79-24607. Also pub. as ISSN-0361-1981. Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418, PC\$3.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-110257

33 307703 BUS TRAFFIC IN RURAL AREAS-THE SAME AS IN DENSELY POPULATED CITIES [Busverkehr auf Dem Land: Wie in Dicht Besiedelten Staedten]. The present paper describes a public passenger transport model for the improvement of transport facilities in rural areas which is to be tried out this year in the Hohenlohe District. The basic aim is the creation of a transport network which is equal to that found in densely populated city regions: no

stopping point further than 1000 M from the place of residence, regular time intervals, e.g. service at hourly or two-hourly intervals to the nearest town or city, fixed fares and uniform fare structure, hourly services during peak hours, at least eight connections each day in each direction for any locality. It is intended to achieve this object in the Hohenlohe model without extra vehicles or drivers and without any addition costs—purely by improved utilisation of existing capacity. /TRRL/ [German]

Omnibus-Revue Vol. 29 No. 2, Feb. 1978, pp 63-64. ACKNOWLEDGMENT: TRRL (IRRD 307903), Federal Institute of Road Research, West Germany

33 307951 RURAL PUBLIC TRANSPORT. This paper describes a methodology for planning public transport on a county-wide basis where the principal concern is the needs of villages, small communities and small towns. The paper describes the relationship between the needs of small communities and the provision of transport. It highlights the complex social relationships that exist between the long-term character of a rural area and the supply of transport services. Having provided the context for public transport, the methodology developed by the authors in various studies over five years is described in terms of the data, the technical procedures developed and typical results obtained. (a) (TRRL)

Martin, BV Warman, P (Martin & Voorhees Associates, England) *Highway Engineer* Vol. 26 No. 8/9, Aug. 1979, pp 8-17, 4 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 243233)

33 307952 RURAL TRANSPORT EXPERIMENTS: THE WELSH SCHEMES. Three public transport experiments were conducted in Wales as part of the Rutex Programme, all based on Llandovery in Dyfed. This report describes the planning, operational and financial aspects of the experiments. The three schemes complemented each other and existing services, and had the objective of improving transport provision by means of low-cost options making efficient use of existing resources. The three services were as follows: (I) a postbus served two routes, and operated in typical fashion, providing a service most suitable for shopping and personal business trips. The experimental provision of a two-way Saturday service attracted very little patronage. (II) spare capacity on four schoolbus routes was made available to the public. These routes were only available during term-time, and attracted only a small group of users, but they were able to cater for certain work journeys, and were provided at very low cost. (III) a voluntary car service was provided over the whole designated area, organised and operated by the women's royal voluntary service. The service was free to passengers, but available only for 'essential' purposes. Despite some uncertainty about permissible purposes, the scheme provided a valuable service, and coped economically with dispersed and unpredictable demands. (a) (TRRL)

Transport and Road Research Laboratory Monograph SR 5, 1979, 18 p., 5 Fig., 5 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242607)

33 308618 ACCESSIBILITY: THE RURAL CHALLENGE. The author sets out the problem, faced by planners, County Councils, education

and health authorities, transport officials, and by those who live in rural Britain, of the inaccessibility of many areas of the country. For those two-car families who choose to live in the remoter villages, it matters little that the main town is only accessible by bus once a day. But for the poor, children, housewives, the elderly it can be a matter of some urgency when local shops, schools and medical services are being whittled away in favour of larger units in distant towns. This book, based on the author's report for the Department of the Environment on rural transport and accessibility, reviews the process of decline which has led to this situation, and considers the concept of accessibility and shows how it can be developed into an analytical tool for measuring the success or failure of alternative policies. The author details each policy option in turn: the support of conventional bus or other transport services; the provision of mobile services; "mini-outlet" policies; and the long-term restructuring of the rural settlement pattern. He devotes a chapter to the crucial fragmentation of decision-making bodies, which inhibits the necessary coordinated attack on the problem, and concludes with a chapter on "the way ahead" which sets out his policy for meeting the 'rural inaccessibility problem'. (TRRL)

Moseley, MJ (East Anglia University, England); Methuen and Company Limited, (0 416 71230 4) Monograph 1979, 204 p., Figs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243848)

33 308625 EVALUATION OF RURAL VOLUNTEER DRIVER TRANSPORTATION SYSTEMS IN WISCONSIN. The purpose of this study is to evaluate the potential for volunteer driver systems in rural areas. Volunteer driver systems in which volunteers are reimbursed for mileage are hypothesized to be a cost-effective means of providing high quality, specialized transportation in rural areas. The reasons for the growth of volunteer driver systems are outlined in terms of their advantages and disadvantages. Volunteer driver systems are used extensively in Wisconsin to provide specialized transportation service for the elderly and handicapped. The potential for expanding the systems exists as the result of a new state operating assistance program. Two well-developed volunteer driver systems which serve rural areas in Wisconsin are analyzed and compared with paid driver systems using vans. Models are developed to compare the costs of volunteer driver and van systems. The analysis shows that volunteer driver systems provide high quality door-through-door service with lower costs per trip than all but the most productive van systems. With professional direction problems of volunteer recruitment and retention, volunteer reliability, and driver safety can be minimized. Insurance is a problem but has not severely restricted the growth of volunteer systems in Wisconsin. Volunteer systems can best serve high priority trips. Van systems are better when extensive grouping of rides is possible. Finally, implications of the results for federal operating assistance are discussed. (Author/TRRL)

Smith, RL, Jr (Wisconsin University, Madison) *Transportation Research. Part A: General* Vol. 13A No. 5, Oct. 1979, pp 309-315, 5 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244296)

33 309528 PUBLIC TRANSPORT IN RURAL AREAS [Le transport collectif en milieu rural]. Sparsely populated rural areas are the object of large-scale operations carried out with the hope of giving a boost to their economy. As regards public transport, it is necessary to find formulae facilitating internal travel as well as linking them with other regions. The role of public transport services should be to instil life in these regions and to integrate them in the environment. The author describes the state of the art of public transport: road or rail infrastructures may be satisfactory but closing of lines has cut off some areas. Local initiatives to ease travel are noted for their increase and diversity. In conclusion three main objectives are outlined: to guarantee great technical flexibility, to adapt services to local needs, and to give local communities every means of decision making and control. (TRRL) [French]

Desmarest-Parreil, A *TEC-Transport Environment Circulation* Mar. 1978, pp 6-9, 2 Fig., 1 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 105528), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

33 309529 PUBLIC TRANSPORT OPERATIONS IN RURAL AREAS [Les opérations de transport collectif en milieu rural]. In order to awaken or reawaken rural parts of France, it is necessary to increase the possibility of transporting people and transporting local goods. Sufficiently dense road and rail networks exist, but are insufficiently exploited. In order to fulfil known public transport needs, the authorities responsible for developing rural areas have drafted a guide for public transport operations in rural areas, which deals particularly with the financial evaluation of public transport projects. (TRRL) [French]

Moniteur des Travaux Publics et du Batiment, (0026-9700026-97000) No. 9, Mar. 1978, pp 89-91, 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 105602), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

33 309920 PERMANENT WAY FOR RURAL TRAINS. The article discusses the positive contribution that rail services can play in rural areas. In areas in the U.K. rail closures have left an uneven distribution of rural rail services depending on political, social and physical influences. Rural communities near to conurbations benefit from commuter demand while in areas where stopping services are a hindrance to operations, bus services can provide greater coverage. It is argued that there is a need for criteria against which the social value of rural rail and bus services can be evaluated as part of a co-ordinated public transport system. Operating economies in rural rail services could result from introducing lightweight rolling stock now being developed by Leyland. The declining significance of public transport is likely to lead to a more selective and specific function for British Rail according to particular social needs.

Hodge, P (British Railways Board) *Surveyor - Public Authority Technology* Vol. 154 No. 4548, Aug. 1979, pp 12-14, 2 Fig., 2 Phot., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243320); ORDER FROM: IPC Building and Contract Journals, Limited, Surrey House, 1 Throley Way, Sutton, Surrey SM1 4QQ, England

33 310069 RURAL TRANSPORT EXPERIMENTS: THE MID-DEVON LIFT-GIVING SCHEME. A REPORT BY THE DEVON RUTEX WORKING GROUP.

The mod-Devon lift-giving scheme permitted motorists to accept payments from passengers in private cars in a designated area, in advance of the general car sharing provisions contained in the transport act 1978. It was the only such 'general authorisation' in the government's programme of rural transport experiments (rutex). An assessment of the scheme is presented. The designated area contained only limited conventional public transport facilities, and lift giving was already prevalent. Few residents felt themselves to be experiencing important transport difficulties, either before or after implementation of the scheme. The authorisation had little effect on car-sharing habits in the area; few lift givers wanted payments, and few residents had been inhibited by the previous legislation. Some difficulties were identified concerning the matching of potential lift receivers with possible lift givers; those needing lifts were reluctant to ask for help, but car drivers had difficulty knowing when lifts were required. The relevant provisions of the transport act 1978 are likely to have been similarly ineffective in comparable areas elsewhere; organised car schemes may offer a better way of improving rural mobility. (TRRL)

Transport and Road Research Laboratory
Monograph SR525, 1979, 15 p., 1 Fig., 5 Tab.;
ACKNOWLEDGMENT: TRRL (IRRD 244396)

33 310070 RURAL TRANSPORT EXPERIMENTS: THE RIPON FLEXIBUS. A REPORT BY THE NORTH YORKSHIRE RUTEX WORKING GROUP.

The ripon flexibus was part of the government's programme of rural transport experiments (rutex). It served an area to the west of Ripon in North Yorkshire where it replaced three bus routes. It was operated by a national bus company subsidiary using a standard bus which made specified diversions from a circular route on demand. A high level of service was offered initially. During phase I of the experiment the level of service in the area as a whole was nearly doubled. However, the improved service carried virtually no more passengers. After seven months the level of service was reduced to a similar level to that offered before the service began, but with the diversions retained. The reorganisation had little effect on patronage (on average 160 trips per week). The diversions were little used and did cause some problems with timekeeping. The booking of detours caused few problems. If phase I of the experiment had been operated for a full year, the revenue would have covered 28 percent of the costs, and the corresponding proportion for phase II would have been 53 per cent, compared with 45 percent for the original bus service. (TRRL)

Transport and Road Research Laboratory
Monograph SR491, 1979, 24 p., 6 Fig., 11 Tab.,
1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244397)

33 310071 RURAL TRANSPORT PROBLEMS IN BRITAIN. PAPERS AND DISCUSSION. REPORT OF A SYMPOSIUM ORGANISED BY THE TRANSPORT GEOGRAPHY STUDY GROUP OF THE INSTITUTE OF BRITISH GEOGRAPHERS, UNIVERSITY COLLEGE OF NORTH WALES, BANGOR, SEPTEMBER 1978.

The symposium discussed the problems of planning and operating rural public transport systems. Papers also evaluated the part to be played by transport in rural communities at a time of decreasing rural facilities. The following papers were included in the proceedings: The Development of Public Transport Policy in Rural Wales (Dredge, AS); Rural Public Transport: The Economic Stranglehold (Dobbs, B); Transport Problems in Gwynedd: The Bus Operator's Experience (Humphreys, JG); The Snowdon Sherpa: Public Transport and National Park Management Experience (Mulligan, CA); Levels of Rural Bus Provision and Fares Policy (Holding, DM); Railway Network Contraction in Rural North Wales, 1948-1972 (Halsall, DA); An Analysis of The Trunk Road Network in Rural Wales (Willis, EL); Road Equivalent Tariffs: The Scandinavian Experience and the Scottish Prospects (Kowles, RD); Evaluating Public Transport Provision in Skye and Lochalsh (Stanley, PA and Farrington, JH); Access to Health Care Facilities in Cumbria (Whitelegg, J and Gibson, CT); Rural Public Transport needs in South-West Shropshire (Bartle, MH); Transport Co-ordination in Rural Areas (Greenwood, RH). (TRRL)

Institute of British Geographers Monograph
Jan. 1979, 216 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 244551)

33 310309 RURAL DEPRIVATION. This report contains the results and conclusions of the examination of rural deprivation carried out by the Association of County Councils. The terms of reference were to consider and report on: (I) the nature and extent of rural deprivation in England and Wales; (II) the difficulties and costs of providing rural services; (III) the extent to which the allocation of resources reflects the scale of rural problems and the costs of overcoming them; (IV) the policies at present adopted by public authorities in rural areas; and (V) ways in which public authorities could alleviate rural problems, especially if a fairer allocation of national resources were achieved. Part a of the report examines the nature and extent of rural deprivation in England and Wales. Parts B and C discuss items (II), (III) and (IV). In Part D, the present national allocation of resources is discussed. Some ways by which public authorities could alleviate rural problems, given a more realistic allocation of resources, are also examined. (TRRL)

Association of County Councils Monograph
Sept. 1979, 52 p., 9 Fig., 15 Tab., 9 Phot., 65 Ref.;
ACKNOWLEDGMENT: TRRL (IRRD 243524)

33 311443 RURAL RAILWAYS. A REPORT ON BRITISH RAIL'S OTHER PROVINCIAL SERVICES. The major categories of British Rail's other provincial services (OPS) are listed, and BR's policy covers development of a secondary inter-city system, use of the cascade principle for replacing rolling stock, and the replacement of diesel multiple units. Use of Leyland railbus is seen as possible for low volume services. Details

are presented, and discussed, of the CTC's dissatisfaction with this policy. A brief critique is given of successive governments' railway investment policies, making long term planning difficult. Suggestions are presented for an improved policy and emphasize the value of a complete rail network for passenger and freight traffic. There is need for stability in investment, and consideration of residential and industrial needs in transport planning. Safeguarding the OPS is recommended by measures to reduce operating and maintenance costs and preserve the assets of the existing rail network. (TRRL)

Central Transport Consultative Committee
Monograph Sept. 1979, 8 p.; ACKNOWLEDGMENT: TRRL (IRRD 400239); ORDER FROM: Central Transport Consultative Committee, 3-4 Great Marlborough Street, London, England; P8001029

33 311749 INNOVATIONS IN RURAL BUS SERVICES. THE GOVERNMENT'S RESPONSE TO THE EIGHTH REPORT FROM THE SELECT COMMITTEE ON NATIONALISED INDUSTRIES: SESSION 1977-78. HC635.

Finance was considered to be the major problem. The government's intention of stabilising public expenditure requires the maximum value for money. Higher productivity could be achieved by using the National Bus Company's (NBC) market analysis project (map). It was agreed that the present system of licensing can hinder the efficient development of new services and needs reform. New services, such as minibuses, shared cars and post buses, should be developed to supplement the existing network of conventional buses. Observations on specific recommendations include the need for regular discussions with the association for county councils on topics such as finance and the training of community bus drivers. The government would not agree to the recommendations that some of the NBC's debt should be written off, or to maintain the new bus grant at 50 per cent beyond 1981. (TRRL)

Her Majesty's Stationery Office Monograph
Paper CMND 7743, Nov. 1979, 6p; ACKNOWLEDGMENT: TRRL (IRRD 245404)

33 311805 RURAL DEPRIVATION. PART B6. RURAL TRANSPORT.

The essential needs for transport in rural areas are considered, which include good communications by rural industries. The scale, distribution and quality of transport opportunities in rural areas are discussed. Details are tabulated of the high road mileage in sparsely populated areas, and the decrease in passenger journeys made by public transport during 1965-75, with vehicle fleet remaining almost constant, is shown graphically. The relation between population decline and transport network is shown for Devon Country, and the effects on a rural population of changes in motoring costs are discussed. Transport provision by local authority consists mainly of providing and adequately maintaining the highway network. This is reviewed in the light of increased vehicle loadings and financial resources available. Reference is made to the need for subsidizing uneconomic passenger services for various groups in rural communities. A description is given of unconventional passenger services and reference is made to the experience gained by TRRL Rutex experi-

ments. The need for extra financial resources is stated, and policies and actions which might be pursued are listed. (TRRL)

Association of County Councils Sept. 1979, pp 17-22, 2 Fig., 3 Tab., 1 Phot., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 245476)

33 312665 THE RURAL TRANSPORT EXPERIMENTS: A MID-TERM REVIEW. This report describes the background to the Government's program of Rural Transport Experiments (RUTEX) and its organization. There were fifteen experiments, in Devon, North Yorkshire, Dyfed and Strathclyde, each of which incorporated at least one of five unconventional features: community transport; small vehicles; demand-responsive operation; dual-purpose services, and feeder services. The experiments are described in detail, together with results obtained by the end of 1978. A number of tentative conclusions are presented, and the future research program is outlined. (Copyright (c) Crown Copyright 1979.) presented at the University of Newcastle upon Tyne symposium "Efficient Public transport for the 1980's", April 1979 and at the Cranfield Institute of Technology conference "Mobility in Rural Areas", 24-26 April 1979.

Balcombe, RJ ; Transport and Road Research Laboratory, (0305-1315) Monograph TRRL SR492, 1979, 42 p., 9 Fig., 1 Tab., 5 Ref.; Also pub. as ISSN-0305-1315.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-112857

33 313817 RURAL TRANSPORT EXPERIMENTS: BLACKMOUNT SERVICES. A REPORT BY THE SCOTTISH RUTEX WORKING GROUP. Detailed information about the design implementation and operation of the Government's first rural transport experiment in Scotland is reported. The experiment comprises an integrated service operated by a 17 seater minibus (the Medwyn Gypsy) and two postbuses. Parts of the minibus route are served on a demand responsive basis. Results of surveys carried out prior to the introduction of the experiment and since its commencement are recorded. Costs of the experimental service are compared with the costs of the conventional bus services which were previously operating in the area. Patronage on the experimental services consists mainly of women and pensioners who do not have a private vehicle belonging to their households. Most trips are for shopping and social purposes. (Copyright (c) Crown Copyright 1979.)

Transport and Road Research Lab., Crowthorne, (England). 46 TRRL-SUPPLEMENTARY-4, c1979., 35p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-144496

33 313966 IMPROVING RURAL TRANSPORTATION: THE SECTION 18 PROGRAM OF THE SURFACE TRANSPORTATION ASSISTANCE ACT OF 1978. The report describes the role community action agencies (CAA's) can play in improving rural public transportation services, with specific emphasis on the Section 18 rural transportation grant program. The report discusses application procedure, labor protection requirements, matching requirements, provisions for the elderly and handicapped and implementation strategies. Appendices include a description of the White House rural transportation initiative, the standard labor protection warranty, a list of state contacts, and the

emergency regulations for the Section 18 program.

Community Services Administration, Department of Transportation Final Rpt. DOT-/I-80-11, Dec. 1979, 60p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-168560

33 314078 A SECTION 147 RURAL PUBLIC TRANSPORTATION DEMONSTRATION MANUAL. No abstract available.

Urban Inst., Washington, DC. Department of, Transportation, Washington, DC. Aug. 1979, 364p-in 5v; includes PB80-181399, PB80-181407, PB80-181415, PB80-181423, and PB80-181431. ñ; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181381

33 314079 A SECTION 147 RURAL TRANSPORTATION DEMONSTRATION MANUAL. NUMBER 1. RURAL PUBLIC TRANSPORTATION SERVICES AND PERFORMANCE [Final rept.]. The manual summarizes the lessons that have been learned from the Section 147 Rural Transit Demonstrations about service and fare policies, and performance and costs. The report concludes that rural transit services have to be innovative, combining conventional transit operations with fixed routes and regular schedules with various forms of paratransit, to meet the specific needs of individual areas. The report also emphasizes the need for careful monitoring of costs and system performance as transit services develop. The report provides capsule summaries of system characteristics and performance for selected projects, identified by State.

McGillivray, R Ernst, U Olsson, ML Tolson, F Urban Institute, Department of Transportation Final Rpt. DOT-I-79-4, Aug. 1979, 39p; See also Number 2, PB80-181407. Also available in set of 5 reports PC E13, PB80-181381.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181399

33 314080 A SECTION 147 RURAL PUBLIC TRANSPORTATION DEMONSTRATION MANUAL. NUMBER 2. PLANNING RURAL PUBLIC TRANSPORTATION SYSTEMS [Final rept.]. The report describes planning processes used to establish rural transportation, and was prepared by examining planning documents and operating reports of projects funded under the Section 147 Demonstrations. It examines the premise that good planning and management measurably contributes to the potential success of rural transportation projects. The study examines system planning, startup, management, funding and alteration in separate chapters, and concludes with an overall assessment of key factors for success. These include common sense, a good project director, a willingness to change, vehicle utilization, high trips per person, and vehicle miles of service.

Burkhardt, JE ; Ecosometrics, Incorporated, Department of Transportation Final Rpt. DOT-I-79-5, Aug. 1979, 71p; See also Number 1, PB80-181399, and Number 3, PB80-181415. ñ Also available in set of 5 reports PC E13, PB80-181381.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181407

33 314081 A SECTION 147 RURAL PUBLIC TRANSPORTATION DEMONSTRATION MANUAL. NUMBER 3. RURAL PUBLIC TRANSPORTATION COORDINATION EFFORTS [Final rept.]. The technical manual discusses coordination and the role it plays in developing successful rural public transportation programs. The report stresses that coordination must begin early, involve as many participants as possible, and be carried forward through the planning, operation, and implementation of a project. Four sections elaborate on coordination with respect to community support, regulatory considerations, the role of public and private operators, and the role of human service agencies.

Ketola, HN ; Applied Resource Integration Limited, Department of Transportation Final Rpt. DOT-I-79-6, Aug. 1979, 45p; See also Number 2, PB80-181407, and Number 4, PB80-181423. ñ Also available in set of 5 reports PC E13, PB80-181381.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181415

33 314082 A SECTION 147 RURAL PUBLIC TRANSPORTATION DEMONSTRATION MANUAL. NUMBER 4. RURAL PUBLIC TRANSPORTATION VEHICLES [Final rept.]. The report examines the various types of vehicles used in the Section 147 Rural Public Transportations, and provides guidelines on vehicle considerations. The report covers specifications, vehicle maintenance, communications equipment, and driver training, and includes example material and suggested methods for each topic. The report finds that a mix of vehicle sizes is normally the best method for purchasing vehicles initially, and sufficient attention has to be provided for back-up vehicles.

Hayes, J ; Michigan Department of Transportation, Department of Transportation, Transportation, Washington, DC. Final Rpt. DOT-I-79-7, Aug. 1979, 104p; See also Number 3, PB80-181415, and Number 4, PB80-181431. ñ Also available in set of 5 reports PC E13, PB80-181381.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-181423

33 314533 TRANSPORT SERVICES IN LOW DENSITY AREAS. An international road research group was set up by OECD to examine public transport systems, both conventional and innovative, implemented in low density areas as well as possible future improvements to these types of service. Due to the increasing number of dispersed and low density zones which have evolved within the last thirty years in OECD countries, the problem of public transport services in these areas is of increasing economic and social importance as the levels of urban accessibility provided depend to a large extent on whether or not the residents possess a private means of transport. Firstly, the report examines urban development patterns, activity distributions and trip patterns and highlights the share of trips made by public transport. It considers the set of transport problems related to these zones supported by a classification of different forms of transport services together with their characteristics, such as system availability and intrinsic accessibility, flexibility in time and space depending on the nature of the system, private or public. The report indicates the main factors to take into account in physical planning in order to promote improved operation of conventional or de-

mand-responsive systems currently in use or under study. It deals in turn with the general conditions applying to public involvement in these areas, the social objectives assigned to public transport, the framework for adequate co-ordination and lastly, the overall problem of evaluating transport schemes for low-density areas. Finally, the report presents a number of conclusions and recommendations regarding methods for improving transport services in low density areas and priority research subjects in this field.

Organization for Economic Cooperation and Devel Monograph Sept. 1979, 79p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 246119)

33 314651 RURAL PUBLIC TRANSPORTATION COORDINATION EFFORTS: A SECTION 147 DEMONSTRATION PROGRAM, TECHNICAL MANUAL. The rural transportation projects of the 147 demonstration program were developed in a complex environment of individual transportation needs; competing human service service agency, public, and private transportation providers; and multiple levels of government. Those projects which were the most successful dealt directly with these elements by coordinating project efforts to conform to the needs and desires of the local community. By doing so, they developed a strong community identification which was translated into sponsorship and other forms of community support. In this technical manual coordination and the role it played in developing successful programs is discussed. Throughout the technical manual, there is one overriding conclusion: Coordination must begin early, involve as many participants as possible, and be carried forward through the planning, implementation and operations of a project. The four sections develop this point as it applies to: community support, regulatory considerations, coordination with public and private operators, and coordination with human service agencies. Community support begins early and continues throughout the successful project's life. By developing strong working relationships and a firm understanding of the local transportation environment many projects turned written proposals into successful and greatly appreciated local transportation operations. (Author)

Ketola, HN ; Applied Resource Integration Limited Final Rpt. Number 3 of 5, Aug. 1979, 38p; Supported by DOT, FHWA, UMTA, and Office of the Secretary.

33 319151 PROCEEDINGS OF THE FOURTH NATIONAL CONFERENCE ON RURAL PUBLIC TRANSPORTATION. The Fourth National Conference on Rural Public Transportation was held in June 1979 in Vail, Colorado. This represented a fairly substantial period of transition for rural transit services. The Section 147 Demonstrations were in many cases winding to a close, and a landmark series of reports on their results was under preparation. The Congress had passed the new Section 18 program, which for the first time provided both capital and operating support for rural public transportation services. Although only \$75 million in FY-1979, the Section 18 money represented a "coming of age" for rural transit. To top things off, the White House was putting the

finishing touches on a Rural Transportation initiative, which was formally announced shortly after the conference. The papers presented at the conference reflect the transition taking place. Many attempted to assess the results of the Section 147 demonstrations, and speculated about their long-term implications. A major theme of the conference was coordination, and how it could be accomplished. This reflect the limited amount of Section 18 funds and provided an option for stretching available resources. A number of papers also dealt with the role of the states in managing rural transportation programs reflecting the emphasis which Section 18 places on this function. This volume contains most of the papers presented at the Fourth National Conference. Rather than following the sequence of paper at the sessions, they have been regrouped in several major areas which the conference highlighted. Some of the papers have been revised or abridged by their authors since their original presentation, and a few have been edited to make them consistent in format with the other papers in the report. (Author)

Urban Mass Transportation Administration Sept. 1979, 154p, Refs., Apps.; Proceedings from the Fourth National Conference on Rural Public Transportation, held in Vail, Colorado, June 1979; Contract DOT-I-79-19; ORDER FROM: TRB Publications Off

33 323364 ECONOMIC ASPECTS: REVIVAL OF RAIL SERVICES IN RURAL AREAS. 20 EXPERIMENTS, A FIRST EVALUATION [Vie economique: la relance des dessertes rurales. Vingt experiences, un premier bilan]. Twenty experiments are being carried out in the hope of reviving rail services in rural areas. One action of this type is planned for each department. Some of these experiments are already two years old. The "atelier central d'etudes d'aménagement rural" (acear-central workshop for the planning of rural regions) has made a first assessment of the schemes operating. [French]

Officiel des Transporteurs No. 1056, Nov. 1978, pp 12-17, 6 Fig. ACKNOWLEDGMENT: TRRL (IRRD 105778), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM: Compagnie Generale de Developpement, 11 rue Godefroy-Cavaignac, 75011 Paris, France

33 326412 RURAL PUBLIC TRANSPORTATION PROJECTS ON INDIAN RESERVATIONS: A REPORT ON ELEVEN DEMONSTRATIONS. This report summarizes and evaluates eleven rural transportation projects conducted on eleven Indian reservations and were funded under Section 147 of the Federal Aid Highway Act of 1973, as amended. The evaluations describe the transportation problems in the reservation settings, the benefits and costs of the projects, the solutions to these problems that were demonstrated, and findings and recommendations relative to government actions in this area.

Crain, J Hodson, E ; Crain and Associates, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. UMTA-MA-06-0049-80-8, May 1980, 211p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-111841

33 326681 RURAL TRANSPORT EXPERIMENTS: THE NORTHALLERTON HOSPITAL TRANSPORT SERVICE. The Northallerton Hospital Transport Service was part of the Government's program of Rural Transport Experiments (RUTEX). It was a demand responsive shared hire-car service to the hospital from two areas containing some 10,000 households. The provisions of the Passenger Vehicles (Experimental Areas) Act 1977 were used to authorize drivers to collect separate fares from passengers. The service operated in the morning and afternoon from Monday to Friday and in the evening from Monday to Thursday. On average 10 return vehicle journeys were made each week and 15 passengers made return journeys, but more than one half of vehicle journeys were made with a single passenger. Without the service 16 per cent of the passengers would have foregone the journey, a further 8 per cent did not know how they would have traveled; the remaining passengers could have made other arrangements. The average passenger spent 80 minutes at the hospital and travelled 31 miles; the average vehicle journey length was 48 miles. Twenty-two per cent of costs were met from revenue, the remainder, \$4.50 per passenger journey, by the Department of Transport. (Copyright (c) Crown Copyright 1980.)

Transport and Road Research Lab., Crowthorne, (England). 52 TRRL-SUPPLEMENTARY-5, c1980., 28p; Prepared in cooperation with North Yorkshire Rutex Working Group, England.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-100455

33 327456 RURAL RIDES. A PRACTICAL HANDBOOK FOR STARTING AND OPERATING A RURAL PUBLIC TRANSPORTATION SYSTEM. Guidelines for planning, implementing, and operating a rural public transportation system are presented. Selection of personnel and vehicles, routing and scheduling, maintenance, accountability, economics, insurance, sources of funding, and potential problems are discussed. It is noted that public transportation is lacking in rural areas, and that the elderly, handicapped, poor, isolated, unemployed, and otherwise disadvantaged rural residents are in more critical need of public transportation than their urban counterparts. Rural transportation systems tend to be initiated to transport people to needed social services, such as senior citizen centers, educational programs, job training programs, and health facilities. While individual agencies tend to acquire a few vehicles for transporting clients to and from services, a coordinated system would be more efficient in terms of manpower, fuel, and vehicles. Responsibility for routing and scheduling should be retained by the manager. Local senior citizen groups, businesses, and social service agencies should be consulted regarding needs. Possible problems with communication, resistance to coordination, and excessive bureaucratization are noted.

Farmers Home Administration, Washington, DC. USDA/PA-1215, Oct. 1978, 22p; Prepared in cooperation with National Council for the Transportation Disadvantaged, Rio Grande, NJ.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0031228/0

33 327752 A STUDY ON FACTORS AFFECTING SUCCESS OF SUBURBAN MASS TRANSIT LINES. The purpose of the study was to identify and analyze the factors that influence the success or failure of public transportation lines that operate mainly within the low density suburban areas, and whose purpose is to serve the local travel needs between and within suburban communities, rather than to provide corridor connections with the central business district (CBD) of the metropolitan region. This report presents the efforts of a research project on factors that effect the success levels of suburban bus transit lines, operating in low density areas and serving non-CBD-oriented, localized travel needs, on fixed-routes and schedules of service. The analysis is based on data from suburban transit routes from two distinctly different metropolitan areas, namely: Philadelphia SMSA and San Diego SMSA. The factors investigated in-

clude those expressive of the connectivity of transit lines, land use mix in the service areas, areal/spatial characteristics of the transit routes, and the characteristics of the transit users.

Tomazinis, AR Replogle, M Del Casino, J Young, D Gleichman, G ; Pennsylvania University, Philadelphia, Urban Mass Transportation Administration, (UMTA-PA-11-0018) Final Rpt. UMTA-PA-11-0018-80-1, Dec. 1979, 170p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-116428

33 328226 INTERCITY, BUS, RAIL, AND AIR SERVICE FOR RESIDENTS OF RURAL AREAS. This is a four part study which focuses on intercity passenger service for residents of rural areas, i.e., persons who live outside officially designated urbanized areas. Part I develops the analytical structure for the study and introduces a definitional structure designed to reduce the

considerable semantic confusion surrounding the subject matter area. Parts II, III and IV examine the characteristics of bus, rail and air service, respectively, currently provided to rural residents. The bus findings were based partly upon case studies of rural areas in 10 states. The study concludes that the combination of bus and air service usually provides adequate intercity service for most rural residents, and that access to this service is not a major problem.

Wells, J Manion, J Connelly, M Johnson, K Kinney, M ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. DOT-P-10-80-18, Jan. 1980, 346p; Contract DOT-OS-80082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-120826

34 050737 THE ADDITIONAL COST OF PROVIDING MOBILITY FOR THE ELDERLY AND HANDICAPPED ON THE WASHINGTON METROPOLITAN RAIL RAPID TRANSIT SYSTEM. The report presents an estimate of the cost of adding elevators and associated equipment to the Washington Metropolitan Rail Rapid Transit System as part of a planning and designing procedure which would meet the special needs of the elderly and the handicapped. The report covers the following specific areas of study: potential elderly and handicapped users, needs of the elderly and handicapped in rail rapid transit, the metro system and its accessibility to the elderly and the handicapped, cost of providing additional facilities, security and safety. A list of references is included.

Urban Mass Transportation Administration
Intrnl Rpt May 1973, 48 pp; See also report dated Jul 73, PB-222 828.; Contract DOT-MA-06-0034; ACKNOWLEDGMENT: NTIS (PB-223108/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223108/2

34 056993 ACCESSIBILITY OF THE METROPOLITAN WASHINGTON, D.C. PUBLIC TRANSPORTATION SYSTEM TO THE HANDICAPPED AND ELDERLY. Two hundred and fifty handicapped and/or elderly citizens from throughout the Metropolitan Washington, D.C., area were interviewed to determine their travel experiences. The survey findings, together with findings from an extensive search of research literature and demonstration programs concerning the travel problems of the elderly and handicapped, provided information about their travel needs and experiences and served as a basis for developing performance standards and guidelines applicable to the design of transit systems that are accessible to the handicapped and elderly. Two computer programs were developed that could be used as design decision tools in transit planning. Portions of this document are not fully legible.

Kinley, HJ ; ABT Associates, Incorporated
Final Rpt AAI-1546, Feb. 1974, 250 pp; Contract DOT-OS-20022; ACKNOWLEDGMENT: NTIS (PB-231815/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231815/2, DOTL NTIS

34 057841 TRANSPORTATION OF THE ELDERLY (TOTE)-A PILOT PROJECT TO DEVELOP MOBILITY FOR THE ELDERLY AND THE HANDICAPPED. The Transportation of the Elderly (TOTE) demonstration project in St. Petersburg, FL, was initiated for the purpose of improving and increasing the mobility of the elderly and handicapped. This demonstration is being conducted in a ten square-mile area which houses a target group of 30,000 persons. Reservation, subscription, demand response and rent-a-bus are four door-to-door services being utilized to provide the elderly (60 and over) and the handicapped (no age limitation) with increased mobility. At the conclusion of the project it is anticipated that TOTE will be integrated with the municipal transit system.

Florida Department of Transportation, (UMTA-FL-06-0007) Intrm Rpt. Apr. 1974, 54 pp
Prepared in cooperation with St. Petersburg City, Fla.; ACKNOWLEDGMENT: NTIS (PB-233593/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233593/3

34 072242 TRANSPORTATION RESEARCH DELEGATION NEWS NUMBER ONE. The bulk of the pamphlet is a summary of three completed research projects. The first was an attempt to develop and test a theory of drivers' route choice in urban areas. From 1500 interviews, drivers' preferences and estimated travel times were ascertained. From these results, and certain other requirements, the model was constructed. It was found that, while travel time is the most important consideration, the number of stops and turns, road width, etc., are also important. The second was an attempt to develop and test methods for traffic actuated control of isolated signal intersections. The project was carried out in five stages- criteria for signal control, literature inventory of control strategies, development of strategies, simulation, and field tests. It was found that vehicle actuated signal timing can be studied within the same theoretical framework as fixed-time signal timing. Together with equipment for selective bus detection, vehicle-actuated controllers can reduce average bus delay by 20 percent. Traffic-actuated control with optimization logic for minimization of operating costs can reduce average bus delay by 40 percent and average vehicle delay by 25 percent. The third was a study of safety in public transportation for persons in wheel-chairs or who have difficulty walking. Most Swedish municipalities have special vehicles for such persons. The study shows that the present system of seat belts is unsafe, and makes suggestions for new systems. Desirable dimensions are given for ramps and hoists to help the passengers enter and leave the vehicle. The rest of the pamphlet consists of a short article on the applications to the transportation research delegation for research money in addition to announcements of a paper on traffic control in 14 Swedish population centers, the appointment of a committee for a project on movable platforms. A project to study taxis, and a trip by the transportation research delegation to Oslo. [Swedish]

Transportation Research Delegation, (TFD-NYTT NR. 1) Vol. 2 No. 1, Feb. 1975, 9 pp, 4 Ref.; ACKNOWLEDGMENT: TSC

34 081303 THE HANDICAPPED AND ELDERLY MARKET FOR URBAN MASS TRANSIT-EXECUTIVE SUMMARY. The purpose of this study is to determine the urban mass transit needs of the elderly and handicapped in order that the Department might better meet their needs. The entire study is divided into three reports: The Executive Summary (this report), a Technical Report which details the study findings, methodology, references, data, etc., and a Census Data section which consists of supportive statistics. This report describes the status, existing services and transit needs and demands of the elderly and handicapped. Alternative solutions discussed include the upgrading of existing or planned systems, Dial-A-Ride, transit stamps, coupon taxi and ubiquitous fixed route service. Various impacts are analyzed and recommendations are made concerning further studies and reports and approaches for local planners are outlined.

Transportation Systems Center, (MA-06-0034) Sumry Rpt. UMTA-MA-06-0034-73-1, July 1973, 32 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche

34 083971 PUBLIC TRANSPORTATION AND TRANSPORTATION NEEDS OF THE ELDERLY AND HANDICAPPED. Section 16(a) of the Urban Mass Transportation Act of 1964, as amended, declares as national policy that urban public transportation shall be available to the elderly and handicapped and that this shall be transportation that they can effectively use. This paper reports on a series of interviews concerning the most efficient and economical means of ensuring the availability of transportation that meets that requirement. The paper discusses the characteristics of these citizens, defines the dimensions of the problem, and focuses on the major measures already in existence or proposed for facilitating their use of urban transit. Measures include modification of the types of vehicles currently in service, use of taxis, development of new vehicles in the TRANSBUS and Small Bus Programs, and demand-responsive service. In the opinions of those interviewed, the most efficient and economical means of providing transportation that the elderly and handicapped can effectively use is to centralize, and support by public subsidy, transportation in the principal urban transit systems: TRANSBUS and small bus for the ambulatory and semiambulatory and demand-responsive vehicles with attendants who would assist invalids and nonambulatory through the doors of their homes and through the doors of their destinations. Interviewers agreed that, regardless of the solution, a sustained program of education is essential to convince and remind the public and the typical rider that the needs of the elderly and handicapped deserve special attention.

Schnell, JB (American Public Transit Association) *Transportation Research Record* No. 516, 1974, pp 1-10, 1 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

34 083974 TRANSPORTATION NEEDS AND DESIRES OF THE ELDERLY RESIDING IN A MEDIUM-SIZED CITY. Large numbers of elderly live in medium-and small-sized cities where the sole form of public transportation is the bus, which is infrequently used and has limited route coverage. This paper reports a study of the transportation needs of those citizens and their reasons for using the modes that they do. Basic data were collected by sampling the elderly in a city of 125,000 population. In a special phase of the study to determine why they used transit, 2 conclusions were reached: Cost plays a minor role in the decision to use or not use the bus, and physical problems significantly limit ridership. Based on the findings, several recommendations are made for improving the mobility of the elderly.

Weaver, VC (Barton-Aschman Associates, Incorporated) Herrin, M (Illinois University, Urbana) *Transportation Research Record* No. 516, 1974, pp 28-34, 6 Tab., 11 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

34 090178 TRANSPORTATION NEEDS OF THE AGED AND HANDICAPPED: A BACKGROUND/RESOURCE PAPER FOR THE UPPER GREAT LAKES UNIVERSITY CONSORTIUM FOR TRANSPORTATION RESEARCH. Two approaches are noted in classifying persons as aged or handicapped, a legal definition, easy for the aged, or a consideration of proficiency in performance of certain

actions. The size of the handicapped population is described, and physical, emotional, and economic travel barriers are discussed. Legislation and programs at local, state and national levels are described. The 1970, 1971 White House Conference on Aging is discussed, with special emphasis on mobility problems. Several current projects in the Upper Great Lakes Region and other regions of the U.S. are described. Several suggestions are made for research to better define and alleviate the transportation problems of the aged and handicapped population.

VanAble, DP Nordley, PM Nelms, JDJ Vicory, AC ; Department of Transportation Final Rpt. Sept. 1973, 142 pp; Prepared in cooperation with Upper Great Lakes Univ. Consortium for Transportation Research. See also PB-231 542.; Contract DOT-OS-30096; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238830/4ST

34 090341 BART AND THE HANDICAPPED.

A ten-year review of BART with regard to special facilities for the handicapped shows a gradual awareness of needs as citizen pressure has mounted. Special facilities for the visually and audibly disabled are not yet provided, and many elevators are awkwardly located for the physically handicapped. A study team in 1974 found many minor elevator operational problems, with an additional barrier for wheelchair users as the lack of level access to and egress from buses that transfer with BART. It is observed that new responsibility is now being taken to provide transportation for the handicapped and that BART has set a planning precedent.

Levine, R ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, California University, Berkeley MTC-WP-17-1-75, Nov. 1974, 67 pp; Contract DOT-OS-38176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239211/6ST

34 091650 STUDENT WHEELCHAIR TRANSPORTATION, LOADING AND SECUREMENT.

California has no standard specifications or regulations which specifically address the construction and outfitting of special school buses required to transport wheelchair confined students. The standard requirements for regular school buses are not suited for buses carrying wheelchairs. Therefore, whenever a new wheelchair bus is proposed, an exemption from the regular school bus requirements is issued by the Department of Education (DOE) for its adaptation. This practice has led to inconsistency in approved systems. A state-of-the-art study was made to assist DOE in developing specifications for their 'wheelchair' school buses. Twenty-one entities, including school districts, transportation contractors and suppliers, were visited, and a documentation was made of the systems found. An engineering judgment type evaluation was made of the equipment. This report also discusses several questions raised during the study relative to the behavior of the student's wheelchair and its associated hardware during a vehicular accident.

Stewart, CF Reinl, HG ; California Department of Transportation Final Rpt. DMT-001, Aug. 1974, 85 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241350/8ST

34 092212 LIFESTYLES AND TRANSPORTATION NEEDS AMONG THE ELDERLY OF LOS ANGELES COUNTY. The report examined the trip-making behavior of persons over 65 years of age residing in Los Angeles County, California. The two types of elderly lifestyles that were studied were those living in the inner-city and those located around the urban fringe. Four areas within the county were selected that reflect these two living patterns. A comparative analysis of trip patterns and socio-economic data was completed. In addition to investigating travel patterns, a survey of taxicab use on weekends and weekdays was undertaken. The elderly represent a substantial proportion of taxicab patrons. Their use of taxis is further indicative of the changes which occur in mobility patterns upon reaching retirement. This mode of transportation is presently the only type of demand-responsive service available to the senior population in some parts of the county. Tables present data collected in the study.

Gillan, J Wachs, M ; California University, Los Angeles, Urban Mass Transportation Administration, California Department of Transportation, Yellow Cab Company, (UMTA-CAL-URT-7(7)T-3) UMTA-CA-11-0009-75-1, Feb. 1975, 28p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243631/9ST

34 092213 DESIGN FOR THE HANDICAPPED IN ELEVATED TRANSPORTATION SYSTEMS.

The report is concerned with the mobility of the physically disabled within urban areas. It identifies architectural barriers faced by the handicapped in relation to rapid transit, establishes design standards, and shows ways these standards may be incorporated in prototypical and existing stations. An evaluation of the Howard Street line of the Chicago Transit Authority (CTA) is presented. Design standards are established to aid designers in making elevated transportation systems accessible to the handicapped. Various architectural elements, including doors, entry and exit controls, stairs and elevators are diagrammed and discussed. The design standards established are for minimal tolerances and may be exceeded wherever it is felt necessary. The two basic types of platforms presently being used in rapid transit systems, the mid platform and the split platform, are analyzed with particular interest to providing access to the handicapped. Representative station types presently used are explained by diagrams and text.

Gelick, MS Silver, ML ; Illinois University, Chicago, Urban Mass Transportation Administration Res. Rpt. RR-11, UMTA-IL-11-0024-75-1, Jan. 1975, 68 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243650/9ST

34 092329 TRANSPORTATION FOR SENIORS AND HANDICAPPED PERSONS IN ROCKLAND COUNTY.

The objective of the report is to develop a precise description of the transportation problems of the handicapped and elderly in Rockland County, N.Y., and to formulate an operational solution to these problems. The essence of the statement of work scope is that a joint Federal-local, multi-agency approach should be used to develop the transportation facilities deemed necessary as a result of this

planning study. Key elements to the work statement are data gathering and analysis, system design sketch, support plan and implementation plan. Some of the major problems facing the elderly and handicapped are delineated. A system design plan incorporating some of the following elements has been developed: establishment of a County office responsible for all transportation activities; development of a 'Council of Agencies' to coordinate agency needs, including transportation; appointment of a Policy Advisory Committee drawn from the agencies, government, target group and employers; 'Purchase of Service' agreements between agencies and the centralized transit operation to provide target group activities; and recommendation of Federal funding for three major purposes.

RRC International, Incorporated, Urban Mass Transportation Administration UMTA-IT-09-0023-74-2, Jan. 1974, 109p; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244469/3ST

34 092398 A DIRECTORY OF VEHICLES AND RELATED SYSTEM COMPONENTS FOR THE ELDERLY AND HANDICAPPED.

The purpose of this report is to determine which manufacturers offer products for over-the-road transportation of elderly and handicapped persons. The report is basically a catalog of small, medium and large transit bus, school bus, and other vehicle manufacturers offering special features to accommodate the elderly and handicapped. It also includes companies which modify vehicles by adding lifts, ramps, wheelchair securement devices and retractable steps for vehicles. Information contained in this report is intended to be a guide for the selection of equipment for purchase. Data were generated by compiling a list of potential manufacturers from registers and mass transit operators. Then, all companies identified were requested, in writing, to send pertinent catalog information. It is recommended that this catalog be updated every three months.

DeBenedictis, JA Dougherty, EJ ; Franklin Institute, Urban Mass Transportation Administration, (UMTA-PA-06-0031) FIRL-F-C3956-2, UMTA-PA-06-0031-75-1, June 1975, 133 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244474/3ST

34 092722 TRANSPORTATION FOR OLDER AMERICANS. A STATE OF THE ART REPORT.

The study examines the transportation demands of the elderly, present delivery systems, taxi and bus modes, the elderly as drivers and pedestrians, and the scope of the market for elderly transportation needs. The study also examines sources of project funding for transportation (present and future potentials), special problems and constraints in developing transport projects for older Americans (public, special and private transport systems), and future needs for research and programs. The study also contains a set of detailed systems serving the elderly, a bibliography, and other special annexes on driver licensing, reduced fares, school bus laws, and others.

Revis, JS ; Institute of Public Administration, Administration on Aging Final Rpt. IPA/AoA-1, Apr. 1975, 727p; Grant HEW-93-P-57405/1-01; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243441/3ST

34 094016 A STUDY ON MAKING TRANSPORTATION FACILITIES ACCESSIBLE TO THE HANDICAPPED AND ELDERLY. The study presents a classification scheme for vertical circulation devices, a classification scheme for fixed facilities, a station questionnaire for recording barriers and a transit user scenario which considers psychological as well as physical barriers. Vertical circulation devices currently used in transportation facilities, their assets and shortcomings are detailed. New concepts of vertical circulation are grouped into ramp, stair, escalator and elevator devices. The concepts are designed to stimulate creative design approaches to the problem. Conclusions center around the applicability of existing circulation devices, the aspect of human engineering, problems related to various devices, and improvements concerning escalators and elevators.

Dougherty, EJ DeBenedictis, JA ; Franklin Institute, Urban Mass Transportation Administration, Washington, D.C., (F-C3956-1) Tech. Rpt. FIRL-F-C3956-1, UMTA-PA-06-0031-75-2, June 1975, 101p; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, NTIS Price, /MFS2.25; PB-248597/7ST

34 094034 THE USE OF EXISTING FACILITIES FOR TRANSPORTING DISADVANTAGED RESIDENTS OF RURAL AREAS. VOLUME ONE. GUIDE FOR TRANSPORTATION PROVIDERS. This Guide constitutes the first volume of a two-part study. It emphasizes solutions to the transportation problems of the elderly, the handicapped, and the poor people in rural areas. More general treatment has been given to the problems of other transportation disadvantaged groups such as the young and persons in autoless and one-car families. Programs were investigated that were determined to be sufficiently flexible to promote increased use of privately owned automobiles, taxis, vans, or buses by the rural disadvantaged groups.

Hauser, EW Rooks, EH Johnston, SA MacGillivray, L ; Research Triangle Institute, Federal Highway Administration RTI-26U-956-Vol-1, FHWA/SES-75/06-1, Jan. 1975, 151 pp; See also Volume 2, PB-248 747.; Contract DOT-FH-11-8261; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248746/0ST

34 094035 THE USE OF EXISTING FACILITIES FOR TRANSPORTING DISADVANTAGED RESIDENTS OF RURAL AREAS. VOLUME TWO. Volume 2 continues the survey of a variety of programs for improving the mobility of the transportation disadvantaged using only locally available resources--public or private vehicles. The vehicles range from small buses to 7-14 passenger vans to private cars. The programs include volunteer drivers in their own cars, leased personal vehicles, subscription service, transportation service by social service agencies, regular fixed-route/fixed-schedule service, and others. The report is a manual for laymen, based on the authors' suggested planning methodology as demonstrated in a Southeastern rural area. Ten alternative transportation programs were examined for their potential utility. The Delphi technique translated non-quantifiable goals into quantified data.

Hauser, EW Rooks, EH Johnston, SA MacGillivray, L ; Research Triangle Institute, Federal

Highway Administration Res. Rpt. RTI-26U-956-VOL-2, FHWA/SES-75/06-2, Jan. 1975, 321 pp; See also Volume 1, PB-248 746.; Contract DOT-FH-11-8261; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248747/8ST

34 094123 LINCOLN EXPERIMENTAL TRANSPORTATION DEMONSTRATION PROJECT. The project involves the provision of a specialized transportation service, known as the HANDIBUS, for handicapped and elderly citizens who encounter barriers to existing mass transportation services. The service includes door-to-door transportation at the same fare as the regular city bus service. Special tickets are purchased by qualified applicants. The specialized service is operated by Lincoln Transportation Service, a city-owned mass transportation system which operates the regular city bus lines. This evaluation specifically addresses five primary objectives of the HANDIBUS service: (1) To achieve a high level of penetration of the target population; (2) to eliminate, to the degree possible, existing barriers to mass transportation among the target population; (3) to substantially increase mobility among the target group; (4) to increase community social and economic integration with the target population; and (5) to provide efficient equipment and operating methods for providing the intended service.

Lincoln-Lancaster Commission on Aging, Urban Mass Transportation Administration, Applied Planning and Management and Associates, (UMTA-NE-06-0002) Final Rpt. UMTA-NE-06-0002-75-1, Oct. 1975, 65 pp; Prepared by Applied Planning and Management and Associates, Lincoln, Nebr.; Contract DOT-UT-877; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248735/3ST

34 094128 CITY OF CLEVELAND NEIGHBORHOOD ELDERLY TRANSPORTATION (N.E.T.) PROJECT. DIAL-A-BUS. The project establishes for people 60 years of age and older what is variously called 'demand responsive,' 'dial-a-bus,' and 'dial-a-ride' door-to-door local transportation service with vehicles specifically adapted to the needs of older persons. The demonstration project, sponsored by the city of Cleveland, Ohio, services three neighborhoods (Buckeye, Model Cities, and Tremont) selected, among other reasons, on the basis of large concentrations of elderly citizens. Seventeen thousand (17,000) persons 60 years and older reside within these three areas which encompass approximately ten square miles. Revenue service began in mid-March, 1975, and by the end of May, 1975, over 21,000 Dial-A-Bus passengers were carried. The report documents the implementation efforts and actual operational experience.

McLaughlin, B Lake, G ; Cleveland, City, Ohio, Urban Mass Transportation Administration, DAVE Systems, Incorporated, (UMTA-OH-06-0018) Intrm Rpt. UMTA-OH-06-0018-75-1, Jan. 1976, 79 pp; Prepared in cooperation with DAVE Systems, Inc., San Francisco, Calif. Quarterly Report. See also PB-253237.; Contract OH-06-0018; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248903/7ST

34 094132 TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. A PROTOTYPE CASE STUDY OF NEW YORK STATE EXPERIENCE IN ACTIVATING AN ELEMENT OF A FEDERAL GRANT PROGRAM. The Urban Mass Transportation Act of 1964, provided grants and loans to states and local public bodies and agencies to assist them in providing mass transportation systems to meet the special needs of the elderly and handicapped. This act was further amended in 1973, and the assistance was extended to private nonprofit corporations and associations. The report looks at this program and its administration in New York State. The development of this program was traced from the rules and regulations provided by the Urban Mass Transportation Administration, to examine the proposals of the private nonprofit organizations, and to determine both the problems involved in the administration of the program and the ways in which these proposals would meet the transportation needs of the elderly and handicapped.

Brunso, JM ; Washington University, Seattle, Urban Mass Transportation Administration, (UMTA-WA-11-0003) Res. Rept. RR-75-5, UMTA-WA-11-0003-75-1, Aug. 1975, 127 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249105/8ST

34 094179 PLANNING HANDBOOK: TRANSPORTATION. A Handbook on planning and implementing transportation projects for serving the elderly is presented. The Handbook contains sections on getting organized, developing a data base, designing the service, selecting the right equipment, running the project, putting a budget together, monitoring and evaluation, paying for the project and problems related to franchise conflicts, insurance costs and labor problems. The Handbook also contains a separate flow chart showing all the steps described in the Handbook and permits easy planning of all stages. The Handbook also contains four Annexes which include sample survey forms, a route information and development chart, a list of vehicle and other equipment suppliers, and sample layouts for developing an operating expense analysis.

Revis, J Eckman, A Coit, R Davidson, J Revis, B ; Institute of Public Administration, Administration on Aging Final Rpt. IPA/AoA-2, Nov. 1975, 284 pp; Grant DHEW-93-P-57405/1-03; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247958/2ST

34 094420 LIFE STYLES AND TRANSPORTATION NEEDS OF THE ELDERLY IN THE FUTURE. Several common views of the transportation requirements of elderly Americans are reviewed, and conclusions are reached regarding the elderly population of the next two decades.

Wachs, M Blanchard, RD ; California University, Los Angeles, Urban Mass Transportation Administration, (UMTA-CA-11-0009) UMTA-CA-11-0009-75-3, July 1975, 20 pp; See also report dated February 75, PB-243631.; ACKNOWLEDGMENT: NTIS, TRRL (IRRD 219293); ORDER FROM: NTIS; PB-249523/2ST

34 094641 TRANSPORTATION FOR SENIORS AND HANDICAPPED PERSONS IN ST. LOUIS, VOLUME II. APPENDICES. The primary purpose of the St. Louis Transportation Study was to identify the unmet public transit needs of the elderly and handicapped and plan a demonstration project to respond to these needs. Several specific innovations were being considered at the time, including a reduced fare plan for senior citizens and the handicapped during off-peak hours and a subsidiary, demand-actuated transit service for the physically disabled.

Crain and Associates, Urban Mass Transportation Administration, (UMTA-IT-09-002A) UMTA-IT-09-0028-74-2, Jan. 1974, 145 pp; Paper copy also available in set of 2 reports as PB-250 789-SET, PC\$10.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250790/3ST

34 094642 TRANSPORTATION FOR SENIORS AND HANDICAPPED PERSONS IN ST. LOUIS, VOLUME I. MAIN REPORT. The report describes in 2 volumes the transportation problems of the handicapped and older persons of St. Louis, Missouri. The features of the proposed plan are: (1) contracts between the Bi-State Development Agency and health-welfare agencies for purchased transit services; (2) reductions in fares for all persons over 65, and further reductions, through a specific agency contract, for seniors and handicapped who are poor; (3) a special demand actuated subsidiary of the Bi-State system providing door-to-door service for handicapped persons and for the elderly who do not live near the present bus routes; and (4) an accountability system that assures payment for all trips under the various agency contracts. The major breakthrough of the proposed demonstration would be the entry of the transit operator into a new social service role, providing transportation on a purchased services basis in support of health-welfare programs. Simultaneously, the operator would be initiating a new form of public transportation—small bus, demand actuated, door-to-door service.

Crain and Associates, Urban Mass Transportation Administration, (UMTA-IT-09-002A) UMTA-IT-09-0028-74-1, Jan. 1974, 80 pp; Paper copy also available in set of 2 reports as PB-250 789-SET, PC\$10.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250791/1ST

34 095291 TRANSPORTATION FOR THE POOR, THE ELDERLY, AND THE DISADVANTAGED. This publication contains five papers that examine various aspects of transportation needs of the poor, disadvantaged and elderly, and the use of public transportation in meeting these needs. Schnell reports on interviews about the most efficient and economical means of insuring the availability of public transportation. Paaswell and Recker identify who and where those without cars are and what transportation alternatives exist for them. Kidder examines the ways social service agencies in a small city cope with the transportation of immobile clients. Weaver and Herrin studied the needs of elderly citizens in medium-sized cities. Dajani and Egan report on income-distribution effects of the proposed Atlanta transit system.

Transportation Research Record #516, 1974, 47 pp, Figs., Tabs., Refs. Included are Five reports prepared for the 53rd Annual Meeting of the Highway Research Board.;

ORDER FROM: TRB Publications Off, Orig. PC

34 097125 MOBILITY FOR THE ELDERLY AND HANDICAPPED: A CASE FOR CHOICES. Human resources agencies which serve the elderly, the urban and rural poor, and the handicapped at the federal, state and local level, know very little about planning, designing, managing, equipping and maintaining transit systems. On the other hand, until recently, it has never been necessary for transit providers to know a great deal about the specialized needs of the elderly and handicapped. A November 1974 study of transportation authorities in the programs administered by HEW, DOL, OEO and the Department of Transportation revealed that no less than 30 programs are authorized by law or regulation to provide transportation funds or services to eligible program clients. What is desperately needed now is a policy that mandates coordination. Unless the human resources agencies and the transportation industry can eliminate fragmentation and duplication of efforts, learn from one another the best way to serve everyone, and make every dollar a dollar well spent, both will be bankrupt and disillusioned.

Brooks, S *Transit Journal* Vol. 1 No. 2, May 1975, pp 45-50

34 098047 DESIGNING FOR THE DISADVANTAGED: OPTIMUM DESIGN CONSIDERS ALL USERS. Designers are becoming more aware of the growing numbers of people prevented from making full use of buildings and transportation systems because of barriers imposed by inadequate design. This disadvantaged category is larger than generally realized, including not only those with obvious physical disability—the wheelchair-restricted or the blind—but the elderly and those temporarily encumbered with packages, suitcases or heavy clothing. Attention to some simple design elements described here can increase the ultimate use of a structure or system.

Fruin, JJ (Port Authority of New York and New Jersey) *ASCE Civil Engineering* Vol. 45 No. 3, Mar. 1975, pp 65-69; ACKNOWLEDGMENT: ASCE Civil Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

34 098656 TRANSPORTATION FOR THE HANDICAPPED. This annotated bibliography is an update of the one published in November 1969 by the Department of Transportation Library. It contains references to papers, journal articles, and reports on the subject of transportation for the handicapped. Topics include: General, Government Activities, Accessibility, Air Travel, Mass Transit, Automobiles, Special Equipment, Transportation and the Blind, and Transportation and the Elderly.

Department of Transportation No. 8, Apr. 1975, 39 pp; ORDER FROM: NTIS, Repr. PC, Microfiche; AD-698 292

34 099135 TRANSPORTATION PROBLEMS OF THE MENTALLY RETARDED. Inadequate travel training and institutional isolation affects retarded individuals' awareness of job, shopping and recreational opportunities. This study identifies the mobility problems experienced by the educable retarded; develops a basic curriculum guide for the teaching of their travel

and transportation awareness; and suggests changes in public and private transit usage that would alleviate some of the difficulties. Specifically, residents of the Austin State School Annex Campus, Austin, Texas were surveyed as to their everyday utilization of predominantly intra-city public and private transportation.

Davies, S Carley, JW ; Texas University, Austin Res. Rept. No. 17, Dec. 1974, 60 pp

34 126167 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED. SPEAKER 1. As a result of deputations and requests for transportation from several handicapped groups, surveys were conducted in 6 Ontario cities. Interviews and mail surveys were carried out (to determine the economic and travel characteristics of the handicapped) and basic transportation options were identified. Work at the provincial level and the independent work of 2 large operators point to the conclusion that initially, the most effective way of providing transportation for the severely physically handicapped in urban areas is to provide a specially equipped demand-responsive transportation service. As the demand for this type of service grows, partial integration of services may be required. The three basic transportation improvement options identified in the studies were: improve existing services, pay direct subsidy to handicapped individuals; and provide new special services for the handicapped. The Toronto Transit Commission has initiated a pilot project for the physically handicapped in which door-to-door transportation is provided for 50 people on their work trips. The project is estimated to require an operating subsidy of \$14,000 per year at a regular 25-cent fare. In Ottawa a handicapped persons' transportation service will be contracted out to a private operator and will provide service for work and medical trips. The daily demand is estimated at between 300 and 400 trips and the anticipated cost is expected to be \$400,000 a year.

Garner, DP (Ontario Ministry of Transportation & Communc, Can) *Transportation Research Board Special Reports Conf Paper* No. 154, 1975, pp 61-65, 4 tab., 3 Ref.; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

34 126847 AN EVALUATION OF COUNCILS ON AGING DIAL-A-RIDE SYSTEMS IN MASSACHUSETTS. Councils On Aging in some Massachusetts communities have set up dial-a-ride systems for the elderly and the handicapped. The purpose of this research was to evaluate how well these demand responsive systems work. Several different communities were compared. The evaluation included a study of each system's productivity, measured by passenger trips per vehicle hour, its cost per vehicle hour and the quality of service. It was found that the dial-a-ride's productivity is not as high as that for public transit but the costs involved are much lower. The latter was due largely to the reliance on volunteer workers.

Teixeira, DB Karash, KH *Transportation (Netherlands)* Vol. 4 No. 2, June 1975, pp 150-121, 1 Fig., 4 Tab.

34 127942 TRANSPORTATION OF ELDERLY TO RURAL SOCIAL SERVICES. In an effort to organize a systematic approach to the development of guidelines for public agencies estimating the need for, and use of, special transit systems, and to enable them to design cost-effective systems in terms of vehicle size and number, routing, scheduling and general operating procedures, this report summarizes the current status of the rural transportation problem for the elderly and discusses a methodology for designing and implementing a rural transportation system. Detailed information from surveys in Southwestern Virginia and other sources were used and a variety of travel variables were interrelated to develop an approximate image of travel activity of the rural elderly, showing effects of residential density, income and living situation on frequency and mode of travel. The nature of social services and currently available travel services are detailed. Although less than 3 percent of all elderly use special services, at least 10 percent would prefer such services. Questions concerning the findings substantiate the need for a broad systems perspective. A broad formulation for studying the effects of attractiveness of transportation services is proposed. Analysis of alternative operating configurations for typical rural transportation systems revealed that significant operational cost savings could be realized by coordinating the provision of rides to a variety of social services. It was concluded that a systematic and comprehensive definition of rural transportation problems is essential to the development of a successful rural transportation program; it cannot be assumed that simple rules and approximations to transportation system design are applicable to all possible rural service delivery scenarios; and demand estimates may be generated through existing, but approximate methods. Data from existing systems must be monitored, collected and utilized in planning future systems.

Notess, C Eakes, E Popper, RJ Zapata, R Pillelkau, E Rajala, D Vemur, SR Chavis, L Davis, P ; Virginia Polytechnic Institute & State University Aug. 1975, 213 pp, Figs., Tabs., Refs., 4 App.; Prepared for the Office of Human Development, Administration of Aging, Dept. of Health, Education and Welfare.

34 128946 TRANSPORTATION FOR THE ELDERLY: THE STATE OF THE ART. This extensive literature review and project identification effort undertaken to provide material for a policy-relevant analysis of existing and past efforts to improve the level and scope of transportation service for the elderly, includes an overview of public transit reduced fare programs, taxi use, special transportation systems, the use of school buses and the potential use of Defense Vehicles. The transportation problems confronting the elderly are considered from two perspectives: those factors that limit mobility of the consumer, and those limitations associated with the supplier. This report which suggests possible solutions to some issues, will be sued as a basis for recommendations relative to: action at Federal, State and Community level; research and demonstration projects; and legislation.

Department of Health, Education and Welfare (OHD) 75-20081, DHEW/PUB/PHD-75/2008, Jan. 1975, 162 pp, Tabs.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0015165/ST

34 129626 PLANNING HANDBOOK: TRANSPORTATION SERVICES FOR THE ELDERLY. This Handbook provides guidance and assistance in the designing and running of a special transportation service for the elderly. Transportation planning methods and techniques (plus background information of value) to be applied in developing special transportation service are presented in the following nine sections: Getting started; Building a Sound Data Base; Designing the Service; Selecting the Right Equipment; Running the Project; Putting the Budget Together; Monitoring and Evaluation; Paying for the Project; and Problems to Watch For. Several key points are identified which should be kept clearly in mind throughout the project planning phase. These are: (1) Some service is better than non; (2) Resources (human, funding and equipment) should not be overextended; (3) More small vehicles are generally better than fewer large vehicles; (4) It is better to have a standardized vehicle from the point of view of maintenance and service requirements; and (5) The service is far more important than the vehicle, since reliable service to appropriate destinations for their needs is what the elderly repeatedly express as the overriding factor in their transportation demands.

Institute of Public Administration Nov. 1975, 269 pp, 4 App.; Sponsored by the Administration on Aging and Department of Health, Education and Welfare.; Grant 93-P-57405;1-01

34 132997 DIRECTORY OF SPECIAL TRANSPORTATION SERVICES IN THE METROPOLITAN WASHINGTON AREA. This directory has been prepared to help the elderly, handicapped and others with special needs to find the agency best able to provide the transportation services they require. It presents an overview of services available throughout the Washington metropolitan area and serves as an information source for agencies or researchers engaged in various forms of transportation planning, particularly transportation planning for the elderly and handicapped and others without access to automobiles. Tax-supported agencies, voluntary organizations, health service providers, non-profit and profit making agencies have been included. Distinctions have been made between organizations with volunteers and those with paid drivers. Inclusion of an agency does not imply endorsement; omission does not imply disapproval. The information contained in this directory is current as of June 1, 1975. It will be periodically updated as time and resources allow. Additions and/or corrections are welcomed. For each organization, the following information is provided: contact person; telephone number; eligibility requirements; geographic area served (description of routes and schedules); operating hours; trip purposes; fare; service type; number of vehicles; types of vehicles; capacity of vehicles; number of persons served; percentage characteristics; length of time providing service; and, whether it is a profit or non-profit organization. /UMTA/

Robinson, M Aronoff, R ; Metropolitan Washington Council of Governments, Urban Mass Transportation Administration, (IT-09-0033) UMTA-IT-09-003-75-1, June 1975, 67 pp; Contract IT-09-0033; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-250689

34 133194 MOBILITY OF PEOPLE AND GOODS IN THE URBAN ENVIRONMENT. MOBILITY OF THE HANDICAPPED AND ELDERLY. This report identifies and discusses the travel behavior of the orthopedically handicapped and the elderly in an urban environment. Mobility indices have been developed for various types of handicaps, car ownership and income levels. The usage of common transportation modes has been analyzed in conjunction with type of handicap and purpose of trip. The interrelationship between mobility, mode usage and psychological condition have been measured and analyzed. Barriers to travel as perceived by the handicapped have been identified and analyzed for each travel mode. Preferences for improvement to available travel modes have been documented and related to trip purpose and current mode usage.

Falcochio, J Kaufman, H Kramer, P Lee, B McShane, W ; Polytechnic Institute of New York, Department of Transportation Final Rpt. TR-74-503, DOT/TST-75/114, Jan. 1975, 220 pp; Contract DOT-OS-30095; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251293/7ST

34 133438 HANDICAPPED AND ELDERLY VERTICAL MOVEMENT ASSESSMENT STUDY. The report discusses the selection and assessment of seven (7) types of vertical movement devices for potential use in older types of fixed rail urban mass transit facilities. The potential utilization of these devices is directed towards an increased usage of transit facilities by physically handicapped and elderly persons. The study concentrates on the technical and cost considerations in the implementation and utilization of various standard (e.g., elevators, escalators, moving walks) and non-standard (e.g., inclined stairlifts, stair climbing wheel chairs) vertical movement devices in providing access and egress for elderly and handicapped persons to three (3) configurations of rapid-rail stations typically found in the older transit systems of the United States. The general conclusion reached in the study is that each station has its own unique character and unique access/egress problems which restrict or enhance the implementation of specific types of vertical movement devices. Hence, the determination of the device option which is technically most effective for a given station, must await the results of a detailed architectural study of the individual station under consideration.

Kangas, R Mann, R Glater, D Cofield, C Bottari, J ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-25, UMTA-MA-06-0047-75-1, Feb. 1976, 100 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-252516/3ST, DOTL NTIS

34 134676 SERVING THE TRANSPORTATION DISADVANTAGED WITH DEMAND-RESPONSE TRANSPORTATION. The first section of this paper assesses the nature of the transportation problems of poor, elderly, and handicapped people. It is shown that demand-responsive transportation systems such as dial-a-ride are demonstrably superior to conventional transit in providing for the transportation needs of transportation-disadvantaged people.

The impact of various demonstration projects of demand-responsive transportation is reviewed. Emphasis is on the effect these projects had on serving elderly, poor, and handicapped people. The final section of the paper reports on the role of the federal government in providing demand-responsive transportation to facilitate more mobility among poor, elderly, and handicapped people.

Saltzman, A Amedee, G (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 559, 1976, pp 1-10, 3 Tab., 22 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

34 135931 MOBILITY AND OLDER AMERICANS: AN ANALYSIS. Recorded viewpoints and demographic characteristics of senior citizens are analyzed and conclusions are presented which relate to mobile patterns attitudes, and causes of mobility problems. Comments are also made on federal transportation programming. Mobility ranked in the top 4 of all problems of older Americans. Income, physical dysfunctions, residential location, and society's insensitivity were some of the more important causes of the problem. The need is noted for an expanded viewpoint towards public transit, and the opinion is expressed that the legally mandated responsibility for meeting needs of the elderly lies with the legally established area transportation body, the local transit authority. A progressive viewpoint must be applied to systems design. Public transit services must include a door-to-door service component, and DOT and state agencies must be able to supply quality technical assistance to local programs to aid with establishment of door-to-door components.

Miklojcik, JL (Michigan Office of Services to the Aging) *Transit Journal* Vol. 2 No. 2, May 1976, pp 41-50, 1 Tab., 1 Phot.

34 135941 VALLEY TRANSIT DISTRICT: ELDERLY/HANDICAPPED TRANSPORTATION. EVALUATION AND IMPACT. A transit system is described which was designed to develop and demonstrate a flexible system which could provide integrated transportation services over a large area, test factory modifications to new buses which could aid the elderly and handicapped in getting on and off the bus and provide safe and comfortable transport, and test a new concept in automated fare collection. The program was also intended to evaluate the mobility impact on individuals and agencies by the transit system. The special needs of the handicapped were studied and endorsed as specifications for the transit vehicles. The transit system uses a credit card fare systems, a special feature of which is the FARESHARE option which allows third parties to share in the cost of the individuals transportation. Positive results were obtained from user surveys oriented toward attitudinal responses. [23 pp 8 Fig., 2 Tab.]

National Technical Information Service Exec Sumry July 1974 Prepared for Lower Navatuck Valley Community Council, Ansonia, Connecticut.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0012181/4ST

34 136922 CITY OF CLEVELAND NEIGHBORHOOD ELDERLY TRANSPORTATION PROJECT-DIAL-A-BUS. The Neighborhood Elderly Transportation Project establishes

door-to-door local transportation service with vehicles specifically adapted to the needs of older people. Seventeen thousand five hundred (17,500) persons 60 years of age and older reside within the three service areas of Cleveland's Buckeye, Model Cities, and Tremont areas, which total about ten square miles. Revenue service began in mid-March 1975 and by the end of December, 1975, over 100,000 Dial-A-Bus passengers had been carried. This report documents the implementation efforts and actual operational experience during the first 9 and one-half months of revenue service. As a by-product, the project aims to increase the utilization of existing social and health services and to encourage the creation of more of these for use by the elderly because suitable transportation services are available. A related report is 'City of Cleveland Neighborhood Elderly Transportation (N.E.T.) Project--Quarterly Report.' (PB-248 903).

Lake, G ; City of Cleveland, Urban Mass Transportation Administration, DAVE Systems, Incorporated, (UMTA-OH-06-0018) Intrm Rpt. UMTA-OH-06-0018-76-1, Jan. 1976, 125 pp; See also PB-248903.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253237/2ST

34 137324 GUIDELINES AND CONSIDERATIONS IN PLANNING AND OPERATING TRANSPORTATION SYSTEMS FOR OLDER AMERICANS. The report identifies considerations in planning and operating: (1) Transportation systems for older Americans; and (2) public systems in rural areas. It identifies an approach to transportation planning and a number of elements related to the planning, implementation, and evaluation of that system. The report draws upon the experience with dial-a-ride and special rural transportation system in the Midwest and on literature concerning dial-a-ride and transportation for the elderly and handicapped. It is intended to provide a basic set of considerations, questions, knowledge and expectations about elderly and rural transportation systems.

McKelvey, DJ ; Iowa University, Urban Mass Transportation Administration, (UMTA-IA-11-0002) Working Paper-15, UMTA-IA-11-0002-75-1, Apr. 1976, 69 pp, Tabs.; Revision of report dated May 75.; Contract IA-11-0002; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254756/0ST

34 137538 PUBLIC TRANSPORT ADJUSTED TO PERSONS WITH HANDICAPS [Handikappanpassad kollektivtrafik]. The aim of society is that the disabled should be fully integrated. The communications sector is an important field in this respect. This report is the result of a commission of enquiry into this problem. In Sweden, about 250,000 people have such limitations in their physical or mental capabilities that they are seriously disabled as regards communications. Of these, about 20,000 need special solutions for all journeys. Another 750,000 have difficulties in travelling due to some form of disablement. Buses, trains, etc are difficult to get on due to high and steep steps. Space on board is restricted. At stations, differences in level create serious difficulties. People with weak sight or hearing need better visual and audible information. Toilets and washing facilities must be better designed and more easily accessible. The

report suggests measures that can be taken at once as part of normal maintenance, such as fitting of handrails, alterations to sleepers, etc, and measures which can only be taken when new equipment is purchased, such as wider steps, provision for wheelchairs, etc. It is proposed that a special national travel service, by special cars or specially adapted public transport, be made available for the 20,000 most seriously disabled. /TRRL/ [Swedish]

Ministry of Communication, Sweden SOU 1975:68, 1975, 197 pp, Figs., 13 Tab., Photos., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD 218363)

34 138152 PUBLIC POLICY AND TRANSIT SERVICES FOR HANDICAPPED PERSONS. Because of increased awareness of the need for transportation for that segment of society whose mobility is limited, there have been increased efforts to establish the funding mechanisms, the management structures, and the operational equipment for such transportation service. However, these attempts, well intended as they are, sometimes have produced less than optimal results because of a lack of (a) knowledge of appropriate solutions to the problems involved, (b) cooperative effort among agencies in some areas, and (c) overall policy direction. This paper discusses efforts being made to overcome these deficiencies. To determine levels of activity in the transit industry, the American Public Transit Association (formerly the American Transit Association) surveyed its transit-operating members for details of all types of specialized services they are providing, not only the demand-responsive services that actually provide mobility but also educational programs teaching handicapped persons how to use transit, research into needs of handicapped persons on a local or statewide basis, and cooperative arrangements with other organizations to serve the needs of the handicapped. The information resulting from the study is viewed partly as a means to assist operators in establishing or expanding their specialized services by providing examples of successful efforts already under way. Perhaps more important, this information should be valuable as an input to the formulation of a comprehensive national policy to better define the appropriate programs for transit operators. Results of the survey are discussed. Also included are details of nontransit and paratransit activities in providing mobility and how the different forms of transportation have been successfully used in different areas. The relationship of these activities to the establishment of policy and regulations by various levels of government is viewed as a crucial factor.

Schnell, JB Braum, PH (American Public Transit Association) *Transportation Research Record* No. 563, 1976, pp 75-88, 11 Ref.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

34 139036 SUPPLEMENT PUBLIC TRANSPORT FACILITIES-AN ALTERNATIVE TO THE TRAVEL SERVICE [KOMPLETERINGSTRAFIKEN-ETT ALTERNATIV TILL FAERDTJAENSTEN]. The travel service was introduced to supplement public transport facilities which cannot be used by the handicapped. Initially, the service was geared to the

needs of those in wheelchairs and special vehicles were provided, but now taxis are increasingly used, and only 15% of those entitled need special vehicles. The aim must be to adapt public service vehicles so that more and more handicapped people can use them. In many rural areas without a bus service, taxis operating on regular timetables are used as supplementary traffic. Trials were carried out to see whether those entitled to travel service facilities can use this supplementary traffic. It was found that by modifying minibuses so that these can accommodate wheelchairs, the two services can be combined to a large extent. To cut down walking distances, supplementary traffic should come as near as possible to customers' homes. In urban areas, the supplementary traffic must be modified so as to be at least partly demand actuated. /TRRL/ [Swedish]

Lundin, I *Kommunal Tidskrift* No. 3, 1976, 1 Phot.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD 219729); ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

34 141935 LOADING AND SECURING WHEEL CHAIRS IN TRANSPORTING STUDENTS. California has no standard specifications or regulations that specifically address the construction and outfitting of special school buses that transport students confined to wheelchairs. The standard requirements for regular school buses are not suited for buses that carry wheelchairs. Therefore, whenever a new wheelchair bus is proposed, the California Department of Education must issue an exemption from the regular school bus requirement. This practice has led to inconsistency in approved systems. A study was made to assist the department in developing specifications for its wheelchair school buses. In particular, outfitting components, such as loading and securing equipment, were addressed. The study involved visiting 21 organizations including school districts, transportation contractors, and suppliers; documenting systems; and evaluating equipment. This report presents not only findings and specification recommendations but also several questions raised during the study on the behavior of wheelchairs and associated hardware during a vehicular accident. Some of these questions can be answered only by dynamic testing of the equipment.

Stewart, CF Reinl, HG (California Department of Transportation) *Transportation Research Record* No. 578, 1976, pp 29-39, 7 Fig.; ORDER FROM: TRB Publications Off

34 142383 FORECASTING NON-WORK PUBLIC TRANSIT DEMAND BY THE ELDERLY AND HANDICAPPED. This paper summarizes a recent survey of 165 randomly selected elderly and handicapped individuals in the Albany, New York, SMSA. Respondents were administered a short (six minute) questionnaire on non-work travel habits, perceived barriers to travel, and intended travel if barriers were removed. Four disaggregate models were constructed relating total travel and mode choice to system demographic, mode availability, and physical handicap factors. Results show: (1) Contrary to present thinking, the elderly and handicapped vary widely in mobility problems and travel patterns: there is no homogeneity

within each group; (2) Transportation solutions will thus have to be carefully designed and tailor-fit; (3) Travel mobility is primarily a function of physical disability, availability of auto, and the individual's ability to use it; (4) Specific bus service improvements will not materially affect transit demand, but will ease the travel burden; (5) Improvements concentrating on service availability and direct pickup appear to be the most promising; (6) Small-sample disaggregate models can be developed which will predict elderly and handicapped non-work travel and mode choice with a high degree of accuracy.

Hartgen, DT Pasko, M Howe, SM ; New York State Department of Transportation Aug. 1976, 44 pp, 1 Fig., 20 Tab., 11 Ref., 3 App.

34 145610 TRANSPORTATION PROBLEMS OF THE TRANSPORTATION HANDICAPPED. VOLUME 1. THE TRANSPORTATION HANDICAPPED POPULATION, DEFINITION AND COUNTS. Despite an abundance of planning and research literature concerning transportation services for elderly and handicapped individuals, at present no single operational definition of this target group, the transportation handicapped (TH), exists. This report provides a definition of a TH person and attempts to describe the TH population. A review of existing estimates of the urban TH population is presented based on an analysis of four studies. These estimates range from approximately six to nine million persons. A recommended estimation procedure considers three basic categories of the TH population: chronic conditions, acutely disabled, and institutionalized. The travel behavior of the TH population is examined including trip purpose, frequency, residence, choice of mode, and latent demand.

Crain and Associates, Urban Mass Transportation Administration, (UMTA-CA-06-0092) Final Rpt. UMTA-CA-06-0092-76-1, Aug. 1976, 105 pp; Also available in set of 4 reports as PB-258 578-SET, PC E99/MF E99; Contract DOT-UT-60063; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258579/2ST

34 145611 TRANSPORTATION PROBLEMS OF THE TRANSPORTATION HANDICAPPED. VOLUME 2. THE ROLES OF GOVERNMENT AND THE PRIVATE SECTOR IN THE PROVISION OF MOBILITY SYSTEMS FOR THE TRANSPORTATION HANDICAPPED. This report examines the conflicting perspectives and attitudes of nine participants involved in improving mobility for the transportation handicapped (TH). These are the handicapped and their advocates, the transit industry which must reconcile the demands of the handicapped with economic realities, the Congress and Federal agencies, state and local governments, the public at large, private providers (taxi, paratransit services), and equipment manufacturers. Federal and state legislation and regulations are discussed. Finally, specific changes and actions needed are presented.

Crain and Associates, Urban Mass Transportation Administration, (UMTA-CA-06-0092) Final Rpt. UMTA-CA-06-0092-76-2, Aug. 1976, 89 pp; Also available in set of 4 reports as PB-258 578-SET, PC E99/MF E99; Contract DOT-UT-60063; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258580/OST

34 145612 TRANSPORTATION PROBLEMS OF THE TRANSPORTATION HANDICAPPED. VOLUME 3. ALTERNATIVE PLANNING METHODOLOGIES. This report proposes a general structure for the planning process for dealing with the problems of the transportation handicapped (TH). Flexibility of procedures and the avoidance of unnecessary standardization are emphasized. Planning for the needs of the TH may be incorporated into conventional transit planning or emerge as an independent process. Effective participation by the transportation handicapped and those who serve them (transit and taxi operators, union representatives, local health and social service agencies) is discussed in detail. Use of census data, the National Health Survey, and general population surveys to assess the transportation needs is presented. Procedures for the assessment of current resources and existing constraints are reviewed. Time phasing, plan revision, and system monitoring are also discussed.

Crain and Associates, Urban Mass Transportation Administration, (UMTA-CA-06-0092) Final Rpt. UMTA-CA-06-0092-76-3, Aug. 1976, 54 pp; Also available in set of 4 reports as PB-258 578-SET, PC E99/MF E99; Contract DOT-UT-60063; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258581/8ST

34 145613 TRANSPORTATION PROBLEMS OF THE TRANSPORTATION HANDICAPPED. VOLUME 4. TRANSPORTATION SOLUTIONS FOR THE HANDICAPPED. This report examines transportation solutions for the transportation handicapped (TH) through three broad strategies-public transit, alternative special services, and private transportation. The first section presents 51 physical and operational solutions for existing systems. To aid the TH it is necessary to construct groups of solutions. These are then presented as minimum, medium and maximum accessibility combinations for terminals, urban bus or trolley, rail rapid-transit, and intraurban bus, railroad and air modes. The use of a personal vehicle for the disabled who can learn to drive is described. Four problems of the disabled driver are presented along with data on adaptive controls. Six aspects of specialized transportation services and four principal vehicle types are examined. Twelve possible systems based on different combinations of service characteristics and provider type are described. Finally a description is given of two operating systems, one in Sweden, the other in Delaware.

Crain and Associates, Urban Mass Transportation Administration, (UMTA-CA-06-0092) UMTA-CA-06-0092-76-4, Aug. 1976, 172 pp; Also available in set of 4 reports as PB-258 578-SET, PC E99/MF E99; Contract DOT-UT-60063; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-258582/6ST

34 145616 TRANSPORTATION FOR ELDERLY AND HANDICAPPED PERSONS. AN INFORMATION BULLETIN OF THE TRANSPORTATION TASK FORCE OF THE URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES. This bulletin was developed by the Transportation Task Force of the Urban Consortium for Technology Initiatives. The reports covers the legislative background of the handicapped and elderly problem, examines user groups, reviews system service characteris-

tics, and provides an overview of equipment and service coordination issues. Also included is a list of contacts and an annotated bibliography on many of the topics covered.

French, BI ; Public Technology Incorporated, Department of Transportation DOT/TST-77-9, Oct. 1976, 37 pp; See also PB-258 733.; Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258734/3ST

34 147983 SOME PROBLEMS OF ELDERLY AND HANDICAPPED PEDESTRIANS. A PRELIMINARY REPORT OF OBSERVATIONS AND SURVEY. For nearly a year the pedestrian research laboratory at Georgia Institute of Technology has been examining the problems of elderly and handicapped pedestrians. The aim of the project was to identify the hazards and problems that confront elderly and handicapped pedestrians and then to develop and field test appropriate countermeasures. Phase one included a literature survey. Phase two is mainly occupied with data collection to identify the problems and hazards faced by the target subgroup. Phase three focuses on these hazards and problems to examine their nature and why they cause difficulties. Phase four will develop several countermeasures for each of the selected high priority problems. /TRRL/ [/FRENCH]

Jones, MA Tempher, JA (Georgia Institute of Technology); International Federation of Pedestrian Association Analytic No Date, pp 336-373; ACKNOWLEDGMENT: Institute for Road Safety Research (SVOV58062E), TRRL (IRRD 223185)

34 148650 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN; SUMMARY REPORT. A summary of the findings and conclusions of a seven study report are as follows: A specialized transportation industry currently exists to serve the elderly and the handicapped in Wisconsin. These services are characterized by a varying quantity and quality of service daily; unstable funding; high transportation cost; heavy volume on categorical federal and state funds for transportation services; and, uncoordinated service programs which compete for funds, clients and geographical areas to continue their existence. The demand for accessible, low cost transportation by Wisconsin's elderly and handicapped citizens exceeds the existing supply. Inadequate funding to meet operating costs is the most difficult service provision problem. Many barriers exist which limit or prohibit the mobility of the elderly and the handicapped in Wisconsin. These barriers are classified as being economic, educational, institutional, physical, psychological and service oriented in nature. The costs of local and state policy addressing the mobility needs of the elderly and handicapped is a major hindrance to improving their mobility. Lately, additional data must be obtained to assist the State of Wisconsin to address the mobility needs of its elderly and handicapped citizens.

Wisconsin Department of Transportation Summ. Rpt. Nov. 1976, 17 pp; The preparation of this report was financially aided through a planning grant from the Department of Transportation under the Urban Mass Transportation Administration as authorized by Section 9 of the Urban Mass Transportation Act of 1964.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-264373/2ST

34 150549 TRANSPORTATION FOR OLDER AMERICANS-1976. PROGRESS, PROSPECTS AND POTENTIALS. The report summarizes experiences in the period since 1974 with the provision of services for the elderly and handicapped. The report is based on information and data provided by state agencies on aging and witnesses interviewed throughout the country. Major emphasis is placed on funding, coordination and project operations. The report develops estimates of the number of projects and level of funding of transportation services for the elderly under major federal programs, and identifies coordination barriers as spelled out by the witnesses interviewed and by cooperating state agencies on aging.

Revis, J Revis, B ; Institute of Public Administration, Administration on Aging Final Rpt. IPA-A0A-3, Nov. 1976, 68 pp; Grant DHEW-AOA-93-57405; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-260379/3ST

34 150952 TRANSPORTATION AND THE DISABLED: AN OVERVIEW OF PROBLEMS AND PROSPECTS. The report is an overview of the transportation problems of the disabled, and identifies both problems and possible solutions. Recent efforts are summarized within the framework of the concepts of accessibility and mobility, the scope and nature of the population affected, major policy issues and options are discussed, and some future needs and directions are identified. The report contains a bibliography on the subject area. The report explores the number, age, income, locational (urban-rural and geographic) characteristics, and travel patterns of the disabled. It explores their design problems with various modes of transportation and explores the potentials and costs for retrofitting public transportation facilities and systems. Presently available services are identified along with major sources of funding, and the report then spells out some future directions in terms of design changes, demonstration projects, hardware research, and basic research. Potential training of the disabled in the use of transportation systems are also explored.

Revis, JS Revis, BD ; Revis (Joseph S.), Department of Health, Education and Welfare Final Rpt. JSR-1, Oct. 1976, 120 pp; Sponsored in part by Office of the Assistant Secretary for Planning and Evaluation (HEW), Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-260369/4ST

34 151174 DETERMINING THE FUTURE MOBILITY NEEDS OF THE ELDERLY: DEVELOPMENT OF A METHODOLOGY. The transportation needs of the elderly are investigated with particular emphasis on the relationships between travel and a variety of lifestyles among the elderly. A methodology for identifying lifestyle groups within a population as a function of travel demands, socioeconomic and demographic characteristics, and residential location patterns is presented. The methodology involves the application of factor and cluster analysis to census data describing the population. Data from Los Angeles County are utilized as a specific case study. Lifestyle groups of the elderly (aged 65 and older) and middle-aged (aged 45-64)

populations are examined for similar characteristics and location patterns. The results suggest that the future mobility needs of the elderly can be anticipated by studying the lifestyles and activity patterns of younger age groups and by forecasting economic and housing trends.

Wachs, M Blanchard, RD Bunker, JB Westfall, M ; California University, Los Angeles, Department of Transportation Final Rpt. DOT/TST-76-T/3, June 1976, 256 pp; Contract DOT-OS-50109; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262809/7ST

34 151712 TRANSPORTATION SERVICES INTEGRATION PROJECT. FINAL RECOMMENDATIONS AND IMPLEMENTATION PLAN. The study was conducted for the Tri-County Region consisting of Ingham, Eaton and Clinton Counties in Michigan. A very large number of special transportation agencies are involved in serving the elderly, handicapped and low-income populations in the area with apparently no coordination among each other. The report documents a brief outline of interim reports besides decision rules for participation in a coordinated system, role of the Central Coordinating Agency, procedures for making services available to a general user and/or clients of an agency, results of an experimental set up for coordination of services, fare structure and other details.

Tubbs, AE Rajendra, K ; City of Lansing, Tri-County Regional Planning Commission, Urban Mass Transportation Administration, (UMTA-MI-09-0015) Final Rpt. TRIP-FR-76, June 1976, 162 pp; Prepared in cooperation with Tri-County Regional Planning Commission, Lansing, Mich.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263649/6ST

34 151810 SPECIAL TRANSPORTATION SERVICES FOR THE ELDERLY AND HANDICAPPED DEMONSTRATION PROJECT-BATON ROUGE, LOUISIANA [Final rept. Nov 75-Oct 76]. In July 1972 the Urban Mass Transportation Administration, under its Service Development Program, awarded an 18-month grant to the city of Baton Rouge to demonstrate the feasibility of establishing a modern, cost-effective method of transporting the aged and disabled by means of a specially designed system, separate from conventional public transit, but coordinated with the community's existing public transportation resources. The report details a chronology of what happened leading up to and during the conduct of the specialized services. Programs encountered and steps taken to resolve these problems are presented. Statistics on system clients, trips, and costs are presented for the 12 months of STS system operation. Where appropriate, implications that might bear on the initiation of a similar service elsewhere are set forth.

McCall, CHJ Olson, MI Reed, HIII ; CACI, Inc.-Federal, Los Angeles., Calif.*Transportation Systems Center, Cambridge, Mass.*Urban Mass Transportation Administration., Washington, D.C.**Capitol Transportation Corp., Baton Rouge, La. 1200-7-76, UMTA-LA-06-0001-76-1, Nov. 1976, 99p; Prepared in cooperation with Capitol Transportation Corp., Baton Rouge, La.; Contract DOT-TSC-1082; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263904/5ST

34 151848 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 1. ANALYSIS OF SPECIALIZED TRANSPORTATION SERVICES. The purpose of this inventory/survey is to provide an overview of existing specialized transportation services available to the elderly and the handicapped, as well as to assist in evaluating proposals for developing and operating specialized transportation services for the elderly and the handicapped. Such tools as the inventory questionnaire and the specialized questionnaire are used; the inventory findings are reported by four major categories: user, operation, finance, and service needs.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) Study Rpt. UMTA-WI-09-8001-77-2, July 1976, 110 pp; See also PB-264 375. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264374/OST

34 151849 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 2. STATEWIDE SERVICE DIRECTORY. The Wisconsin Department of Transportation initiated a study with the broad objective of developing a comprehensive statewide inventory of paratransit systems serving the elderly and the handicapped. This is the second report of seven study reports. A statewide listing of 299 specialized transportation service providers serving the elderly and the handicapped is mapped out by the county and the major target group (elderly or handicapped) that each provider serves.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) UMTA-WI-09-8001-77-3, Aug. 1976, 119 pp; See also PB-264 376. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264375/7ST

34 151850 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 3. STUDY METHODOLOGY. The purpose of this report is to document the methods and materials used to execute the statewide study of existing transportation services for the elderly and the handicapped. This documentation of the study methodology aims to serve the Department as a useful tool for periodically updating relevant survey data, as well as, for providing explicit background information on how the first statewide survey had been developed and executed. The report contains a chronology of study activity as well as the contents of major surveys, administrative information guides, and program planning that shaped the methodology.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) UMTA-WI-09-8001-77-4, July 1976, 140 pp; See also PB-264 377. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264376/5ST

34 151851 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 4. BIBLIOGRAPHY. Report 4 is a Bibliography that cites publications on the subject of mobility for the elderly and the handicapped. The majority of citations refer to publications published after the Urban Mass Transportation Assistance Act of 1970, which established national policy on provisions of mobility for the nation's elderly and handicapped citizens. Most citations are drawn from the literature of the field of transportation planning rather than the medical fields of mental hygiene, vocational rehabilitation, and gerontology.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) UMTA-WI-09-8001-77-5, Nov. 1976, 17 pp; See also PB-264 378. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264377/3ST

34 151852 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 5. SURVEY OF NURSING HOMES AND RESIDENTIAL CARE FACILITIES. The Wisconsin Department of Transportation initiated a statewide study in 1975 to learn of the supply of, and demand for, transportation services for the elderly and handicapped in Wisconsin. The Department identified nursing homes and residential care facilities as significant providers of paratransit services to the elderly and the handicapped. This report presents the findings of a transportation-oriented survey of nursing homes and residential care facilities conducted in January 1976. This survey involved the mailing out of a questionnaire to 506 licensed nursing homes and 33 residential care facilities not affiliated with nursing homes. The purpose of this survey is (1) to obtain an overview of transportation services provided by nursing homes and residential care facilities, and (2) to augment the data obtained from the full paratransit industry survey.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) UMTA-WI-8001-77-6, Oct. 1976, 34 pp; See also PB-264 379. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264378/1ST

34 151853 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 6. POTENTIAL DEMAND FOR SERVICES. As part of a statewide study of transportation for the elderly and the handicapped, the Wisconsin Department of Transportation surveyed agencies providing transportation to the elderly and handicapped. In order to compare supply with demand for service, the Department developed a model to estimate demand. This report documents the model and the demand estimates it produces. The purpose of this report is to (1) calculate the size of the potential market of elderly and handicapped, (2) identify the number of elderly and handicapped presently being served, and (3) provide the Department and other agencies with data for assessing program needs and evaluating program proposals involving state or federal financial assistance.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) UMTA-WI-8001-77-7, Aug. 1976, 54 pp; See also PB-264 380. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264379/9ST

34 151854 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED IN WISCONSIN. REPORT 7. MOBILITY BARRIERS TO THE ELDERLY AND THE HANDICAPPED. This is Report 7 of the comprehensive statewide study of transportation for the elderly and the handicapped that had been initiated in 1975 by the Wisconsin Department of Transportation. The purpose of this report is to (1) develop an understanding of the vehicular-environmental barriers that confront the elderly and the handicapped, and (2) assist in formulating recommendations to improve the mobility of the elderly and the handicapped through the reduction or elimination of the identified barriers.

Wisconsin Department of Transportation, Urban Mass Transportation Administration, (UMTA-WI-09-8001) UMTA-WI-09-8001-77-8, Sept. 1976, 33 pp; See also PB-264 373. Also available in set of 8 reports PC E12, PB-264 372-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264380/7ST

34 153115 STATEWIDE STUDY OF TRANSPORTATION FOR TENNESSEE'S ELDERLY. In an effort to determine the transportation needs of the elderly and to determine how these needs can be met within the public and private resources of the State, a study was initiated which included a review of current literature, the assembling of pertinent demographic and transportation data from previous studies, and a statewide survey of the elderly. Various alternative systems were analyzed to determine how best to serve the additional travel needs of the elderly. Identification of the most viable transportation systems is followed by their evaluation with regard to economic feasibility, level of service, dependability, physical usability, monitoring capability, manageability, and psychological acceptability. Alternative management structures were investigated and analyzed with respect to the selected combination of transportation alternatives. Funding sources for capital expenditures and operating costs are also discussed.

Kimley-Horn and Associates, Incorporated Apr. 1975, 98 pp, 18 Fig., 24 Tab., 2 App.; Prepared for Tennessee Department of Transportation in cooperation with the Tennessee Commission on Aging

34 153117 SUMMARY OF OHIO'S FISCAL YEARS 1976 AND 1977: METROPOLITAN TRANSPORTATION ACTIVITIES RELATING TO THE ELDERLY AND HANDICAPPED. This update of a 1975 report summarizes the studies proposed in the 1977 unified work programs and indicates to what degree the transportation needs of elderly and handicapped persons are being met in urbanized areas of Ohio. Metropolitan transportation planning activities which emphasize the needs of the elderly and handicapped and the total cost of each

planning activity are listed. Capital purchases for meeting the special transportation needs of the elderly and handicapped are also listed. Programs in Ohio's urbanized areas are briefly summarized, and appendices present excerpts from overall work programs of the Metropolitan Planning Organization for 1977.

Ohio Department of Transportation Sept. 1976, 14 pp, 2 Tab., 2 App.; The preparation of this document was financed through a Technical Studies Grant from DOT, Urban Mass Transportation Administration.; Grant Proj. No. OH-09-8001

34 153930 PUBLIC TRANSPORT FOR HANDICAPPED MORE IN THE PICTURE [Openbaar vervoer voor gehandicapten meer in de belangstelling]. Most means of public transport do not allow for the transport of disabled persons, the costs being often a hindrance. In this article, the transport of heavily and lightly handicapped persons is described and some transportation data are given. For the transport of a group of handicapped people, specially equipped small buses are used most often. /TRRL/ [Dutch]

Nederlands Transport Analytic Vol. 28 No. 11, Dec. 1976, pp 522-523, 1 Phot. ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV62004E), TRRL (IRRD 225138)

34 153933 PEDESTRIAN SAFETY FOR THE ELDERLY. ROAD SAFETY COURSES FOR ELDERLY PEDESTRIANS. A MANUAL OF ADVICE FOR ROAD SAFETY OFFICERS. The aim of this manual is to encourage the provision of special courses in road safety for old people. The need for such courses is discussed, and tables show how the number and rate of fatal and injury accidents increase with age. Possible venues for such courses, are mentioned and a list is given of special considerations to be remembered by an instructor dealing with a group of elderly people. Topics are suggested, with regard to crossing the road, using subways or footbridges, central reservations, zebra and pelican crossings and signalized junctions. The need for explaining traffic signals, signs and road markings is discussed, and reference is made to some of the problems drivers have with pedestrians. The manual suggests ways in which the information given can be illustrated with practical instruction, gives a brief account of how publicity may be handled and an example of a typical specimen handout. /TRRL/

Department of the Environment, England Monograph Jan. 1975, 16 pp, 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 224382)

34 153968 HUMAN FACTORS EVALUATION OF TRANSBUS BY THE ELDERLY. One of the design goals of the Transbus Program is to provide transportation for the elderly and the handicapped. Tests evaluated the design features of Prototype Bus in comparison to the baseline of a current production bus. Findings from these tests served as a key input to the development of specifications for production. This human factors test program consisted of test subjects (33 elderly volunteers), three prototype Transbuses and a General Motors New Look, Chicago version Transbus, that served as a human factors baseline for comparison with the other three prototype Transbuses. The test results showed mobility (getting on and off a bus) to be the highest

preference score for the elderly. The elderly gave a high rating to the GM prototype for passenger assists, and low rating to the AM General and Rohr because both buses lacked vertical assists in the front of the bus and in the lounge area.

Booz-Allen Applied Research, Incorporated, Urban Mass Transportation Administration, (UMTA-IT-06-0025) UMTA-IT-06-0025-77-2, Transbus-TR-76-002, May 1976, 103 pp; Contract DOT-UT-10008; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264757/6ST

34 154017 COORDINATING TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. A STATE OF THE ART REPORT. The Urban Mass Transportation Administration initiated this survey interview study of on-going social service transportation projects serving the elderly and handicapped in order to understand the nature of the coordination problems being encountered, namely, at the local level--that is, at the point of service delivery where coordination appears to be most important and most difficult. This report consists of four major sections: (1) An overview of the nature of the problem and the results of an examination of 26 transportation projects, of which 20 have been developed as case studies; (2) preliminary findings and conclusions based on a telephone survey of the 20 projects; (3) preliminary recommendations for future effort and programs; and (4) an appendix containing the survey form for interviews of the special projects on coordination methods (Appendix A), and detailed case studies of the 20 transportation projects (Appendix B).

Institute of Public Administration, Urban Mass Transportation Administration, (UMTA-DC-06-0106) UMTA-DC06-0106-77-11, Nov. 1976, 146 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265079/4ST

34 154041 WHO ARE THE TRANSPORTATION DISADVANTAGED. Who are the transportation disadvantaged? The author proposes the definition--those groups whose same opportunities for development have been hindered, either by omission or commission, by deficiencies in the transportation system. He then asks the question of whether those conditions which make an individual disadvantaged within the general societal context are the same conditions which make one transportation disadvantaged. He discusses income, disability, place of residence and place of employment, automobile accessibility, race, sex, and age as factors which may contribute to transportation disadvantage. The author concludes that only a tenuous case at best can be made that the poor, minorities, handicapped, elderly, women, and youth are really "transportation disadvantaged", but that these groups have certain general disadvantages vis-a-vis society which make them of special concern, in an equity sense, in planning a transportation system.

McGuire, C; Metropolitan Transportation Commission, Department of Housing and Urban Development, Department of Transportation, (UMTA-CA-09-0042) DOT-BIP-WP-27-10-77, Apr. 1976, 68 pp; Prepared for Department of Housing and Urban Development, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265211/3ST, DOTL NTIS

34 155152 TRANSPORTATION BARRIER PLANNING COUNCIL. TRANSPORTATION NEEDS STUDY REPORT. Tabular data detail agency responses to a survey about transportation services and barriers in Polk County-Des Moines, Iowa. Responses from health care, counseling, and other types of agencies are tabulated separately. Data are presented for clients served, proportion of low income clients, client's needs for special transportation because of physical handicaps, need for special transportation because of low income, and need for transportation because of lack of access to public transportation. Agency responses are also provided concerning expenditures for transportation, transportation services provided, use of volunteers, operation of vehicles, and sources of funds. Each agency was polled about the question of a central transportation agency and the barriers to such an agency.

Integrated Services Program of Polk County, Iowa June 1975, 26 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0000961

34 156113 DIVERSIFIED TRANSPORTATION SERVICES WITH EMPHASIS ON THE ELDERLY AND HANDICAPPED. This paper advocates the use of taxicab companies to provide paratransit services for the elderly and handicapped. The author provides examples from his company's operation to show the kinds of services a cab company can handle for a local transit authority. /Author/

Glassman, ML (Columbus Green Cabs) *Transportation Research Record* No. 608, 1976, pp 76-77; ORDER FROM: TRB Publications Off

34 156114 RESEARCH IN SPECIAL PARATRANSIT SERVICE FOR THE HANDICAPPED. This paper discusses the development of the Disabled Adult Transportation System in Edmonton, focusing on the user from two points of view: research and marketing. Three research techniques were used to determine and identify the user--incidence levels, civic census, and a registration system. Each technique is defined and described with a review of its advantages and disadvantages. The underlying philosophy of the marketing program was to involve disabled persons. This was achieved by information meetings, public meetings, and an Advisory Council that included disabled persons. The Advisory Council has met on a regular basis throughout the developmental and operational stages of the system and is considered to be central to the system. /Author/

Latham, GR Wesseling, FW (Alberta Engineering & Transportation Dept, Canada) *Transportation Research Record* No. 608, 1976, pp 78-80; ORDER FROM: TRB Publications Off

34 157789 TRANSIT PLANNING FOR THE TRANSPORTATION-DISADVANTAGED IN A SMALL TOWN. High auto ownership rates and low population densities have resulted in large-scale elimination of public transit systems in small towns. This trend exacerbates the mobility problem of the transportation-disadvantaged: the poor, the elderly, the handicapped, and the young. Lumberton, North Carolina, is typical of the transportation situation of towns with a population of less than 25,000. Located along an important Interstate Highway, the town has attracted industries that offer jobs within a few

miles of the town. yet, unemployment rates are high among the carless, predominately Black population of Lumberton. A group of concerned citizens from the transportation-disadvantaged community tried to organize a bus company. The company went bankrupt within 2 months. The Transportation Institute of North Carolina Agricultural and Technical State University performed an economic autopsy and drew up a proposal for an innovative transit program designed to minimize cost and give service specifically to the transportation-disadvantaged. The success of the program depends on the willingness of the City Council to underwrite approximately \$30,000 of operating deficit yearly. The authors suggest that in the case of a low-wage area such as Lumberton the major costs are those of overhead, namely management, and the necessary backup system of extra buses and a maintenance crew. The authors propose that towns such as Lumberton join into a transit consortium with nearby communities and make a joint application for funding from the capital grants program of the Urban Mass Transportation Administration. /Author/

Saltzman, A Kidder, AE (North Carolina Agricultural and Technical State U) Soloman, R *Highway Research Record* No. 473, 1973, pp 39-54, 5 Fig., 10 Tab., 10 Ref.; This article appeared in *Highway Research Record* No. 473, Transportation for the Disadvantaged.; ORDER FROM: TRB Publications Off

34 158141 ASSUMING RESPONSIBILITY FOR MOBILITY OF ELDERLY AND HANDICAPPED: THE ROLES OF TRANSIT PROPERTIES, TRANSIT PLANNERS, AND SOCIAL SERVICE AGENCIES IN SMALL CITIES. Public policy currently promotes the proliferation of small, uncoordinated programs aimed at agency clients rather than broader transportation services for the community. The purpose of this research is to explore the degree of harmony in actions between transit operators, social service agency personnel, and local transportation planners in small and midsize cities (50,000 to 500,000 population) with emphasis placed upon the perceptions of actors in the system (planners, social workers, and transit operators) about their roles in providing transportation services to the elderly and handicapped. This report purports to test the underlying assumption of revenue sharing advocates that, left to themselves, local agencies will allocate resources efficiently at the local level. The results of this study suggest that this assumption is unwarranted in many cases. This report cites examples of successful interactions between transit planners, social service agency staffs, and transit properties in enhancing consolidated transportation services to the elderly and handicapped. It also documents the more usual pattern of non-interaction which seriously impairs the efficiency of transportation services to this disadvantaged group. Data was obtained from three principal sources: (1) the set of 89 questionnaires; (2) the set of case studies of ten localities; and (3) the two volumes of written submission made to the Chief Counsel of UMTA pursuant to the public hearings on UMTA's proposed "Elderly and Handicapped Regulations" held in 1975.

Kidder, AE Amedee, G ; North Carolina Agricultural and Technical State U, (A&T-TI-18RR-76) UMTA-NC-11-0004-77-1, 67 pp;

Sponsored by DOT, Urban Mass Transportation Administration.; NC-11-0004; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-267231

34 158306 STUDY OF TRAVEL BEHAVIOR OF THE ELDERLY. A study has been made of comparative travel behavior of a group of elderly and non-elderly persons in Buffalo, New York. The study supports the hypothesis that there are no severe changes in travel behavior as one gets older, but that the quality of travel, as opposed to the quantity of travel, deteriorates. The paper analyzes all aspects of travel for 14 non-work activities. Characteristics of the study group, car availability, activity choices, and travel distance and attitudes are discussed.

Paaswell, RE (State University of New York, Buffalo) Edelstein, P *Transportation Planning and Technology* Vol. 3 No. 3, Sept. 1976, pp 143-154, 5 Ref.; ACKNOWLEDGMENT: EI, TRRL (IRRD 223273); ORDER FROM: ESL

34 158734 TRANSPORTATION NEEDS OF THE MOBILITY LIMITED. A study to define the public transit needs of the handicapped in northeastern Illinois is reported. Three sources of information were used in the study: census data, a mailed survey to obtain basic information about physical conditions and mobility limitations, and a home interview with a sample drawn from those receiving the mailed questionnaire. The survey instrument was designed to elicit information in six areas: existing travel patterns, health conditions, mobility or ability to get around, latent demand, demographic questions, and attitudes. The findings indicate that all people classified as mobility limited by conventional schemes were, regardless of label, mobile. A total of 63 percent used some form of public transportation and 19 percent actually drove themselves. Over 90 percent depended on others for transportation at least occasionally. In general, the more disabled a person was, the more that person was travel dependent on others. Three major factors with which the physically handicapped have difficulty were identified: vehicle environment, walking, and climbing. It was found that approximately 38 percent of those classed as handicapped have a significant mobility limitation. Mobility limitation varies by geographic location: 46 percent of the handicapped in urban areas are mobility limited, while 30 percent in high density suburban and 35 percent in low density suburban areas are mobility handicapped. A procedure for estimating travel demand for the handicapped was developed. Supporting data are provided in tabular form.

Michaels, RM Weiler, NS ; Illinois Univ. at Chicago Circle. Dept. of Systems, Engineering.-*Department of Transportation., Washington, D.C.*Northeastern Illinois Planning, Commission, Chicago.*Hull House Association., Chicago, Ill. Sept. 1974, 267p; Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0001153/ES.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0001153

34 159603 TRANSPORTATION NEEDS OF THE DISABLED AND THE ELDERLY--SUMMARY AND REPORT. This study summarizes more than a year of research into the accessibility and utility of transportation for

elderly and disabled people in Seattle and King County. The following areas of study are included: Characteristics of the elderly and handicapped population of King County; transportation needs and problems of the elderly and disabled; the supply of transportation services; and policy recommendations. In addition, four major action areas were selected by the study; each area promoting one or more aspects of mobility for the elderly and disabled individual. The major areas of intervention are: Physical Aspects, Social/Psychological Aspects, Economic Aspects, Legal/Political Aspects, Geographic Aspects. These intervention areas are further broken down and evaluated for their capacity for enhancing mobility. They are accompanied by Recommended Action Agendas that propose specific intervention which are to be refined and developed by the study team in its final "action phase" and by others working in the field.

Feiss, CL Yapp, S Shuman, L Lovell, SB White, B Beck, J Ellis, LB ; Seattle, City of, Washington, King, County of, Washington, Municipality of Metropolitan Seattle-Metro, Wash Jan. 1977, 236 pp, Figs., Tabs., 5 App.; The preparation of this report has been financed in part by DOT, Urban Mass Transportation Administration.

34 163563 DO ELDERLY DEMAND-RESPONSIVE SYSTEMS, DUPLICATE EXISTING FIXED ROUTE SYSTEMS?. The purpose of this study was to determine the degree to which the specialized door-to-door transit service for the elderly was a duplication of existing fixed route service. The analysis measured the proportion of elderly who could have used the existing fixed route system for their trip making and therefore did not need the door-to-door system. Using this as an operational definition of duplication, the study proposes a number of alternatives which may be implemented to increase service insuring service especially to those who need it. /Author/ McKelvey, DJ Lichtenheld, JA ; Iowa University Tech. Rpt. #45, May 1975, 15 pp, 3 Fig., 6 Tab., 7 Ref.; This report was produced as part of a program of Research and Training in Urban Transportation sponsored by the Urban Mass Transportation Administration of the Department of Transportation.

34 163597 DEMAND FOR SPECIAL TRANSIT SYSTEMS TO SERVE THE RURAL ELDERLY. Regional planning agencies have become increasingly aware of the transportation needs of the rural elderly. A promising solution to some of these problems has been the development of a rural special service transit system that gives elderly persons who lack means of transportation access to crucial social services. A preliminary, important step in planning such systems is estimating demands; unfortunately little demand information is available to aid in making such decisions as selection of vehicles, routing, and scheduling. This paper examines the demand for transportation services for the elderly and presents techniques for approximating travel demands. Methods based on attitudinal surveys, comparative trip rates, and participation frequencies illustrate that the best estimates currently possible are based on average travel behavior. Further, such methods only approximate the many factors affecting demand. Data monitoring to formulate an economic demand model, which

would account for the significant variations of behavior, is suggested by this study as a relevant future research activity. /Author/

Popper, RJ (Virginia Polytechnic Institute & State University) Notess, CB (Winthrop College) Zapata, RN (Virginia University) *Transportation Research Record* No. 618, 1976, pp 1-6, 1 Tab., 13 Ref.; This article appeared in *Transportation Research Record* No. 618, *Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.*; ORDER FROM: TRB Publications Off

34 163601 LIFE-STYLES AND TRANSPORTATION NEEDS OF THE ELDERLY IN THE FUTURE. Several common views of the transportation requirements of elderly Americans are reviewed, and conclusions are reached regarding the older population of the next two decades. While the elderly of today are relatively dependent on public transportation, live at higher densities, have lower incomes, and travel relatively little compared with other groups, there are indications that the elderly of the future may not be similar. Planners wrongly assume that a decline in mobility occurs with aging because of the aging process itself. Rather, people bring certain long-established life-styles into their old age. The mobility patterns of today's elderly reflect life-styles that were developed decades ago, when mobility was limited for all citizens, regardless of age. By contrast, the elderly of the next 20 years will include many suburbanites, many drivers, and many who travel a great deal. Planning and forecasting methods for the future transportation needs of the elderly should not be based on the transportation patterns and needs of those who are currently elderly, but should focus more on those who are now in their thirties and forties and will become the elderly of the future. /Author/

Wachs, M Blanchard, RD (California University, Los Angeles) *Transportation Research Record* No. 618, 1976, pp 19-24, 15 Ref.; This article appeared in *Transportation Research Record* No. 618, *Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.*; ORDER FROM: TRB Publications Off

34 163602 ANALYSIS OF A TAXI-OPERATED TRANSPORTATION SERVICE FOR THE HANDICAPPED. This paper analyzes the demand for and cost of a taxi-operated special transportation service for the handicapped. Gross hourly cost is found to be \$6.74 for regular taxi service and \$8.62 for lift-equipped vans. About 1.5 percent of the population would need the special service. One-fifth of the handicapped need the special vans. Demand for this service would take years to develop. After approximately 5 years, demands of 1.4 trips/week/eligible person could be expected. The net cost of such a service for a standard metropolitan statistical area of 3 million people would be approximately \$11 million/year. The net cost of service is very sensitive to the fares charged, to limitations on trip purposes served, and to the advance notice requirement. /Author/

Karash, KH (Massachusetts Executive Office of Transp & Constr) *Transportation Research Record* No. 618, 1976, pp 25-29, 7 Tab., 8 Ref.; This article appeared in *Transportation Research Record* No. 618, *Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.*;

ORDER FROM: TRB Publications Off

34 164024 ELDERLY AND HANDICAPPED TRANSPORTATION NEEDS IN THE DUBUQUE AREA. The transportation needs of the elderly and handicapped have been met or partially met in urban areas by varied combinations of transit and paratransit services. For the most part, these services have been uncoordinated, and may have been designed and operated for a very specific target group or population. This document denotes the Dubuque experience in the field of paratransit and transit fulfillment of the elderly and handicapped transportation needs, and suggests an alternate path in the attempt to meet those needs. This report includes discussions of travel needs, socio-economic background data, existing services and travel alternatives. /Author/

Sherkow, FE ; East Central Intergovernmental Association, (DMATS-78-01) UMTA-IA-09-0017, July 1977, 67 pp, 9 Fig., 90 Tab., 2 App.

Prepared for the Dubuque Metropolitan Area Transportation Study. Sponsored by DOT, Urban Mass Transportation Administration; by Iowa Department of Transportation; and by Illinois Department of Transportation.; Contract 1563 (FY77)

34 164076 STUDY OF IMPROVED TRANSIT SERVICES FOR HANDICAPPED AND ELDERLY. The CPO undertook this study to investigate public transportation services currently available to the handicapped and elderly population, and to develop a short-term transportation program and long range transportation policies. A survey of approximately 75 social service agencies revealed there is a large unmet transit service need. About eight percent of the unmet need, or 3300 trips per day, require door-to-door service with lifts. Most unmet needs—67 percent or 26,700 trips—call for door-to-door service without lifts. The remaining 24 percent or 9,600 trips could be made on conventional transit if special equipment were added to coaches. Based on alternatives evaluated in the study, a three part program for meeting the needs identified was adopted as part of the Regional Transportation Plan. The program includes the expansion of door-to-door transit service, the coordination of social agency transportation sources and minor modifications of existing vehicles. /Author/

De Leuw, Cather and Company, Bigelow-Crain Associates Oct. 1976, 130 pp, Figs., Tabs., 16 Ref., 3 App.; Prepared for the Comprehensive Planning Organization of the San Diego Region. The preparation of this report has been financed in part through a grant from the Department of Transportation, Urban Mass Transportation Administration.

34 164080 MOBILITY OF PEOPLE AND GOODS IN THE URBAN ENVIRONMENT: MOBILITY OF THE HANDICAPPED AND ELDERLY. An evaluation methodology for the analysis of alternative transportation improvements for the handicapped and elderly is proposed. The approach is based on the ability to incorporate the qualitative attributes of transportation systems which are particularly significant to the handicapped and elderly groups. These attributes include comfort and convenience, security and safety, and accessibility. In addition, this

study addresses the issues of demonstration projects planning and offers guidelines for the design of demonstration experiments which can produce results that are capable of objective analytical interpretation. /Author/

Falocchio, J Santimataneedol, S Horwitz, L Stephanis, B ; Polytechnic Institute of New York, (TR-75-503) Final Rpt. DOT-TST-77-43, Sept. 1976, 128 pp, 11 Fig., 53 Tab.; Prepared for DOT, Office of the Secretary; Contract DOT-OS-30095; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270941/8ST

34 166131 LET'S END ISOLATION. Examples of community services designed to alleviate isolation among elderly people are presented, together with lists of publications and sources of further information on each type of service. The following services are covered: transportation (special buses or vans, senior center bus services, private cars, reduced fare programs, programs to remove physical barriers in public transportation); senior centers; nutrition programs (group meals, meals on wheels); telephone reassurance; friendly visiting; in-home services (homemakers, home health aides); opportunities to serve (senior citizen employment or volunteer programs); outreach services; and information and referral services. Information relevant to the establishment and operation of each type of service is provided, and examples of programs are drawn from a variety of communities. The booklet emphasizes that elderly people are not all isolated for the same reasons and do not all need the same service. Separate services for the elderly need to be expanded and interrelated in a comprehensive approach to the problem of isolation. References to organizations as well as publications are provided for every topic.

National Clearinghouse on Aging DHEW/PUB/OHD75/20129, Dec. 1974, 49 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0015166/2ST

34 166448 INCIDENCE RATES AND TRAVEL CHARACTERISTICS OF THE TRANSPORTATION HANDICAPPED IN PORTLAND, OREGON. The report presents incidence rates, characteristics, and travel patterns of transportation handicapped and able-bodied elderly (65 and over) persons. Tables and discussion are presented on demographics, health problems, use of mobility aids, and trip rates, purposes and modes, and origin/destination patterns. A section is devoted to functional problems in using public transportation vs. handicap classification, health problem and use of mechanical aid. Respondents are evaluated in their ability to use six different transit modes ranging from a fixed-route regular bus to a door-to-door bus with a lift. Wheelchair/walker users are analyzed separately. Data for this report was derived from a 6,000 household survey conducted in Portland. The survey design, questionnaires and field procedures are described.

Crain, J Courington, W ; Crain and Associates, Urban Mass Transportation Administration, Transportation Systems Center, (DOT-TSC-UMTA-77-11) Final Rpt. UMTA-OR-06-0004-77-1, Apr. 1977, 97 pp, 3 Fig., 31 Tab., 3 App.; Contract DOT-TSC-1081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269859/5ST

34 166449 CLEVELAND NEIGHBORHOOD ELDERLY TRANSPORTATION DEMONSTRATION PROJECT. The document is a final evaluation report of the Cleveland Neighborhood Elderly Transportation (NET) System. The Cleveland NET Project was implemented in March 1975 with the purpose of providing personalized door-to-door transportation services for elderly persons within three inner-city neighborhoods. Operations and vehicle maintenance were provided by the Cleveland Transit System/Regional Transit Authority on a daily basis with 12 buses specifically designed and equipped to serve the elderly and the elderly-handicapped. Service was obtained at 10 cents per ride by telephoning a scheduling/dispatching center. The document describes the Cleveland NET Demonstration Project in terms of the description and operation of the transportation system, the operational agencies involved, the test area, and the operational results. It also includes an analysis of the operational problems encountered, the costs incurred, and the suggested means for improving service and reducing the costs. Results of the surveys of users and non-users of the service are also presented in an attempt to assess the social impacts and benefits relative to costs.

Crain, J ; Crain and Associates, Urban Mass Transportation Administration, Transportation Systems Center, (UMTA-06-0018) Final Rpt. UMTA-OH-06-0018-77-1, Apr. 1977, 168 pp; Contract DOT-TSC-1081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269860/3ST

34 166625 TRANSPORTATION FOR THE ELDERLY IN NEBRASKA: A REVIEW OF EXISTING AND ALTERNATIVE SYSTEMS. The need for transportation for the elderly in Nebraska and the existing modes of transit with respect to cost, barriers, and target group suitability, were analyzed, and alternative modes of mass transit or systems to service the elderly are suggested. A variety of data sources and literature were used and synthesized in the study. Only one of the six modes of transit for the elderly in Nebraska, Senior Handibus, lends itself extensively to the elderly and their needs. The other five modes, including intracity bus transit, have a different target group suitability, a factor which presents many physical barriers. The alternative modes of transit suggested include the school bus, the coupon taxi, expansion of reduced fare, the transit stamp, the ubiquitous fixed route (involving establishment of new routes in areas not presently served, and removal of physical bus barriers. The first of the three alternatives have the elderly as their target group suitability. Extensive supported data dealing with the quality of transportation, the destination of retired people and the form of transportation taken to get there, comparison of selected intercity and intracity transit company indices (with attention to revenue, cost, patronage, and service); maps, a list of intercity bus companies operating in Nebraska, and other material is appended.

Albers, LV ; Nebraska Commission on Aging, Lincoln. Aging in Nebraska-5, 1973, 23p; Available from Nebraska Commission on Aging, P.O. Box 95044, Lincoln, NE 68509.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0017259/3ST

34 166646 TRANSPORTATION FOR THE ELDERLY OR PHYSICALLY HANDICAPPED (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1964-Aug 77]. Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities are included. (This updated bibliography contains 147 abstracts, 64 of which are new entries to the previous edition.)

Young, ME ; National Technical Information Service., Springfield, Va. Aug. 1977, 152p; Supersedes NTIS/PS-76/0622, NTIS/PS-75/575, and COM-74-10887.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0713/6ST

34 167304 TRANSIT MOBILITY FOR ELDERLY AND HANDICAPPED PERSONS. Elderly persons, who are defined for this study as persons 65 or more years in age, constitute 8.7% of the Sedgwick County population and 9.7% of the Wichita population. The Metropolitan Transit Authority (MTA) provides the elderly and handicapped persons with a half-fare program that is in effect on all lines during all days and hours of service. The purpose of the report was to determine the size and location of the elderly and handicapped population of Sedgwick County, Kansas, to identify the transportation needs and problems, analyze alternative solutions, and, based on these findings, recommend actions designed to improve the mobility of these persons. Major data sources for this study include the annual Sedgwick County Intergovernmental Enumeration, a survey of social service agencies and adult care homes, and a survey of handicapped persons.

Wichita-Sedgwick County Metropolitan Area Png Dpt, (UMTA-KS-09-0005) Tech Study UMTA-KS-09-0005-77-1, May 1977, 152 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272443/3ST

34 167457 TRANSPORTATION PLAN FOR THE ELDERLY AND HANDICAPPED. The objective of this study is to determine the transportation needs of the elderly and handicapped population in the St. Louis area and to develop effective ways of increasing their mobility through improvements to the public transportation system. Four steps were followed to accomplish the study objective. The first step was to identify the number and location of elderly and handicapped persons in the St. Louis Region, then to identify specific mobility limitations. The next step was to identify their travel needs, using data from other cities and local sources. The fourth step consisted of establishing a committee of elderly and handicapped persons and their representatives to provide a forum for discussion of the needs of this group. These steps and the elements of the plan for improving the mobility of the elderly and handicapped are discussed along with issues that need to be addressed for effectively meeting these needs.

East-West Gateway Coordinating Council, (320.1) Final Rpt. EWG-TS-0332.10.0, May 1977, 54 pp, 8 Fig., 4 Tab., 2 App.; This report was sponsored by the Urban Mass Transportation Administration.; Contract IT-09-0067; ORDER FROM: East-West Gateway Coordinating Council, 112 North Fourth Street, Suite 1200, St. Louis, Missouri, 63102

34 168774 TRANSPORTATION: THE DIVERSE AGED, POLICY REPORT ONE. USCS RESEARCH PROGRAM ON SOCIAL AND CULTURAL CONTEXTS OF AGING. The report is designed for transportation policymakers, planners, social service delivery personnel, and advocates for the aged. It investigates the transportation patterns and problems of older persons. The purpose of the report is to highlight the aged's transportation problems, and to offer possible solutions to mobility dilemmas of many senior citizens. Three different studies were conducted: (1) a survey of 1,269 community residents, age 45-74, sampled from three ethnic groups in Southern California from various socioeconomic levels; (2) 316 decisionmakers involved at various levels in establishing, implementing, or influencing policy regarding the elderly; (3) a cross-cultural anthropological investigation of aging in three foreign countries (Yugoslavia, Tanzania, and Mexico) and of the adaptations made by immigrants growing old in the American culture.

Bengtson, VI Torres-Gil, F Newquist, D Simonin, M ; University of Southern California, Los Angeles., Ethel Percy Andrus Gerontology Center. National, Science Foundation, Washington, D.C. Research, Applied to National Needs. NSF/RA-770023, May 1976, 87p; Grant NSF-APR75-21178; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271403/8ST

34 169259 PROCEEDINGS OF THE SOUTHWEST CONFERENCE ON COORDINATING MOBILITY PROGRAMS FOR THE TRANSPORTATION DISADVANTAGED HELD IN SAN ANTONIO, TEXAS ON FEBRUARY 1-3, 1977. The proceedings contain the presentations, workshop reports, and recommendations passed by the conferees. The subjects covered in the presentations include federal and state policy on coordination of transportation services; the barriers to coordinated transportation services; problems caused by the lack of coordinated services; potential solutions to the problem of insufficient coordination; the available agency resources for extending or coordinating existing and future services; and specific program alternatives for establishing coordinated services.

Huddleston, JW ; Texas University, Austin, Department of Transportation, Texas Department of Community Affairs, Texas State Department of Public Welfare, National Council for the Transp Disadvantaged DOT-TST-77-84, Nov. 1977, 281 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275033/9ST

34 169685 THE TRANSPORTATION DISADVANTAGED IN OREGON. Most of the poor, the young, the aged, and the disabled are transportation disadvantaged. That is, most of these people do not share the level of mobility enjoyed by most Oregonians. The purpose of this document is to provide a clearer picture of the distribution of these people in Oregon. In addition, the handicapped and elderly are identified as a subgroup of the transportation disadvantaged. This technical document can provide the basis for decision making on where and what kinds of services are needed. A major portion of the document describes a method by which the overlap between the poor, young, aged and disabled can be reconciled. The data which

resulted are given for all counties and for the state illustrated below.

McRae, D ; Oregon Department of Transportation Apr. 1977, 47 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273980/3ST

34 172433 GUIDELINES FOR IMPLEMENTATION: ADDENDUM TO ELDERLY AND HANDICAPPED TRANSPORTATION NEEDS. A brief description is given of existing fixed route services and the characteristics of the special service for the elderly and handicapped are detailed. A majority of the elderly and handicapped are able to use regular transit vehicles, and revision of service characteristics relating to bus stops, shelters etc. which would aid their utilization are noted. The special services and facilities should be used only by those certified as transportation handicapped. The reservation procedure, fares, hours of service and vehicles of such a service are described. Other aspects covered here include budget, terminals, orientation for drivers, promotion and marketing, monitoring, and schedule for implementation are discussed. Appendices are provided which describe the transportation programs in Springfield, the list of terminals relevant to handicapped and elderly, eligibility criteria, and selection criteria.

Haas, H Peterson, R Reames, N Donley, H Potter, R ; Springfield, Missouri Zoning and Planning Comm Monograph MO-09-0007 UMTA, Mar. 1977, 66 pp, 2 Fig., 4 App.; This report was prepared in cooperation with the City Utilities Transportation Department, Springfield, Missouri and was financially aided through a federal grant from the Department of Transportation.

34 172434 A STUDY OF ELDERLY AND HANDICAPPED TRANSPORTATION IN HANCOCK COUNTY. The purposes of this study are to determine the special transportation needs of the elderly and handicapped persons living within the boundaries of the study area, Hancock County, Ohio, and to develop strategies for improving the transportation services presently available in this county. The study includes information concerning the character of the community, estimates of the elderly and handicapped populations, their travel characteristics, an inventory of existing transportation services, a survey of potential financial resources, and an evaluation of the extent that the existing and proposed transportation services will satisfy the transit demand of the transportation disadvantaged. Opportunities for coordination and consolidation of local transportation services are also discussed. /Author/

Boden, RN ; Ohio Department of Transportation Final Rpt. UMTA-OH-09-8001, July 1977, 57 pp, 16 Fig., 7 Tab., 4 App.; This report was sponsored by the DOT, Urban Mass Transportation Administration.; Contract UMTA Proj OH-09-8001; ORDER FROM: Ohio Department of Transportation, 25 South Front Street, Columbus, Ohio, 43215

34 175716 PLAN FOR ELDERLY AND HANDICAPPED TRANSPORTATION SERVICE IMPROVEMENTS IN THE ATLANTA REGION. The recommended plan outlined in this report covers five types of actions to be taken in order to improve transportation services to elderly and handicapped persons in the Atlanta

(Georgia) Region. The five types are management actions aimed at improving the coordination of existing services, financing actions, operation actions to improve efficiency and cost effectiveness, regulatory actions, and public relations actions. The discussion covers the background, organization, and process of the study. Subsequent material deals with the target population and their service needs, service provider needs, user related policy needs, policies developed from a review of Federal regulations, policies evolved from an examination of similar programs, and the analysis of alternatives. Also considered are the various barriers--financial, service, personnel, and attitude--to service coordination and consolidation. The recommended plan which is designed to be implemented over a 5-year period is discussed in terms of the 5 types of actions. A program for monitoring and updating the plan is included. The appendices contain descriptions of the components of a transit service (e.g., service schedules, vehicle occupancy), information on the consumer's view of the costs and service characteristics of a specialized transportation service, and sample data collection forms for the monitoring and updating program.

Peat, Marwick, Mitchell and Company, Atlanta Regional Commission, Urban Mass Transportation Administration May 1977, 141 pp; Executive Summary available from PROJECT SHARE, P.O. Box; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002054

34 175915 TRANSPORTATION SERVICES FOR THE DISABLED AND ELDERLY. Multipurpose transportation systems for the developmentally disabled and the elderly are the focus of this study sponsored by the New Jersey Developmental Disabilities Council. Trends in the evolving transportation dilemma from 1950 to 1974 are examined on a national scale and in the State of New Jersey, and supporting data are tabulated. Projections are made of employment in New Jersey through 1980 and of the U.S. population through 1990. Transportation problems of the disabled and the elderly are considered, with particular attention given to travel barriers and the provision of transportation services. Kinds of information which may be useful in determining the demand for specialized transportation services are extrapolation from census materials or other secondary sources, information gathered from agencies about their clients, and surveys of disabled and elderly individuals. A basic framework for the design of a transportation system is presented, and it is suggested that multipurpose personalized systems are preferable. It is noted that obtaining funding for special-purpose transportation systems is difficult and that there are also legal and institutional issues to be taken into account. Transportation case studies are appended along with chapter notes and a bibliography.

Brail, RK Hughes, JW Arthur, CA ; New Jersey Developmental Disabilities Council 1976, 231 pp; Available from Center for Urban Policy Research, Rutgers University, Building 4051-Kilmer Campus, New Brunswick, NJ 08903.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0023854/3ST

34 176280 SAN DIEGO WHEELCHAIR ACCESSIBLE BUS STUDY [Interim rept. Feb-Apr 77]. The study describes the implementation and early operation of a pilot project of fixed route, wheelchair accessible bus service on two routes of the San Diego Transit system. Five buses of the Transit Authority fleet were retrofitted with wheelchair lifts by the lift manufacturer. Four lift equipped buses are used in the service with one bus held as a spare. Relatively few lift problems have been encountered. Nevertheless, lift design improvements have been and are continually being made to improve its performance and usability. Ridership by wheelchair confined persons has been low and a number of possible reasons for this are enumerated. Wheelchair accessible bus service will incur added operational costs but insufficient experience has been generated to permit estimation of the annual amount.

Casey, RF ; Transportation Systems Center, Cambridge, Mass.*Urban Mass Transportation Administration, Washington, D.C. DOT-TSC-UMTA-77-41, UMTA-MA-06-0049-77-8, Sept. 1977, 50p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281087/7ST

34 176298 SUBSIDIZED TAXI PROGRAMS FOR ELDERLY AND HANDICAPPED PERSONS IN THE SAN FRANCISCO BAY AREA. The report examines subsidized taxi systems serving elderly and handicapped persons in six locations in the San Francisco Bay Area. The systems studied are San Leandro, Santa Clara County, Sunnyvale, Palo Alto, Lafayette, and Fremont. These systems are designed to deliver taxi service at a reasonable cost to target groups residing within the program areas. The objectives of the report are: (1) to describe six programs which deliver transportation service to elderly and handicapped persons utilizing the subsidized taxi mode; (2) to identify the essential similarities and differences among these programs; (3) to illustrate, in qualitative terms, the nature of the costs, efficiencies and impacts on taxi operators, subsidizers, and users of the six approaches; and (4) to interpret this information and identify those findings which appear to be transferable to planners in other localities. The subsidized taxi programs are successfully delivering transportation service to elderly and handicapped residents in all locations as evidenced by rising client enrollment and ridership volumes. Overall, response to the programs has been and continues to be extremely favorable.

Bloomfield, P Flynn, S ; Crain and Associates, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. UMTA-MA-06-0049-77-9, Sept. 1977, 74 pp; Contract DOT-TSC-1081; ACKNOWLEDGMENT: NTIS (GMRL 77-301); ORDER FROM: NTIS; PB-281474/7ST

34 177107 A STUDY OF ELDERLY AND HANDICAPPED TRANSPORTATION IN ATHENS COUNTY. The purposes of this study are to determine specific transportation needs of elderly and handicapped persons within Athens County, Ohio, and to develop strategies for improving the county's present transportation services. The study includes information about the character of the community, estimates of the number of elderly and handicapped, their travel characteristics, a survey of potential financial

resources, and an evaluation of the extent that the existing and proposed services will satisfy the needs of the transportation disadvantaged. Opportunities for coordination and consolidation of local transportation services are also discussed. /Author/

Ohio Department of Transportation Final Rpt. UMTA-OH-09-8002, Dec. 1977, 96 pp, 23 Fig., 8 Tab., 4 App.; Sponsored by DOT, Urban Mass Transportation Administration.; Contract UMTA-OH-09-8001; ORDER FROM: Ohio Department of Transportation, 25 South Front Street, Columbus, Ohio, 43215

34 177151 A STUDY OF ELDERLY AND HANDICAPPED TRANSPORTATION IN PERRY COUNTY. The purposes of this study are to determine the special transportation needs of the elderly and handicapped persons living within the boundaries of the study area, Perry County, Ohio, and to develop strategies for improving the transportation services presently available in this county. This study includes information concerning the character of the community, estimates of the elderly and handicapped populations, their travel characteristics, an inventory of existing transportation services, a survey of potential financial resources, and an evaluation of the extent that the existing and proposed transportation services will satisfy the transit demand of the transportation disadvantaged. Opportunities for coordination and consolidation of local transportation services are also discussed. /UMTA/

Ohio Department of Transportation Final Rpt. UMTA-OH-09-8002, Dec. 1977, 78 pp, 13 Fig., 6 Tab., 10 Ref., 4 App.; Sponsored by DOT, Urban Mass Transportation Administration.; Contract UMTA-OH-09-8001; ORDER FROM: Ohio Department of Transportation, 25 South Front Street, Columbus, Ohio, 43215

34 178252 SAN DIEGO WHEELCHAIR ACCESSIBLE BUS STUDY--INTERIM REPORT. This study was performed as part of a series of wheelchair accessible bus implementation. It describes the implementation and early operation of a pilot project of fixed-route, wheelchair accessible bus service. An update of the information contained in this paper is planned in the near future. In 1976, the San Diego Transit Corporation (SDTC), implemented a pilot program to demonstrate the need for a bus wheelchair lift. Two heavily patronized routes were selected for this service. During the first week of the service, ridership averaged slightly less than two trips per day. Shortly thereafter, ridership had dropped to about one person per week. The factors that may explain this include: (1) a lack of advertising of the lift service due to budget constraints; (2) the limited origins and destinations served by wheel chair buses; (3) the difficulty of accessing the bus stops or destinations near the bus stops due to street curbs and hilly terrain; (4) the competition from social service agency transportation services and from the City of San Diego Dial-A-Ride; and (5) the initial unreliability of the service due to late delivery of some of the vehicles and the absence of a back-up vehicle when the lift design improvements were being incorporated. In this study all relevant aspects of the current operation are covered, such as service and equipment, level of service, eco-

nomics, demand, impacts, attitudes, and implications for transferability. The report also contains Appendix A, which is a Dial-A-Ride Passenger Survey. The conclusion is that the life is workable, and is being continually improved, but that a true measure of handicapped and elderly ridership will not be determined until a major portion of the external travel barriers are removed. /Author/

Casey, RF ; Transportation Systems Center, (MA-06-0049) Intrm Rpt. UMTA-MA-06-0049-77-8, DOT-TSC-UMTA-77-41, Aug. 1977, 50 pp, Figs., 2 App.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract MA-06-0049; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-281087/AS

34 178709 TRANSIT OPTIONS FOR THE ELDERLY AND HANDICAPPED. The several transit and paratransit options which could be potentially implemented to improve transportation services to the elderly and the handicapped in North Central Texas were analyzed. This paper summarizes the analysis undertaken for this task and identifies some of the philosophical and technical issues which arise in performing such a study. The elderly and handicapped population was divided into 4 categories: Category I included 70% of the population who could use public transportation--Category II (16%) includes those who could use public transport with minor changes; Category III (9%) includes those who could use public transport with major modification; Category IV (5%) are those who are house-bound and not included in the potential market. Several bus options and paratransit options were considered. The options were designed to lower taxicab fares for eligible patrons. This could be accomplished by a redistribution of funds. It is considered possible to provide for category III individuals through the use of taxicabs at a fraction of the cost of accomplishing the same objective with bus transit. Various approaches apparently exist which would permit a city and its taxicab firm to provide lower fares to the elderly and handicapped without an external government subsidy.

Barker, WG Ryden, TK Watson, FT (North Central Texas Council of Governments) *Transit Journal* Vol. 4 No. 2, Apr. 1978, pp 2-20, 3 Fig., 6 Tab.

34 178788 COUNTY-WIDE TRANSIT DEPENDENT STUDY-LINCOLN/LANCASTER COUNTY, NEBRASKA. This report describes the analyses and findings resulting from a technical study to investigate the special transportation requirements of the handicapped, elderly, and economically disadvantaged persons in Lancaster County, Nebraska. It inventories the existing transportation available to transit dependents, defines target groups and latent trip demand, establishes ridership objectives, and evaluates the costs and benefits of various alternative improvement concepts. The key to the overall focus and purpose of this study is to ensure that the mobility needs of urban and rural transit dependent groups in Lancaster County are being adequately met, and that their role in the planning and development of improved transit services is secured. In order to achieve these goals, a program has been initiated which consists of the following elements: (1) maintain the existing Handi-Bus system (a demand responsive service

to elderly and handicapped persons); (2) institute procedures to increase system productivity; (3) increase weekend and evening hours of operation; (4) implement shared-ride taxi service as a supplement; (5) institute a reduced fare program on fixed-route service for qualified low-income persons; (6) expand Handi-Bus service to rural areas; (7) give additional study to a medical service shuttle on the regular LTS system; (8) expand the Handi-Bus system if shared-ride taxi service cannot be implemented; and (9) ensure that the transit dependent groups are included in the continuing planning process for special transportation needs. The study points out that the program must include continuous review and monitoring and should be updated annually. Appendices A-H are included, and Appendix I, which is a bibliography.

Stringfellow, WG ; Smith (Wilbur) and Associates, (NE-09-0009) Final Rpt. UMTA-NE09-0009-78-1, Oct. 1977, 194 pp; This report was sponsored by the DOT, Urban Mass Transportation Administration.; Contract: NE-09-0009; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281640/AS

34 179037 INCORPORATING BARRIER EFFECTS IN ELDERLY AND HANDICAPPED NON-WORK-TRANSIT DEMAND FORECASTS. A simple no-computer method is presented for determining the increase in elderly or handicapped non-work transit travel which would occur in response to the removal of any combination of transit system barriers. Data on E & H perceptions of the severity of some 35 transportation system variables, collected in the Albany, N.Y. SMSA, are used to construct the relationship between barrier removal and increased travel. The method of non-commitment is applied to the relationship to estimate true demand. The method is then applied to a series of case applications involving specific barrier removal policies. Results show that barrier removal will have a small effect (2-5%) on total non-work bus travel of the elderly non-handicapped, but a moderate (5-20%) effect on handicapped travel. /Author/

Knighton, RG Hartgen, DT ; New York State Department of Transportation Res. Rpt. 116, Apr. 1977, 42 pp, 2 Fig., 15 Tab., 13 Ref., 1 App.

34 179174 TRANSPORTATION NEEDS FOR THE ELDERLY, HANDICAPPED AND LOW INCOME OF MISSISSIPPI. The purpose of this report is to examine the elderly and disadvantaged population of Mississippi and define how transportation fits into their needs for daily living. Essential segments of this study are the identification of existing transportation resources within the state, categorization of deficiencies in existing facilities, and appraisal of future efforts needed to provide the transportation services for the elderly and disadvantaged. In view of the problems of the transportation disadvantaged defined by this study; i.e., need for critical tips due to rural isolation; coordination of existing programs, facilities, and support systems within local government bodies as well as private sources emerges as the most promising approach to providing better services to meet the needs in Mississippi. Five alternatives are noted for coordinating the existing resources of the state: Coordination of social service providers who need

transportation for their clients; coordination of transportation systems and social service agencies who are or could be potential transportation providers; equipment purchasing coordination for all agencies; coordination of site location; coordination and integration of funding sources and user restrictions.

Van Sickel, K Heathington, KW ; Hensley-Schmidt, Incorporated No Date, 27 pp, 1 Fig., 15 Tab.; Prepared for Mississippi State Highway Department and Mississippi Council on Aging. Financed in part through a grant from DOT, Urban Mass Transportation Administration.

34 181340 IMPLICATIONS OF BART'S ENVIRONMENTAL IMPACTS FOR THE TRANSPORTATION DISADVANTAGED. This is the first of four interim reports to be developed by the Implications for the Transportation Disadvantaged (ITD) Project of the BART Impact Program (BIP). This report focuses on the environmental impacts of BART's construction and operations on the transportation disadvantaged. The special population groups included in the analyses in this report are ethnic minorities (Black, Spanish heritage, Asians and others), the elderly, and the handicapped. Six issues related to possible environmental impacts of the construction or operation of the BART system for the transportation disadvantaged are examined. Information developed in the major project areas of the BIP is applied in the investigation of each issue. (Color illustrations reproduced in black and white)

Donnelly, RM Arguelles, JS Hinzdel, J ; Metropolitan Transportation Commission, Urban Dynamics Associates, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT-BIP-TM-34-10-7, DOT-BIP-TM-36-10-78, Jan. 1978, 90 pp; Prepared by Urban Dynamics Associates, San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283022/2ST, DOTL NTIS

34 183642 THE USE OF TAXIS IN TRANSPORTATION OF DISABLED PEOPLE [Taxi som transporttillbud for handikappede]. The report highlights the use of taxis in transportation of disabled people. The report discusses in relation to individual resources and the environment the transportation of people with limited mobility using ordinary taxis.(a) /TRRL/ [Norwegian]

Melchior, K ; Transportokonomisk Institutt, (82 7133 213 9) Monograph Mar. 1978, 61 p., Figs., Tabs., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234599), Norwegian State Highway Laboratory

34 183697 FEASIBILITY STUDY OF THE MOBILITY CLUB CONCEPT IN RURAL AND SMALL URBAN AREAS (TRANSPORTATION FOR THE DISADVANTAGED). This report documents a feasibility study of the Mobility Club concept as applied to a small city and a rural area. The purpose of this overview is to examine the concept in a slightly broader perspective so that results of the study can be interpreted in the context of other geographic areas. The Mobility Club was conceived as a means of providing door to door, demand responsive transportation to the handicapped at low cost. The Mobility Club has two distinctively

separate driver and user groups, and can handle many trip patterns for a variety of purposes. Because of its flexibility, the club can be tailored to incorporate features that make it adaptable to the needs of a particular locality and/or particular groups. Having examined the Mobility Club concept within an urban and rural environment, it was decided that the rural application looked more attractive at the present time. A cost estimate for the rural application showed that potential yearly deficits were within the range of local funding. Key elements of the implementation plan for the local demonstration project include the establishment of intergovernmental and community responsibilities; clearance of relevant licensing or insurance constraints; planning of organizational infrastructure; establish a tentative start-up data and service period; administration of a monitoring program; and, evaluating the system following the end of the service demonstration period.

Department of Transport, Canada TP 1489, May 1978, 21 pp, 5 Fig., 2 Tab., 65 Ref., 3 App.

34 184267 TRANSPORT OF DISABLED PERSONS [Ufoeretransport]. This report is a summary of 8 preliminary notes made for the research project "disabled people in the street environment" (IRRD 604867). The aim has been to make proposals for organizing the transportation service for handicapped persons. The conclusions drawn are: transport of disabled persons is a public responsibility, and a special service should be established in all communities. The service must give the disabled as good transportation possibilities as other people have. In the future this service ought to be operated by bus-companies and taxi-cabs. Directives and regulations for transport facilities used for this purpose should be prepared as soon as possible. Drivers and assistants need special training on how to aid disabled persons. Financially the special transport service should be supported by the government, counties and communities. /TRRL/ [Norwegian]

Vodahl, SB Hansen, EO ; Norwegian Institute of Technology, STEKNIKK Monograph Oppdragsrapport 14, June 1976, 48 p., Figs., Tabs., Photos., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-233161), Norwegian State Highway Laboratory

34 184577 A COMPREHENSIVE TRANSPORTATION PLAN FOR THE ELDERLY AND HANDICAPPED. The major factors that led to the initiation of Tacoma's Transportation Plan for the Elderly and Handicapped were the continued interest given by UMTA to the transportation needs of the elderly and handicapped, and also that Tacoma has been operating a transportation program to assist transportation-disadvantaged individuals since 1973. Therefore, in 1976, the City requested and received funding to support a one-year study to examine the needs of mobility-restricted citizens and to offer a variety of alternatives that might provide the needed services. The study group examined the background of the transportation problems in Tacoma and found that the elderly and handicapped are confronted by numerous barriers that inhibit their ability to travel within the city. The five phases of the Plan were to develop citizen coordination, establish objectives, collect and

analyze census data, develop scenarios for system development, and to generate the selection process. The options for meeting the transportation needs were accessible fixed-route service, demand-responsive transportation operated by public sector, operated privately for profit sector, operated privately for non-profit sector, and multi-modal (combined systems). Before making recommendations, it was necessary to compare these alternatives, from which the most viable option was to be selected. The study group recommended that the City Council consider the combined fixed-route demand-responsive system alternative, which utilizes taxis and the existing bus fleet. /UMTA/

King, L ; Puget Sound Council of Governments UMTA-WA-09-0013-78-1, Nov. 1977, 226 p.; Contract UMTA-WA-09-0013; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-284136/AS

34 184718 TRANSPORTATION FOR THE ELDERLY AND THE HANDICAPPED: THE SAN DIEGO STUDY. The purpose of a recent transportation study in the San Diego region was to estimate the needs of elderly and handicapped citizens and to develop a comprehensive program and policy package to meet those needs. Both the methodology and the recommendations of the study may be applicable elsewhere. Because of the varying financial, operational, and management structures associated with different types of transportation service, demand estimates were built around five categories of transportation service. This classification system directly related limitations on the mobility of different groups of handicapped persons to the types of transportation service required by those limitations. Statistical surveys were avoided. Demand for each type of service was estimated from available statistics, from other studies, and from extensive interviews with social service agencies. The study found that there was heavy demand for services other than conventional, fixed-route bus transit. Because this implied that cost was a major issue, emphasis in program and policy design was placed on the development of cost options. Operational and institutional aspects of the service were also considered. /Author/

Knight, R Swan, S (DeLeuw, Cather and Company) *Transportation Research Record* No. 660, 1977, pp 24-30, 16 Ref.; This paper appeared in *Transportation Research Record* No. 660, Improving Transportation Services for the Elderly, the Handicapped, and the Disadvantaged.; ORDER FROM: TRB Publications Off

34 184719 COORDINATION AND INTEGRATION OF SPECIAL TRANSPORTATION SERVICES FOR THE TRANSPORTATION DISADVANTAGED (ABRIDGMENT). The study conducted in the Lansing, Michigan, area demonstrated that the level of transportation service provided for the transportation disadvantaged (i.e. the elderly, poor, and physically and mentally handicapped) is quite low in comparison with the service offered to the general public through the existing transit system. It further showed that the provision of special transportation service by independently operated agencies resulted in duplication of management requirements and service vehicles, the overlapping of service areas, and service inefficiencies. The development and analysis of alterna-

tive means for providing service indicated that a simple coordination of the operations of these independent agencies would significantly reduce service costs and increase both vehicle utilization and the level of demand satisfaction. The tri-county region is currently in the process of implementing the plan for a minimal level of coordinated service in the Lansing urban area and the rural areas of Clinton, Eaton, and Ingham counties. It is anticipated that the results of this planning study will be applicable to many communities throughout the state of Michigan that are faced with similar service requirements and limited financial resources for implementing special transportation services for the transportation disadvantaged.

McKelvey, FX Taylor, WC (Michigan State University, East Lansing) *Transportation Research Record* No. 660, 1977, pp 30-33, 1 Fig., 2 Tab., 5 Ref.; This paper appeared in *Transportation Research Record* No. 660, Improving Transportation Services for the Elderly, the Handicapped, and the Disadvantaged.; ORDER FROM: TRB Publications Off

34 184720 COSTS OF ALTERNATIVE TRANSPORTATION SYSTEMS FOR THE ELDERLY AND THE HANDICAPPED IN SMALL URBAN AREAS (ABRIDGMENT). Data from 18 systems (both demand-responsive and fixed routes, public and private, profit and non-profit) in cities ranging in population from 25,000 to 500,000 and representing all regions of the United States was collected and analyzed to determine costs per passenger kilometer, per vehicle kilometer and per passenger trip. The purpose of the research was to determine whether or not the theory of U-shaped cost curves (i.e., up to a point, increased volume will result in lower per unit cost) applies to these transportation systems so that public policy about the systems may be changed if necessary. (Current policy tends to encourage proliferation of small-scale units of operation.) The study suggests that, on a cross-sectional basis, transportation programs for the elderly and the handicapped appear to operate at the lowest average unit costs at scales of operation that are considerably larger than those of most systems now operating under federal assistance programs. The data suggest that management costs can be better spread over systems that cover larger geographical areas and deliver more passenger kilometers of service. Although these findings do not result in causal relations, they do suggest that more research is needed on the sources of variations in cost.

Kidder, AE Sen, L Amedee, G McKelvey, D (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 660, 1977, pp 34-38, 3 Tab., 11 Ref.; This paper appeared in *Transportation Research Record* No. 660, Improving Transportation Services for the Elderly, the Handicapped, and the Disadvantaged.; ORDER FROM: TRB Publications Off

34 184721 ESTIMATION OF DEMAND FOR TRANSIT SERVICE AMONG THE TRANSPORTATION DISADVANTAGED. Four techniques are presented for estimating demand for public transit or paratransit service among the transportation disadvantaged. These techniques are grouped in three basic categories: (a) graphic-analytic techniques, (b) mathematical formula-

tion, and (c) regression techniques. The four techniques include estimating demand among the disadvantaged in New York City; determining the effects of barriers on demand in Massachusetts; using noncommitment response techniques to estimate demand if specific travel barriers are removed in Albany, New York; and using regression techniques to estimate demand in rural Pennsylvania. Each technique requires a description of the population to be served, an estimate of their current travel patterns, detailed descriptions of new transportation systems or system improvements, and some overall description of this service area. /Author/

Paaswell, RE (State University of New York, Buffalo) *Transportation Research Record* No. 660, 1977, pp 38-49, 4 Fig., 4 Tab., 15 Ref.; This paper appeared in *Transportation Research Record* No. 660, Improving Transportation Services for the Elderly, the Handicapped, and the Disadvantaged.; ORDER FROM: TRB Publications Off

34 184897 THE MOBILITY OF THE ELDERLY AND DISABLED IN GREAT BRITAIN: AN OVERVIEW. This paper summarizes some of the developments of the past ten years which have brought benefits to elderly and disabled people with mobility problems. In the case of the elderly it identifies concessionary fares schemes as having been of considerable importance despite the unfairness of their distribution and value. It is argued that the elderly could be further helped in the future, if the results of recent research on vehicle design, lead to new generations of public transport vehicles which are accessible and comfortable for the widest possible span of passenger capabilities. Those disabled people who are unable to use public transport are now being helped by a new form of benefit called the "Mobility allowance" which is described. However, despite much goodwill the needs of the elderly disabled are inadequately met and this is identified as an important problem to which solutions have yet to be found. /Author/

Garden, JM (Greater London Council) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184899 MOBILITY FOR THE ELDERLY AND HANDICAPPED. PUBLIC TRANSPORT AND THE PHYSICALLY DISABLED--THE TRANSPORT OF HANDICAPPED PEOPLE IN WHEELCHAIRS. In this paper two great families of handicapped persons are considered; individuals with reduced mobility able to travel without wheelchairs, and handicapped people in wheelchairs. A functional classification has been constructed for the first family which, based on the physical aptitudes of the individual, shows the limits and the impossibilities with respect to the use of conventional public transport. Solutions and recommendations are given to increase the accessibility of buses to handicapped individuals not using wheelchairs. It is emphasized that this methodology, (the functional classification and

the ergonomic requirements which derive therefrom), can be applied to most situations with which the handicapped are confronted (e.g. in the workplace and at home). The access of handicapped individuals in wheelchairs into public transport has been studied and tested by TREGIE. The authors describe the vehicles which have been used and the necessary conditions which simultaneously satisfy the needs of the handicapped (in urban transport and group travel), operations' considerations (i.e. methods of operation) and the necessary techniques of the vehicle builders. /Author/

Flores, JL (Institute of Transport Research) Remy, E ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 184900 SWEDISH EXPERIENCE IN MODIFYING VEHICLES AND INFRASTRUCTURE. Suitable modified vehicles and personal assistance are often prerequisites for the disabled and elderly to be able to travel. A commonly used means of conveyance is the taxi-cab. Experimental studies have provided guidelines for modification of these vehicles so that people who have difficulty in walking can use them. Volvo's prototype taxi, which can be used by a person confined to a wheelchair, is described. The problems of entry and exit associated with special vehicles for transport of the disabled and the question of safety for people in wheelchairs during travel by these vehicles is discussed in relation to the results of experimental studies in which different models of wheelchairs, anchored in different ways and containing dummies, have been subjected to crash tests. The results of these investigations have been applied in an experimental car, designed by Volvo, which allows transport of two passengers in wheelchairs at the same time in the back seat and one person who has difficulty in walking in the front seat. Measures aimed at making it easier for the elderly and disabled to travel by town buses and long-distance coaches are discussed in relation to various experiments and practical tests. Different types of buses are described and analysed. Development work on designing better wheelchairs with the aim of facilitating travel is discussed. A special wheelchair that can be carried and lifted is described. The back legs of this chair are collapsible, enabling the chair to be placed, with its occupant, on top of car-, bus-or train-seats. /Author/

Brattgard, SO (Goteborg University, Sweden) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Lough-

borough LE113TU, Leicestershire, England

34 184902 ADDITIONAL COSTS INVOLVED IN DESIGNING PUBLIC TRANSPORT SYSTEMS. The discussion about the modes of transport for handicapped and elderly persons was very much intensified in West Germany in the last years. The Public transport systems are not convenient for everyone like in many other countries. Special transport services however are not everywhere available. The paper presents some results of a study about the possibilities to adapt public transport systems to the necessities of handicapped and elderly people. Estimates of cost and realization periods were made. /Author/

Blennemann, F Pajonk, E (Studiengesellschaft f Unterirdisch Verkehrsanlagen) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184908 LIFESTYLES AND THE CHANGING TRANSPORTATION NEEDS OF THE ELDERLY IN LOS ANGELES. Transportation plans for the elderly are frequently based upon the assumption that old people are a homogeneous group of central city residents who are poor and dependent on public transportation. Yet, there is evidence that the elderly population is quite diverse. In this paper, the diversity of the elderly is studied using the concept of lifestyle. Lifestyle is defined by a set of socioeconomic, demographic, and behavioral characteristics of a group of persons. A methodology is presented for operationalizing the concept and for identifying unique lifestyle groups among the elderly population in an urban area. An investigation of the elderly population of Los Angeles County was conducted as a case study. Seven dimensions were defined which provided a basis for the identification of seven elderly lifestyle groups. Each group was found to be unique in terms of travel demands and socioeconomic composition. Lifestyle groups were found to reside in specific areas within the county, a necessary condition to the provision of transportation services that vary with location to meet their special needs. A forecast, through the year 2000, of the population and tripmaking patterns of each lifestyle group in Los Angeles showed that diversity will continue to characterize the elderly. Some of the lifestyle areas will show increases in elderly population and tripmaking, while others will show declines.

Wachs, M (California University, Los Angeles) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184911 CONCESSIONARY FARES ON PUBLIC TRANSPORT IN ENGLAND AND WALES. This paper examines the reasons for providing concessionary fares on public transport for the elderly, blind and disabled, and the advantages and disadvantages of so doing. An objective is suggested. The relevant legislation is examined and this is followed by a description of its effects which have been sufficiently varied in different areas to arouse widespread dissatisfaction. A case study of concessionary fares in Surrey, a "shire" county on the fringe of London, follows, detailing the methods and the problems involved in setting up a unified scheme. It is stressed that there are three parties whose requirements have to be met—the local authority, the bus operator and the concessionaire. The scheme and its results are covered in depth. In conclusion the benefits of a concessionary fares scheme on public transport as a whole are emphasised. /Author/

Glover, JG (Surrey County Council) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184912 COMMUNITY TRANSPORT PROVISION IN BIRMINGHAM. The paper is basically a descriptive summary of the results from investigations into the nature and extent of voluntary and social services transport in Birmingham. The work consisted of: (i) detailed interview surveys covering 32 voluntary organisations; (ii) a back-up postal questionnaire sent out to a total of 582 organisations. It was sponsored by the Transport and Road Research Laboratory. Although the elderly and handicapped formed a large proportion of the users, there was also a significant amount of transport provided for children and families, youth clubs and other specific groups. Transport services are provided mainly by minibuses (owned or hired) and volunteer drivers using their own cars. Generally the services are provided entirely free to passengers; being financed by local fund-raising schemes and grants. Drives are drawn from a variety of social groups, but recently retired people appear to be the most suitable. The majority of elderly and handicapped people travelling on such services find it physically impossible to use public transport, so that there is little if any duplication. Although voluntary transport in many cases provides for the majority of their travel needs these are generally low because of the extent of in-home services (e.g. meals-on-wheels).

Bailey, JM (Oxford University, England) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184914 THE ROLE OF VOLUNTARY TRANSPORT. The paper briefly describes the various forms of supplementary transport which may be available to elderly and handicapped people and goes on to discuss the disparity of levels of provision in different parts of the country and the practical problems which arise if vehicles are shared. It is suggested that vehicle sharing and driver recruitment needs to be patiently built up by an organiser attached to a Council of Social Service or other nonspecialised voluntary body and that this is a role which demands considerable initiative and ability. Another approach is to publish an annually updated list of the supplementary transport resources available in an area. Examples are given. Actual and possible changes in the law under which supplementary services operate are described and it is suggested that these may have an important effect on the supplementary transport scene. Other major changes may be set in motion by the reappraisal of the organisation of social services transport which many local authorities are now undertaking and experience has shown that one factor in this reappraisal is a radical review of the proper relationship between public, statutory and voluntary transport. The paper concludes by suggesting that there is an urgent need to appoint experienced and able people (perhaps recently retired professionals working on a part-time basis) to investigate these matters and to promote the co-ordination of voluntary transport resources and District and County level.

Norman, AJ, Assistant Secretary (National Corporation for the Care of Old People) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184915 THE TEXAS EXPERIENCE. The basic concept of this paper is to relate how state government become involved in transportation for the elderly and handicapped, what has been accomplished since its involvement, and the plans for future involvement. Texas involvement began with a study of the problem entitled *Elderly and Handicapped Transportation in Texas—Defining the Problem* published by this Department in February, 1976. The primary purpose of this document was to bring attention to the problem in Texas and to serve as a reference manual for local and area planners. Our study of the problem combined with our involvement in the two grant programs enabled the Department to become aware of the need for more information on the status of public transportation in Texas. This Department in cooperation with two other state agencies conducted a transportation provider inventory and survey to gain this additional information. The results of this survey indicated the need for coordination and consolidation of human services transportation providers to avoid duplication of service. In response to this need, a Resource Advisory Group for Human Services Transportation in Texas has been organized by

eight state agencies and two educational organizations.

Fisher, J (Texas State Department of Highways & Public Transp) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 184917 TRANSPORT FOR ELDERLY AND HANDICAPPED PERSONS. Urban transportation problems focus on the extensive utilization of automobiles, with high social costs, to the exclusion of mass transportation systems. The deterioration of mass transit services has led to serious deficiencies in service for transit-dependent groups. Likewise the proliferation of highways and automobile-oriented facilities has fostered an urban sprawl which makes difficult effective transit operations. In such a setting, attention is frequently given to two groups: the automobile-oriented commuter and the transportation disadvantaged, particularly elderly and handicapped. Programs have been developed to discourage automobile use by the commuter and to encourage his selection of transit facilities. On the other hand, programs have more recently been developed to offer service and equipment advantages to those dependent on transit because of fewer personal alternatives. This paper deals with two such innovations in upstate New York. The first is an extensive system of Call-A-Bus operations in which special vehicles are available on a call basis for use by transit-dependent elderly and handicapped. In such a situation, it has been found that door-to-door services have enabled such persons greater access to transit and to the enrichment of life which comes through an ability to move to work, shopping, and recreation sites. The second program deals with bus-rider education. It is effectively argued that a good number of transportation-disadvantaged need not the specialized equipment or services envisioned in Call-A-Bus operations; but instead, through effective training, can be led to utilize existing mass transit facilities and routes. Such a program has been developed in the Syracuse, New York area and has proved successful in its implementation. These two programs may serve as models for reaching the special transportation needs of the elderly and the handicapped. /Author/

Przepiora, JW (Central New York Regional Transportation Authority) Wallin, TO, Director, The Salzberg Institute (Syracuse University) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184918 MOBILITY OF THE DISABLED IN AN URBAN ENVIRONMENT. The aim of this study is to discover how and to what extent physically handicapped people cope with daily activities within the local area when living at home. An interview survey conducted in an urban area compared the mobility, use of transport facilities, local facilities, and social interaction of 120 physically handicapped people with a control group of 30 able-bodied people. The results demonstrate the need for improved transport facilities for the handicapped; and they indicated that there were three major improvements necessary in transport facilities to allow the handicapped more mobility within the local area: designed standard buses, a more flexible system of door-to-door public transport, and a larger mobility allowance to enable more of the handicapped to run their own car.

Chamberlain, MA (Loughborough University of Technology, England) Buchanan, JM (Leeds University, England) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 184919 SPECIAL TRANSPORT SERVICE AND MODIFICATION OF CONVENTIONAL PUBLIC TRANSPORT SERVICES. In this paper handicapped persons are considered to be those with insufficient physical and mental ability to move about freely on existing public transport systems. We have grouped handicapped persons into four main groups; those handicapped in movement, vision, hearing or in other respects. We estimate that 10,000 of the Norwegian population of 4 million is completely dependent on transport in special vehicles. These are wheelchair users, paralysed people, deaf-blinds, people with certain mental conditions and people with serious allergies. More than 100,000 people may with varying degrees of difficulty use trains, airplanes and ships for regional or interregional trips. For local trips they are dependent upon some sort of special transport service. By modifications to conventional public transport services, we estimate savings in yearly operating costs of 30-40 million English Pounds because of the reduced demand on special services. We have, in co-operation with the different groups of handicapped persons, investigated different modes of transport and terminals. One conclusion is that wheelchair users have the most serious difficulties as public transport passengers and that both stick-users and people who are visually handicapped have considerable problems. The aurally handicapped coped quite well. /Author/

Simonsen, S (Technical University of Norway) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England;

ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184922 PLANNING FOR THE TRANSPORTATION DISADVANTAGED: A CLASSIFICATION OF USER GROUPS. Existing services for the transportation disadvantaged in the United States are fragmented among several providers which often do not account for the diversity of the disadvantaged population. A subdivision of the disadvantaged based upon their transportation needs is a necessary starting point for developing coordinated plans that meet the spirit of recent federal guidelines in a cost-effective manner. An alternative approach to client definition is offered which is based upon matching the characteristics of transportation service to the transportation needs of the disadvantaged. Because increasing numbers of persons drive an automobile, its availability is a primary consideration of the classification. Financial condition of the individual is considered to affect individuals who cannot afford an automobile. The disadvantaged may be further subdivided into those who can use conventional transit without extensive vehicle modification and those who cannot. Next, the availability and levels of service provided by the conventional transit system is examined. There is a small percentage of the disadvantaged population that can only be served by door-through-door service. A continuum of seven user subgroups is determined. The implementation of the proposed classification scheme can be used to plan for transportation services to the disadvantaged and would require inter-agency cooperation and an area-wide census of the disadvantaged.

Hood, TC Bell, TL Heathington, KW (Tennessee University, Knoxville) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 184924 IMPROVING ELDERLY AND HANDICAPPED SERVICE VEHICLE PRODUCTIVITIES UNDER CONDITIONS OF LOW VEHICLE DENSITY. A very large number of public transport service providers in the U.S. and Canada are either currently operating or are planning to operate demand-responsive transit service for the elderly and handicapped. Customers typically include public and private institutions as well as unaffiliated individuals. The providers are often faced with politically determined, large land areas to be served and limited resources with which to provide the services. In this context, development of methods to improve upon the generally low vehicle productivities experienced to date is of prime importance. The paper proposes an integrated planning, marketing and operating control methodology designed specifically to improve elderly and handicapped transport service productivities under conditions of low vehicle density. In this instance, productiv-

ity is defined as passengers per vehicle service hour, and vehicle density as vehicles operated per unit of land area.

Brigham, TB (Massachusetts Institute of Technology) Bass, E, Director of Special Markets (Personal Transit); Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 184925 PUBLIC TRANSPORT FOR THE HANDICAPPED IN STOCKHOLM. Stockholm County Council is since 1977 responsible for all public transport for the handicapped. The County has a population of about 1.5 million. 67,700 persons, i.e. 4.5 percent of the population are entitled to special transport service either by taxi (62,900) or by special vehicle (4,800). 80 percent of the entitled persons are pensioners. The County Council has accentuated that the special transport service for the handicapped is to be seen more as a matter of transportation than a matter of social service. The service should as far as possible be integrated in the general public transportation. All land public transport in the Stockholm County-including the special service for the handicapped-run by Stockholm Transport (SL), a company owned by the County Council. About 4.5 million special handicapped-transportations have been produced in 1977. The gross costs of the special service were about 200 million crowns. The government subsidizes 25 percent of the costs. /Author/

Berg, I, Director of Public Transport for the Handicapped (Stockholm Transport); Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184926 TRANSPORTATION FOR HUMAN SERVICES. This paper presents a case study of a private-non-profit corporation (PNP) in a rural county in the Northeastern United States. This PNP, Call-A-Ride of Barnstable County, Inc. (CAR), initiated a demand-responsive transportation service for the elderly and handicapped in April of 1976 with four operational mini-buses (converted vans with raised roofs, lowered steps, and hydraulic lifts for wheelchairs). As of December 31, 1977, that effort had expanded to 25 mini-buses of which 15 are equipped to accommodate wheelchairs. This enlarged program included transportation for the elderly and handicapped to health care facilities, congregate meal sites, adult day care activities, special education programs, and food delivery for a "meals-on-wheels" program for the elderly. A county-wide demand-responsive public transport

program aimed at the elderly and handicapped was also initiated. Ridership began at 250 trips per month and reached 8849 twenty-one months later. The program brought together nine sources of federal funds through an array of intermediate agencies, added to local sources of support, in order to provide these transportation services for the elderly and handicapped. This paper briefly outlines the history of CAR's development of a varied program of consolidated transportation services in rural Cape Cod, Massachusetts. It explores the problems and opportunities of an integrated program of financial assistance for these services, many of which relate to the emerging interest in elderly and handicapped transportation by the national and state governments and various regional entities. In conclusion, the paper will evaluate how some of these developments affect present and future services for transportation the elderly and handicapped in rural areas of the United States.

Harman, LJ, General Manager (Call-A-Ride of Barnstable County, Incorporated); Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184927 TRANSPORT FOR THE DISABLED IN WESTERN CANADA. The world's largest transit company dedicated to the sole purpose of mobility for the disabled is the British Columbia Lions' Easter Seal Transport Service. The service has in excess of one hundred vehicles to transport both children and adults. The annual budget is 1.5 million to transport half a million students and two hundred thousand adults. Adult transport is becoming more a government social service and less a charity operation. The total trip costs in Western Canada range from \$5.00 to \$8.50. The vehicles generally carry between 1 and 2 passengers per hour and 50 percent of the vehicle time is spent travelling empty. The high usage by wheelchair patrons and time consuming courtesy service to and from buildings yields an "optimal" passenger rate of 2 passengers per hour. Vehicle productivity and unit costs may be reduced by revising and speeding up access procedures to the vehicle and focusing service on major nodes of demand. The service may be made efficient by employing taxis for all other service for non-wheelchair patrons. Vehicle productivity will in future decrease as cities spread over greater areas and trip lengths increase. Expanding public involvement in, and financing of, urban public transit will no doubt increase the pressure to provide transit services for the disabled. Increasing costs make it imperative that public transit and subsidized private taxi services be blended to provide maximum mobility at minimum cost. /Author/

Navin, FPD (British Columbia University, Canada); Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport

and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

34 184931 THEORETICAL AND METHODOLOGICAL APPROACH TO THE TRANSPORT PROBLEMS PERCEIVED BY ELDERLY AND HANDICAPPED PERSONS. We have tried, in this presentation, from a synthesis of a number of studies to determine both the needs and hopes of elderly and handicapped persons with respect to travel and to determine the difficulties of using transport, particularly public transport, while concerning ourselves with short trips in the urban area. We have been able to observe that the movement needs and the wish to use non-segregated transport is very important to that part of the population with reduced mobility. Equally we have noted that technical solutions exist to reduce the inconveniences of public transport and similarly to satisfy the needs of those categories of persons under consideration. The definition of needs has led us to emphasize the methodological difficulties raised and the way in which these difficulties are overcome. Also emphasized are the methodological precautions which should be observed in all investigations of needs and the necessity to place demand analysis in its dynamic context. Finally, our approach has led us to recommend that the problem of transport accessibility is seriously considered in the political decisions of the appropriate governmental units, to avoid seeing the decision become rapidly outdated. /Author/

Dessertine, A, President (Housing Association of the Severely Sick); Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 184932 TRANSPORT EQUITY AND INEQUITY FOR THE ELDERLY AND HANDICAPPED. Sources of inequity in the provision of transport to the elderly and handicapped are examined, and are seen to originate in the transport planning process, as well as occurring in program implementation. It is suggested that elderly and handicapped needs be integrated rather than added on to regional plans. The paper contains a brief analysis of trip purposes and modal needs of the elderly and modal barrier problems of the handicapped. The need for major expenditures on traditional public transport is questioned. More auto-like transit is needed. Funding sources are seen to be limited, disjointed, and do not go far in improving transport equity. Local decisions must be made on the extent to which transport for the elderly and handicapped will be supported, and then programs to address their problems should be developed. /Author/

Paaswell, RE Appelstein, MJ (State University of New York, Buffalo) ; Loughborough University of Technology, England July 1978, n.p.; From the Proceedings of the International Conference on Transport for the Elderly and the Handicapped, sponsored by the Transportation Research Board, Transport and Road Research Laboratory, England, and the Ministère d'Équipement (Transports) France.; ACKNOWLEDGMENT: Loughborough University of Technology, England; ORDER FROM: Loughborough University of Technology, England, Loughborough LE11-3TU, Leicestershire, England

34 185421 TRANSPORTATION FOR ELDERLY AND HANDICAPPED PERSONS IN THE WASHINGTON METROPOLITAN AREA. A survey was conducted of persons living within the Washington Metropolitan Area who were 65 or older and/or who had physical or mental disabilities which made it difficult or impossible to use existing buses or taxis. Improvements in the accessibility of Metrobuses, taxis, vans, small buses and alternative paratransit systems were a major goal of this effort. A survey was made to determine demographic and travel characteristics of the target population and identify the handicapping conditions which made the use of buses or taxis difficult or impossible. The gap analysis was used to determine the latent demand for travel. Alternative service concepts were then developed which could potentially meet the latent needs. These alternatives (detailed in the text) were evaluated and combined into seven implementable programs: central information and referral program; advance reservation and subscription service; modification of existing metro-buses; special systems for nonambulatory; taxi services; carpool/van pool; and purchase of buses with lifts and ramps.

Mark Battle Associates, Parsons, Brinckerhoff, Quade and Douglas, Inc Final Rpt. Oct. 1978, v.p., Figs., 5 App.; Submitted to Metropolitan Washington Council of Governments.; Contract IT-09-0033-33

34 185424 THE LIFT: SPECIAL NEEDS TRANSPORTATION IN PORTLAND, OREGON. This report covers the first year of a two-year demonstration in which the regional transit authority in coordination with local social service agencies provides curb-to-curb transportation services to eligible elderly and handicapped clients on an advance reservation basis. The demonstration project was designed to test the transit operator's ability to provide specialized service to handicapped and elderly persons and coordinate this service with contracting social service agencies. The report presents time-series data as well as analysis of the project's workability, cost-effectiveness, and impact on all project participants. The issues and analysis procedures are outlined. The project operation and its evolution from its pre-implementation phase are described. The demand and supply of the Special Needs Transportation service are also described. The economics of the LIFT system are analyzed and the projects impact on clients, social service agencies and Tri-Met (the regional transit authority are assessed.) The conclusions are summarized, and information for comparing LIFT with two other modes (taxis and private non-profit providers) are provided.

Cooper, T Bloomfield, P Flynn, S ;

Crain and Associates, (DOT-TSC-UMTA-78-35) Intrm Rpt. UMTA-OR-06-004-78-2, June 1978, 228 p., 21 Fig., Tabs., 8 App.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-294711/AS

34 185672 TRANSPORTATION FOR THE ELDERLY OR PHYSICALLY HANDICAPPED (A BIBLIOGRAPHY WITH ABSTRACTS). Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities. (This updated bibliography contains 207 abstracts, 60 of which are new entries to the previous edition).

Young, ME ; National Technical Information Service Aug. 1978, 214 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0828/OST

34 186156 IMPLICATIONS OF BART'S MOBILITY AND ACCESSIBILITY IMPACTS FOR THE TRANSPORTATION DISADVANTAGED. The report examines the mobility and accessibility impacts that the 71 mile Bay Area Rapid Transit System has had to date on the transportation disadvantaged. Three special population groups are the focus of analysis—ethnic minorities, the elderly and handicapped. These groups are of special concern for transportation planning and policy because of either low-income status or mobility related impairments. Findings are reported from the investigation of five issues related to BART's impacts for the transportation disadvantaged on increased accessibility to employment, social, medical, cultural and recreational opportunities. Rapid rail patronage levels by ethnic minorities, the elderly and handicapped travelers are examined. The impact on the handicapped of BART's barrier-free design is investigated. Evaluation of these findings is made in the context of the level, nature, and degree of equity in the incidence of BART's mobility impacts. Based on the findings of the study, implications for the transportation disadvantaged of a regional rapid rail transit investment are presented in terms of policy considerations for other areas in which similar systems may be considered. (Color illustrations reproduced in black and white)

Donnelly, R Arguelles, J ; Metropolitan Transportation Commission, Urban Dynamics Associates, Department of Housing and Urban Development, Department of Transportation Tech Memo DOT-BIP-TM-35-10-78, Apr. 1978, 93 p.; Prepared by Urban Dynamics Associates, San Francisco, CA. Prepared in cooperation with Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286760/4ST, DOTL NTIS

34 188944 RURAL ELDERLY TRANSIT MARKETS. In rural areas a significant proportion of elderly people are isolated from social service and recreation centers. Yet special transit vehicles serving the elderly carry only a small percentage of all elderly people. This article sheds light on this apparent discrepancy. An approach to disaggregating the transit demand is described,

and is used to derive upper bounds for demand for a comparison of urban and rural travel data. Special emphasis is placed on how the attractiveness of social services affects travel demand. Interagency panels are proposed as a feasible means for including service attractiveness in demand predictions.

Notess, CB (Winthrop College) *American Institute of Planners, Journal of* Vol. 44 No. 3, July 1978, pp 328-334; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

34 189347 TECHNICAL REPORT OF THE NATIONAL SURVEY OF TRANSPORTATION HANDICAPPED PEOPLE. This document represents one portion of a major effort undertaken by UMTA in response to Congressional interest in and legislation for the "planning and design of mass transportation facilities to meet special needs of the elderly and handicapped." It involves a number of parallel and interdependent areas of activity ranging from a national survey to a national perspective of the state-of-the-art concerning transportation of the transportation handicapped population (THP). The purpose of this technical report is to present complete findings on all information areas covered in the National Survey in order to provide specific information for decision makers at all levels. This National Survey is a comprehensive national study using probability techniques and procedures to provide quantified information on the THP in urban areas of the U.S. The information includes the number of THP (7,440,000), their characteristics, their transportation behavior, the perceived barriers inhibiting use of public transportation, and an assessment of solution alternatives designed to improve transportation for the THP. Forty-one in-depth interviews and ten focus group sessions were conducted with leaders and members of groups representing the handicapped. Some of the highlights herein are: (1) Of the 7,440,000 THP, 98% (7,276,000) travel—19% (1,405,000) cannot use public transportation at all, 30% (2,175,000) use public transportation with more difficulty, and 51% (3,860,000) use public transportation with a little more difficulty; and (2) The average number of bus barriers is 6.9, subway barriers is 6.0, and taxi barriers is 3.7. /UMTA/

Grey Advertising, Incorporated, (NY-06-0054) UMTA-NY-06-0054-78-1, Sept. 1978; Sponsored by the Department of Transportation, Urban Mass Transportation Administration. Other reports of this study: "Study of the Transportation Problems of the Transportation Handicapped: Off-Peak Half-Fare Study (PB-263867), and "Off-Peak Half-Fare Study, Ten Case Studies," (PB-263868).; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-290161

34 189609 REGIONAL CO-ORDINATION OF THE LOCAL TRAVEL SERVICES FOR DISABLED PERSONS [Regional Samordning av den Kommunala Faerdtjaensten foer handikappede]. This proposal for regional co-ordination of travel services for the disabled within the Gothenburg-region is based upon rules concerning: the right to travel, special conditions, application procedure and treatment, purpose of journey, number of journeys, length of journey, starting time of journey, co-ordination of journeys, booking of journeys, stop during journey, fares, travel company and assistant personnel. In

order to secure the co-ordination the following main principles are proposed: the working out of planning and administration aids for the local member authorities, co-ordination of booking and routing routines, co-ordinating the journeys for handicapped with other transport modes. /TRRL/ [Swedish]

Geotehorsregionens Kommunalforbund
Monograph 1978, 205 p., 4 Fig., 7 Tab., 7 Phot.;
ACKNOWLEDGMENT: TRRL (IRRD 236496), National Swedish Road & Traffic Research Institute

34 190091 DOT RULEMAKING IMPLEMENTATIONS SECTION 504. The Federal Register of June 8, 1978 contained the draft proposed rulemaking by the Department of Transportation (DOT) which would implement section 504 for the Rehabilitation Act of 1973. The proposed regulations mandate full accessibility for handicapped persons on all bus, light rail, heavy rail, commuter rail and other transit systems. In essence, the regulations will require that all new and existing transit facilities and vehicles be accessible to handicapped persons (including wheelchair users) within a number of years specified for each mode. Any system not fully accessible within three years, however, must provide comparable alternative service until the required physical accessibility deadline is reached.

Metro Vol. 74 No. 4, July 1978, pp 38-39
ACKNOWLEDGMENT:

34 190210 MASTER PLAN: TRANSPORT SERVICES FOR PERSONS WITH SPECIAL NEEDS. The overall objective of the study was to develop a planned approach to solving the mobility problems of persons with special needs-the transportation handicapped. More specific objectives were as follows: identify the characteristics and needs of the group of the transportation handicapped; establish the accessibility difficulties of the existing fixed route MBTA service and develop a planned approach for improvements in order to provide increased mobility for this group; identify other existing transportation resources which provide services to this group and develop a planned approach for alternative specialized service (door-to-door and feeder to fixed route) which addresses the unmet mobility needs of this group; provide meaningful participation of advisory groups throughout the planning process and communicate results to a large public forum; and develop an integrated implementation plan. /Author/

Massachusetts Bay Transportation Authority
Feb. 1978, 237 p., Figs., Tabs., Apps.; This report was prepared by Applied Resource Integration Limited under contract No. PD-037 from Massachusetts Bay Transportation Authority.

34 190995 SUMMARY REPORT OF THE NATIONAL SURVEY OF TRANSPORTATION HANDICAPPED PEOPLE. A major effort has been undertaken by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation (DOT) in response to Congressional interest in and legislation for the "planning and design of mass transportation facilities to meet special needs of the elderly and handicapped." The total endeavor involves a number of parallel and interdependent areas of activity ranging from a national survey to

identify and quantify the transportation handicapped population to a national perspective of the state of the art concerning transportation for transportation handicapped people. As a first step in this multi-phased program, UMTA funded a comprehensive national study using probability techniques and procedures which provide quantified information on the transportation handicapped population in urban areas of the United States. This information includes the number of transportation handicapped people, their characteristics, their current transportation behavior, the perceived barriers that inhibit using public transportation as often as they would like, and an assessment of solution alternatives designed to improve transportation for transportation handicapped people. The national survey is considered to be a major component of the total endeavor since it establishes a firm base of knowledge on the transportation handicapped population on a national basis, which until now did not exist.

Grey Advertising, Incorporated, Urban Mass Transportation Administration, (UMTA-NY-06-0054) UMTA-NY-06-0054-78-2, June 1978, 96 p.; See also reports dated Oct 76, PB-263 868, and Sep 78, PB-290 161.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291765/6ST, DOTL NTIS

34 191026 TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. VOLUME II. USER SURVEY RESULTS. In August 1976 the Northwestern Indiana Regional Planning Commission (the Metropolitan Planning Organization) began a process to develop a plan which would meet the transportation needs of mobility-limited people in Lake and Porter Counties. The first phase of the planning process was an inventory of existing transportation (Volume I), and a survey of user needs (Volume II). The number of elderly and handicapped in Lake and Porter Counties is 65,019, the base population for this survey. This report, Volume II, contains tables of numbers documenting in detail the results of a survey distributed to 3,117 people, of which 1,000 were returned. Results are presented in two ways: some tables simply describe questionnaire results, and others present cross-tabulations to many questions. Information is displayed in numerical and literary terms.

Strains, SR ; Northwestern Indiana Regional Planning Commission, Urban Mass Transportation Administration, (UMTA-IT-09-0072) UMTA-IT-09-0072-79-2, Mar. 1978, 161 p.; See also Volume I, PB-290685.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-290686/5ST

34 191297 TRANSPORTATION AND THE ELDERLY AND HANDICAPPED: A LITERATURE CAPSULE. This volume, one in a series initiated by the U.S. Department of Transportation, is intended to make the literature in transportation concerning the elderly and handicapped more accessible to decisionmakers in the community. It includes an introduction to the literature, selected summaries of five detailed studies in transportation for the elderly and handicapped, and an annotated bibliography. Literature selected for identification and annotation is organized according to five categories: overview, needs, programs, planning and policy. Approximately 100 citations are included that date from 1970, and an author index and a listing of

suggested periodicals and other sources of information are provided. Five studies in transportation for the elderly and handicapped are detailed: (1) Transportation for Older Americans-The State of the Art, a comprehensive survey of the transportation problems of older Americans; (2) The Handicapped and Elderly Market for Urban Mass Transit, an evaluation of the urban market for mass transit alternatives to serve the elderly and handicapped; (3) Transportation for the Elderly and Handicapped-A Prototype Case Study of New York State Experience in Activating an Element of a Federal Grant Program; (4) Lincoln Experimental Transportation Demonstration Project, a study of various types of transportation services for elderly and handicapped residents in Lancaster County, Nebraska; and (5) Planning Handbook-Transportation Services for the Elderly, a manual for transportation planning methods and techniques.

Department of Transportation Jan. 1977, 83 p.
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002083/ES.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002083

34 191338 TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED VOLUME I. INVENTORY AND ANALYSIS. In August 1976, the Northwestern Indiana Regional Planning Commission (the Metropolitan Planning Organization) began a process to develop a plan which would meet the transportation needs of the elderly and handicapped persons in Lake and Porter Counties. The First Phase of the planning process was an inventory of existing transportation (Volume I), and a survey of user needs (Volume II). This report, Volume I of II Volumes, describes the First Phase of the planning process, namely, the transportation situation of the mobility-limited people in Northwest Indiana; it also documents the first planning phase--data gathering and analysis, committee organization, alternative evaluation, and initial recommendation. There are 46 agencies providing some transportation to the elderly and handicapped people, ranging from medical patient reimbursement to special Dial-A-Ride vans to regular bus and train service at reduced rates. The results of a survey of users of the services reveal that half (32,500) of the 65,000 elderly and handicapped in the two counties need better transportation or have none at all.

Strains, SR ; Northwestern Indiana Regional Planning Commission, Urban Mass Transportation Administration, (UMTA-IT-09-0072) Tech. Rpt. UMTA-IT-09-0072-79-1, Mar. 1978, 88 p.

See also Volume 2, PB-290686.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-290685/7ST

34 191611 IMPACT TESTING OF RESTRAINT DEVICES USED WITH HANDICAPPED CHILDREN IN BUS SEATS AND WHEELCHAIRS. A series of 16 sled impact tests were conducted at the Highway Safety Research Institute sled facility in order to evaluate the effectiveness of restraint devices and systems currently being used for the transport of school bus and wheelchair-seated handicapped children in the state of Wisconsin. A sled impact pulse of 20 m.p.h. and 16 G's was used for all tests. Eight tests involved wheelchairs in for-

ward-facing and side-facing orientations for head-on and 33 degree oblique impacts. Another eight tests involved forward-facing bus seats for head-on and 33-degree oblique impacts. The results generally point out the ineffectiveness of many currently used devices and systems for protecting the child in the event of a bus collision. In six of the eight bus seat tests the dummy's head struck the back of the bus seat in front. The practice of placing wheelchairs in a side-facing orientation is shown to be a poor one for the protection of the child.

Schneider, LW Melvin, JW ; Highway Safety Research Institute, Wisconsin State Department of Public Instruction Final Rpt. UM-HSRI-78-52, Nov. 1978, 83 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289903/7ST

34 191640 REPORT ON SERVICES TO THE ELDERLY. NUMBER 1, TRANSPORTATION--A LOW COST, FARE-FREE TRANSPORTATION PROGRAM. This report is the first in a series on county efforts to help the elderly, sponsored by the Aging Program, National Association of Counties Research Foundation, and a grant from DHEW. Cape May County, on the southern tip of New Jersey, is a resort community in the summer but for the rest of the year the county has only a small scattering of stores, a few service industries, and 15,878 elderly residents. These residents faced many problems because in the winter there was no public transportation in the county. To cope with this problem, Cape May City bought a 12 passenger van in 1970 to help elderly residents get to stores and to doctors' offices. Since then the service has expanded and now most of the free rides are provided by 44-seat school buses that follow six separate routes on fixed schedules. The program employs 10 drivers, called senior assistants, who all have completed special driving courses as well as emergency medical technician training. Costs are currently shared by the county and Federal grants. In 1976 an estimated 120,000 free rides were offered.

Jones, P Rott, E Murphy, MB ; National Assoc of Counties Research Foundation, Administration on Aging 1976, 8 p.; Contract DHEW-AOA-90-714; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0026344/2ST

34 192099 TRANSPORTATION FOR THE HANDICAPPED: AN ANNOTATED BIBLIOGRAPHY OF THE HOLDINGS OF THE INSTITUTE OF TRANSPORTATION STUDIES LIBRARY, UNIVERSITY OF CALIFORNIA AT BERKELEY. The annotated bibliography is concerned with transportation for the handicapped. For the most part, it represents holdings found in the Institute of Transportation Studies Library at the University of California, Berkeley. A few important works not currently in the ITS Library holdings are included. Compilation of the bibliography was carried out during Spring and early Summer, 1978. A quick glance through the bibliography reveals a few citations prior to 1970. This is not due to a lack in ITS Library holdings, but rather reflects the scant attention paid to the subject before the late 1960's in this country. The belated interest of the 1970's has been spurred on by federal and state legislation, as well as by the disabled themselves. Much attention continues on transportation for the

disabled, and thus much more in terms of publications can be expected in the near future. The bibliography is broken down into broad subject sections, as indicated by the table of contents following. With the exception of bibliographies, all foreign works are listed in a special section.

Krummes, DC ; California University, Berkeley July 1978, 29 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291871/2ST

34 193543 TRANSPORTATION PLAN FOR THE ELDERLY AND HANDICAPPED. This report documents the Council's continuing efforts to explore ways to improve transportation services to the elderly and handicapped of the St. Louis area. Current data on the size and distribution of the elderly and handicapped population is presented and the extent of existing transit and paratransit services documented. The report concentrates on identifying the needs of those elderly and handicapped who represent the market for public transportation services and offers alternatives for meeting the unmet transportation needs of that segment of the population. /Author/

East-West Gateway Coordinating Council Final Rpt. EWG-TS-0372.10.0, July 1978, 86 p., 10 Fig., Tabs.; Contract IT-09-0090; ACKNOWLEDGMENT: UMTA; ORDER FROM: East-West Gateway Coordinating Council, 112 North Fourth Street, Suite 1200, St Louis, Missouri, 63102

34 195498 AN INVESTIGATION INTO THE TRAVEL PERFORMANCE OF PHYSICALLY HANDICAPPED PERSONS. The study described in this report comprised an investigation of the travel performance and behaviour of 26 persons having various types of physical impairment of a permanent nature. These subjects were observed, recorded and assessed whilst negotiating a pre-selected route which comprised a purposeful journey from Loughborough to Leicester incorporating four modes of transport (pedestrian, bus, car and train). Data relating to speed of performance on individual tasks comprising the route, and the nature and degrees of difficulty experienced during travel, have been analysed in order to provide guidelines in terms of gross orders of priority for the future design and operation of public transport systems more suited to the requirements of physically handicapped persons. Generally, results have indicated that travel tasks which involve raising and lowering the whole body (and especially the former) can be assigned maximum priority for planning action. Walking distances in modal and inter-modal access, and within transport termini, are also designated a high priority. The need to improve the communication of relevant information to the physically handicapped traveller is suggested. /TRRL/

Gazely, DJ Hawkins, NM ; Loughborough University of Technology, England Monograph TT 7806, Dec. 1978, 117 p., 7 Fig., Tabs., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240296)

34 195632 THE APPLICATION OF PUBLIC TRANSIT PRINCIPLES IN SUPPLYING HANDICAPPED TRANSPORTATION IN A MEDIUM-SIZED CITY. The authors discuss the set-up and operation of a modified route service to supplement the current taxi-type service for the physically handicapped. Based on user

locations and trip purposes for the "taxi" service, three zones of the city where user density was highest were selected for the new service. Trip purposes indicated that over 60% of the destinations were to a major hospital and the down-town area. The "zone" service goes through eight cycles a day and is comprised of a demand-responsive pickup loop, transportation to destinations and a drop-off loop. Among the various statistics that were analyzed were: time per passenger trip, load/capacity ratio and cost per passenger trip. By comparing statistics with the "taxi" service and maintaining a close rapport with the operators of the service, improvements and changes were made to maximize the benefits of the "zone" service. This new service has improved the usefulness and availability of transportation for the handicapped and decreased costs on a per passenger basis. /TRRL/

Bergan, AT (Saskatchewan University, Canada) Ross, A (Saskatoon Transit System) Watson, LG Rivett, DE (Saskatchewan University, Canada) ; Roads and Transportation Association of Canada Monograph 1978, 15 p., 3 Fig., 4 Tab., 4 Ref.; Paper presented to the RTAC Annual Conference--Transportation Operations--Technical Session and Workshops.; ACKNOWLEDGMENT: TRRL (IRFD 240487), Roads and Transportation Association of Canada

34 195889 SAFETY DURING SPECIAL TRANSPORTATION SERVICE TRIPS. VOLUME ONE; TRANSPORTATION IN VEHICLES DESIGNED FOR THE HANDICAPPED. Special transportation is provided in Sweden for those who have difficulty in using the regular public transportation systems. The vehicles used for the special transportation are generally small buses and all are equipped with a ramp or a small elevator to move the passengers into or out of the vehicles. Inside of the vehicle, seats have been removed and special fastening equipment for wheelchairs has been installed. Travel service vehicle transportation can be divided into three main parts: 1) moving to or from the vehicle; 2) moving into or out of the vehicle; and 3) traveling in the vehicle. The University of Goteborg conducted studies on the safety aspect of loading and securing wheelchairs in this type of transportation service. This report covers the wheelchair-securing portion of the study. A related study: Volume Two: Movement In and Out of Special Transportation Service Vehicles (PB 289-132T), deals with safety factors during the movement into and out of the vehicles. In the conducted studies described in this report, dummy-occupied wheelchairs were dynamically tested on a sled simulator while secured by various methods. Six different types of chairs were tested. Crash simulations were made at acceleration levels of 5g, 10g, 15g, and 20g, and all occurring under at least 100ms from onset. The report concludes that satisfactory securement can be provided for forward and rearward-facing wheelchair users on the special transportation vehicles. However, sideway facing is not advisable because of the low tolerance of the human body to side stresses. /UMTA/

Aldman, B Brattgaard, SO Hansson, S ; Chalmers University of Technology, Sweden, Gothenburg University, Sweden, (CA-06-00998) UMTA-CA-06-0098-78-2, Oct. 1974, 122 p.; Translations sponsored by the California Department of Transportation and the Urban Mass Transportation Administration.; Contract

CA-06-0098; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-294969-T/ST

34 195939 ELDERLY AND HANDICAPPED TRANSPORTATION OPERATIONS STUDY. This study focuses on the coordination and consolidation of transportation services for the elderly and handicapped in the New Haven, Connecticut area. The report focuses on the areas of vehicle control, financial control, and system evaluation. In some cases, analyses have been up-dated during the preparation of this final report. The proposed near-term system is intended to provide a plan for the integration of services. Initially, it is proposed that this involve services currently offered or planned by three local agencies: the City of New Haven Office of Human Services; the Easter Seal Rehabilitation Center; and the Greater New Haven Transit District. Integration would be accomplished through purchase of service agreements between each agency and a local private transportation operator. This approach represents a cross between system consolidation and system coordination, and attempts to achieve the economies of consolidation while allowing participating agencies to retain a degree of identity and control. A purchase of service agreement based on payment per passenger is also proposed. The vehicles (10 to 12 passenger vans) for the service are to come from a combination of public and private sources. To improve the management of the system, it is proposed that an automated computer-aided scheduling/financial control system be designed and implemented. To facilitate the implementation and monitoring of the service, some degree of coordination between participating agencies is required. This report discusses operating framework, vehicle control, financial control, reporting requirements, cost analysis, and system implementation.

Multisystems, Incorporated, (IT-09-0069) Final Rpt. UMTA-IT-09-0069-79-1, July 1978, 134 p.; Contract IT-09-0069; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-295071/AS

34 197023 PUBLIC TRANSPORT AND THE HANDICAPPED. The author points out that pedestrians of all ages make use of buses, trams, metro's and trains. They are consumers of public transport. Some of these people have a handicap, of which some are temporary and some are for a lifetime. Public transport is managed by healthy people of employable age for healthy people of employable age. The handicapped are a minority group and have little done for them. In this paper a review is given of research, studies and applications of measures which have been taken in various countries for better accessibility and increased safety of public transport for disabled persons. These include, use of audible warning by vehicles when reversing, audible signals at pedestrian crossings, arrangements made for help on train and air journeys, accommodation for wheel chairs on trains and buses and at stations. /TRRL/

Vanersen, TV *Voice of the Pedestrian* Vol. 10 1978, pp 53-61; ACKNOWLEDGMENT: TRRL (IRRD 240603), Institute for Road Safety Research

34 197111 ELDERLY AND HANDICAPPED TRANSPORTATION STUDY PUBLIC TRANSPORTATION FUNDING CATALOGUE. This catalogue is designed to serve as a reference for public transportation or "special transportation" funding sources. State administered financial and technical aid programs are described, and a number of local tax revenue sources that can be used for public transportation financing are reviewed by analyzing local tax enabling legislation. Federal funding sources are described, and federal programs are listed and described by department or agency and brief excerpts are provided for each funding program. Local tax revenue and other financial resources that can be used to provide local matching funds for state and federal programs are described. The catalogue also describes how certain programs can be consolidated for joint funding as well as funding sources that may be currently unused in the Greater Bridgeport Region. A table is provided which gives a brief summary of Federal Public Transportation Funding Sources. The table indicates whether funds can be used for financing operating costs, capital costs or labor costs, who is eligible under the funding program, and what types are eligible for funding.

Pshyk, FU *Greater Bridgeport Regional Planning Agency* Vol. 2 Nov. 1978, v.p., 1 Tab., Apps.; Performed under contract No. TSH-321 IT-09-0089 D126256; ORDER FROM: Greater Bridgeport Regional Planning Agency, 525 Water Street, Bridgeport, Connecticut, 06604

34 197146 TRANSPORTATION FOR THE ELDERLY AND HANDICAPPED. The report identifies the transportation needs of the elderly and handicapped, evaluates the current services, and discusses options to meet special transportation needs. It was prepared for local governments to use in the development of their own local transportation plans for the elderly and handicapped. According to the Urban Mass Transportation Administration, local transportation plans for the elderly and handicapped must be prepared and implemented in order for local governments to receive any federal transit capital and operating funds. /Author/

Kansas City Area Transportation Authority, Mid-America Regional Council UMTA-IT-09-009, Jan. 1979, 46 p., 1 Fig., 7 Tab., 2 Phot., 11 Ref., 2 App.; ACKNOWLEDGMENT: UMTA

34 197154 ELDERLY AND HANDICAPPED TRANSPORTATION STUDY. VOLUME 4. This report presents a Regional Plan for the improvement of transportation services to the region's elderly and handicapped persons. The Greater Bridgeport Region includes the City of Bridgeport and the towns of Easton, Fairfield, Monroe, Stratford and Trumbull. The plan can be implemented over a 5-year period and specifies: management actions that can be carried out to improve the coordination of currently provided services; financing actions that can provide additional funds for both capital and operating costs required by the provision of improved services; operational actions that can make the provision of existing and improved services more efficient and cost effective; regulatory actions that can eliminate barriers to the improved coordination or consolidation of services; and public relations actions that can be taken to make existing

transportation services known to a broader base of elderly and handicapped persons and that can lead to the identification of persons needing transportation services. /Author/

Pshyk, FU *Greater Bridgeport Regional Planning Agency* Final Rpt. July 1978, v.p., Figs., Tabs.

Sponsored by Urban Mass Transportation, Connecticut Department of Transportation, Tri-State Regional Planning Commission, Greater Bridgeport Transit District and Greater Bridgeport Regional Planning Agency, Contract No. TSH-321 IT-09-0089 D 1236256; Contract TSH-321; ORDER FROM: Greater Bridgeport Regional Planning Agency, 525 Water Street, Bridgeport, Connecticut, 06604

34 197155 TRANSPORTATION SERVICES FOR THE ELDERLY AND HANDICAPPED, BROWNSVILLE. The information presented herein establishes a data base for planning public mass transportation facilities and services that can effectively be utilized by the City's elderly and handicapped (EH) citizens. It details the findings of a survey questionnaire which was designed to determine the current level of transportation services for the EH in the City of Brownsville. From this detailed evaluation an analysis is made to quantify those EH persons who, because of their impaired mobility, do not have access to transportation services and facilities. The final section of this report discusses operations alternatives to provide demand-responsive service for semi-and non-ambulatory persons. /Author/

Texas Department of Planning and Community Develop TX-09-0051, Mar. 1979, v.p., 4 Fig., 1 Tab., 3 App.; ACKNOWLEDGMENT: UMTA

34 198140 RESOURCE GUIDE TO LITERATURE ON BARRIER-FREE ENVIRONMENTS. WITH SELECTED ANNOTATIONS. This annotated bibliography provides a guide to the state-of-the-art knowledge and literature on architectural barriers and barrier free design. Every attempt has been made to identify and review all relevant documents through December 1976. The format for citations consists of bibliographic information, descriptors, and an annotation or abstract. The major subject areas contained in the guide are: architecture by type of building and barrier elements; transportation by transit systems, by mode and by fixed facilities, streets, highways and pedestrians; parks and recreation; standards, legislation, and legal matters; general statistics and human factors research; disabilities by type; attitudes of professionals, handicapped persons, elderly persons and the public; aid and devices for handicapped persons; and information resources and audio / visual aids. Citations range from research studies, surveys, literature reviews, books, dissertations, journal articles and other professional literature to more general information for consumers and the public such as pamphlets, booklets, flyers, fact sheets, press releases and manufacturer's specifications. Appendices include listings of travel guides for the handicapped and periodicals and organizations related to barrier free environment or services for the handicapped or elderly.

Systems Group, Incorporated, Architectural & Transport Barriers Compliance BD, Washington, DC. Jan. 1977, 231 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002423

34 198143 ELDERLY AND HANDICAPPED TRANSPORTATION PLAN. This transportation plan has been prepared to provide direction in meeting the transportation needs of the elderly and handicapped population in Massachusetts' Merrimack Valley Planning Commission (MVPC) region. The federal mandate for transportation planning and the implementation of transportation services for the elderly and handicapped is discussed. Social service transportation is analyzed for the region in terms of regularly scheduled service, volunteer service, and client-restricted service. Information on the available fixed bus route service in the region is presented. Data on the size of the region's elderly and handicapped population, based on the 1970 Census, are also presented. The demand for transportation service through the development of ridership estimates is examined. Various types of transit service and management structures that could be employed to operate a transit system for the elderly and handicapped are noted. Appropriate concepts for the MVPC region are fixed route service, demand-responsive service, and user side subsidy. Cooperation, coordination, and consolidation are viewed as significant alternatives in the operation of a transportation system for the elderly and handicapped. Recommendations for establishing a transportation system for the elderly and handicapped in the MVPC region are offered, including detailed service recommendations and costs. Consideration is given to funding, monitoring, evaluating, and marketing special transportation services. Additional information on the plan for the MVPC region is appended, as well as a social service agency questionnaire.

Merrimack Valley Planning Commission, Urban Mass Transportation Administration, Urban Transportation Systems Associates 1977, 134 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002656

34 198265 ELDERLY AND HANDICAPPED TRANSPORTATION: LOCAL GOVERNMENT APPROACHES. One of the highest priorities identified by the Transportation Task Force of the Urban Consortium for Technology Initiatives during its first year was providing transportation to handicapped and elderly citizens. The publication describes how a number of localities have dealt with this problem. A wide range of existing innovative local government approaches to transportation for elderly and handicapped persons were investigated and described. Detailed case studies were prepared for most of the services described in the report. No single example presents a complete answer to the problem of mobility for elderly and handicapped persons. However, the examples collectively identify the variety of options which are available to local officials and the need to fit solutions to local situations. In the report, the service descriptions are grouped informally according to the type of service provided in various cities throughout the United States. In the interest of examining the relative merits of each approach, a summary table of key characteristics is provided.

Public Technology, Incorporated, Urban Mass Transportation Administration UMTA-DC-06-0122-79-1, Mar. 1979, 63 p.; Grant DOT-UMTA-DC-06-0122; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297289/1ST

34 198722 COORDINATION OF SPECIAL TRANSPORTATION SERVICES IN WACO, TEXAS. This study of special transportation services and their coordination in the city of Waco, Texas was conducted to: identify agencies involved in the provision of special transportation services, compile detailed information on each agency, analyze data for the purpose of determining whether there were overlapping or duplicative services and whether economies could be achieved through consolidation, and evaluate special transportation service alternatives and select the best one for the Waco area. The target population for special transportation services constituted the elderly, handicapped, and other transportation-disadvantaged citizens. Of 37 agencies initially contacted, 16 returned questionnaires. Information was provided by agency respondents on the scope of services, drivers, vehicles and maintenance, agency budget information, income sources, and agency opinions about various transportation services available in Waco. A demographic survey and an activity center survey were also conducted. Three alternatives were selected as viable for the Waco area: (1) maintaining the existing supply of special transportation services; (2) establishing a single special transportation system; and (3) forming a special transportation system as an integral part of the public transportation system. It is recommended that the third alternative be adopted by the city of Waco. More detailed recommendations in the areas of organizing, operating, and financing a coordinated special transportation system are offered. Survey materials, survey summaries, a description of the estimated ridership demand methodology, and agency data sheets for special transportation services are appended.

Transportation Management Associates, Urban Mass Transportation Administration Mar. 1978, 273 p.; Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002759/ES; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0002759

34 198921 JOINT HEW-UMTA EVALUATION OF ELDERLY AND HANDICAPPED TRANSPORTATION SERVICES IN REGION IV. VOLUME I. PLANNING AND COORDINATION MANUAL. The major goals of the project were twofold: (1) to evaluate the degree of coordination that presently exists among human service transportation providers, both public and private, with special attention focusing on the needs of older citizens and handicapped individuals; (2) to develop a generic planning, implementation, and evaluation document based on an analysis of findings in six selected sites in the Southeast that would be transferable to any community seeking to more efficiently serve the mobility needs of elderly and handicapped persons through coordinated efforts. Volume I is a 'how to' manual intended for use by those responsible for planning and/or operating specialized transportation systems. Paratransit, elderly, and handicapped transportation; social services transportation; and rural transportation are the categories addressed. The manual explains how to start, plan, operate, and manage a specialized transportation system and how to coordinate the services of one agency with those of others.

Carter-Goble-Roberts, Incorporated, Department of Health, Education and Welfare HEW/REG/4-77/1/1, 327 p.; Contract DHEW-140-77-0016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296894/9ST

34 198922 JOINT HEW-UMTA EVALUATION OF ELDERLY AND HANDICAPPED TRANSPORTATION SERVICES IN REGION IV. VOLUME II. CASE STUDIES. Paratransit, elderly, and handicapped transportation; social services transportation; and rural transportation are the categories addressed. Volume II presents findings from the use of a survey instrument along with qualitative observations and analyses based on site visits and communications with State, Federal, and local individuals.

Carter-Goble-Roberts, Incorporated, Department of Health, Education and Welfare HEW/REG/4-77/1/2, Jan. 1979, 193 p.; Contract DHEW-140-77-0016; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296895/6ST

34 260638 TRANSPORTATION FOR THE ELDERLY (TOTE) A PILOT PROJECT TO DEVELOP MOBILITY FOR THE ELDERLY AND THE HANDICAPPED. The Transportation of the Elderly (TOTE) Demonstration Project in St. Petersburg, Florida, was initiated for the purpose of improving and increasing the mobility of the elderly and handicapped. This demonstration is being conducted in a 10 square-mile area which houses a target group of 30,000 persons. Reservation, Subscription, Demand Response and Renta-Bus are the 4 door-to-door services being utilized to provide the elderly (60 and over) and the handicapped (no age limitation) with increased mobility. At the conclusion of the project it is anticipated that TOTE will be integrated with the Municipal Transit System to complement the 30 some fixed routes presently in operation within the demonstration area. As a means of control and a method of identifying the riders, a registration program was initiated 4 months before service started. Approximately 7,000 had registered prior to the first passenger pick-up. This figure had increased to 12,626 as of March 31, 1974 and it is expected that close to 20,000 will be registered by the end of the project. Among findings are: the two major outgoing trip purposes for the first six months of operation have been medical/Dental (27.9%) and personal business (25.9%); peak-hours have been between 10 a.m. and noon; and, reservation and subscription services have been used by approximately 85% of the riders during each month of operation. /UMTA/

Florida Department of Transportation, St Petersburg, City of, Florida Intrm Rpt. UMTA-FL06-0007-74-1, Apr. 1974, 51 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233593/AS

34 262515 PROBLEMS OF THE CARLESS IN THE UNITED KINGDOM AND THE UNITED STATES. An examination of current population statistics show that in the U.S. more than half of the population is without immediate access to a car, and in the U.K. more than three-fifths of the population is without access to a car. This phenomenon has been accentuated by national investment in both countries in major highway programs. The term carless refers to

more than just households that own no cars. It extends, in households with cars to those without licenses (old and young), the handicapped, and even the licensed drivers who have no access to the family car when it is in use elsewhere (e.g. at work). The most severely affected are those in urban areas and especially the urban poor. Transportation expenses are limited for the poor. Recent dispals of public dissatisfaction and protest are priority. Once the work trip has been satisfied, money for other trips, for the poor, is not always available. One solution to cost-free travel is pedestrianism (walking), but this too is difficult in urban areas where the pedestrian has been overlooked in favor of the car. Solutions to problems of the carless include dial-a-ride, better public transit, and better design of urban form. /Author/

Paaswell, RE (New York State University, Buffalo) *Transportation* Vol. 2 No. 4, Dec. 1973, pp 351-373

34 263931 METHOD FOR EVALUATING METROPOLITAN ACCESSIBILITY. Improving the quality of urban life requires not only the provision of employment, medical, educational, and recreational opportunities but also a convenient means of access to these facilities for all citizens. This study reports on a prototypical application of a new methodology, called Special Area Analysis (SAA), designed to assess the quality of accessibility in metropolitan areas. Starting with a definition of accessibility in functional terms, this SAA develops measures that focus on the level of accessibility afforded by Boston's present, planned, and programmed urban transportation systems to such essential urban activity centers as major employment districts, medical, recreational, and educational facilities, the central business district, and the airport. In addition, the methodology is applied toward an evaluation of the level of accessibility afforded to specific population subgroups such as low-income and zero-car households. This study demonstrates that the SAA methodology is a useful evaluation tool for use by metropolitan area transportation planning agencies.

Sherman, L (Department of Transportation) Barber, B (Rhode Island University) Kondo, W (Massachusetts Department of Public Works) *Transportation Research Record* No. 499, 1974, pp 70-82, 12 Fig., 1 Tab., 1 Ref.; ORDER FROM: TRB, Orig. PC

34 265262 PROJECT HELPING WHEELS. 'Helping Wheels' (1971-1973) determined the effects of reimbursement on a volunteer driving program and established a system of special transportation services for the elderly which was a reliable, acceptable, and economical means of transporting senior citizens. Reimbursement of 10 cents per mile to older volunteers using personal automobiles significantly increased both the number of drivers and riders. It also developed a network of transportation services, STIR (Senior Transportation in Raleigh), which resulted in reduced bus fares and discount ambulance service.

Gresham, SM Evans, KL ; North Carolina State University, Raleigh, Social and Rehabilitation Service Final Rpt. June 1973, 89 pp; Grant SRS-RD-93-75169; ACKNOWLEDGMENT: NTIS (PB-235628/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235628/5

34 265263 AID TO SENIOR CITIZEN MOBILITY IN EAST ORANGE, NEW JERSEY. AN ESCORT SERVICE. A demonstration project was begun on September 1, 1971 to test the hypothesis of the apparent need for the elderly population for an escort service, a corps of transportation aides, to accompany individuals on public transportation. Because of the apparent difficulty many elderly individuals have in using public transportation (buses, trains, taxis), due to the handicaps of increasing age, it was felt that latent demand of the elderly population for this trip-making could be drawn out by this means. Accordingly, a sample of the population of East Orange, New Jersey, was interviewed to determine current intentions and habits with respect to trip-making; the local transportation system was studied to develop knowledge of its availability and applicability to the elderly population's trip-making propensity, and escort personnel were hired.

Rinaldi, AT ; National Council of Jewish Women, Social and Rehabilitation Service Final Rpt. Feb. 1973, 194 pp; Grant SRS-RD-93-75147; ACKNOWLEDGMENT: NTIS (PB-235631/9); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235631/9

34 291142 THE DISABLED TRAVELLER ON PUBLIC TRANSPORT. Constructive suggestions are given for the guidance of operators to meet the needs of disabled persons using public transport. With regard to travel by bus the long-term aim is to stipulate the lowest step height possible. Handrails, bell pushes, fare collection, seating and storage are the subject of experiment. With train travel, handrails and seating are discussed. The department recommends the practice of inviting representatives of disabled people to comment on their experience of existing facilities and to test prototypes for convenience and comfort. /TRRL/

Burr, DJ ; Department of the Environment, England No 102/73, Aug. 1973, 5 pp, 15 Ref. Appeared in DOE Circular Number 102/73; ACKNOWLEDGMENT: TRRL (IRRD 207710)

34 300252 TRANSPORT AND HANDICAPPED PEOPLE. A LITERATURE SURVEY PREPARED IN THE DEVELOPMENT AND SPECIAL PROJECTS SECTION, REHABILITATION POLICY AND SERVICES DIVISION, OF THE COMMONWEALTH DEPARTMENT OF SOCIAL SECURITY. Material in this report is covered in three sections. The first (chapter 2) is concerned with the definition of disability and identification of disabled people, both in practice as it is done in Australia and overseas, and in theory, as it might have been done. The second (chapters 3- 6) is concerned with transport barriers on the major transport systems: road, rail, air, "private" and "public". It covers identification of the barriers which make them partly or wholly inaccessible to the disabled, and the attempts to remove these barriers. The third section (chapters 7-8) focuses on the roles of organisations for the handicapped and of governments in bringing about change in the transport system as a whole, and assesses the value of the various approaches that have been adopted. Comments on the applicability of particular approaches to the Australian social and political situation, and to the needs of handi-

capped people in Australia, are made throughout the discussion. /TRRL/

Department of Social Security, Australia Monograph Res Series No. 1, 1977, 101 p., 104 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 238065), Australian Road Research Board

34 300254 TRANSPORTATION FOR THE MENTALLY AND PHYSICALLY HANDICAPPED. PHASE 2. This report was prepared for the South Australian State Health Resources Unit. This phase II study analyses existing transport provisions for mentally and physically handicapped persons, and identifies ways in which the efficiency and effectiveness of transport service for these people can be improved. Recommendations are presented for longer term objectives and policies concerning co-ordinated funding, regionalization of services for the handicapped, need for special transport, payment of fares, satisfaction of latent demand, vehicle specification and modification, use of volunteers, monitoring of services and staggered working hours. Short term actions on improved utilization of vehicles, co-ordinated purchasing of new vehicles and vehicle modifications, use of taxis, contract mini-buses and sales tax exemptions for modifications are recommended. /TRRL/

Pak-Poy (PG) and Associates Proprietary Limited Monograph July 1978, 77 p.; ACKNOWLEDGMENT: TRRL (IRRD 238071), Australian Road Research Board

34 300366 THE VALLEY TRANSIT DISTRICT EVALUATION STUDY: THE EVOLUTION OF A FLEXIBLE TRANSIT SYSTEM. This paper discusses transit service for the elderly and handicapped and low income persons provided by the Valley Transit District in Connecticut. A computer was intended to provide a billing function for the service; and in addition, it was planned that it serve as a tool for more efficient dispatching. However, this never occurred; and the computer, which is not operational at present, is not likely to be repaired in the immediate future. A radio communication system, which was built into each vehicle initially, has been maintained; and it has permitted more efficient dispatching of vehicles as well as immediate notification in case of breakdown of vehicles of malfunction. There has been a problem with the Transit District Vehicles. The original buses, which established a standard in rider comfort and attractiveness that no subsequent units have been able to match, were mechanically unable to meet service demands; and all six of those vehicles have been out of service for at least three years. The second group of vehicles had a similar fate; however, the present fleet seems to be relatively stable. Management of the transit district has been extremely difficult, and marketing efforts have always been minimal and frequently of negative nature. The operating costs have been held remarkably consistent over the past three years, which is due in large part to increased state assistance and growing ridership from new services. Rider revenue has increased throughout the life of the District. Improvements of the Transit District's utilization will be effected, in large part, by more comprehensive coordination of the services with those of other modes.

Ferrigno, J, Executive Director Berkowitz, S ; Valley Regional Planning Agency Apr. 1979, 66 p., 17 Fig.; Sponsored by Connecticut Department of Transportation, Valley Municipalities,

Department of Transportation, Urban Mass Transportation Administration, Tri-State Regional Planning Commission.; Contract TSH-211 IT-09-006; ORDER FROM: Valley Regional Planning Agency, Derby, Connecticut

34 300453 VEHICLES AND SYSTEMS FOR TRANSPORTATION OF DISABLED. Suitable modified vehicles and personal assistance are often prerequisites for the disabled and elderly to be able to travel. Experimental studies have provided guidelines for modification of taxi cabs. Volvo's prototype taxi, which can be used by a person confined to a wheelchair, is described. The problems of entry and exit associated with special vehicles for transport of the disabled and the question of safety for people in wheelchairs during travel in these vehicles is discussed in relation to the results of experimental studies in which different models of wheelchairs, anchored in different ways and containing dummies, have been subjected to crash tests. Measures aimed at making it easier for the elderly and disabled to travel by town buses and long-distance coaches are discussed in relation to various experiments and practical tests. Development work in designing better wheelchairs with the aim of facilitating travel is discussed. A special wheelchair that can be carried and lifted is described. /TRRL/

Brattgaard, SO; Gothenburg University, Sweden Stencil 61, Oct. 1978, 33 p., 3 Fig., 4 Phot., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240389), National Swedish Road & Traffic Research Institute

34 300698 OVERVIEW OF THE SOCIAL SERVICE INSURANCE DILEMMA. ABRIDGMENT. The General Accounting Office estimates that there are 112 federal programs which serve the needs of the elderly and the handicapped by transporting either the service to the client or the client to the service. In addition, there are several programs of the Department of Labor, the Department of Transportation, and programs under the Comprehensive Employment Training Act. The operation of a program is briefly described, and it is shown that efforts to meet intense social needs are totally frustrated by insurance limitations. Insurance limitations problems encountered by social-service agencies are discussed and 6 recommendations which emerge from the study are presented. The impact of the proposed changes on social-service transportation projects are also discussed.

Davis, FW, Jr (Tennessee University, Knoxville) *Transportation Research Record* No. 696, 1978, pp 38-40; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

34 300714 IDENTIFYING AND SERVING THE ELDERLY AND HANDICAPPED IN RURAL AREAS. ABRIDGMENT. It is noted that more data is available on auto ownership by elderly persons than on the needs of handicapped persons. The relative transportation disadvantage of elderly households is compounded by the high incidence of such households in rural areas. Local social service and welfare agency data can provide details of handicapped persons without access to automobiles. Data on hospitals, clinics and senior citizens offer information on the physical, economic and other characteristics of their clients. In

addition to addresses and other information from these organizations, supplementary data can be obtained from direct surveys. Information obtained from state highway and transportation departments could be used in conjunction with the other sources to identify the primary target groups. Rural inhabitants who are neither elderly nor handicapped and who would desire public transportation may also be identified.

Eckmann, A (Institute of Public Administration) *Transportation Research Record* No. 696, 1978, pp 87-88, 1 Tab., 2 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

34 300978 DEVELOPMENT OF TRANSPORT SYSTEMS FOR DISABLED PERSONS [Utveckling av system foer handikappades transporter]. This report is a summary of previous reports on a project regarding the development of transport systems for handicapped persons. The project was carried out by Volvo in cooperation with the institute for traffic safety, Chalmers University of Technology. The report contains a discussion of the market for vehicles together with some viewpoints regarding anthropometric measurements of interest to designers of vehicles for transport of handicapped persons. Different bus and taxi systems are presented together with a demand specification. /TRRL/ [Swedish]

Brattgaard, SO Aldman, B; Gothenburg University, Sweden Stencil 56, Dec. 1977, 19 p., 2 Fig., 3 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 241304), National Swedish Road & Traffic Research Institute

34 301055 USE OF TRAVEL DIARIES IN COLLECTION OF TRAVEL DATA ON THE ELDERLY AND THE HANDICAPPED. ABRIDGMENT. Because other data collection methods, such as retrospective travel surveys and on-board user surveys, have not provided statistically reliable results, a method is proposed whereby each survey subject records in a diary each trip made over a specified and extended period of time, thus precluding memory lapses and reducing random variations. This paper reports on the planning and implementation of a before-and-after survey of elderly and handicapped users of a user-side-subsidy demonstration project in Lawrence, Massachusetts, which incorporates diary techniques. The study plan called for the diary survey to be administered once before the start of the project and then again a year after to monitor changes in travel patterns. The survey field plan had four stages: preliminary screening, field contact and training for the pilot test, conduct and review of the pilot test, and conduct of the main survey. In both the pilot and main survey, a random sample of elderly and handicapped were selected and then contacted for a 2 minute screening interview. The participants were then given the diaries (which, as the result of previous surveys) were designed to be as concise and simple as possible) which were collected once a week. (This continuing contact was later judged to be an important factor.) Major literacy or comprehension problems were not encountered. Ultimately, 195 of the 196 elderly and 90 of the 93 nonelderly handicapped completed the main survey. No diary was rejected because of unusable results or sloppy or suspicious reporting.

Kuzmyak, JR (Comsis Corporation) Prenskey, S (Transportation Systems Center) *Transportation Research Record* No. 701, 1979, pp 36-38, 6 Ref.

This paper appeared in TRB Research Record No. 701, Applications and Use of Transportation Data.; ORDER FROM: TRB Publications Off

34 301720 ANNUAL REPORT OF THE LIAISON COMMITTEE FOR THE CARRIAGE OF DISABLED PERSONS [Rapport annuel du Comite de Liaison pour le transport des personnes handicapees]. The problems of proving transport for the disabled are described and details given of the legal aspects of efforts made by the public authorities. The results of work by the COLITRAH are listed: criteria governing access to public transport systems, rail transport, vehicles for the disabled, air transport, other public transport and private cars. [French]

Conseil Superieur des Transports SNCF Cat 26 N42, Mar. 1979, 110 p., Tabs.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Conseil Superieur des Transports, 55-57 Avenue Kleber, 75784 Paris Cedex 16, France

34 301934 OPERATIONAL IMPROVEMENTS FOR SPECIAL TRANSPORTATION SERVICES FOR THE HANDICAPPED. This study has two principal objectives: to investigate the factors influencing the effectiveness and efficiency of special public transportation services for the handicapped, and to develop a series of recommendations to improve the operations of these systems. As a secondary objective a permanent information sharing mechanism for special service operators in Canada was to be evaluated. /TRRL/

Department of Transport, Canada, Stanley Associates Engineering Limited Monograph Mar. 1979, 86 p., 2 Fig., 10 Tab.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada (IRRD 241555), Roads and Transportation Association of Canada

34 302122 RETROFITTING TRANSIT STATIONS: POTENTIAL OPERATIONAL IMPACTS. Congress has mandated that at least the key stations of rail rapid transit systems in the older urban areas be retrofitted to make them accessible to persons in wheelchairs or otherwise handicapped persons. The potential operational impacts of such retrofitting fall under the areas of safety, security, service, and cost. These impacts are discussed in relation to the retrofit of individual stations, the effects of the individual station upon the system, the effects of the mix of accessible and nonaccessible stations upon the user and the system during the retrofit period, or permanently if the key station approach is followed, and to the perceptions of the user. The safety consequences of an unavoidable mix of accessible and inaccessible stations must be determined. It is noted that anything that adds to station congestion will subtract from the attributes of service. In addition to the impacts of degraded safety and security and service, there is the impact of increased cost. It is concluded that the impact of station retrofitting will not be conducive to increased employee productivity. The transit operator will also face the potential of increased labor costs as a consequence of station retrofit. The observation is made that the potentially high unproductive use of scarce fiscal resources in station retrofit is frustrating.

Andrus, DL, Jr (Port Authority Transit Corp of Penn & New Jersey) *Transit Journal* Vol. 5 No.

3, 1979, pp 57-64

34 302261 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME VIII: ACCESS FOR ELDERLY AND HANDICAPPED PERSONS WORKSHOPS. This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Access for Elderly and Handicapped Persons. Part I deals with planning and regulation and includes discussions of transportation problems of handicapped people and transportation policies and practices as they affect handicapped people. Part II, demonstrations and hardware, includes discussions of concepts under development in the area of transportation for the elderly and handicapped hardware research and development to improve transit for elderly and handicapped travellers, and a critique of research concerning transportation for the elderly and handicapped. This volume contains five resource papers which are summarized in Volume I of this multi-volume work along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants. These proceedings (Rpt. Nos. UMTA-DC-06-0157-79-1 thru UMTA-DC-06-0157-79-9) consist of nine separately titled volumes, namely: Volume I: Proceedings of General Sessions and Summarized Reports of Workshops; Volume II: Bus and Paratransit Technology Workshops; Volume III: AGT and Advanced Systems Workshops; Volume IV: Service and Methods Demonstration Workshops; Volume V: UMTA Special Technology Programs Workshops; Volume VI: Rail and Construction Technology; Volume VII: Transit Management Workshops; Volume VIII: Access for Elderly and Handicapped Persons Workshops; and Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association, Urban Mass Transportation Administration, (DC-06-0157) UMTA-DC-06-0157-79-8, Nov. 1978, 50 p.; This report is a sequel to reports: Proceedings of the UMTA/APTA R&D Priorities Conference, February 1978 (PB 255-898); and Proceedings of the Second R&D Priorities Conference, December 1976 (PB 266-158); Contract DOT-UT-70026; ORDER FROM: NTIS; PB-300993

34 302434 ALTERNATIVE TRANSPORT FOR THE HANDICAPPED IN THE NETHERLANDS. A TYPOLOGY, TEXT AND APPENDICES [Alternatief verkeer voor gehandicapten in nederland. Een typologie, tekst en bijlagen]. Nine categories of alternative transport systems for handicapped (altev) are distinguished: volunteer organizations, taxicab companies, nursing-homes, revalidation centres, homes for the aged and nursing-home combinations, general systems, motor coach companies, residential centres and social work-shops. They are compared regarding technique, organisation, financing, use, efficiency, costs and users. A comprehensive picture of each category is given. Design and course of the project are explained. A separate appendix contains an extensive description of 36 system operators, divided into the nine categories. /TRRL/ [Dutch]

Werner, C; Adviesgroep voor Verkeer en Vervoer BV Monograph Aug. 1978, 123 p., Figs., Tabs.,

Photos., 42 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241906), Institute for Road Safety Research

34 302688 THE IDEAL DESIGN OF A SCHOOL BUS STOP. EVERYTHING CONCERNING PLANNING, COSTS, EQUIPMENT AS EXEMPLIFIED BY RINGSTRASSE IN WINNENDEN [Musterbeispiel Einer Schulbushaltestelle. Alles ueber Planung, Kosten, Einrichtung, Dargestellt am Beispiel Winnenden, Ringstrasse]. The documentation reports on an "ideal school bus stop", and the support received from the press and local and central government authorities. It contains the requirements of the adac concerning school bus transport, a review of the dangers and potential accident situations involving children at bus stops, photos which record the improvement of the safety aspect of the bus stop, a layout plan of the bus stop, the new school bus stop sign proposed by the ADAC, a cost plan, press releases from the ADAC, the reaction in the press and the comments of the ministries. /TRRL/ [German]

ADAC Wuerttemberg Monograph 1977, 16 p., 3 Fig., 1 Tab., 9 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 307946), Federal Institute of Road Research, West Germany

34 302938 TRAVEL AND THE HANDICAPPED: A PROJECT SUMMARY. A series of related studies of the travel characteristics and problems of physically handicapped people were carried out to identify the scope for improvements in transport provision. This report summarises the findings of these studies. The main forms of enquiry were a survey of organisations for the physically handicapped, a small behaviour study, and surveys of physically handicapped travellers and non-travellers; a bibliography was also prepared. An attempt was made to relate type of disability with travel problems, and also to look at the effect of urban deprivation on the travel patterns of handicapped people. Walking was the most frequently used form of transport, followed by car, then bus; other modes did not provide a significant amount of mobility. The report identifies some of the main problems encountered in travel by handicapped people, of which those associated with the level access appeared to be the most common. Methodological problems encountered with studies of this population are also discussed. (TRRL)

Feeney, RJ Ashford, NJ Morris, A Gazely, D (Loughborough University of Technology, England); Transport and Road Research Laboratory SR 480, 1979, 16 p., 4 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242040)

34 302954 TRANSPORT FOR THE ELDERLY AND THE HANDICAPPED-AN OVERVIEW FROM THE LATE 70'S. Over the last ten years, there has been considerable interest in a number of countries in the accessibility and mobility problems of the transport disadvantaged particularly the elderly and the handicapped. The authors summarize the rationale that has been used in the examination of needs and demand and in the provision of infrastructure in the form of vehicles and installations. The paper outlines some of the more important policies relating to the United States, Great Britain, France and a number of other countries. (TRRL)

Ashford, N (Loughborough University of Technology, England) Bell, WG (Florida State University, Tallahassee) *Transportation Planning and Technology* Vol. 5 No. 2, 1979, pp 71-78, 4 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242186)

34 303466 SERVICE QUALITY IMPLICATIONS OF TRANSBUS. The results of this bus service simulation indicated that mobility limited riders of handicapped-accessible buses can cause late bus arrivals, deteriorated reliability or slower bus travel times. The investigation was designed to analyze the purchase of Transbus, a kneeling, wide-door, ramp equipped urban bus. Reasonable levels of transit travel demand for the mobility limited and estimates of the time required for their boarding and alighting of Transbus were used as inputs to a simulation model. Three different types of bus service and different levels of handicapped patronage were combined in a series of experiments designed to test the sensitivity of bus service to delays associated with the boarding and alighting of transportation handicapped persons. The magnitude of the deterioration in the bus service is dependent upon the number and type of handicapped persons as well as the distribution of their arrivals and departures along the bus route. Levels of handicapped ridership between 2% and 5% are enough to consume the time saved by faster boarding times for mobile passengers on the improved buses; higher handicapped travel demand levels affect the performance and reliability noticeably.

Polzin, SE (Northwestern University, Evanston) Schofer, JL *ASCE Journal of Transportation Engineering* Vol. 105 No. 5, Sept. 1979, pp 561-576, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

34 303645 EVALUATION OF ADDITIONAL COSTS FOR MAKING PUBLIC TRANSPORTATION ACCESSIBLE TO THE HANDICAPPED. The study made in the Federal Republic of Germany is described. The study deals with possible measures for handicapped persons in public transport systems, an estimation of costs and the possibilities of realization.

Blennemann, F Pajonk, E *Transportation Planning and Technology* Vol. 5 No. 2, 1979, pp 105-114; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

34 303943 OVERVIEW OF ACCESSIBLE BUS SERVICES. By December 1978, the number of transit authorities that operated fixed-route, wheelchair-accessible bus services totaled five. This paper is intended to disseminate information about these initial efforts. The majority of the operational data and results are from the experience of the St. Louis metropolitan area with accessible bus service, which was operated by the Bi-State Development Agency. Very few persons who use wheelchairs have used the fixed-route accessible bus services to date. Ridership has averaged only a few trips per day. However, the reliability of the services has been poor and some wheelchair boardings have been denied due to unavailability or malfunctioning of lift equipment. Consequently, judgment of the effectiveness of accessible bus services based on this early experience is premature. Accessible bus operations can have a substantial economic impact. In

addition to the capital cost of the lift equipment, operating costs have increased due to the heavy lift maintenance and repair workload and, to some extent, to the changes in operational procedures that partial accessibility may necessitate. Due to the low number of riders who are wheelchair users, the overall mobility of this population group would seem to be little changed.

Casey, R (Transportation Systems Center) *Transportation Research Record* No. 718, 1979, pp 47-52, 4 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

34 304119 TRANSPORTATION FOR THE ELDERLY OR PHYSICALLY HANDICAPPED (A BIBLIOGRAPHY WITH ABSTRACTS). Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities.

Young, ME ; National Technical Information Service Aug. 1979, 275 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0840/3ST

34 304642 A METHODOLOGY FOR EVALUATING THE EFFECTIVENESS OF TRANSPORTATION IMPROVEMENTS FOR THE ELDERLY AND HANDICAPPED. The research project is a study dealing with the evaluation of transportation services from the viewpoint of the elderly and handicapped users. The objective of the research is to develop a cost-effectiveness methodology for evaluating existing services and transportation improvements; and to develop suggested service design standards for different types of handicap severity. The transportation services considered are the City Transit System (bus and subway); taxi service; EASYRIDE service; and the amulette service.

Falcocchio, J ; Polytechnic Institute of New York, Department of Transportation Final Rpt. TR-78/503, DOT/RSPA/DPB/50-79/2, June 1979, 111 p.; Contract DOT-OS-70084; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300440/SST

34 305539 COORDINATING TRANSPORTATION SERVICES FOR THE ELDERLY AND HANDICAPPED. EXECUTIVE SUMMARY. The summary presents an overview of a two-volume report which examines the nature and extent of legislative barriers and incentives to coordinated transportation services for the elderly and handicapped. Eight federal statutes are analyzed with regard to funding, planning, and service requirements. Incentives for state and local agency participation as well as regulatory reform are recommended for further consideration. Establishment of human service transportation authorities within the states, and Office for Coordinated Transportation in HEW and DOT are proposed. In the context of this report, coordination of transportation means sharing existing transportation resources through interagency cooperative agreements.

Cutler, DA Knapp, SF ; Ecosometrics, Incorporated, Office of the Asst Secretary for Policy & Intl Aff Final Rpt. Jan. 1979, 52 p.; See also Volume 2, PB80-111180. Also available in set of 3 reports PC E11, PB80-111156.; Contract

DOT-OS-60180; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111164

34 305540 COORDINATING TRANSPORTATION SERVICES FOR THE ELDERLY AND HANDICAPPED. VOLUME I: STATUTORY AND REGULATORY ANALYSIS OF INCENTIVES AND BARRIERS TO COORDINATING TRANSPORTATION SERVICES FOR THE ELDERLY AND HANDICAPPED. The report contains the findings and conclusions of a two-part study of coordinating transportation for the elderly and handicapped. Part I analyzes the incentives and barriers to coordinated transportation that appear in the statutes and regulations governing eight Federal programs. The document is intended as a guide for planners and providers of human service transportation, to alert them to opportunities for coordination that exist within the framework of the Federal programs included in the study and to the barriers posed by certain regulatory provisions. The model billing and accounting system has been reviewed and discussed in terms of its applicability at the local level with each of the programs included in the study, as well as with officials of OMB, GAO, and HEW.

Cutler, DA ; Ecosometrics, Incorporated, Office of the Asst Secretary for Policy & Intl Aff Final Rpt. Jan. 1979, 151 p.; See also Volume 2, PB80-111180. Also available in set of 3 reports PC E11, PB80-111156.; Contract DOT-OS-60180; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111172

34 305541 COORDINATING TRANSPORTATION SERVICES FOR THE ELDERLY AND HANDICAPPED. VOLUME II: A MODEL UNIFORM BILLING AND ACCOUNTING SYSTEM FOR COORDINATED TRANSPORTATION SYSTEMS. This is Volume II of a two-volume report which examines the nature and extent of legislative barriers and incentives to coordinated transportation services for elderly and handicapped persons. This Volume contains a model billing and accounting system that could be useful to local agencies and organizations attempting to coordinate their transportation services. This model addresses the common administrative problems (and barriers to coordination) of accounting, allocation/billing, and certification of funding sources. In addition, an analysis of the federal regulations pertaining to fiscal management procedures is provided.

Knapp, SF ; Ecosometrics, Incorporated, Office of the Asst Secretary for Policy & Intl Aff Final Rpt. Jan. 1979, 127 p.; See also Volume 1, PB80-111172 and Executive Summary rept., PB80-111164. Also available in set of 3 reports PC E11, PB80-111156.; Contract DOT-OS-60180; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-111180

34 305864 A REQUIREMENTS ANALYSIS DOCUMENT FOR TRANSIT VEHICLE WHEELCHAIR LIFT DEVICES. The purpose of the document is to provide guidelines for the design and evaluation of wheelchair lift devices for public transit vehicles (buses and light rail vehicles). Included is an analysis of wheelchair and maneuvering dimensions and their impact on both the lift system and transit vehicle design. Much of the content deals with general safety

considerations and vehicle interior design which are the same for ramp or lift devices. A total of sixty three (63) requirements and recommendations are presented covering the design and operation of the lift, the vehicle lift interface, the vehicle interior, and the reliability and maintainability of the system. In addition, the report discusses evaluation parameters needed to assess the cost of public transit lift devices.

Sanders, MS ; Canyon Research Group, Incorporated, Urban Mass Transportation Administration, (UMTA-CA-06-0101) Final Rpt. UMTA-CA-06-0101-79-1, June 1978, 87 p.; See also PB-294 711.; Contract DOT-UT-60106T; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-127038

34 307849 ACCESSIBILITY AS THE OBJECTIVE OF PUBLIC TRANSPORTATION PLANNING: AN INTEGRATED TRANSPORTATION AND LAND USE MODEL. An analysis of the system to be planned is carried out. A comparison with a survey on the traffic and transportation models available in the literature, though very voluminous, reveals a lack of a general model-framework for planning public transportation in sparsely populated areas. A discussion is presented of how to evaluate optional plans for the physical and socio-economic structure of a region and concludes that this must be done by means of accessibility. A model is presented which describes the inter-dependence between, on one hand the demand of accessibility of the population, and on the other hand the transportation system, both public and private, and the location of facilities and residential areas. The applicability of some standard transportation and traffic models is discussed.

Holst, O (Royal Technical University of Denmark) *European Journal of Operational Research* Vol. 3 No. 4, July 1979, pp 267-282, 20 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

34 307931 PRODUCTIVITY OF VEHICLE TRANSPORT FOR THE ELDERLY AND HANDICAPPED. This paper reports on the provision of public transportation for the handicapped and elderly in Canada. Their demand for travel is examined; the vehicles used and the productivity experienced. Methods of increasing vehicle productivity are suggested and a set of operating policies proposed.

Navin, FPD (British Columbia University, Canada) *Transportation Planning and Technology* Vol. 5 No. 2, 1979, pp 99-104, 9 Ref.; ACKNOWLEDGMENT: EI, TRRL (IRRD 243574); ORDER FROM: ESL

34 308066 THE VALLEY TRANSIT DISTRICT: SPECIALIZED TRANSPORTATION FOR THE ELDERLY, HANDICAPPED AND LOW-INCOME IN THE LOWER NAUGATUCK VALLEY, CONNECTICUT. A multifaceted demonstration with special emphasis on service to the elderly and handicapped has been operating since January 1973. Valley Transit District (VTD) achieved operational status as a transit district in Connecticut after a demonstration grant ended, and is providing services to its target population and the general public. It has had a large impact on the mobility of a small portion of the target population, with lesser impacts on the general public. This report covers the entire period of the demonstration program.

Four types of service are operated by VTD: fixed-route, demand responsive door-to-door, subscription, and contract services. An automated fare collection system using credit cards and monthly billings was used from 1973-1975. Fare subsidization for handicapped and elderly citizens was facilitated by this computerized system which bills sponsoring agencies. The user-side subsidies and monthly billings were continued after 1975 using manual methods. Of the target population of 12,000, 600 are regular, heavy users of the VTD system. VTD users are mainly low-income and autoless elderly from small households. The system operates 10 vehicles daily; average hourly cost is near \$12. Earned revenues are derived from user-side subsidy funds. VTD has withstood several challenges in regulatory and institutional areas from private bus operators and has expanded services throughout the demonstration. (UMTA)

Kocur, G ; Cambridge Systematics, Incorporated, (CT-06-0003) Final Rpt. UMTA-CT-06-0003-79-1, Feb. 1979, 310 p.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract DOT-TSC-1083; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB80-113087

34 308078 PUBLIC TRANSPORTATION AND THE TRAVEL NEEDS OF WOMEN.

The existing literature relating to women's use of public transportation is reviewed. The kinds of travel needs that should be considered in developing suitable public transit alternatives for women are discussed, and two recent innovations that appear to meet the needs are described. Comments are made on case studies in Seattle, New York and some small cities. The recent innovations discussed are demand-responsive transit and the exclusive lane busways. The demand-responsive service which utilizes smaller vehicles (minibuses or taxis) is better suited to low or medium density areas with dispersed travel patterns than conventional fixed-route bus service. A recent study of an exclusive-lane commuter bus service in Miami revealed that 70% of all passengers are women, 98% of all trips are work trips, and 25% of all passengers did not make the trip prior to institution of the service. Suggestions are made for future research.

Guiliano, G (California University, Irvine) *Traffic Quarterly* Vol. 33 No. 4, Oct. 1979, pp 607-615, 1 Tab.

34 308780 MOBILITY FOR THE ELDERLY AND HANDICAPPED. FRENCH POLICY IN RELATION TO THE TRANSPORT OF PERSONS WITH REDUCED MOBILITY. As a result of the law of orientation of handicapped persons in 1975, an interministerial working party was set up to survey the problems of transport for the handicapped, analyse solutions and create regulations to implement solutions. The resulting report concerned itself with regulations which are simultaneously concerned with the modification, adaptation and design of both fixed installations and rolling stock, the simplification of administrative procedures and their provision of special financial help to ease the problems of the transport integration of the handicapped. (Author/TRRL)

Ashford, N, Editor Bell, WG, Editor Ar-tand-Macari, MJ ; Loughborough University of Technology, England 1978, n.p.; ACKNOWLEDG-

MENT: TRRL (IRRD 243843)

34 308781 MOBILITY FOR THE ELDERLY AND HANDICAPPED. THE MOBILITY OF THE ELDERLY AND DISABLED IN GREAT BRITAIN: AN OVERVIEW. This paper summarizes some of the developments of the past ten years which have brought benefits to elderly and disabled people with mobility problems. In the case of the elderly it identifies concessionary fares schemes as having been of considerable importance despite the unfairness of their distribution and value. It is argued that the elderly could be further helped in the future, if the results of recent research on vehicle design, lead to new generations of public transport vehicles which are accessible and comfortable for the widest possible span of passenger capabilities. Those disabled people who are unable to use public transport are now being helped by a new form of benefit called the 'mobility allowance', which is described. However, despite much goodwill the needs of the elderly disabled are inadequately met and this is identified as an important problem to which solutions have yet to be found. (Author/TRRL)

Ashford, N, Editor Bell, WG, Editor Garden, JM . Loughborough University of Technology, England 1978, n.p.; ACKNOWLEDGMENT: TRRL (IRRD 243842)

34 308783 MOBILITY FOR THE ELDERLY AND HANDICAPPED. TRANSPORTATION PROBLEMS OF THE ELDERLY AND HANDICAPPED: AN OVERVIEW OF AMERICAN EXPERIENCE. This paper reviews the experience in the United States since 1970 as regards the transportation problems of older and handicapped americans. The paper identifies the basic nature of the problem in terms of low income, low levels of auto ownership, poor transit availability, and system design problems. The paper then reviews the scope of the problem in terms of the number of elderly and handicapped, their location geographically and in terms of urban and rural places, and explores some of the implications thereof. A review is undertaken of the transportation systems presently serving the elderly and handicapped including public transit, taxis, school buses, personal transportation via the automobile, special and private systems. The basic characteristics of each of these systems is described covering service, operating levels and costs. Finally, the paper presents an evaluation of present US systems discussing three levels of system activities: funding, institutional, and planning and operational problems. The paper draws some basic conclusions of relevance for other countries. (Author/TRRL)

Ashford, N, Editor Bell, WG, Editor Revis, JS ; Loughborough University of Technology, England 1978, n.p.; ACKNOWLEDGMENT: TRRL (IRRD 243844)

34 309264 PUBLIC TRANSPORT OF HANDICAPPED PEOPLE [Le transport en commun des handicapés]. The problem of the transport of handicapped people has been extensively studied during the last three years. This article describes different types of vehicle specially designed for the transport of disabled persons and outlines the technical problems arising from this type of transport service: access to the vehicle and posi-

tioning of wheelchairs in the vehicle itself. Following the example of Nancy, the town of Toulouse is setting up an experiment by establishing a special budget, details of which are presented in tabulated form. (TRRL) [French]

Derray, RT, Editor *Le Poids Lourd* No. 742BIS, Apr. 1977, pp 41-45, 3 Tab., 15 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105514), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

34 310031 PERSONAL MOBILITY AND TRANSPORT REQUIREMENTS OF THE ELDERLY. This report contains the text of a chapter of a forthcoming book, Towards an older Australia (edited by Anna Howe and to be published by Queensland University Press in 1980). The available evidence on the transport and mobility requirements of the elderly is surveyed and summarised, with particular emphasis on Australian experience. The elderly are shown to have some special transport needs, although their travel behaviour is not so different from the rest of the population as is sometimes thought. The mobility problems of the elderly have more to do with the quality of their travel rather than the quantity of travel undertaken. The decline in personal mobility of the elderly is largely brought about by their failing physical capabilities and their reduced incomes, although environmental considerations also play a part. The elderly adapt to their declining mobility in a number of ways: by concentrating on "essential" trips to the doctor, the shops, or the bank; by confining travel to less congested daylight hours; by shifting to slower modes of travel; and by reducing the distances travelled. Planning which is sensitive to these differences can help to minimise the mobility problems of the elderly and help them to maintain an independent lifestyle. Special attention must be given to the convenient location of essential services, the quality of the pedestrian environment, and improved public transport. (Author/TRRL)

Morris, JM ; Australian Road Research Board Monograph AIR 344-1, Oct. 1979, 29 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239557), TRRL

34 310258 TRANSPORTATION FOR THE ELDERLY. This book is the result of a 2 year study to develop a methodology for determining the future mobility needs of the elderly as a function of their future locational patterns and travel behavior. The first chapter on the diversity of lifestyles among the elderly, examines socio-economic and political factors affecting future transportation policy, demographic changes and their consequences, anticipated changes in mobility and the concept and role of lifestyle. Chapter 2 examines the lifestyles of the elderly in Los Angeles County, and Chapter 3 examines the relationships between lifestyle and travel behavior. Current transportation services for the elderly are reviewed including bus service, taxi service and other specialized services. The fourth chapter (the changing social setting of the elderly) covers the analytical framework for the longitudinal analysis, the history of residential location, and the differentiation of cohort, aging and period effects. The sixth chapter covers population forecasting methodology, forecast scenarios and housing market projections. Future travel patterns of the elderly are covered in

Chapter 7. The last chapter (8) reviews the interpretation of transportation needs, national priorities, goals of transportation policy, service coordination, user-side subsidies, and the role of the automobile in the subsidies, and the role of the automobile in the mobility of the suburbanized elderly.

Wacks, M (California University, Los Angeles); California University Press, Limited 1979, 262 p., 44 Fig., 50 Tab.

34 310540 STOCKHOLM'S TRANSPORT FOR ELDERLY AND HANDICAPPED: AN INTEGRATED MODEL. Stockholm's programme of special transportation, administered by the Greater Stockholm Public Transport (SL) is composed of three elements (a) a demand responsive service utilizing commercial taxis for individual trips, (b) a fleet of modified minibuses for routine and repetitive trips, both offering door-to-door service, and (c) continued modification of conventional public transport vehicles and equipment to extend their accessibility for handicapped trip makers. Commercial taxi service is described as the primary source of transportation, with 91 per cent of those eligible being provided with special authorization cards. The user pays three crowns, the current mass transit fare to the driver, and the taxi company is reimbursed by SL at the metered rate. Reimbursement controls associated with the 2500 taxis participating in this scheme are described, and statistics provided on journey details and costs. A fleet of 135 modified minibuses caters for those who cannot or need not use taxis, with three quarters of the trips being associated with home to and from school and clinic journeys. Details of the vehicles, journey schedules and driver training are presented. Reference to public transport accessibility indicates the installation of lifts at all subways, and escalators from street and or ticket levels to station platforms. Financing and costs are discussed. (TRRL)

Bell, WG (Florida State University, Tallahassee) Bell, RS (Stockholm University, Sweden) *Transportation Planning and Technology* Vol. 5 No. 2, 1979, pp 79-86, 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 243573)

34 311247 ALTERNATIVE TRANSPORT FOR SEVERELY DISABLED PERSONS IN THE CITY OF UTRECHT. AN INVENTORY STUDY [Alternatief vervoer voor zwaar gehandicapten in de stad Utrecht. Een inventariserend onderzoek]. According to the Dutch Central Bureau of Statistics 8.7 per cent of the Dutch population of 5 years and older is physically handicapped. For these persons in society provisions are needed; such as the accessibility of buildings and provisions in traffic, recreation, communication and transport. This report discusses alternative transport requirements for maintaining social contacts for severely disabled persons in the city of Utrecht. The need for such transport is shown by the fact that severely disabled persons can only take part in the social life if transport is available for them. Results of interviews held and possibilities for alternative transport are presented and discussed. Aspects of efficiency and cost of different alternative systems are mentioned. (TRRL) [Dutch]

Denter, C; Stedelijke Stichting Welzijnsbevordering, Utrecht Monograph Jan. 1979, 65 p., 13 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL

(IRRD 245424), Institute for Road Safety Research

34 311298 SHARE A FARE: A USER-SIDE SUBSIDY TRANSPORTATION PROGRAM FOR ELDERLY AND HANDICAPPED PERSONS IN KANSAS CITY, MISSOURI. The Share A Fare (SAF) program in Kansas City, Missouri, is a user-side subsidy program designed by the City to provide low-cost door-to-door transportation for the City's elderly and handicapped citizens. The City, acting as broker, coordinated between user and provider by enrolling participants, enlisting providers, and matching the two through the trip scheduling process. Share A Fare began operation in May 1977 and is totally funded through a 1/2, city sales tax designated for transportation purposes. After 20 months of service, SAF has 13,182 enrollees and subsidizes almost 11,000 trips a month. The transportation service is provided by three not-for-profit agencies, two taxicab companies, one for-profit medical provider, and three city-owned vans. The service is available for any Kansas City resident who is 65 years of age or older or physically disabled. SAF participants fall into two major categories: the affiliated rider, who is a client of a social service agency carrier, and the unaffiliated rider, who is a non-client. This final report documents the Share A Fare project during its first 20 months of operation. The purpose of this report is to describe how the project works and to identify key features and their impacts on program success. The study relied upon available data, which included an inventory of services of elderly and handicapped, a project survey, and various project staff reports. Personal interviews were conducted with service providers and all major agencies involved in planning services for elderly or handicapped in Kansas City. Data is presented on project design and planning; operating characteristics; and on the project's impact on service providers, users, and city sponsor. SAF has demonstrated that the City, acting as broker, can effectively coordinate transportation service between users and providers. (UMTA)

Dorosin, E Phillips, J; Crain and Associates, Urban Mass Transportation Administration, (MA-06-0049) Final Rpt. UMTA-MA-06-0049-7911, July 1979, 96p; Contract UM927-R9742; ORDER FROM: NTIS; PB80-142193

34 311816 TRANSPORT SCHEMES. This booklet, intended to help local age concern groups, gives advice on the method and requirements of voluntary schemes to assist the mobility of elderly people. After analysing the activities that need to be supported, bus operators should first be approached with a view to improving existing schemes. If this is not possible, consideration should be given to the possibilities of using private cars, a minibus or community transport. The relative merits of each type of scheme are discussed in detail. Some modifications are suggested to help accommodate the very frail or disabled. A plan of action is outlined once the type of scheme is agreed upon. Examples are given of the design and operation of a centralised and a diffuse car scheme and a jointly operated minibus service. (TRRL)

Richards, T *Age Concern Action Guide* Monograph Oct. 1978, 15 p.; ACKNOWLEDGMENT: TRRL (IRRD 244893)

34 312263 PROJECT MOBILITY FIRST-YEAR EVALUATION: FINAL REPORT. Project Mobility (PM), a one year demonstration project of demand-responsive transportation serving the transportation handicapped, is summarized and evaluated. The report addresses the quality of PM's service, its impact on the users' lives, the cost and its comparability to other innovative handicapped transportation systems. The registration procedure for potential PM users is discussed and the three classes of certification are explained. The characteristics of its users and the reasons given by other persons for non-use are presented with the opinions of current users. The operational data from Project Mobility's first year of operation is summarized, including ridership figures, trip purposes, travel patterns, productivity and vehicle utilization. The level of service is measured, based on vehicle and passenger reliability, the time between reservation and pick up, the number of trip denials, and travel time or trip length. Monthly costs of the project are given, also. Six case studies of selected users are given with information based on three interviews held throughout the year. Five other demand-responsive systems are then described and compared for Project Mobility. The service and performance standards prescribed for the project are summarized briefly. Future planning is addressed with special consideration given to estimation of the transportation of the handicapped, unmet needs, coordination with other para-transit services, future expansion costs and the impact of wheelchair accessible buses. Eight final recommendations, based on the evaluation, are made regarding the future of Project Mobility.

Applied Resources Integration, Limited, Metropolitan Transit Commission, Urban Mass Transportation Administration, (ARI Proj. No. 531) Final Rpt. MTC-SSR-0008, July 1979, 64 p., 4 Fig., 12 Tab., 1 App.; Contract MN-09-0015/0019

34 312270 TRANSPORTATION OPTIONS FOR THE MOBILITY DISADVANTAGED IN RURAL GEORGIA. The general relationships between and among 1) mobility, 2) personal income, 3) work activity in rural areas were examined, and the manner in which locations and time intervals impeded access to work and determined personal revenues and expenses was considered. Case studies were made of some counties in rural Georgia and of persons who are economically disadvantaged because their personal mobility limits and excludes locations and time intervals in which work is accessible to them. A series of policy proposals to solve the problems are proposed. The study demonstrated that personal mobility was a limiting factor on personal income and work activity particularly in rural areas and small places. Among the actions that were recommended are the following: an advocacy role should be assumed by economic development administrator and planners to enhance work mobility; the spatial dispersion relating non-worker and other potential employee residences to a proposed industrial or commercial activity should be determined; limitations to 1973 Federal-Aid Highway Act should be recognized; limits of demand-responsive and paratransit should be reviewed prior to implementation; and a personalized automobile grant program is technically possible for a spatially dispersed population.

Maggied, HS ; Georgia University, Athens May 1979, 296 p., 6 Fig., Tabs., Refs., Apps.; Contract DOT-I-79-17

34 312621 TRANSPORTATION SERVICES FOR THE ELDERLY. A PLANNING GUIDE PREPARED FOR THE N.C. GOVERNOR'S COORDINATING COUNCIL ON AGING. This planning guide is designed to aid communities and service agencies in their choices for setting up transportation services for the elderly. Preliminary steps involve defining service objectives, and may also involve determining need; several alternative methods of predicting demand are discussed. Alternatives to actual service include the special bus for the elderly. This service may be provided directly by the coordinating agency and include vehicles such as specially equipped vans, school buses, and station wagons. Cost, revenues, and legal issues of such service are discussed in depth. Another alternative is the reduced fare program whereby older adults may ride existing public transit at a reduced fare. Volunteer services, with private groups providing transit alternatives to the elderly are also discussed. Tables list federal, local, and private funding sources for providing transportation for older Americans.

Orlin, G ; North Carolina Univ., Chapel Hill. Extension Univ. 1975, 53p; Prepared in cooperation with North Carolina Governor's Coordinating Council on the Aging, Raleigh. Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210,

ACKNOWLEDGMENT:

NTIS; ORDER FROM: NTIS; ED-165753

34 312868 TRANSPORT AND THE ELDERLY: REQUIREMENTS, PROBLEMS AND POSSIBLE SOLUTIONS. This report examines the travel patterns of the elderly, and the problems which the experience the travelling in relation to those of the population as a whole. Data from a TRRL survey among old people in Guildford, and the 1975/76 National Travel Survey are used to show that even though the travel patterns and requirements within the elderly population vary considerably from person to person, they are similar in many respects to those of other people without cars. Problems occur mainly among a small group who experience serious constraints on their ability to travel while at the same time having an urgent need for mobility. It is suggested that the possibility of concentrating a greater proportion of the available resources on this group might be considered. Solutions could take the form of a special transport or home-based support service. The remainder of the elderly population, and younger people with a similar choice of transport modes, would benefit from improvements to conventional public transport and the walking environments, as well as from more conveniently located facilities. (Copyright (c) Crown Copyright 1978.)

Hopkin, JM Robson, P Town, SW ; Transport and Road Research Lab., Crowthorne, (England). 19 TRRL-SUPPLEMENTARY-4, c1978., 13; Also pub. as ISSN-0305-1315. Presented at the International Conference on Transport for Elderly and Handicapped Persons, Held at Cambridge, MA, on April 4-6, 1978.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-124928

34 313249 EQUITY IN URBAN TRANSPORTATION. The paper examines the various aspects of the equity issue in urban transportation, an issue which has become increasingly controversial in recent years. A number of data sets are analyzed to determine the extent to which poor, elderly, or handicapped persons suffer from sub-standard levels of mobility. The authors then assess the cost-effectiveness and political feasibility of a range of alternative policy measures designed to increase the mobility of these disadvantaged groups.

Altschuler, A Womack, J Pucher, J ; Massachusetts Institute of Technology, Department of Transportation DOT/RSPA/DPB-5-79/9, Dec. 1979, 86p; Contract DOT-OS-50240; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-154974

34 314369 PLANNING FOR THE PHASE-IN OF FIXED-ROUTE ACCESSIBLE BUSES. INTERIM REPORT NO. 1: REVIEW OF ACCESSIBLE TRANSIT SERVICES. This document presents a review of the current status of the various planning activities undertaken by the transit systems which are currently operating accessible buses to accommodate the handicapped and elderly persons in fixed-route services. The review of planning activities included detailed investigation of six case study systems, telephone interviews with other accessible transit system operators, and a review of the existing literature on the subject of accessible fixed-route transit.

Booz-Allen and Hamilton, Incorporated, Urban Mass Transportation Administration UMTA-IT-09-9010-80-1, Jan. 1980, 287p; Prepared in cooperation with Synergy Consulting Services, Northridge, CA.; SPONSORING AGENCY; Contract UMTA-IT-09-9010; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB80-184146

34 315277 TRANSIT STATION USE BY THE HANDICAPPED: VERTICAL MOVEMENT TECHNOLOGY. Transit station use by the handicapped is one area of concern affected by Section 504 of the Rehabilitation Act of 1973. Within any given transit station facility, problems related to vertical movement of level change (i.e., stairway and ramp width, ramp grades, stairway tread, height of risers, and use of escalators and elevators), especially for the handicapped, can be most critical. The Reston conference addressed some of these problems in light of existing and potential vertical movement technology. New transit systems or modifications to existing systems can incorporate appropriate designs to solve level-change problems that will accommodate Section 504 requirements. Design solutions for new stations may also be applicable to the adaptation of older stations. (Author)

Transportation Research Board, Urban Mass Transportation Administration, (UR 14) Final Rpt. UMTA-DC-06-0149-80-1, Apr. 1980, 68p, 9 Fig., Refs.; Proceedings of a conference held May 20-23, 1979 at the Sheraton International Conference Center, Reston, Virginia.; Contract DOT-UT-80040; ORDER FROM: TRB Publications Off

34 316805 DATA BASE STUDY FOR THE IDENTIFICATION AND QUANTIFICATION OF TRANSPORTATION HANDICAPPED PERSONS IN CANADA. This study provides a comprehensive data base for the identification and quantification of transportation handicapped (th) individuals in Canada. The data base consists of tabulations of the population of th individuals for Canada and for 58 cities/areas in Canada. Further, tabulations of demographic, socio-economic and transportation characteristics are given for the the population in Canada. The study comprises four volumes. The first of these contains the main study report while volumes two and three provide detailed supporting information. The fourth volume is a summary report. (TRRL)

Monograph Rept No. TP 22049, 1979, 580p, Figs., Tabs., Photos., Refs. ACKNOWLEDGMENT: TRRL (IRRD 246870), Roads and Transportation Association of Canada

34 318342 AN EVALUATION PACKAGE FOR SPECIALIZED ELDERLY AND HANDICAPPED TRANSPORTATION SERVICE. In order to evaluate the multitude of specialized elderly and handicapped transportation systems now operating in Massachusetts, the Massachusetts Executive Office of Transportation and Construction (EOTC) developed a special service evaluation package. Objectives, measurement criteria, and standards were established, and questionnaires were designed to compare system performance with the measurement criteria and standards. The questionnaires include a ridership survey and a questionnaire for the transportation program administrator. The evaluation package was applied to 11 different special systems operating in the greater Springfield, Massachusetts area for the Pioneer Valley Transit Authority (PVRTA).

Karash, KH Lenoff, MD ; Massachusetts Executive Off of Transp & Construct PUB-10039-32-50-1277, Nov. 1977, 34p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-192388

34 318794 TRANSPORTATION FOR THE ELDERLY OR PHYSICALLY HANDICAPPED. 1964-1978 (CITATIONS FROM THE NTIS DATA BASE). Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities. (This updated bibliography contains 221 citations, none of which are new entries to the previous edition.)

Young, ME ; National Technical Information Service July 1980, 229p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-813009

34 318795 TRANSPORTATION FOR THE ELDERLY OR PHYSICALLY HANDICAPPED. 1979-JULY, 1980 (CITATIONS FROM THE NTIS DATA BASE). Reports on planning public transportation for elderly persons or those persons who are physically disabled are cited. Studies are included of difficulties encountered, special design, and real and potential use of facilities. (This updated bibliography contains 106 citations, 59 of which are new entries to the previous edition.)

Young, ME ;

National Technical Information Service July 1980, 114p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-813017

34 319341 RECENT EXPERIENCE WITH ACCESSIBLE BUS SERVICES. Fixed-route, standard-sized buses equipped with level-change mechanisms to transport wheelchair or semiambulatory passengers between the ground and the bus floor level are currently in service in 23 locations in the United States. This paper includes a brief description of the services in place and a discussion of experience with their operation. Data are limited due to the newness of many of the services and the fact that few transit operators collect the kind of information that is most useful for evaluation. Available data have been collected to inform planners and operators of future accessible bus services of the policy issues and operational impacts they probably will face and the level of ridership they initially can expect. A few findings can be stated: (a) Lift reliability has improved substantially through the emergence of new lift designs and modifications to existing models and (b) ridership continues to be low, with most transit operators reporting between one and three lift-assisted boardings per day. Most of these trips are taken by few regular riders. The economic impact varies considerably among operators, depending on the reliability of the particular model of lift operated and whether schedule changes were instituted specifically for implementation of the accessible buses. At current lift-utilization rates, accessible bus service will not significantly affect transit operations. (Author)

Casey, R *Transportation Research Record* No. 746, 1980, pp 47-50, 1 Tab., 1 Ref.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

34 319531 PUBLIC TRANSPORT IN KINGSTON, JAMAICA AND ITS RELATION TO LOW INCOME HOUSEHOLDS. This report is based on a study of public transport in Kingston, Jamaica, carried out with the cooperation of the Jamaican government. It is one of a series of similar studies in developing countries carried out by TRRL. The results of local investigations into the organisation and operation of the conventional bus undertaking and of the privately-operated minibuses are described and Jamaican government survey data are used as a basis for analysing the characteristics of the users of the two different services. An analysis of the attitudes of passengers, as elicited from this survey and from in-depth research with low income households, helps in formulating the ways in which both bus and minibus services may be improved. The role which public transport plays in the lifestyle of low income households is discussed with particular reference to expenditure on transport compared to other budget items. The Jamaican findings are compared with previous studies of the role of paratransit in two cities in South-East Asia. (a) (TRRL)

Heraty, MJ ; Transport and Road Research Laboratory Monograph TRRL Report SR 546, 1980, 30p, 2 Fig., 16 Tab., 4 Phot., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247083)

34 322254 ELDERLY AND HANDICAPPED TRANSPORTATION STUDY. The objective of this study is to identify the transportation needs

of the elderly and handicapped in the McAllen, Pharr, Edinburg Urbanized Area. The study details the findings of a survey questionnaire which was designed to identify transportation provides now available as well as transportation required but unobtainable for elderly and handicapped. Recommendations voiced by the elderly at the White House Conference on Aging Community Forums are also included. The community forums were held in each of the cities in the study. The conclusion of the study deals with operational alternatives to provide for the transportation needs of elderly and handicapped, both ambulatory and non-ambulatory.

Lower Rio Grande Valley Development Council Aug. 1980, 50p, Figs., 4 App.

34 322477 ANALYTICAL MODELS FOR COMPARISON OF ALTERNATIVE SERVICE OPTIONS FOR THE TRANSPORTATION HANDICAPPED. Recently much debate has been generated over the issue of public transportation service for the transportation handicapped. In particular, older rapid rail systems have been required to make key stations accessible to the handicapped. However, a waiver of this requirement is permitted in cities where the handicapped community and local officials work out an alternative service system with equal or better station accessibility. In this context, it is the purpose of this paper to present a comparative analysis of a door-to-door demand responsive system and feeder/fixed-route service, two of the service options which are expected to represent acceptable alternatives to "key transit station accessibility" requirements. The comparisons evaluate alternative scenarios of doorstep accessible transportation for the transportation handicapped using analytical models. The results of the comparisons clearly indicate the relative advantage of door-to-door demand-responsive systems over the combination of a feeder and an existing fixed-route system. In particular, when compared to a feeder service, the direct door-to-door service is likely to be less costly, because it requires a smaller fleet and to provide a more desirable service, because it does not entail transfers. (a) (TRRL)

Jacobson, J (Department of Transportation) *Transportation Research. Part A: General* Vol. 14A No. 2, Apr. 1980, pp 113-118, 1 Fig., 2 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247691)

34 322653 AN EVALUATION OF METRO'S SPECIAL TRANSPORTATION SERVICE PROGRAM FOR THE ELDERLY AND HANDICAPPED. This report presents an overview of Metro's planning and management of the Special Transportation Service Program (STSP). Also, it contains discussion of the Taxi Scrip Program and the Van Program. Findings and recommendations of the study are summarized and financial implications of selected recommendations are discussed. The study found that there is no position within the Metro organization with overall authority for the management of the STSP. Some operational functions, such as maintaining contact with taxi and van operators, are not performed. Except for this evaluation, no one has been monitoring or evaluating the total program to identify and correct specific problems or to provide overall program direction. It is

recommended that Metro should create or designate a position within its authority to manage the STSP, and it should be in a section which is clearly responsible for managing transportation programs. Since the taxi and van programs are very different from bus operations, it is also recommended that Metro consider establishing a Special Program or Para-transit Operations Section with the function of developing and operating all transportation programs that supplement regular bus service and to coordinate elderly and handicapped services provided by Metro.

Reeder, S Carlson, D Feiss, C ; Seattle-King County Division on Aging Jan. 1980, v.p., Figs., Tabs., Apps.

34 323365 TRANSPORT FOR HANDICAPPED PEOPLE [Les transports au service des handicapés]. This publication reproduces the text of the report of the working group set up by decision of the 18th August 1975 for considering transport facilities for handicapped people. The integration of handicapped people in the professional environment and in society is conditioned by the autonomy granted to them. The problems of the transport of handicapped people are reviewed and possible solutions suggested: modification of existing public transport modes, creation of special public transport modes, use of individual transport. [French]

Bachelier, C ; Secretariat d'Etat aux Transport Monograph 1977, 57p; ACKNOWLEDGMENT: TRRL (IRRD 105730), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM: Secretariat d'Etat aux Transport, Boulevard Saint Germain 244, Paris, France

34 325879 A GUIDE TO BRITISH RAIL FOR THE PHYSICALLY HANDICAPPED (REVISED 1979 EDITION). The guide describes facilities introduced by British Rail at stations and in train design to aid disabled passengers. Sections list British transport hotels and stations within commuting distance of London, as well as those frequently used for leisure travel, which offer special facilities for the disabled user of public transport.

Royal Association for Disability & Rehabilitation Monograph 1979, 288p; ACKNOWLEDGMENT: TRRL (IRRD 250068); ORDER FROM: Royal Association for Disability & Rehabilitation, 25 Mortimer Street, London, England

34 325916 ADAPTING PUBLIC TRANSPORTATION SERVICES FOR DISABLED PERSONS [Tilpasning af de kollektive trafikmidler til handicappede]. The Committee on Communications of the Nordic Council deals with the problems of disabled persons' travelling conditions in public transport. Among the disabled those who are wheelchair-bound have the greatest problems. The new DSB high-speed trains will be fitted with lifting platforms which can raise a chair from ground level, with WC which can allow wheelchair access and a special compartment with removable chairs to give space for wheelchairs. The lifting platform, which has a capacity of 400 kg, is described. When not being used, the wheelchair lift can be pushed under the car floor. [Danish]

Brogaard, H *DSB Bladet* Vol. 7 No. 4, 1980, pp 10-11, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD;

ORDER FROM: Danish State Railways, Soelvgade 40, DK-1349 Copenhagen K, Denmark

34 326348 EVALUATION OF THE EASYRIDE SPECIALIZED TRANSPORTATION SERVICE. The evaluation of the EASYRIDE demonstration project was funded by the Urban Mass Transportation Administration, through the Transportation Systems Center. The project took place on the Lower East Side of Manhattan in New York City. EASYRIDE began operation as a pilot program in June 1976. After receiving its complete vehicle fleet, it began full scale operations in April 1977. During the first two years of the demonstration project, there was no required passenger fare; however, donations were accepted. This evaluation report covers the first two full years of operation, which was from June 1977 through May 1979. The Vera Institute of Justice was the grantee for this project in which door-thru-door demand-responsive transportation service was provided to elderly and handicapped residents of the Lower East Side. The door-thru door nature of the project refers to the fact that EASYRIDE drivers will leave the vehicle to assist passengers boarding and alighting from the vehicle. Service was provided by five fully accessible lift-equipped vans and five regular vans. Most of the drivers for the EASYRIDE project were graduates of the Wildcat Corporation program which trains rehabilitated ex-offenders and ex-addicts for work on public service projects.

Edelstein, P ; Applied Resource Integration Limited, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. UMTA-06-0049-80-4, Nov. 1979, 354p; Contract DOT-TSC-1248; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-100687

34 326476 IMPLICATIONS OF BART'S (BAY AREA RAPID TRANSIT'S) IMPACTS FOR THE TRANSPORTATION DISADVANTAGED. The project has examined the implications of the impacts that the 71 mile Bay Area Rapid Transit System has had to date on the transportation disadvantaged. Three special population groups are the focus of analysis--ethnic minorities, the elderly and handicapped. These groups are of special concern for transportation planning and policy because of either low-income status or mobility related impairments. This report integrates the study of BART's impacts on the transportation disadvantaged in each of four major impact areas examined in previous interim project reports--environmental, mobility, economic and land use. Findings are reported from the investigation of twenty-three issues related to the entire range of BART's impacts on the transportation disadvantaged. Evaluation of these findings is made in the context of the level, nature, and degree of equity in the incidence of BART's economic impacts.

Donnelly, R Arguelles, J ; Metropolitan Transportation Commission, Department of Transpor-

tation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-12, Apr. 1979, 148p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001642. Prepared by Urban Dynamics Associates, San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118101, DOTL NTIS

34 326486 TRANSPORTATION OPTIONS FOR THE ELDERLY AND HANDICAPPED OF PUEBLO. Conducted to aid the development of a transportation system to adequately serve the elderly and handicapped population of Pueblo, Colo., this study consisted of a survey of 189 agencies involving types of transportation services for the elderly and handicapped, a demographic analysis of the Pueblo area, projections of elderly and handicapped populations for the next 20 years, and analysis of travel patterns of the target population. A number of inadequacies or gaps can be cited particularly with regard to restricted passenger coverage, limited service capacity, scheduling and dispatching procedures, inadequate facilities, lack of uniform operating data, and inefficient route assignments. An array of service alternatives are proposed to close these gaps. A single purpose system whose transportation vehicle operates between one or more origins to one destination, a fixed route system (transportation supplied along an established route at pre-determined times) which is used by most public transportation systems, and personalized service, possibly requiring advance registration for pickup or operating on a demand-response basis are mentioned as options and discussed in terms of accessibility and effectiveness in getting a client to a precise destination. Organization and operational alternatives possible for offering special transportation services to the target group include accessible bus, subsidized taxi, public-operated paratransit, and private, nonprofit paratransit. When all of these options were evaluated on the criteria of funding availability, quality of service, legal considerations, and cost approximations, results showed private, nonprofit paratransit to have the greatest potential for meeting the needs of the disadvantaged. Study data and recommendations are provided.

Pueblo Area Council of Governments, Federal Highway Administration, Urban Mass Transportation Administration July 1979, 79p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; SHR-0003548

34 327768 ELDERLY AND HANDICAPPED TRANSPORTATION: CHIEF EXECUTIVE'S SUMMARY. The report very briefly profiles the transportation handicapped, examines legislative responses to their needs, and describes actual programs and services implemented by local government.

Public Technology, Incorporated, Department of Transportation Final Rpt. DOT-I-79-29, Sept. 1979, 24p; Contract DOT-05-80076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-123580

EDGMENT: NTIS; ORDER FROM: NTIS; PB81-123580

34 327769 ELDERLY AND HANDICAPPED TRANSPORTATION: INFORMATION SOURCEBOOK. The document, intended as an introduction to information sources on elderly and handicapped transportation, includes the following five chapters: (1) Federal Agency Contacts, which lists Federal agencies that provide assistance with respect to various aspects of transportation for elderly and handicapped persons and agency contacts. (2) Interest Group Contacts, which lists interest groups that are concerned with the provision of transportation for elderly and handicapped persons and interest group contacts. (3) Vehicle Manufacturers, which lists manufacturers of lift-equipped and non-lift-equipped vehicles. (4) Selected Approaches to Providing Transportation for Elderly and Handicapped Persons, which includes brief descriptions of 10 local approaches to providing transportation for elderly and handicapped persons. (5) Annotated Bibliography, which presents a selection of material that has been published on various aspects of transportation for elderly and handicapped persons.

Public Technology, Incorporated, Department of Transportation Final Rpt. DOT-I-79-31, Sept. 1979, 35p; Contract DOT-05-80076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-123598

34 327770 ELDERLY AND HANDICAPPED TRANSPORTATION: EIGHT CASE STUDIES. The report, while not covering the complete range of approaches to the problem of providing more adequate transportation for and increasing the mobility of elderly and handicapped persons, is illustrative of a variety of approaches that have been taken in communities of all sizes throughout the United States. Case studies of: Austin, Texas; Pomona Valley, California; Akron, Ohio; Chattanooga, Tennessee; Bridgeport, Connecticut; Spokane, Washington; Brockton, Massachusetts; and San Mateo County, California are presented.

Public Technology, Incorporated, Department of Transportation Final Rpt. DOT-I-79-32, Sept. 1979, 127p; Contract DOT-05-80076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-123606

34 327771 ELDERLY AND HANDICAPPED TRANSPORTATION: PLANNING CHECKLIST. The report sets forth in brief form the relevant Federal legislation pertaining to transportation for elderly and handicapped persons, the principal Federal sources of funding, and the basic steps in the process for developing transportation services that are responsive to the needs of the elderly and handicapped persons.

Public Technology, Incorporated, Department of Transportation Final Rpt. DOT-I-79-30, Sept. 1979, 23p; See also Report dated March 79, PB-297289; Contract DOT-05-80076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-123614

41 050046 TRANSPORTATION, AUTOMATION, AND SOCIETAL STRUCTURE. The author points out that only when we learn to understand much better the dynamic interaction between new transportation systems and the structure of our communities can we take full advantage of transportation's potential as a really effective tool in our quest for a finer quality of life for our citizens. The opportunity to do so is much enhanced by the recent rapid evolution in transportation from its centuries-old pattern of unconstrained growth paced by key advances in propulsion and new rights of way to a new age of finesse in which automation will bring, from existing rights of way, higher capacity, greater safety, and far better service at lower cost through automated system and total-trip management. In parallel, the discipline that has helped us predict well the dynamic behavior of such mostly physical systems as air-traffic control may add some helpful insight into such critical questions as the long-range effects of transportation on urban structure, where nontechnological factors dominate. Leadership belongs to the communities; the federal role is to provide support in generic ways. It is hoped that new Department of Transportation programs in technology-and-planning-tool sharing and in university support will be helpful.

Cannon, RH, Jr (Department of Transportation) *Institute of Electrical and Electronics Engrs Proc* Vol. 61 No. 5, May 1973, pp 518-525; ACKNOWLEDGMENT: EI (EI 73 046386); ORDER FROM: ESL, Repr PC, Microfilm

41 052105 NEIGHBORHOOD OBJECTIVES AS GENERATORS OF REGIONAL TRANSPORTATION NETWORKS. Transportation network design can start from: (1) Existing and projected traffic generation with the objective of improved network performance, or (2) individual neighborhood objectives among which are environmental quality and connections to other neighborhoods. Either is reasonable technically; the second more reasonable politically.

Passonneau, JR *ASCE Journal of the Urban Plan and Develop Div Paper* Vol. 99 No. UP2, #10032, Sept. 1973, pp 217-233; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

41 053983 MOVING PEOPLE IN BIG CITIES. This article discusses urban transportation of people. The difficulties of using buses on crowded streets are reviewed and the case is stated for rapid transit systems. Alternative transit systems are reviewed, including monorails.

Way, R *Railway Engineering Journal* Vol. 2 No. 2, Mar. 1973, 9 pp, 6 Fig.; ORDER FROM: Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London SW1, England Repr PC

41 054721 THE IMPACT OF THE PHILADELPHIA-LINDENWOLD RAPID TRANSIT LINE ON AUTOMOBILE USAGE. This paper examines new data now available and concludes that there has definitely been a decrease in peak-hour bridge usage by automobiles. The paper further considers what would be the impact on automobile bridge traffic if the line were to shut down, noting that there has been considerable growth in the Jersey suburbs since the line was completed.

Allen, WB (Pennsylvania University, Philadelphia) *Traffic Quarterly* Vol. 28 No. 1, Jan. 1974, pp 21-35, 2 Fig, 2 Tab; ORDER FROM: Eno Foundation for Transportation, Incorporated, Westport, Connecticut, 06880 Repr PC

41 054760 THE DEMAND FOR COMMUTER RAIL TRANSPORT. The study focuses on the short-run market demand for commuter rail service. In the short run, the total market demand for transport can be assumed constant, because there is insufficient time to adjust locational factors such as employment and residence that determine one's transport needs. Empirical evidence was obtained from the Boston area. Methodologically: (1) a theory of consumer demand for commuter rail transport is developed; (2) a model of market demand is developed; and (3) the results of least squares regression estimation of the parameters of the demand equation are presented and evaluated. The strong significance of the income and relative travel time variables suggests that rail demand is most sensitive to changes in time cost, whether these changes result from changes in travel time or in the opportunity cost of this time. Moreover, commuters tend to place greater emphasis on time-minimization for peak-hour trips, which are generally work trips, than on the more occasional, leisure-oriented, off-peak trip. Evidences of this are the signs on the income coefficients, which suggest a higher opportunity cost for peak time, and the comparatively greater magnitudes of the peak relative travel time coefficients. Thus attempts to divert auto commuters to rail transport by decreasing rail travel time should have a higher probability of success during the peak period, when in fact there is greater traffic congestion. Within the higher income range, where presumably private transport is used for the home-station trip, higher income levels are associated with increased rail demand. The middle-income commuter may opt for auto commutation, not because he judges rail transport to be unsatisfactory, but because, given his valuation of time, auto transport has a comparatively low total cost. If this interpretation is correct, the reduction of home-station travel time through the provision of efficient public transit to and from suburban rail stations should tend to increase rail demand.

McDonough, C *Journal of Transport Economics and Policy* Vol. 7 No. 2, May 1973, pp 134-143, 2 Tab, 11 Ref; ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England Repr PC

41 054802 THE DEVELOPMENT OF QUESTIONNAIRE SURVEYS FOR THE INVESTIGATION OF PASSENGER COMFORT. In the course of this paper the authors seek to establish the usefulness of the questionnaire as a tool for obtaining information concerning passenger comfort from the passengers themselves. An appropriate questionnaire developed at University College of Swansea is used as an illustration.

Osborne, DJ Clarke, MJ *Ergonomics* Vol. 16 No. 6, Nov. 1973, 15 pp, 7 Fig; ACKNOWLEDGMENT: UIC (92); ORDER FROM: Taylor and Francis Limited, Red Lion Court, Fleet Street, London EC4, England Repr PC

41 054806 CITIZEN GROUPS, PUBLIC POLICY AND URBAN TRANSPORTATION. The article deals with the reactions of the population to projects for the creation of means of transport, the methods which the citizens may employ to make their views known, the disadvantages in allowing transporters' pressure groups to draw up the transport policy, the futility of the arguments often brought forward to justify expensive investments in transport, particularly in roads.

Taebel, DA *Traffic Quarterly* Vol. 27 No. 4, Oct. 1973, 13 pp; ACKNOWLEDGMENT: UIC (7); ORDER FROM: Eno Foundation for Transportation, Incorporated, Westport, Connecticut, 06880 Repr PC

41 056881 COMMUTER PERCEPTIONS OF PUBLIC TRANSPORT WORK JOURNEYS. Commuter perceptions of certain public transport peak-hour performance characteristics are quantified for samples of car-owning public transport users and car users in six randomly selected areas of the Dublin conurbation. The existence of roadside survey data (for buses) and timetables (for trains) permitted an analysis of the degree of distorted perception of in-vehicle times, waiting times, and costs. Results show that the use of objective performance data on public transport modes in urban transportation planning models needs to be questioned, because actual times and costs seldom reflect the subjective images of commuters.

O'Farrell, PN Markham, J *Environment and Planning* Vol. 6 No. 1, Jan. 1974, pp 79-100; ORDER FROM: Pion Limited, 207 Brondesbury Park, London NW2 5JN, England Repr PC

41 057931 REDUCING THE NEED FOR TRAVEL. The report identifies the alternative ways of accomplishing the reduction of urban travel and urban travel needs. The underlying reasons for travel are analyzed. Candidate solutions to reducing travel are described. Candidates are grouped into three classifications: communications substitutes, changes in the location and structure of cities; rescheduling of work hours. A fourth alternative, that of reshaping the need for travel through increases in the cost of travel by auto and re-education of the public plays a major role in the proposed Urban Mass Transportation Administration program.

Krzyczkowski, R Henneman, SS ; Interplan Corporation Final Rpt. 7226-R, Mar. 1974, 165p; ACKNOWLEDGMENT: ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234665/8, DOTL NTIS

41 071765 LIFE-STYLE FACTORS BEHIND MODAL CHOICE. Conventional modal-split models used by transportation planners and engineers have been based on socioeconomic indices and relative travel time and cost characteristics for the alternative modes of travel. Further refinement of these models to include the particular needs of autoless groups such as the poor and elderly include sociocultural factors. This paper describes how life style can affect modal choice and uses the behavior of young inner-city residents to focus attention to the potential contribution of this factor. A dimension for ordering life styles has been found useful in community studies. This dimension orders life styles between extremes of mainstreamer and activity seeker. It is hypothesized that the former

life style would be more compatible with using public transit than the latter.

Notes, C *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE3, 9953, Aug. 1973, pp 513-520; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

41 071980 SIMULATION OF THE RELATIONSHIP BETWEEN CERTAIN SOCIAL FACTORS AND TRANSPORTATION IN A LOW INCOME AREA. The intent of this paper is to model a typical urban ghetto in terms of three variables: education, health and income, and to simulate the behavior of these variables over a ten-year period. A fourth variable, the effect of accessibility generated by an improved transit system, is then introduced in order to determine the effect of this component upon system performance. From this analysis it is hoped that a number of insights will emerge concerning the development of urban ghettos and the effect (or lack of effect) of transportation in helping this development.

Phelps, BG Dickey, JW *ITCC Review* Vol. 3 No. 2, Apr. 1974, pp 90-95, 5 Ref; ACKNOWLEDGMENT: EI (EIX740902882); ORDER FROM: ESL, Repr PC, Microfilm

41 080251 TRAVELTIME BUDGETS AND MOBILITY IN URBAN AREAS. The study tests by empirical comparative analysis the concept that tripmakers have a stable daily traveltime budget and discusses the implication of such a budget to transportation modeling techniques and the evaluation of alternative transportation systems. After verifying the stability of the traveltime budget for both macro and micro conditions, the responsiveness of travel demand to system supply is developed and formulated. Many known travel factors, such as the levels of mobility, modal choice and trip purpose splits, are then explained by a unified behavioral mechanisms. One of the many conclusions that are presented in the study is that extreme care should be exercised in evaluating policy decisions such as speed reductions and pricing policies without first establishing the sensitivity and responsiveness of mobility to such restrictions. This conclusion is of special significance at this time when fuel shortages threaten mobility.

Zahavi, Y ; Zahavi (Yacov), Federal Highway Administration Final Rpt. May 1974, 90 pp; Contract DOT-FH-11-8183; ACKNOWLEDGMENT: NTIS (PB-234145/1); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234145/1, DOTL NTIS

41 080263 SOCIAL SERVICE AGENCY TRANSPORTATION STUDY. Previous studies of transportation need of the North Carolina Piedmont Triad area indicate that low income, carless residents of urban centers and hinterland are very dependent on other auto drivers for mobility. Bus service accounts for no more than 30% of trips taken by carless residents despite a wide network inside city limits. Taxis or 'catching a ride' are alternate modes upon which the carless have come to depend. Studies have shown that these people without access to cars have difficulties getting to medical facilities, manpower training programs and getting children to recreational programs. Social service agencies in Greensboro,

North Carolina, have identified the needs of low income residents and each agency has its own program which has attempted to solve the problem of immobility among its clients. With the cooperation of 24 agencies, surveys were conducted to answer questions related to the transportation resources currently at the disposal of the agencies. Recommendations were put forth and hypotheses tested. Models for alternative consolidated systems for improving transportation services of agencies are presented and advantages and disadvantages examined.

Brown, RL Lund, J Kidder, AE ; North Carolina Agricultural and Technical State U, Urban Mass Transportation Administration, (UMTA-NC-11-0002) A/T-TI-07RR-73, Dec. 1973, 48 pp; ACKNOWLEDGMENT: NTIS (PB-235883/6); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235883/6

41 080342 LENGTH OF WALKING DISTANCES AND DISTANCE BETWEEN STOPS: THEIR INFLUENCE ON THE ATTRACTIVENESS OF PUBLIC TRANSPORT. Walking distance as a factor in providing adequate public transportation is closely related to distance between stops (stations), route (line) alignment and land use planning. The size of the catchment area of a stop, i.e. the area from which passengers come, is expressed in geometrical terms. The position of the stops in their urban environment defines the catchment area of a route; in the ideal network, the catchment areas of parallel routes would overlap. Data relative to walking distances have been obtained empirically and are based on many years of experience; further investigation of the subject is suggested.

Bandi, F Brouwer, P Conde Cabeza, M Nyst, J Lehn, F *Union Internationale des Transports Publics, Revue* Vol. 23 No. 3, 1974, pp 175-181; ACKNOWLEDGMENT: International Union of Public Transport; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PC

41 080424 BART IMPACT PROGRAM: METHODOLOGICAL APPROACH FOR DEFINING THE GENERALIZED NO-BART ALTERNATIVE (GNBA). The Generalized No-BART Alternative is the hypothetical transportation system judged most likely to have resulted in the Bay Area in FY 1976 if BART had not come into existence. The purpose of the paper is to explain how MTC intends to define the GNBA and the role to be played in the process by findings from the decision history of BART. It is structured in three parts: (1) Introduction to basic concepts and criteria; (2) overview of methodological approach and guidelines for implementation; and (3) application of criteria for defining the GNBA.

Rosenthal, SR ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, (WP-10-1-75) MTC-WP-10-1-75, Oct. 1974, 23p Working Paper; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS (PB-237357/9SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237357/9SL, DOTL NTIS

41 080641 PATTERNS OF MOBILITY OF WORKING POOR. This study examines the transportation problems faced by low-income residents in Greensboro, N.C., with special em-

phasis on the autoless worker. A survey revealed a strong auto-orientation among lower income families. Of the autoless respondents, more than half used someone else's automobile as a principal mode for the journey to work. An important segment of the working poor were "captive riders" to the transit system. These workers were typically older, more likely to be female than male, more likely to be Black than White. There appeared little significant difference between the average hourly wages of auto-owning and carless workers. Consequently, any alternative transportation system for the city would have to charge low fares in line with the current fare structures.

Saltzman, A Kidder, AE (North Carolina Agricultural and Technical State U) *ASCE Journal of Transportation Engineering* Vol. 100 No. TE1, Proc. Paper 10760, Aug. 1974, pp 769-780, 1 Fig., 12 Tab., 7 Ref., 1 App.

41 080646 REVIEW OF SOME ANTICIPATED AND OBSERVED IMPACTS OF THE BAY AREA RAPID TRANSIT SYSTEM. The report briefly summarizes some of the most important impacts of the Bay Area Rapid Transit System as revealed by a survey of the Technical and Nontechnical Literature. The report has been prepared as a Reference and Planning Guide for the BART Impact Program. It describes both anticipated Impacts that have been stated by Public, Officials, Planners, and Observers since BART was planned more than a decade ago, and actual Impacts as reported in newspapers and in the few Technical Studies of Bart Impact that have been already performed. No attempt is made to prove or disprove the statements about Impacts that have appeared in print. About 100 technical and planning reports and 4,500 newspaper articles were scanned.

Peat, Marwick, Mitchell and Company, Metropolitan Transportation Commission PD-3-1-74, May 1974, 71 pp; Planning Document.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS (PB-237309/OST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237309/OST, DOTL NTIS

41 080746 TECHNICAL IMPLICATIONS OF TELECONFERENCE SERVICE. Definitions of separated-groups teleconferences, as opposed to person-to-person video telephone service, are reviewed. The teleconference facility, in terms of an audio mode, a graphics mode, and a video mode, can have an impact on the interactive, interpersonal communication process. Recent audio and audio/video teleconference experiments are summarized. Teleconferencing is not viewed as an alternative to transportation by urban planners or urban transportation demand forecasters, at least for the remainder of this century. The absence of design information and research results for the separated-groups teleconference service telecommunication facility tends to support that view.

McManamon, P *IEEE Transactions on Communications* Vol. Com-23, No. 1, Jan. 1975, pp 30-38

41 080813 URBAN TRANSPORTATION IN SOUTH FLORIDA. The proceedings are presented of a forum for debate of transportation problems in the South Florida urban region especially pertaining to the urban centers of Miami-Ft. Lauderdale-Palm Beach. The forum of public officials, planners, business leaders and

citizens suggested and debated recommendations on policy and facility. The results of the discussions indicate that decision-making by both public and private sectors is being undertaken within a new and broadened context requiring major participatory format. Among the urban transportation aspects considered are, the planning process, public transportation as a solution to the transportation problem, urban pollution, congestion and mobility, and the social-economic integration of diverse population groups.

Miami University, Coral Gables Feb. 1974, 107 pp, 1 App.; Proceedings of the South Florida Urban Transportation Forum.; ORDER FROM: Miami University, Coral Gables, Ryder Program in Transportation, Coral Gables, Florida, 33124 Repr. PC

41 081001 TRAVEL PATTERNS OF SUBURBAN HIGH SCHOOL MALES AND PROGRAMS TO INCREASE THEIR MOBILITY.

A study of the travel behavior and mode preferences of 50 male teenagers documents their lack of dependence on public transit. They prefer private or personal transportation modes such as walking and automobile travel. Trip logs, budgets, and other information were collected during weekly panel discussions designed to investigate traveler characteristics, needs, and problems. Panelists were 15 to 18 years old, lived in three working-class Boston suburbs, and had varying degrees of access to public transit and automobiles. Similar conclusions about travel patterns were drawn in each town. Automobiles and walking were preferred modes even where good transit was available. Teenagers' responses to available transportation and their expenditures to achieve mobility reflected their degree of interest in travel. That is, currently mobile teenagers travel more than less travel-oriented, but otherwise similar, youth if transportation is provided. Maturing working-class travelers felt compelled to secure their own transportation, even at high cost, because their parents and communities seemed unwilling to provide transportation that permits informal, off-peak, and unchaperoned travel. Bus and rail transit service, dial-a-bus systems, and other forms of public transportation seem unable to accommodate teenagers' needs for short-range, fast, and spontaneous tripmaking. Expanded programs to improve pedestrian facilities and ease access to automobile travel would most likely satisfy the travel requirements of the teenage subgroup.

Gurin, DB (Harvard University) *Transportation Research Record* No. 508, 1974, pp 1-12, 2 Tab., 14 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

41 081010 SOCIOECONOMIC AND TRAVEL CHARACTERISTICS OF DIAL-A-RIDE USERS. Ten socioeconomic characteristics of the average daily users of the Dial-A-Ride system in Haddonfield, New Jersey have been obtained and compared with the characteristics of the residents of the entire service area. Five questions were asked on the trip characteristics, including frequency of Dial-A-Ride use during the week and weekend, trip purpose, trip distance, and the usual means of transportation. Ratings and rankings of seven Dial-A-Ride system characteristics were obtained using a seven-part semantic scale. This information was obtained by means of two on-board surveys that were conducted on 10 July

1973 and 18 September 1973 by employees of The MITRE Corporation.

Arrilloga, B ; Mitre Corporation, (MTR-6717) UMTA-VA-06-0012-74-7, July 1974, 44 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238163/AS

41 081185 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART I. OVERVIEW AND SUMMARY. The report is a summary of the work undertaken under the BART-II contract dealing primarily with selected aspects of environmental effects, land use, and retail sales. Chapters include background to the BART impact studies and a discussion of the nature and conduct of the BART-II studies. Also included are an outline of the administrative organization, a list of participants in the conduct of the studies, a list of related papers and reports, and a listing of data products.

California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. June 1973, 51p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 2, Volume 1, PB-236 728.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236727/4ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236727/4ST, DOTL NTIS

41 081186 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART II. VOLUME I. VALIDATION CHECK OF SYSTEMWIDE SOCIAL AND DEMOGRAPHIC DATA. The report evaluates the validity of the sampling strategy and its implementation used in the system-wide home interview survey random sample for the residential environment impact study. The study itself is outlined. Chapters include the rationale of the sampling strategy, procedure, results, discussion, implications, and suggestions for future data collection.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 50p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 1, PB-236 727, and BART-2, Part 2, Volume 2, PB-236 729.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236728/2ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236728/2ST, DOTL NTIS

41 081188 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART II. VOLUME II. CONTROL STRATEGIES. The report documents the need for using controls in a study such as the residential impact study, and discusses the special problems encountered with regard to controls. It outlines the general research design and the two complementary branches of that design—the system-wide random sample approach and the selected site approach, and it describes in detail the control strategy adopted for each branch. Also included is a review of some research design problems inherent in impact studies in general.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of

Housing and Urban Development Final Rpt. June 1973, 78p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 2, Volume 1, PB-236 728, and BART-2, Part 2, Volume 3, PB-236 730.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236729/OST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236729/OST, DOTL NTIS

41 081189 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART II. VOLUME IV. RATIONALE AND PROCEDURE FOR THE COLLECTION OF PRE-BART GEOGRAPHIC, CENSUS AND SECONDARY DATA FOR THE SYSTEMWIDE STRATEGY. The report presents the rationale and procedure for the collection of the geographic, census and secondary data used in the assessment of BART'S impact on the residential environment. It includes an outline and overview of the residential impact study, especially the system-wide branch of the study, and a detailed discussion of the variables of interest to the study. Chapters include discussions of the use of the data in developing criteria of environmental quality and of the procedure for gathering and coding data.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 128p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 2, Volume 3, PB-236 730, and BART-2, Part 2, Volume 5, PB-236 732.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236731/6ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236731/6ST, DOTL NTIS

41 081190 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART II. VOLUME VI. RATIONALE AND PROCEDURES FOR COLLECTION OF BEHAVIORAL AND ENVIRONMENTAL DATA. The report presents the rationale for the collection of behavioral and environmental survey data for the residential impact study and documents the procedures used to collect this data. It places these surveys in the overall research design by outlining the study's two strategies with special attention to the site' strategy. The environmental qualities, which form the basis of all the data collection, are introduced. The environmental and behavioral surveys and also the resident interview are discussed. The development of the surveys and the field data collection methods are presented, and each of the environmental qualities is discussed in terms of the specific environmental and behavior measures related to it.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. June 1973, 463p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 2, Volume 5, PB-236 732, and BART-1, Part 2, Volume 1, PB-236 734.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236733/2ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236733/2ST, DOTL NTIS

41 081191 BART-I: TRAVELER BEHAVIOR STUDIES. PART II. VOLUME I. PRE-BART TRAVELER ATTITUDES AND PERCEPTIONS: EAST BAY PANEL. This is a report on interviews conducted with a panel of east bay residents shortly before the first section of BART became operational with the overall objective of studying the BART travelers environment and his responses to it. Chapters include collection of pre-BART data, characteristics of the panels, information about BART, sources of information, general attitudes toward BART, expected similarity to other modes, comparison of BART, automobile and bus, intended use of BART, types of BART lines, the BART car, BART stations, and the construction period.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. May 1973, 346p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 2, Volume 6, PB-236 733, and BART-1, Appendix A, PB-236 735.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236734/OST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236734/OST, DOTL NTIS

41 081192 BART-I: TRAVELER BEHAVIOR STUDIES. APPENDIX A. SAMPLE DESIGN AND FIELD RESULTS OF THE TRAVELER STUDY. The report, describes the sampling methods and summarizes the field results of the traveler study. It is divided into six sections--objectives and overall strategy, population definition, sampling fractions and stratification, selection of tracts, blocks, and housing units, screening, subsampling and respondent selection, and weighting. A map of the study area is also included.

Nicholls, WL, III ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. May 1973, 25p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Part 2, Volume 1, PB-236 734, and BART-1, Part 1, PB-236 736.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236735/7ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236735/7ST, DOTL NTIS

41 081193 BART-I: TRAVELER BEHAVIOR STUDIES. PART I. OVERVIEW AND SUMMARY. The report is an overview and summary of the studies undertaken as part of the BART-I contract dealing with various aspects of pre-BART travel behavior. The survey includes the traveler study, the travel demand forecasting study, and the unmet travel needs study.

California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. May 1973, 52p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Appendix A, PB-236 735, and BART-1, Part 2, Volume 3, PB-236 737.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236736/5ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236736/5ST, DOTL NTIS

41 081195 BART-I: TRAVELER BEHAVIOR STUDIES. PART II. VOLUME III. ANALYSIS OF BART TRAVELER INQUIRIES. The inquiry analysis project attempts to document

one facet of the traveler's early experience of BART by recording and analyzing questions the travelers asked the station agents. Chapters include method, product, and discussion. Three appendices include schedules and listings of the data collected.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. May 1973, 79p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Part 1, PB-236 736, and BART-1, Part 2, Volume 2, PB-236 738.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236737/3ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236437/3ST, DOTL NTIS

41 081196 BART-I: TRAVELER BEHAVIOR STUDIES. PART II. VOLUME II. BART TRAVELER ENVIRONMENT: ENVIRONMENTAL ASSESSMENT METHODS FOR STATIONS, LINES, AND EQUIPMENT. The report concentrates on the development of methods for describing and assessing the BART travelers' environment-- the stations, system-wide components, cars, and lines--in a form that can be validated by the travelers' response. Chapters include environmental qualities (station indicators), station assessments, a line assessment system, automatic fare-collection assessment, and assessment of the BART car.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. May 1973, 156p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Part 2, Volume 3, PB-236 737, and BART-1, Part 3, PB-236 739.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236738/1ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236738/1ST, DOTL NTIS

41 081197 BART-I: TRAVELER BEHAVIOR STUDIES. APPENDIX C. SUMMARY AND WORKING PAPERS. BAS-1 UNMET TRAVEL NEEDS STUDY. The report presents an analysis of the Bay Area survey to delineate the nature and extent of 'transportation disadvantage' in terms of the categories and location of persons who lack access to motor vehicles.

Foley, DL ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. May 1973, 118p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Part 3, PB-236 739, and BART-2, Part 3, Volume 1, PB-236 741.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236740/7ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236740/7ST, DOTL NTIS

41 081202 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART IV. BART IMPACT ON RETAIL SALES. The report presents a study to determine the impact of BART on consumer shopping in the Bay Area. The first part establishes baseline data on retail sales in order to make possible eventual evaluation of post-BART alterations. The second part develops a questionnaire for use in measuring BART's effect upon consumers' attitudes toward and choices of different shopping centers. Chapters include an over-

view of the baseline studies, baseline study of retail sales, and the attitude study.

Bucklin, LP ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 58p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 6, PB-236 746, and BART-2, Appendix A, PB-236 748.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236747/2ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236747/2ST, DOTL NTIS

41 081594 BEHAVIORAL DEMAND MODELING AND VALUATION OF TRAVEL TIME. ATTITUDINAL DATA. The role of attitudinal data in urban transportation planning was reviewed in this workshop report. The goal of the workshop was to propose stages of research in the investigation and development of a forecasting methodology that associates observed travel behavior with the attitudes of the population toward system attributes and policy variables. The attitudinal models had to satisfactorily relate to the real world and provide a design-directing process in contrast to the present methodology that evolved as a resource-allocation process. It was considered that a valid model of the decision process must (a) include the variables on which people base their decisions, (b) possibly combine sets of these variables into more basic dimensions (multivariate techniques), and (c) describe how people actually use the dimensions or variables to make travel decisions. To implement research results, an evolutionary process of behavioral model development was recommended. This strategy would require improving the modal-choice methodology. This could be accomplished by a modal-choice model which derives choice patterns on the basis of behavioral measures rather than, or in addition to, physical dimensions. This model would provide a true abstract representation of travel modes to facilitate predictions of demand for new as well as existing modes. By directly or indirectly incorporating appropriate measures such as comfort, convenience, and reliability into the prediction algorithm, a significant increase in the explanation of variance over existing models would result.

Demetsky, MJ (Virginia University) *Transportation Research Board Special Reports* No. 149, 1974, pp 21-24; Presented at a conference in South Berwick, Maine, July 8-13, 1973, sponsored by TRB, DOT and the Engineering Foundation.; ORDER FROM: TRB Publications Off, Repr. PC

41 081611 DISAGGREGATE BEHAVIORAL MODELS OF TRAVEL DECISIONS OTHER THAN MODE CHOICE: A REVIEW AND CONTRIBUTION TO SPATIAL CHOICE THEORY. In recent years, considerable effort has been spent on the disaggregate, behavioral modeling of travel decisions. Much work has centered on intraurban mode-choice decisions and on home-based person trips for work purposes. Disaggregation has been accomplished by a focus on the travel behavior of individuals or of subgroups of the urban population; subgroups are defined by either socioeconomic characteristics or class of residential location. Preliminary attempts

to incorporate more realistic assumptions about human behavior in traditional models have led to probabilistic approaches and to the a priori specification of perceived time, comfort, safety, convenience, and other variables as factors influencing mode choice. Attention is now being paid to the measurement of the disaggregate, behavioral modeling of intraurban travel by: (1) collating and reviewing literature to assist with decisions other than mode-choice applications in the trip generation, trip distribution, and route assignment phases of current transportation planning; (2) focusing attention on the importance and salient features of spatial choice models in these contexts, particularly destination choice models for shopping, recreational, and social trips; and (3) outlining research problems and strategies.

Burnett, P (Texas University, Austin) *Transportation Research Board Special Reports* No. 149, 1974, pp 207-222, 103 pp; Presented at a conference in South Berwick, Maine, July 8-13, 1973, sponsored by TRB, DOT and the Engineering Foundation.; ORDER FROM: TRB Publications Off, Repr. PC

41 081829 VARIATIONS IN PSYCHOLOGICAL RESPONSES TO CHARACTERISTICS OF BUS SERVICES. This study was undertaken as a part of a Florida Department of Transportation (DOT) bus demonstration project in Clearwater, Florida. It was intended to provide psychological data as inputs to analysis and design of public transportation systems. The bus system serviced a low-density urban region in which many elderly people lived. A survey for obtaining consumer inputs was administered at home to 145 users and nonusers of the bus system. Three other variables (in addition to user status) were studied: age, sex, and health status. Large differences were found on responses to various transportation-related concerns or annoyances. Non-users were more concerned about injury and health risks, annoyances, and long-time pressures (e.g., delays). Oldest respondents were more concerned about injury and health risks and about short-time pressures (e.g., not being able to move more quickly enough). Less healthy persons also reflected this latter concern. Because of the large number of persons in the elderly (sometimes infirm) category, it was suggested that consideration of the needs and limitations of these persons is clearly advisable in the design of transportation systems.

Olsen, WT Smith, S (Florida State University, Tallahassee) *Transportation Research Record* No. 513, 1974, pp 8-14, 3 Fig., 1 Tab., 7 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

41 083347 THE EFFECT OF IMPROVED SERVICE ON THE BUS TRANSIT RIDERSHIP IN THE GREATER LAFAYETTE AREA. This report was for the purpose of studying the effects of new equipment and improved routing on the type of riders and their attitudes toward the local transit system, the Greater Lafayette (Indiana) Transportation Corporation. The report analyzes the change in characteristics and attitudes of the riders, both old system riders and new riders. Two on-board surveys were conducted, one before the initiation of the new system (March 1973) and one afterwards (October 1973). The results of the data

gathered showed a trend change in public transportation for the Greater Lafayette area. Daily ridership had more than doubled since the ribbon cutting ceremony and was still increasing. In areas where improvements in service had been made, rider attitudes had improved. Attitudes toward the driver were the most positive of any area. In terms of service dependability, the rider again expressed a more positive attitude. As for efficiency and convenience of the service of the service, riders indicated that the system was performing well. The type of person found on the buses was changing with increased ridership. The new rider drawn to the system were, for the most part, younger, had more education, and had a higher family income when compared to those who had been riding for more than a year. And, an increased percentage of new riders had other means of transportation. Appendices of the report include the questionnaire and results of the administration of the questionnaire.

Merritt, JC ; Purdue University, (IN-11-0001) UMTA-IN-11-0001-73-3, Dec. 1973, 44 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238939/AS

41 083588 ATTITUDES AND ATTITUDE CHANGE TOWARD BUS TRANSIT SYSTEMS. The purpose of this report, according to the author, is to show that attitude measurement can provide meaningful information and that it should be a basic part of periodic evaluations of bus transit systems. The data for this study were 2 attitude surveys conducted for the Greater Lafayette (Indiana). Transportation Corporation: one before major system changes and one after system changes were completed. It was hypothesized that: (1) attitudes of the bus riding public would be significantly more favorable after changes in the bus system were made as compared to before changes were made; and (2) differences in attitudes would be related specifically to those parts of the system that had been changed. 566 bus riders took part in the first survey in Mar. '73 and 704 riders took part in the second survey in Oct. '73. The questionnaires were presented to the bus riders by the drivers during the afternoon of the survey days. It was found that attitudes did change significantly in a favorable direction between the first and second surveys. The data show significant change even when the demographic characteristics of the population, which had also changed, were held constant. Greater change was shown for those attributes that were directly affected by system change than for those indirectly affected by system change. The use of the questionnaire results in providing information for future planning is also discussed. Tables, a bibliography and appendices are included. /UMTA/ Dietvorst, TF ; Purdue University, (IN-11-0001) Univ. Res. UMTA-IN-11-0001-74-1, May 1974, 61 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238918/AS

41 083723 THE SYNTHESIS OF AN URBAN TRANSPORTATION SYSTEM BASED ON SOCIETAL CRITERIA. An urban transportation system is proposed to satisfy societal criteria of greater mobility, safer travel, lower energy consumption, less pollution, personalized travel, and conservation of the urban fabric. The system is synthesized, for the most part, using elements already developed through research in the areas of

electric vehicle and PRT. Emphasis is given to new components developed to make the synthesis possible. The system can offer in the not too distant future an advantageous alternative to conventional automobile-roadway transport.

O'Shea, J Polis, MP ; Institute of Electrical and Electronics Engineers 1973, 2 pp, Photos., 2 Ref.

Presented at the International Conference on Cybernetics and Society of the Institute of Electrical and Electronics Engineers, 5-7 November 1973, Boston, Massachusetts.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-31545)

41 083812 THE URBAN CIRCULATION NOOSE. This book contains a series of essays on the role of transportation and communication in the changing social conditions of growing metropolitan areas. The topic treated here is vital because current indications are that changes in urban systems are accelerating, but not necessarily toward resolution of existing social conflicts and problems. The fundamental and encompassing role of urban circulation as it interacts with changing social issues is too little recognized and appreciated by both the interested layman and the urban and transportation policy planner. It is therefore the purpose of this book to provide insight into some of the more critical social, and hence human, implications of urban transportation and communications. Three themes are interwoven into these essays. One is the role of circulation as it lays the basis for the spatial organization of people and their activities in urban areas. A second is spatial organization as it influences social organization. Third are the transportation and communication systems and their evolution as they precipitate social stress.

Wheeler, JO (Georgia University) ; Duxbury Press 1974, 130 pp, Figs., Tabs., 44 Ref.

41 083972 LOCATION OF THE CARLESS. This paper identifies the "carless" and shows where they are and what transportation alternatives exist for them. More than 65 percent of the U.S. population are carless. Data from Buffalo, New York, serve to indicate the relations among carlessness, median income, race, age, and accessibility of public transport. For the study area, the public transport system, which has a development consistent with the traditional pattern of urban growth, no longer adequately serves the needs of those who rely on it most. Examination of the extent of carlessness in the suburbs shows that the problem of mobility among suburban households may be more severe than that in the inner city.

Paaswell, RE Recker, WW (State University of New York, Buffalo) *Transportation Research Record* No. 516, 1974, pp 11-20, 9 Fig., 5 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

41 084709 SUCCESSIVE OVERLAYS-A SMALL CITY TRANSIT SURVEYING PROCESS. A study was conducted in the city of Paducah, Kentucky, to estimate its transit potential. The first aim in the program was quantification of demand, which was achieved by means of a postal card survey. In order to define on a map those areas with a significant propensity for using transit, the technique of "successive overlays" was used. The first step was to evaluate the socio-economic characteristics of an area which would indicate ridership potential. The indices

chosen were: 1) the number of passenger cars per dwelling unit; 2) average income; 3) females from 16 to 24 years; 4) persons over 62 years; and 4) dwelling units per acre. The best single indicator of transit patronage was found to be the number of passenger cars per dwelling units. Average income was also a good indicator, especially in combination with vehicle ownership. Each index was recorded on a transparent map and when these were superimposed on the area map, the shaded portions indicated the areas with the greatest transit potential. The postal card questionnaire was then sent to residents of these areas. After the data from this survey was analyzed, it was compared with the overlay data, and was found to correlate quite well. The overlay data tended to overestimate transit potential in some areas. In addition to this method being a valuable tool for small city planners, it is also a relatively low-cost survey.

Corradin, JC Coomer, BD (Schimpler-Corradino, Associates) Upshaw, WS (Paducah, City of, Kentucky) *Traffic Engineering* Vol. 44 No. 15, Dec. 1974, 5 pp, 8 Fig.

41 090542 PHASE I-RESEARCH PLAN. INSTITUTIONS AND LIFE STYLES PROJECT. BART IMPACT PROGRAM. The report is a research plan outlining central institutions most likely to be affected by BART, most feasible for study, and most likely to produce findings of transferability to other settings for policy-related decisions. Second, selected aspects of various kinds of life-styles are reviewed and suggestions and hypotheses presented for further study of both institutions and life-styles (I and LS). The methodologies are designed to inter-connect from different angles in the study of the same problem, with a combination of ethnographic, observational, and survey research supplemented by document monitoring and analysis.

Duster, T Fischer, C ; Metropolitan Transportation Commission, Jefferson Associates, Incorporated, Department of Transportation, Department of Housing and Urban Development, National Science Foundation PD-10-6-75, Jan. 1975, 50 pp; Prepared by Jefferson Associates, Inc., San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240467/1ST, DOTL NTIS

41 091473 SPECIAL AREA ANALYSIS. The report encourages the consideration of social and environmental factors in planning urban transportation systems, discussing the analytical tools for addressing some of the issues involved. These issues include accessibility, air quality, noise, and dislocation impacts. Tools include criteria, methodology guidelines, reporting methods, and use of computer assistance in the planning.

Federal Highway Administration Final Rpt. Aug. 1973, 173 pp; Includes Errata sheet dated Aug 73.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241787/1ST

41 091488 INSTITUTIONS AND LIFE STYLES WORK PLAN. PHASE I, RESEARCH PLAN. Research plan outlining central institutions most likely to be affected by BART, most feasible for study, and most likely to produce findings of transferability to other settings for policy-related decisions. Second, selected

aspects of various kinds of life-styles are reviewed and suggestions and hypotheses presented for further study of both institutions and life-styles (I&LS). The methodologies are designed to inter-connect from different angles in the study of the same problem, with a combination of ethnographic, observational, and survey research supplemented by document monitoring and analysis.

Duster, T Fischer, C ; Metropolitan Transportation Commission, Jefferson Associates, Incorporated PD-11-6-75, Jan. 1975, 22 pp; Prepared by Jefferson Associates, Inc., San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242-41/2ST, DOTL NTIS

41 091664 STANDARDS OF RIDER COMFORT: NOISE, VIBRATION AND AGE OF RIDER AS FACTORS. Psychological responses of bus passengers to noise and vibration in terms of ride quality are studied in a field test. An attempt is made to correlate passenger comfort ratings with the age factor.

Colegate, RL ; Norfolk State College Final Rpt. NASA-CR-136744, June 1974, 10 pp; Contract NGR-47-025-001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. CP, Microfiche; N75-18891/2ST

41 092223 EXPLORATORY NETWORK ANALYSES OF BART'S IMPACTS UPON ACCESSIBILITY. The objective of the study was to (1) make a preliminary assessment of BART's impacts on areawide accessibility, and (2) evaluate the use of network-based accessibility measures as an impact analysis technique. Accessibility measures were based on estimates of zone-to-zone travel times and transit fares derived from networks developed for the 1971 'pre-BART' and 1976 'post-BART' highway and transit systems. The accessibility measures were expressed as simple indices, weighted by the size and characteristics of the resident population in the origin zone. Comparisons of the accessibility indices were made for both peak and off-peak travel times for selected destination zones in the BART service area. The selected zones represent the locations of important employment centers, shopping facilities, and hospitals. Assessments were made of BART's potential accessibility impacts on the racial minority, elderly, and low-income populations as well as the generation population.

Fan, HSL Sherret, A ; Metropolitan Transportation Commission, Urban Mass Transportation Administration, Peat, Marwick, Mitchell and Company, (UMTA-CA-09-0025) WP-15-3-75, July 1975, 93p; Prepared in cooperation with Peat, Marwick, Mitchell, and Co.; Contract DOT-OS-301-76; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244088/1ST, DOTL NTIS

41 092424 BART IMPACT PROGRAM. DATA SUMMARY. The paper is a guide to data collected for use by the BART Impact Program. For each data collection project it contains (1) a short summary of the nature and purpose of the study, (2) a description of each type of data collected and the size of the data set, (3) the time period represented by the data, (4) the geographic location of the data collection and (5) a list of the data items and reports which are presently avail-

able and catalogued at MTC and the Data Catalog I.D. Words by which the items may be referenced. The Appendix includes study area maps, matrices of data collection by BART station area, and the BART Impact Data Catalog table of contents.

Bachman, S ; Metropolitan Transportation Commission, Department of Housing and Urban Development Work Paper WP-8-1-75, July 1974, 56 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, NTIS Price, /MF\$2.25; PB-244553/4ST, DOTL NTIS

41 093013 TRAVEL PATTERNS AND PROBLEMS OF SUBURBAN HIGH SCHOOL MALES: EXPLORATORY STUDY OF THE PHYSICAL MOBILITY OF A POPULATION SUBGROUP, WITH RECOMMENDATIONS. Teenagers' travel behavior and their transportation needs and preferences were investigated in three working class Boston suburbs having different levels of transit service. Fifty male high school students met in weekly panels to discuss where, when, how, and why they traveled, how much it cost them, and other travel-related information. The report recommends long-term, direct participation of all traveler subgroups in transportation planning and management. Expanded programs to improve pedestrian facilities and ease access to automobile travel are concluded to be most likely to satisfy the travel requirements of the teenager subgroup.

Gurin, DB ; Harvard University, Federal Highway Administration, (HPR) Summary Rpt. FHWA/SES-75/01, June 1974, 47 pp; Contract DOT-FH-11-7849; ACKNOWLEDGMENT: NTIS, Federal Highway Administration, Highway Safety Research Institute (HSRI-32894); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245094/8ST

41 093750 ATTITUDES TOWARD METRO-RAIL IN THE WASHINGTON AREA. This report includes the major findings of a study carried out in late winter and early spring of 1975 to assess public attitudes in the Washington area toward the Metrorail system in various stages of its construction in different parts of the community. The study used standard survey research techniques in which samples of the population were interviewed about their transportation habits, their priorities for improvements in local transportation, their views about Metrorail and aspects of its operation, their own prediction about the likelihood of their using the system and their opinions about methods of financing Metro's construction. The interviewing was carried out by the field staff of The Washington Survey, the local research facility of BSSR.

Bureau of Social Science Research, Incorporated, Washington Metropolitan Area Transit Authority, Federal City Council BSSR-717, June 1975, 85 pp; Also pub. as Washington Metropolitan Area Transit Authority, D.C. WMATA-75/26. Prepared in cooperation with Federal City Council, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-245569/9ST, DOTL NTIS

41 093912 DATA NEEDS FOR MEASURING THE IMPACTS OF NEW TRANSPORTATION SYSTEMS: THE BART EXPERIENCES. The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system, BART. The Impact Program has just completed its initial phase of planning and investigation, and is now evaluating its results, research strategy and analytical methods developed thus far.

Markowitz, J Reynolds, M ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development WP-18-1-75, Aug. 1975, 22 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-2477-9/1ST, DOTL NTIS

41 093913 THE BAY AREA RAPID TRANSIT SYSTEM-CURRENT STATUS AND IMPACTS. The report reviews the history of the BART system, describes the kind of service the system provides, discusses the difficulties of impact measurement, reports the early findings about BART's effects on travel, and describes how BART is seen by residents and policy-makers of the area. The Bay Area Rapid Transit system has only been in operation on all of its lines since September 1974. The inherent design of the system as a long-distance, commuter rail facility means that BART by itself could not possibly live up to some of the inflated expectations held for it, nor produce some of the dramatic impacts which had been predicted. As BART solves its operational problems, it will become a key element in the total regional transportation system of the Bay Area, and is likely to prove to have been worth its cost.

Bay, P Markowitz, J ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development WP-17-1-75, Aug. 1975, 33 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247709/9ST, DOTL NTIS

41 094017 URBAN DATA BOOK. VOLUME I. URBAN DATA: ATLANTA-MIAMI. A quick reference compilation of certain population, socio-economic, employment, and modal split characteristics of the 35 largest Standard Metropolitan Statistical Areas (SMSA) in the United States is presented. The three basic groups or urban data presented are population, socio-economic, and employment. The population data include population totals and densities for the various segments of each of the individual SMSA's (CBD, Central City, Urbanized Area, and SMSA). Also included are population totals by concentric urban rings and population density plots (dot, contour, and isometric views). The urban ring data combined with the population density plots can be used for identifying existing urban corridors. The socio-economic data compiled by concentric urban rings include: median female and male age, proportion of population 65 years and older, median family income, number of households and families, number of home-owners and renters, average home value and average rent paid, and auto ownership. The employment data found in this report include: home-to-work flows, employment and worker densities, and a modal split distribution for each of the 35 SMSA's.

Bronitsky, L Costello, M Haaland, C Schiff, S ; Transportation Systems Center, Union Carbide Corporation Final Rpt. DOT-TSC-OST-75-45.I, Nov. 1975, 174 pp; Prepared in cooperation with Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.; ACKNOWLEDGMENT: NTIS, Federal Highway Administration; ORDER FROM: NTIS, NTIS Price, /MFS\$2.25; PB-248601/7ST

41 094048 PROCEEDINGS OF THE TSC WORKSHOP ON ATTITUDINAL SURVEYS FOR TRANSPORTATION PLANNING AND EVALUATION, HELD AT CAMBRIDGE, MASS., ON JANUARY 30, 1975. The major conclusions of a 1975 workshop are presented. The Workshop participants, including planners, transit system operators, market researchers, and social scientists, assessed the practical utility of attitudinal survey techniques for transportation planning and evaluation.

Stearns, MD ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-75-20, UMTA-MA-06-0049-75-1, Nov. 1975, 40 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248898/9ST

41 094169 FULL COSTS OF URBAN TRANSPORT. PART II. MARGINAL COSTS OF FIXED-RAIL RAPID TRANSIT SERVICE IN THE SAN FRANCISCO BAY AREA. Contents: The capital costs of BART; Calculating marginal peak and base costs; Operating costs of the San Francisco Bay Area rapid transit district; Marginal costs per seat-mile in current and long-run operation; Alternative marginal-cost concepts; Comprehensive marginal costs for selected trips. Portions of this document are not fully legible.

Keeler, TE Merewitz, LA Fisher, P ; California University, Berkeley, National Science Foundation Monograph-20, NSF/RA/S-75-069B, June 1975, 108 pp; See also PB-248 147.; Grant NSF-GI-37181; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248146/3ST, DOTL NTIS

41 094241 HOW TO SET UP A LOCAL PUBLIC TRANSPORTATION SERVICE IN YOUR COMMUNITY. Intended for small urban and rural areas, the document describes the steps necessary to set up public transportation services. Such subjects as estimating costs, obtaining funding, marketing the service, subsidizing a taxi operator, setting up a non-profit corporation to run the service, and developing the required forms for transit record-keeping are covered. The objective of the study was to provide a simple, straightforward guidebook for local officials and private groups to use in establishing public transit services.

Hart, K ; Fresno County Council of Governments, California, Urban Mass Transportation Administration, (UMTA-CA-09-0038) Final Rpt. FCOG/TR-001, Sept. 1975, 63 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247283/5ST

41 094636 DEVELOPMENT OF METHODOLOGY FOR THE ASSESSMENT OF BART'S IMPACTS UPON ECONOMICS AND FINANCE RESEARCH PLAN. This is a research plan for the Economics and Finance

Project, one of the six major components of the BART Impact Program, a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system. The Economics and Finance Project will determine the impacts of the construction of BART, the transportation service it provides, and the bond issues and taxes that finance it, on the regional economy and on specific economic sectors. It will also assess impacts on employment, productivity, business activity, the cost of public borrowing, public willingness to incur debt for other purposes, and the distribution of tax burdens among socioeconomic sectors of the population. In the Research Plan, one or more work elements are defined for each of the enumerated factors. The discussion of each element includes a description of a model of the determinants of the impact, expectations as to measurability of the impacts, a consideration of alternative study methodologies, and a recommendation of a preferred methodology.

Bergsman, J Muller, T McGillivray, R Garn, HA Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Urban Institute PD-22-7-76, Mar. 1975, 45 pp; Prepared by Urban Inst., Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-250719/2ST, DOTL NTIS

41 095261 POTENTIAL IMPACTS OF RAPID TRANSIT AND PUBLIC RESPONSES TO RAPID TRANSIT PLANS. An analysis is presented of potential impacts of rapid transit systems, and some ways in which such an analysis can aid in achieving widespread public support for the rapid transit system itself. The analysis of the rapid transit plan developed for the St. Louis region is analyzed and its potential impacts are specified. A comparison is made of these impacts with preferred system features and goals desired by the region's residents. This report is not only a case study of a rapid transit planning experience, but also a description of several innovative planning procedures, especially in the area of identifying potential coalitions among regional factions so that support for the proposed system could be increased.

Hinkle, JJ (Consad Research Corporation) Lowrey, RA Yedla, V *High Speed Ground Transportation Journal* Vol. 8 No. 1, 1974, pp 87-123, Refs.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

41 096549 HUMAN FACTORS IN URBAN TRANSPORTATION SYSTEMS. Urban growth and the development of the megalopolis have forced a re-examination of all urban transportation systems in terms of their ability to satisfy human needs and preferences. Encouraging the re-emergence of public transportation in cities requires a total assessment of the physical and behavioral characteristics of the user population as well as their economic, social, and esthetic preferences. This population includes many groups not normally considered in human engineering design, such as the physically or functionally handicapped and the aged. Existing data are reviewed and research needs are identified for the design of urban transportation systems.

Hoag, LL (Oklahoma University) *Human Factors* Vol. 17 No. 2, Apr. 1975, pp 119-131, 7 Tab., 31 Ref.; ACKNOWLEDGMENT: Human Factors;

ORDER FROM: ESL, Repr. PC, Microfilm

41 096576 RAPID TRANSIT AND OFFICE DEVELOPMENT. The Lindewold rapid transit service has had a considerable impact upon the commercial office market in the Philadelphia region. The line is acting simultaneously to consolidate the Philadelphia central business district as a prime office location and to promote the development of new suburban office locations. All the implications of these developments will require further analysis. It is suggested that theoretical and empirical analyses of urban rapid transit impact might well be tested in the Philadelphia region and that a complete appraisal will require the passage of more time.

Gannon, CA Dear, MJ *Traffic Quarterly* Apr. 1975, pp 223-242, 2 Fig., 6 Tab.; ORDER FROM: ESL, Repr. PC, Microfilm

41 096602 WASHINGTON, D.C., METRO: AT WHAT REAL PRICE THE "BENEFITS"? There is general public enthusiasm for a rapid rail transit system in Washington, DC, primarily because it would reduce surface congestion at rush hours. METRO, as it is now designed, may nevertheless prove to be a poor second choice to the automobile by suburban commuters for destinations other than the CBD and, at the same time, fail to provide satisfactory service for the transit-dependent. If downtown employment projections (and consequently, planned patronage) are not realized, the "benefits" of METRO will in no way justify the costs of the inflexible fixed-track system.

Brooks, EG (Institute for Defense Analysis, Evaluation Div) *Transportation Planning and Technology* Vol. 2 No. 2, 1973, pp 105-119, 45 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

41 097113 TRANSPORTATION CONTROLS AND THE SPATIAL STRUCTURE OF URBAN AREAS. The long-run effects on cities of changes in the cost of moving people are examined. Two kinds of policies are compared: those that increase the cost of travel by car, and those that improve the quality or reduce the price of public transportation. The paper argues that the former are likely to reduce auto travel more quickly. However, these policies are also more likely to cause the economies of central cities to decline more rapidly than they would otherwise. A policy of improving and subsidizing public transportation would tend to slow their rate of decline. So far as the economies of central cities are concerned, there is a set of measures that appears to be most damaging. These are the ones that increase the cost of auto travel to central cities or their core areas relative to the cost of auto travel elsewhere in standard metropolitan statistical areas. Reductions in the supply of downtown parking, special taxes on such parking, tolls to the downtown areas, are examples of such measures.

Coldstein, GS Moses, LN *American Economic Review* Vol. 65 No. 2, May 1975, pp 289-294

41 097290 DISAGGREGATED BEHAVIORAL VIEWS OF TRANSPORTATION ATTRIBUTES. The assessment of attitudes toward various attributes of urban transport alternatives is of interest because of (a) the relation between personal behavior toward transport systems and the perceptions and preferences of individuals

toward attributes of the alternatives, (b) the possibility of developing policy-sensitive prediction models, and (c) the compatibility of output from attitude research with ongoing disaggregate behavioral model development. The current investigation applies all individual-differences scaling model to a set of perceptual similarity judgments of an automated urban transportation system to find groups of respondents with a homogeneous viewpoint. The perceptions of 7 distinct groups of respondents were represented by Euclidean distance models. The points of view of the different groups could be identified both by the number of dimensions and the relative position of attributes for their corresponding spaces. Across the axes of the perceptual spaces for the 7 groups, 3 major classes of attributes could be defined: basic transport service, personal luxury service, and general amenities. Satisfactions with modes of a proposed urban transportation system could be predicted from the projections of the attributes on the axes of the spaces, and in addition the particular classes of attributes that differentially contributed to satisfaction with a given mode could be determined. Finally, the potential contribution of the technique for evaluating impact models was demonstrated by the investigator, which indicated those activity pattern and socioeconomic variables that were not uniformly distributed across the 7 homogeneous perceptual groups.

Dobson, R (General Motors Research Laboratories) Kehoe, JF (University of Southern California) *Transportation Research Record* No. 527, 1974, pp 1-15, 6 Fig., 4 Tab., 35 Ref.; Report prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

41 097292 CONSUMER PREFERENCES FOR AUTOMATED PUBLIC TRANSPORTATION SYSTEMS. This paper investigates the attitudes of a cross section of residents of a metropolitan area toward 3 automated transportation systems. Respondents to a home interview survey evaluated their satisfaction with each system according to 12 attributes such as travel time, comfort, automatic control, and privacy of the vehicle. Respondents also evaluated their over-all satisfaction for each system and projected their possible use of these systems. In the first phase of the analysis, the interrelations among the respondents' perceptions of the system attributes are examined. Five latent factors are determined through factor analysis to describe the attribute satisfaction ratings: level of service, comfort and privacy, degree of automatic control, out-of-pocket cost, and options and amenities. These factors are consistent for both work and shipping trips. In the second phase, reported overall satisfaction for work and shopping trips is explained in terms of the attributes through the use of linear additive models. Level of service is a significant descriptor of overall satisfaction for work trips; comfort and privacy and options and amenities are added descriptors for shopping travel. The final phase of the analysis uses a nonlinear estimation technique to explain the allocation of work and shopping trips by the respondent. This technique revealed, as did the linear additive model, that satisfaction with a mode is dependent on trip purpose.

Costantino, DP Golob, TF (General Motors Research Laboratories) Stopher, PR (Northwest-

ern University, Chicago) *Transportation Research Record* No. 527, 1974, pp 81-93, 2 Fig., 7 Tab., 29 Ref.; Report prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

41 097294 TRAVEL BEHAVIOR ANALYSIS. This Record contains various concepts of behavioral analysis in relation to transportation needs and requirements. The eight reports are: Disaggregated Behavioral Views of Transportation Attributes; Toward the Development of Measures of Convenience for Travel Modes; A Bernoulli Model of Destination Choice; Traveler Preference for Fare Alternatives as a Transportation Planning Input; Comparison of the Model Structure and Predictive Power of Aggregate and Disaggregate Models of Intercity Mode Choice; Preliminary Analysis of Disaggregate Models of Intercity Mode Choice; Preliminary Analysis of Disaggregate Modeling in Route Diversion; Prediction with Disaggregate Models; The Aggregation Issue; Consumer Preferences for Automated Public Transportation Systems.

Transportation Research Record No. 527, 1974, 94 pp, Figs., Tabs., Refs. Reports prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

41 098028 PSYCHOLOGICAL DESIGN FACTORS IN URBAN PUBLIC TRANSPORTATION VEHICLES. Recent trends in transportation have shown a reluctance to accept public transportation as a viable alternative to the automobile. Even some advanced systems such as BART have not been well received. A major source of this reluctance has been attributed to the failure to successfully meet the psychological needs and preferences of the traveler in designing passenger compartments of public vehicles. A discussion is presented on important psychological variables such as personal space, situation control, esthetics, perceived safety, privacy, and forced interaction with other travelers. Recommendations are given for improving the design of urban public transportation vehicles.

Adams, SK (Iowa State University, Ames) ; Human Factors Society Proc Paper 1974, pp 5-12, 12 Ref.; Presented at the 18th Annual Meeting held in Huntsville, Alabama, Oct. 15-17, 1974.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

41 098595 TRAVEL TO WORK. On any given working day the daytime population of the 50 largest United States cities, as a group, increases by seven percent, based on 1970 Census data. The effect of the comings and goings of workers on a city's population was especially notable in New York City, where the population of Manhattan (New York County) rose by two-thirds every work day. More than 5.4 million people—about 30 percent of the 18.8 million people working in the 50 largest cities of the United States—resided in the suburban areas of these cities. Only slightly more than one-third of the workers in the northeast used a car for traveling to work, compared with more than two-thirds in the north central region, and more than three quarters in the south and the west. On the average, over half of the resident workers in the seven cities of the northeast used public transportation, two-thirds of these workers used railroads and subways.

Metropolitan Life Insurance Company Stat Bulletin Vol. 56 June 1975, pp 206

41 099246 WORKSHOP 5: THE USER'S PERSPECTIVE. The purpose of Workshop 5, which viewed the evaluation of urban public transportation from the user's perspective, was to identify appropriate dimensions of consumer satisfaction and ways to measure the responsiveness of transportation service to consumer requirements. This report of the proceedings of Workshop 5 identified the following research projects as being necessary for an adequate evaluation of urban public transportation: (1) measuring the quality of public transportation service; (2) identification of public transportation consumer groups; (3) monitoring and evaluation of public transportation systems; (4) translation of mobility requirements of user groups into specific transportation service characteristics; (5) potential for diversion of automobile commuters to public transportation; (6) information system requirements of transportation system consequences; (7) assessing benefits of a public transportation system for users and the community at large; (8) demand elasticities of user groups as related to service attributes; and (9) measurement of convenience for auto access.

Olsen, WT (Florida State University, Tallahassee) *Transportation Research Board Special Reports* No. 155, 1975, pp 47-50, 8 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

41 099334 SOCIAL COMPLEXITY AND TECHNOLOGICAL CHOICE: THE BAY AREA RAPID TRANSIT SYSTEM. There are two strategies in planning transportation for a metropolitan area; one is flexible and can adapt to future changes in the area. The second adopts a particular technology and the area must adapt to it in the future. The Bay Area Rapid Transit System is an example of the inflexible strategy. In this case community leaders decided that improving transportation in the area, thus improving accessibility, would save San Francisco from decay. The flaw in the decision making process was that even though consultants were used, they designed and implemented on particular form of transit system rather than deciding what the future needs of the region would be and then deciding what mode would best fit those needs. The choice of rapid rail implies a political strategy. A bus system would have been more flexible, less expensive, use already existing and multipurposes facilities. The building of a rail system forces development, growth and prescribed uses of land. Technology becomes an independent variable in political decision making because it forecasts what the future will be. This is called technocracy; rule by technology. The author proposes a socio-political impact statement which would report probable consequences of a proposed investment in a particular technology.

Zwerling, S (Connecticut University, Storrs) *Urban Law Review* Vol. 8 1974, pp 97-120

41 125209 YOUR CITY-YOUR CHOICE. A PUBLIC OPINION SURVEY FOR SOUTHAMPTON CITY. Southampton City Council undertook an extensive public opinion survey on such issues as traffic restraint measures, new road construction, improvements to public transport

and the relative priority of investment in alternative transport facilities. This article describes the care with which the questionnaires were framed, and comments on questionnaire comprehension, respondent characteristics and reliability. It appears that only a small minority of the public have sufficient understanding of the problems to formulate a meaningful transport policy of their own. It is suggested that public participation will be more effective if alternative overall packages of policies are presented, together with a simple description of how each package would affect everyday life. /TRRL/

Gregory, WR (Hampshire County Council, England) Robbins, J (East Sussex County Council, England) *Traffic Engineering and Control* Vol. 16 No. 2, Feb. 1975, pp 64-67, 2 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 213063)

41 125359 SOCIO-ECONOMIC CHARACTERISTICS AND TRAVEL PATTERNS OF NON-DRIVERS RESIDING IN METROPOLITAN MELBOURNE. The purpose of this report is to present the findings of a study undertaken as a first step towards gaining an understanding of the transportation needs of the little considered non-driving members of the population. These are people who do not have the use of private transport, except perhaps as a passenger, and are therefore reliant on public transport for their independent travel needs. Data used for the study were collected in household interviews carried out for the 1964 Melbourne Transportation Study. Non-drivers were initially separated into three categories: (a) persons from non-vehicle households; (b) unlicensed adults from vehicle-owning households too young to obtain a licence. There were three major aspects to the study. The first involved determining what proportion of the population is comprised of these non-drivers and the extent of their contribution to motor transport use. The second was concerned with establishing the socio-economic characteristics of each non-driver group. The third involved an attempt to determine how far non-drivers are disadvantaged relative to drivers by not having independent use of private transport.

Bence, R ; Australian Road Research Board ARR Report 30, Nov. 1974, 84 pp, Figs., Tabs., 9 Ref.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-32618)

41 126425 DISTRIBUTION OF BENEFITS OF PUBLIC TRANSIT PROJECTS. The paper examines the basic issues related to efficiency and equity and reviews the existing techniques of including income redistributive effects in the evaluation of public projects with the objective of determining their applicability to the ease of urban mass transit projects. The current techniques of estimating the benefits of rapid transit as well as conventional bus systems and the quantification of their distribution among the various socioeconomic groups of beneficiaries are examined. It is pointed out that in the case of urban transportation projects, it is necessary for practical reasons to extend the concept of an equitable distribution of income to that of mobility or the opportunity to travel. Two alternative procedures based on the criteria of the dependence of individual groups on particular modes for different purposes are suggested for analyzing the distributive effects of urban transportation projects.

Chatterjee, A Sinha, KC *ASCE Journal of Transportation Engineering* Vol. 101 No. TE3, Proc. Paper 11497, Aug. 1975, pp 505-519; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

41 126483 THE ECONOMIC COST OF COMMUTING. The economic costs of work trips to the central business districts of 33 urban areas of more than one million population are compared according to mode of transportation. The four modes considered are automobile, rail transit, bus transportation, and vanpools. Cost data are based on information available as of January 1, 1975, and results are expressed in terms of dollars per one-way person trips of 5, 10, 15 and 20 miles. A detailed discussion of the 10-mile trip is presented to illustrate the approach used. Results show that automobile travel has a comparatively low cost only when there are sufficient vehicle occupants to share the cost. For the 10-mile trip the estimated cost per person for a single occupant automobile is \$3.71, while for the 2 to 6 occupant automobile the cost decreases from \$1.86 to \$0.62. Rail transit is relatively expensive, with the per person cost for the 10-mile trip ranging from \$2.25 with bus access to \$3.29 with kiss-and-ride access. The cost per person for the 10-mile trip by bus transportation ranges from \$1.76 for conventional service to \$2.95 for a busway system with kiss-and-ride access. The most economic means of commuting is the eight-or-more person vanpool with a cost per person for the 10-mile trip of \$0.54. Calculations showing how these costs were determined are included in an appendix to the report.

Reed, MF, Jr ; Highway Users Federation for Safety and Mobility Tech Study Memo 13, July 1975, 22 pp, 3 Tab., 3 App.; ORDER FROM: Highway Users federation, 1776 Massachusetts Avenue, NW, Washington, D.C., 20036 Orig. PC

41 126814 TRANSPORTATION DECISION-MAKING: A GUIDE TO SOCIAL AND ENVIRONMENTAL CONSIDERATIONS. An integrated approach is presented for systematically incorporating social, economic, and environmental factors into transportation planning and decision making. The timely identification is stressed of the nature, magnitude, and incidence of these potential factors so that in all phases of transportation planning, alternatives may be developed that avoid or minimize adverse effects and that take full advantage of opportunities to increase benefits. The early, effective, knowledgeable involvement of the public to clarify issues and to aid in the development and evaluation of proposals is emphasized, and the effective use is stressed of expertise and resources both of the transportation agency and of other agencies with maximum flexibility and openness. The report also stresses the consideration of a range of transportation improvements involving various types of highway facilities, other models, transportation regulations, controls and constraints, and the no-build option. A systematic evaluation process, and the documentation of work performed and decisions made are crucial, and institutional arrangements and decision-making are important. The planning approach and techniques presented here are based on the following findings: the overall process through which social, economic and environmental considerations are

brought into transportation planning and decision-making is as important as the particular techniques used for predicting impacts; issues of social equity must be explicitly recognized and taken into account in transportation decision-making; different groups can be expected to have different interest and different priorities. System plans should be defined using a strategy of implementation decisions being made over a period of time, thereby enabling options to be kept open longer. Periodic reassessment of decisions should be built into all stages of system studies. Objectives for all phases of a transportation planning and design process are listed, a 4-phase study strategy is proposed, and the roles of the transportation professional are reviewed.

Manheim, ML Suhrbier, JH Bennett, ED Neumann, LA Colcord, FC, Jr Reno, AT, Jr (Massachusetts Institute of Technology) *NCHRP Report No. 156*, 1975, 125 pp, Figs., 14 Tab., 292 Ref., 2 App.; Research sponsored by the American Association of State Highway and Transportation Officials in Cooperation with the Federal Highway Administration.; NCHRP 8-8(3); ORDER FROM: TRB Publications Off

41 127011 **ECONOMIC CRITERIA FOR MAINTAINING MODIFYING OR CREATING URBAN OR SUBURBAN PUBLIC TRANSIT SYSTEMS** [Critères économiques pour le maintien la modification ou la creation de services de transports publics urbains ou suburbains]. Professor Beeseley, of the London Graduate School of Business Studies, author of the report, presents the latter as a sequel to his communication, under a similar title, to the 4th ECMT Symposium held at the Hague in 1971. This 1st study showed more particularly how public-transport subsidies alleviated certain social costs such as those occasioned by traffic congestion, and contributed to a redistribution of incomes in favour of lower-income groups. In his report, the author reviews and comments on a whole range of studies covering: the effects of subsidies on various aspects of urban life and development; the flexibility of public-transport services, in terms of fares, frequency, and efficiency; their flexibility set against the private car; what he calls their "operational role" and the possibility of taking the value of this "role" into consideration. The exchanges of views are a critical survey: of the justification given for the subsidies, of their sometimes unexpected effects; of the alternatives to subsidies; of the conditions for the subsidies to be efficient; of the pattern to be given them: equipment, operating, inclusive or special-purpose subsidies; finally, of the role of the controlling authorities these subsidies imply. In conclusion, the Round Table stresses the need for studying the problem in the general framework of transport as a whole and of the conditions of town life. [French]

European Conference of Ministers of Transport No. 24, 1974, 82 pp; Report on the 24th Round Table on Transport Economy held in Paris on 22-23 November 1973, and subsequent exchange of views.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: International Union of Railways, BD, 14 rue Jean Rey, 75015 Paris, France Repr. PC, OECD Publications Center, 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006 Repr. PC; UIC cat. No. 01N106

41 127697 **ECONOMIC AND ENVIRONMENTAL ASPECTS OF PERSONAL RAPID TRANSIT-A FURTHER STUDY**. A parametric study of system variables of personal rapid transit (PRT) networks is presented. The analysis examines the effect that the detour penalty associated with one-way networks has on system ridership. A preliminary estimate of the potential PRT ridership from kiss-and-ride access is given. The analysis further considers modal split, reduced-auto emissions, cost per mile, benefit-cost ratio, electrical-power requirements as dependent variables. Independent variables are population density, trip length, PRT operating and fixed costs, mesh spacing, auto speed, perceived-auto-mileage cost, parking cost, PRT speed and fare. Particular attention is paid to the effects that parking cost, auto speed, perceived-auto-mileage cost and trip length have on the dependent variables. /Author/TRRL/

Dais, JL (Bell Laboratories) Kornhauser, AC (Princeton University) *Transportation Research Vol. 9 No. 2/3*, July 1975, pp 149-157, 8 Fig., 2 Tab., 30 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 215066); ORDER FROM: ESL, Repr. PC, Microfilm

41 127810 **URBAN TRANSPORTATION AND DECISION MAKING-A COMPARISON OF THREE CASE STUDIES IN BRITAIN**. In spite of the impacts that new transportation facilities have upon the economic, social and political structures of established urban areas, the decision process leading to policy formation and plan implementation has received little, if any, attention. Case studies of three county boroughs in Britain having different urban transport policies suggest that the decision making process is dominated by groups and individuals who attempt to implement policies which benefit the sectional interests which they represent. Within a changing relevant environment, local technicians, politicians and community groups compete and form coalitions in order to acquire authority and implement their own notions of justice and equity in the adaptation of the built environment. (A) /TRRL/

Grant, JA (Reading University, England) *Transportation (Netherlands)* Vol. 4 No. 2, June 1975, pp 123-142, 4 Fig., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 214561)

41 127884 **THE CONTINUING EVOLUTION OF URBAN TRANSPORTATION**. This exploration of the countiuing evolution of urban transportation, describes the prime determinants of the direction and rate of change in urban transport and examines the existing generic transport options and their future roles. Changes in urban transport will evolve steadily but relatively slowly for the foreseeable future. The nature and rate of such change will be largely determined by rates of change in urban form, in socio-economic conditions and in resource constraints. However, it is possible that the physical environment, economic and social conditions may coalesce into a sufficiently compelling force to override this gradual change. The nine principal determinants of the future of urban transportation are: inertia, demography, distribution of economic activity, constraints on transport side-effects, consumer preference, promotion of the general welfare, technology, financial resources and institutional mechanisms. Transport is identified as a function

subject to strict control by public administrations which can be used as an instrument in achieving new objectives for urban form and social interaction.

Hamilton, CW (Battelle Columbus Laboratories) *Ohio Transportation Engineering Conference Vol. 29 Apr. 1975*, pp.56-65, 2 Fig, 6 Tab.; Proceedings of the twenty-ninth annual Ohio Transportation Engineering Conference, conducted by the Department of Civil Engineering, in cooperation with the Ohio Department of Transportation.

41 127886 **MEASURING SOCIAL IMPACTS OF URBAN TRANSPORTATION MODES: A VALUE APPROACH**. Proceedings of the Twenty-Ninth Annual Ohio Transportation and measuring existing or held values of residents of impacted areas and users of transportation systems, discusses the theoretical aspects of the differences between value-behavior and verbal-value failings. The contingent conditions associated with quantification of values, requirements for such quantification, and identification of some alternative quantifying techniques are examined, and two useful matrix forms for displaying values (for the public presentation of quantified values) are described. The objects of the values are specified as those positive and negative social impacts which accrue to alternative transportation modes. A figure is used to explore valuing for alternative transportation modes assuming continued growth of dispersion points and continued growth of points of conflux in many spatially segregated areas. Valuing related to the automobile, public transit, and rapid transit is illustrated. The importance is emphasized of the precise identification and measurement of valuing activities in transportation planning and other social variables in the planning process.

Watkins, GA (Battelle Columbus Laboratories) *Ohio Transportation Engineering Conference Vol. 29 Apr. 1975*, pp 74-85, 2 Fig., 19 Ref.; Proceedings of the twenty-ninth annual Ohio Transportation Engineering Conference, conducted by the Department of Civil Engineering, in cooperation with the Ohio Department of Transportation.

41 128230 **STATEWIDE PUBLIC OPINION SURVEY ON PUBLIC TRANSPORTATION: TECHNICAL REPORT**. A survey of public attitude towards public transit addresses such topics as modal choice, opinions on mass transit and its operation, and transit assistance alternatives. Results indicate that though the importance attached to transit differs from rural to urban areas, there is general agreement in a desire for increased service and reasonable fares, special services for handicapped, elderly and children, and continued transit assistance coupled with public participation. /HRIS/

Donnelly, EP Weiss, DL Cohen, GS Liou, PS Holthoff, WC; New York State Department of Transportation June 1975, 207 pp, 50 Tab., 3 App.; Study sponsored in part by U.S. DOT.

41 128257 **THE INFLUENCE OF PUBLIC TRANSPORT ON CAR OWNERSHIP IN LONDON**. This paper discusses the development of a statistical model of car ownership in London which included public transport quality as one of its variables. Two broad sets of variables are

distinguished: household factors and planning factors. The two basic statistical approaches taken are (a) time series (analysis of changes in car ownership over time); and (b) cross-sectional (analysis of differences in car ownership at one point in time between different areas or socio-economic groups). The model, which excludes residential density, explains, at least in part: (a) the tendency for income/density models to underpredict the increase in car ownership during the 1960's and (b) the instability of the income models of J.J. Bates.

Fairhurst, MH (London Transport Executive) *Journal of Transport Economics and Policy* Vol. 9 No. 3, Sept. 1975, pp 193-208, 5 Fig., 1 Tab., 8 Ref.

41 128573 PUBLIC TRANSPORTATION IN THE SCHOOL CURRICULUM. The rationale for public transportation education is set forth, the goals for such education are described, and the ways in which government and the transit industry could help achieve the goals are outlined. The five ultimate goals which education should achieve are: motivate youngsters to use transit for the benefit of the common good; expand travel options of the public; promote personal, social and political action by citizens to ensure the adequacy, safety and efficiency of transit; promote transportation safety; and reduce vandalism of public transportation vehicles and facilities. Instrumental goals which must first be achieved are also listed. These relate to provision of information on transit availability, alteration of stereotyped thinking about transportation issues, setting of priorities, feelings and attitudes associated with the use of cars, and the understanding of social, political and economic factors related to public transportation systems. The government and transit industry could provide educational services and promote curriculum development.

Finn, P (ABT Associates, Incorporated) *Transit Journal* Vol. 1 No. 4, Nov. 1975, pp 21-32

41 128807 A BEHAVIORAL ANALYSIS OF TRANSPORTATION: SOME SUGGESTIONS FOR MASS TRANSIT. Behavioral principles are outlined and used to analyze bus riding and car driving. It is concluded that transportation behaviors are chains of responses, consequences (reinforcers and punishers), and discriminative stimuli, and that alterations of these components will influence ridership. It is suggested that manipulations such as free transit and exclusive bus lanes will attract the carless more than car drivers. Analysis indicates that systems such as Dial-a-Bus and Park-and-Ride have potential for competing with the car because these systems reduce the delay of reinforcement and the adverse consequences associated with bus riding. /Author/

Deslauriers, BC (Pennsylvania State University, University Park) *High Speed Ground Transportation Journal* Vol. 9 No. 2, 1975, pp 13-20, 1 Fig., 16 Ref.

41 129520 THE URBAN TRANSPORT DILEMMA. This paper examines methods which could reduce the present undue dependence on the private vehicle for urban travel in New Zealand. In addition to engineering, social and political issues are discussed. Reference is made to the importance of public participation in town planning objectives. Solutions discussed include

radial and inter-suburban bus routes, and the promotion of walking and cycling as urban travel modes, over distances of up to 1800 M and 2 to 3 km respectively. /TRRL/

Williman, A *New Zealand Engineering* Vol. 30 No. 1, Jan. 1975, pp 19-24, 5 Fig., 1 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213507)

41 129566 TRANSPORT AND SOCIAL EQUITY. The author reviews the problem of the integration of transport needs into a social and economic environment and suggests that the remaining gap lies in social equity or "fairness". The article also discusses the manner in which levels of income and social status act as constraints on personnel opportunity through the use of a transport facility. The effect of social inequality on a way of life in a stratified society is examined and it is suggested that transport systems are needed which reflect society's priorities where group interests are represented. /TRRL/

Roberts, J *Built Environment* Vol. 4 No. 2, Feb. 1975, pp 95-98, 1 Fig., 1 Tab., 3 Phot., 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-214673)

41 129994 A PILOT STUDY OF A METHOD FOR TESTING THE PUBLIC IMAGE OF FORMS OF TRANSPORT. After a brief review of the use of psychological tests of attitude in transport, this report outlines a method which employs schematic human faces. Its use in a pilot study to test the image of forms of transport held by residents in two housing estates is then described. The results of this study are not entirely unambiguous, but suggest that the bus user may be less highly regarded than the car user. It is recommended that the test itself should be refined before wider use is made of it. (A) /TRRL/

Chapman, RA ; Newcastle-Upon-Tyne University, England, (0306-3402) R&D Rept. Work Paper No. 10, May 1975, 31 pp, 4 Fig., 10 Tab., 28 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 215986)

41 129997 BETTER TOWNS WITH LESS TRAFFIC. This article is concerned with the OECD traffic conference to be held in mid-april 1975. It is primarily concerned with the survey of traffic management measures in 300 cities which was conducted in preparation for the conference, and two examples (Besancon and Nagoya) of a series of case studies of particular cities that were planning comprehensive measures to limit car use, improve public transport and abate nuisances. Besancon (population 135,000) is improving public transport and environmental conditions. Reference is made to a system of licences to control access to the city center (costing \$730,000), to its \$520,000 pedestrian precinct scheme and changes in its public transport services. Nagoya (population 2.3 million) shows environmental traffic measures deployed over an exceptionally wide area. Improvements include a 4-year plan which is designed to shift emphasis from cars to public transport and the elimination of through traffic from areas suffering from accidents, noise or other traffic problems. Results of before and after surveys of accidents and noise are given, and of the progressive effect of the 4-year plan on traffic inflow and outflow in a 2.4 sq kilometre area of the city. /TRRL/

Bendixson, T *Surveyor - Public Authority Technology* Vol. 145 No. 4322, Apr. 1975, pp 33-34, 2 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 213775)

41 130415 ECONOMIC RELATIONSHIPS AMONG URBAN TRANSIT MODES. Economic relationships among demand-actuated, scheduled-route, and rapid transit services are examined to determine where the operating economy justifies intensive capital investment in permanent facilities. Analysis of national experience in the more heavily populated urban areas discloses that per capita ridership is much greater in areas served by rapid transit than in areas served only by street transit service, which in turn generates far higher levels of per capita ridership than demand-actuated service. The relationships cover common situations. Unique situations (e.g., New York's unusual costs and densities and San Francisco's experimental technology) are not included. Public acceptance is measured by comparing paid ridership with population and by reference to census data on the percentage of work trips made by transit. A general similarity between the two sources is evident, but rapid transit ridership outside New York is understated because of policies involving free transfers from buses and streetcars to rail transit. This does not impair city totals, however, in which transfers are not counted as additional trips. Costs are measured by financial records based on the number of vehicles operated. The usual denominator of vehicle miles (kilometers) varies based on speed or slowness, and hourly values vastly understate the cost of service provided only during peak hours when employees must be guaranteed pay for 40 hours/week. The results are empirical but appear to be realistic.

Tennyson, EL (Pennsylvania Department of Transportation) *Transportation Research Record* No. 552, 1975, pp 19-30, 2 Fig., 5 Tab., 10 Ref.; ORDER FROM: TRB Publications Off

41 130420 WHAT ROLE FOR CITIZENS? Citizen participation can and does take a variety of forms and will result in different roles for citizens in planning and policy-making processes. This paper describes and compares the citizen participation strategies used in two recent regional transportation planning projects in King County, Washington. The purpose of this analysis is to determine how citizen participation strategies differ according to the planning issue and its importance in the community and how such strategies provide different opportunities for citizens to become involved and to influence the planning process. The analysis and comparison focus on several key aspects of the programs: recruitment techniques, structure and process of involvement, and the citizen's role and impact on the planning process. The analysis finds that where the issue, such as the airport study, is important in the community a loosely structured, citizen-defined involvement program is more effective. Advocate planners are beneficial in this instance. For a nonsalient, or less visible, issue such as the countywide transit plan, a more tightly structured involvement program that emphasizes educating citizens is effective in stimulating citizen input. This strategy relies on planner-defined activities with all citizens playing the same role. The information for this analysis is

based on a survey and study done in the Metro 1980 transit planning study and on involvement in the initial stages of the

Curry, M (Battelle Human Affairs Research Centers) Gunby, BK, *Discusser Transportation Research Record* No. 555, 1975, pp 23-36, 2 Tab., 7 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

41 132203 BART'S IMPACT ON THE BAY AREA IS BEING STUDIED IN DEPTH. Bay Area Rapid Transit has a new group of officers and the organization has been simplified. Equipment reliability and availability remain serious problems. While some of the equipment problems have been resolved or controlled, new ones have taken their place, preventing any real improvement in equipment availability. Traction motor flashovers and braking problems are receiving most attention. Changes in operating concepts are also to be implemented.

Railway Age Vol. 177 No. 7, Apr. 1976, p 27, 1 Phot. ORDER FROM: XUM, Repr. PC

41 133452 AN EQUITY EVALUATION MODEL FOR URBAN MASS TRANSPORTATION: AN ASSESSMENT OF THE SPATIAL AND SOCIAL DISTRIBUTIONS OF BENEFITS AND COSTS. This report deals with the distribution question, i.e., the distribution of resources among members of society. Public investment decision-making in the provision of impure goods (those public goods which intrinsically incorporate a spatial dimension) is discussed and a public investment model which describes investment issues as both a production and a distribution question is presented. Then, an alternative public investment model, the Equity Evaluation Model (EEM) which examines public investment as a distribution question, is examined. The mathematical foundation of distributional analysis, particularly the link between aggregate and distributional analysis, is discussed. The three stages of the EEM are detailed which special attention to the selection of a proper equity criterion by which competing public projects are to be evaluated. A case study application of the EEM is presented through the examination of the geographic setting of Pittsburgh and the alternative public projects, three mass transit proposals. The social and economic environment of Pittsburgh region is described and the results of conventional benefit/cost evaluations of the projects are presented. The distribution of benefits and costs is determined for each of the three proposals using the EEM. Net change in the distribution of real income is calculated and evaluated in terms of equity. The projects are compared and the most equitable project, according to the author, is chosen. Finally, the concepts of the report are integrated with an emphasis on an understanding of the key role played by spatial forces in the distribution of real income. The model is evaluated in terms of methodological soundness and its overall appropriateness to the equity paradigm. Future applicability of the model is discussed.

Hodge, DC ; Pennsylvania Transportation Institute, (PTI 7424) Univ. Res. UMTA-PA-11-0010-74-4, Nov. 1974, 221 pp; Sponsored by the Urban Mass Transportation Administration.; Contract PA-11-0010; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, REPR. PC, Microfiche; PB-251205

41 133568 ECONOMIC MEASUREMENT OF BENEFITS OF TRANSPORTATION. Presents an economic measure of the benefits of transportation. This measure allows proposed changes in an urban system in either transport or land use to be evaluated for urban planning purposes in terms of cost and accessibility. The benefit to cost ratio for the change may be expressed conveniently in terms of the ratio of costs and accessibilities of the two systems considered.

Brotchie, JF *ASCE Journal of Transportation Engineering* Vol. 102 No. TE1, Feb. 1976, pp 17-26, Refs.; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

41 134511 FACTORS AFFECTING CHOICE OF TRAVEL MODE. Society is contemporarily demanding intensified study of both private and public travel modes. Transport planners are being questioned on the validity of large expenditure on limited access roadways. They are also being asked the social consequences of substantial investment in urban public transport. To make an objective assessment of the public-private transport issue, a sound understanding of the mode choice decision-making process is necessary. Unfortunately, most of the current literature on mode choice is directed towards extolling the virtues of one particular type of model. This paper presents a wider approach and attempts to give an understanding of the mode choice decision-making process and to define a base for the sound evaluation of mode choice models. (A) /TRRL/

Davis, BC (Queensland Main Roads Department, Australia) *Australian Road Research Board Conference Proc* Vol. 7 No. 2, 1975, pp 6-19, 5 Fig., 3 Tab., 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218020)

41 134731 PERCEIVED ATTRIBUTE IMPORTANCE IN PUBLIC AND PRIVATE TRANSPORTATION. A group of 500 mail panel respondents rated attributes of two generic classes of innovative urban transportation systems on a seven-point importance scale. A factor analysis of the data resulted in seven interpretable factors to describe the variance of the 40 public transportation attributes and five factors to describe the variance of the 34 private transportation attributes. These latent dimensions of importance were shown via discriminant analyses to have relations to the socio-economic characteristics of the panel respondents. Discriminant analysis was also used to reveal perceptual differences between the two system alternatives with respect to 16 common attributes.

Golob, TF Dobson, R Sheth, jr ; General Motors Corporation GMR-1465, July 1984, 5 pp, Tabs., 13 Ref.; Proceedings of the National American Institute for Decision Science meeting, 14-16 November, 1973, Boston Massachusetts.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-34093)

41 134881 INTEGRATED ECONOMIC-SOCIAL-ENVIRONMENTAL PLANNING. This paper deals with the practical application of integrated economic, social, and environmental analyses to transportation planning for a municipal government, corridor planning for a state department of transportation, and national-level

planning for an overseas federal government. Each project was real, not theoretical or part of advance planning. Two of the projects were responsible for the U.S. Department of State request for a paper on the subject to the 1972 U.N. Conference in Stockholm on the Human Environment. First, the paper is based on an attempt to improve and broaden the understanding of integrated analysis. Three projects are used to point out selected and particularly difficult problems. Next, the paper describes the philosophical basis for and approach to integrated analysis. Key aspects and issues are reviewed by using selected references to identify strengths and weaknesses with specific elements of the approach. A special effort is made to identify and rank the more important elements of the approach so that planners might draw some inferences or conclusions on the utility of important elements as well as the overall approach. Finally, the paper concludes with answers to questions on what the results of the integrated analyses were, how the decision makers reacted to the results, and what decisions were made concerning the projects that were directly traceable to parts or all of the approach and integrated analysis. The paper refers to other theoretical and applied efforts. Emphasis on actual experiences and practicality is maintained throughout the discussion.

Bigelow, CD (Bigelow and Associates) *Transportation Research Record* No. 565, 1976, pp 25-32, 10 Ref.; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

41 135207 ON THE PROFITABILITY OF URBAN AND SUBURBAN LINES [Ueber die Wirtschaftlichkeit von S-Bahn Strecken]. The increasing deficit recorded in short-distance public transport, has brought the economic aspects of these services to the fore. Criticism of investment in urban railway and underground networks, and a number of contradictions observed, suggest that a general analysis should be made of the profitability of these railway systems, and in particular, an examination of the factors liable to influence the engineer when planning, preparing and constructing such systems. Based on indices, the author explains the interdependence of factors of management economy, and gives an overall view of cost-utility studies for urban railways, together with recommendations on criteria of comparison for assessing alternative short-distance transport investment. [German]

Weigelt, H *Archiv fuer Eisenbahntechnik* Vol. 30 Dec. 1975, pp 9-21, 8 Tab., 30 Ref.; ACKNOWLEDGMENT: UIC; ORDER FROM: Hestra-Verlag, Holzhofallee 33, 61 Darmstadt, West Germany

41 135936 METHODS OF PREDICTING LOCAL DEMAND FOR NEW RAPID TRANSIT SERVICES. Two models developed (by the Illinois Department of Transportation IDOT) to predict local travel demand as well as four alternative approaches (by the Chicago Transit Authority CTA), are summarized. All analyses emphasize empirical travel patterns and are formulated to predict future levels of ridership on new rapid transit lines based on actual demand levels on existing rapid transit facilities. In one IDOT method, a linear regression model was constructed to predict local ridership on a rapid transit line as a function of the population and employment densities of the line's service area.

The second IDOT method expressed local ridership on a new rapid transit line as a function of diversion from parallel bus routes. The CTA methods were formulated to address the following: demand models for rail rapid transit system optimization study; treat branches of the same route as single lines; avoid the use of a systemwide proportion of local trips; and develop a relationship between existing and local ridership and population and employment with a degree of correlation which can be used to predict local trip generation on new lines.

Lee, I Permut, H ; Northeastern Illinois Regional Transportation Auth TR-75-03, Dec. 1975, 23 pp, 4 Fig., 5 Tab., 3 App.

41 135939 AN ALTERNATIVE APPROACH FOR ESTIMATING THE HOME BASED TRIP PRODUCTIONS IN URBAN TRANSPORTATION PLANNING. Trip generation is one of the important stages within the framework of conventional urban transportation planning package. Zonal Regression method and household regression method are the most commonly recommended procedures for estimating the future trips. Notable drawbacks in both these methods have been spotted out, specially in the adoption of mechanistic rather than a logical approach. Individual is the basic decision-making unit and the model should incorporate his/her characteristics. After studying the socio-economic conditions prevailing in India and their implications on travel demand, an Individual Regression model has been formulated. The population of the study area has to be disaggregated into a set of groups based on individual's travel traits and characteristics before the models could be developed for each of the groups separately. To investigate the capability of the proposed method, full scale Home Interview survey was conducted in Roorkee town. The experiment was so designed as to assist in calibration of models and in verification of their performances. The data were used in developing the Individual models, as also Zonal and Household models. The tests have revealed that the proposed hypothesis has produced satisfactory results, in relation to other methods.

Raghava Chari, S Khanna, SK (Roorkee University, India) Virk, HBS (Indian Army Corps of Engineers) *Indian Roads Congress, Journal of Vol. 36-2 Nov. 1975, pp 229-250, 2 Fig., 7 Tab., 16 Ref.*; Direct requests to the Secretary, Indian Roads Congress.; ORDER FROM: Indian Roads Congress, Jamnagar House, Shanjahan Road, New Delhi 110011, India

41 136427 URBANISATION AND TRANSPORTATION IN JAPAN, A SHORT HISTORY. During the past century the growth of urban population has increased transport demands. Better developed transport modes have promoted urban growth so that urbanisation and transportation have been mutual catalysts. However the development rate of urban transport has lagged and Japanese cities face serious transport problems. The article describes separately the growth history of cities and urban transport over the last 100 years. The principal factors contributing to city growth are examined and related to corresponding developments in urban transport. With the increased volume of traffic, problems of noise, exhaust emission and vibration have be-

come more serious. The government has been forced to introduce legislation and is conducting research into new transport systems. The author concludes that although short term measures are being taken to improve transport the only real solution is a re-structuring of cities. /TRRL/

Niitani, Y *Wheel Extended Vol. 5 No. 1, 1975, pp 4-10, 7 Fig., 6 Phot.*; ACKNOWLEDGMENT: TRRL (IRRD 218835); ORDER FROM: Toyota Motor Sales Company, Limited, #3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

41 137336 THE CENSUS AND TRANSPORTATION PLANNING: SURVEY OF EVALUATIONS AND RECOMMENDATIONS AS TO THE USEFULNESS OF THE 1970 CENSUS DATA IN URBAN TRANSPORTATION PLANNING. The purpose of the project is to evaluate the usefulness of 1970 Census data for urban transportation planning with special emphasis placed on evaluating the 1970 Urban Transportation Planning Package. The project seeks to: (1) Identify urban transportation planning-related data from the 1970 Census; (2) evaluate the uses of those data in urban transportation planning; (3) identify user problems; (4) identify alternative sources of these data products; and (5) develop a series of recommendations for the 1980 Census. Personal and telephone interviews with ten state, and twenty-five substate regional agencies and three university and private consultants were used to generate the desired information. The experiences and opinions of the interviewees were compiled and summarized into a series of recommendations for the 1980 Census.

Stuart, RC Hauck, MR ; Virginia Polytechnic Institute & State University, Urban Mass Transportation Administration, (UMTA-VA-11-0003) UMTA-VA-11-0003-67-1, 53 pp; Contract VA-11-0003; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254802/2ST

41 137451 PERSONAL MOBILITY AND TRANSPORT POLICY. A social policy on transport must be directed towards the needs of human beings moving from place to place in their daily lives, and particularly to the needs of those who have difficulty in doing so. It must particularly favour those modes which minimise noise, pollution, accidents, congestion and the reduction in the ability of other people to move around. In order to achieve these goals, firstly, considerable political will is required. Secondly, A considerable amount of the mobility currently enjoyed by the motorist must be surrendered, for the level of personal mobility of people without cars can not otherwise realistically be raised. The only fair solution is an equitable transport policy, based on social and environmental goals as well as those of efficiency and economy.

Hillman, M ; International Federation of Pedestrian Assoc 1975, 9 pp; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 218615)

41 137476 THE SHAPE OF TOMORROW: A STUDY ON THE FUTURE OF URBAN TRANSIT SYSTEMS. The article discusses the future development of urban transit systems in Canada, the most significant of which is the proposal by Ontario to develop intermediate capacity transit (ict) systems. Designed to handle

6000-20000 passengers per hour, these systems have possible application in the nine largest Canadian cities. Using estimates based on households in the main cities, figures are given which indicate that such systems should be installed within the next 12 years during a time of maximum estimated city growth. Based on estimated distribution of income the possible future trend of car ownership and urban growth is examined. In order to attract higher income households to the proposed ict system two transport options are considered based on either general peripheral growth with feeder mini-buses or concentrated growth with short distance walking as the likely feeder mode. Preliminary designs for ict systems are considered, based on these two options showing specification, costs and performance characteristics. /TRRL/

Reynolds, DJ *Habitat Vol. 18 N 1975, pp 9-22, 2 Fig., 4 Tab.*; ACKNOWLEDGMENT: TRRL (IRRD 218627)

41 138147 CONSUMER ATTITUDES TOWARD PUBLIC TRANSIT. Transit planning requires a high level of input from the public. Market survey research has been found to be a very useful and simple tool for collecting and analyzing data on key user groups and public opinion segments. Therefore, the objectives of this study were to identify and weight the factors that jointly influence the use of public transportation and, with this information, to formulate guidelines for both marketing and policies of transit operations. In summary, a transit system must, if it is to solve urban transportation problems, be designed to provide service that is attractive and competitive in a consumer-oriented market and socially concerned society. This paper reports preliminary results from a 1972 study conducted in Orange County, California. Changes have been made in the questionnaire, and a more detailed market segmentation study was conducted in 1974.

Fielding, GJ Blankenship, DP Tardiff, T (Orange County Transit District, California) *Transportation Research Record No. 563, 1976, pp 22-28, 2 Fig., 9 Ref.*; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

41 138148 CHARACTERISTICS, ATTITUDES, AND PERCEPTIONS OF TRANSIT NONUSERS IN THE ATLANTA REGION. Immediately after transit fares in Atlanta were reduced, transit ridership increased dramatically, exceeding the previous estimates by 50 percent. Total ridership for the 6-month period following the March 1, 1972, fare reduction was almost 15 percent greater than that for the equivalent period in 1971. The fare reduction program of the Metropolitan Atlanta Rapid Transit Authority (MARTA) generated considerable local and national interest, and research was designed to measure the effect of the fare reduction and subsequent transit service improvements on ridership. The study effort consisted of two surveys: (a) an on-board interview of transit riders and (b) an in-home survey of households in the two-county transit service district. This paper deals exclusively with the in-home survey. The MARTA in-home survey dealt with two principal areas of inquiry to complement the on-board survey findings. The first area consisted of the

characteristics of transit nonusers as well as their attitudes toward and perceptions of transit. In addition, the in-home survey was designed to determine whether the characteristics, attitudes, and perceptions of nonusers were significantly different from those of transit users. The second area dealt with why the increase in ridership was not even higher and what actions would be necessary to attract additional riders.

Byrd, JP, IV (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Record* No. 563, 1976, pp 29-37, 9 Tab.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

41 138337 THE EFFECT OF A SUBWAY ON THE SPATIAL DISTRIBUTION OF POPULATION. This research determined the effect of the original subway line on the spatial distribution of population in Metropolitan Toronto. The comparison made is between a mass transit system and a road (rather than expressway) system. By using 1951, before the subway opened, and the same type of population figures in 1956 and 1961, after the operations began, it was found that the construction of the subway altered the spatial form of the area. The line was initially built through a low-density area which was primarily commercial. It was found that redevelopment of urban land is a protracted process and effects of transit service are slow in manifesting themselves.

Davies, GW (University of Western Ontario, Canada) *Journal of Transport Economics and Policy* Vol. 10 No. 2, May 1976, pp 126-136, 1 Fig., 3 Tab., 17 Ref.; ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England

41 138830 FOR TRAFFIC-POLICY TO MOBILITY-POLICY. The author reviews government policy in the Netherlands on spatial planning and the criticisms of it. The consequences of the exclusion of the use of cars in socially dissimilar cases are queried. /TRRL/ [Dutch]

Tijdschrift voor Vervoerswetenschap Vol. 11 N 1975, pp 261-72, 18 Ref. ACKNOWLEDGMENT: TRRL (IRRD 220525), Institute for Road Safety Research

41 138899 THE FUTURE OF THE CAR. A personal view is presented by the author who believes that car-ownership can continue to grow despite arguments that have been put forward based on the effects of the energy crisis. Data is given on the number of cars licensed and scrapped and changes in size, depreciation rate and price. The author concludes that the resilience of the car market means that growth is inevitable but asks whether it should be permitted. It is suggested that increase in car-ownership and usage should be developed in the best manner for society as a whole, increasing mobility and amenity for all sections of the community and not penalising those who have to rely on public transport. /TRRL/

Mosridge, MJH (Leeds University, England) *Traffic Engineering and Control* Vol. 17 No. 3, Mar. 1976, pp 101-114, 9 Fig., 3 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-219922)

41 138979 SOME GENERALIZATIONS AND APPLICATIONS OF THE VELOCITY FIELD CONCEPT: TRIP PATTERNS IN IDEALIZED CITIES. This paper discusses the velocity field concept and seeks to extend its descriptive power by introducing the continuous analogue of the traditional link speed-flow relations used in transportation studies. By solving the resulting velocity field equations self-consistently in terms of land use and socio-economic factors, and various policy variables, the profile of this field, which reflects the spatial distribution of congestion in an urban area, may be found. The velocity field is computed in a circular city with a single ring road in order to identify its optimal radius. Car parking and public transport "no fares" policies are also considered to illustrate various aspects of our approach. (A)

Williams, HCWL Ortazars, HCWL (Leeds University, England) *Transportation Research* Vol. 10 No. 2, Apr. 1976, pp 65-73, 9 Fig., 1 Tab., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220246)

41 139044 URBAN COMMUTING: CONGESTION AND CATECHOLAMINE EXCRETION. Male passengers regularly commuting to Stockholm by train were interviewed on two mornings at different levels of congestion, before and after the introduction of petrol rationing in 1974. One group travelled the whole length of the route, the other travelled halfway. Subjective experience was gauged by self ratings, and physiological stress was measured by catecholamine concentration in urine. The results showed that discomfort increased as the train approached Stockholm and the number of passengers rose. Perceived congestion increased with the square of the number of passengers. On both trips, adrenaline levels were lower in the group travelling a longer distance, and they were higher in both groups when the train was more crowded. This supports previous findings that stress in travelling by train depends more on social and ecological conditions during the trip than on its length or duration. /TRRL/

Lundberg, U ; Stockholm University, Sweden Report 453, 1975, 11 pp, 5 Fig., 1 Tab., 19 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD 219741)

41 141072 A CAUSAL MODEL FOR ESTIMATING PUBLIC TRANSIT RIDERSHIP USING CENSUS DATA. This paper applies a causal perspective to the study of travel behavior through the use of path analysis. The study develops a model of public transit use for work trips in the Raleigh and Durham, North Carolina Standard Metropolitan Statistical areas. The model is estimated with data from the 1970 Census of Population and Housing. It is successful in explaining 85 percent of the variance in use of public transportation. Auto ownership is the most influential variable determining use of public transportation. However, the causal analysis demonstrates that auto ownership is itself determined to a large extent by other variables in the model, particularly percent black, median income, and level of transit service. Therefore, these variables have a substantial indirect effect on transit use mediated through auto ownership. /Author/

Dajani, JS Sullivan, DA (Duke University) *High Speed Ground Transportation Journal* Vol. 10 No. 1, 1976, pp 47-57, 1 Fig., 2 Tab., 16 Ref.

41 141241 SOCIAL ASPECTS OF URBAN TRANSPORTATION: A BIBLIOGRAPHIC REVIEW. This annotated bibliographic review which presents data categorized in seven sections, concentrates on works which represent a seminal contribution to the field, offer worthwhile empirical findings, demonstrate a unique well-implemented methodology, contain new and useful insights, or employ a multidisciplinary approach. Section one of the report identifies issues which have led to attempts to relate social research and social insight to the solution of transportation problems. Studies specifying alternatives and evaluating them are presented as well as writings initiated by protests at major transportation projects. Writings which summarize and integrate the ideas presented above are also included. The review of literature on impact studies covers aspects such as community and neighborhood disruption, dislocation and relocation, environment and aesthetics. Transportation disadvantaged (low income groups, elderly, handicapped, children) which has attracted little research attention, is covered. The characteristics and purpose (work trip, non-work trip) of urban travel are reviewed and the choice and use of alternative transportation modes (automobile vs transit, walking; bicycling) are examined. The history and characteristics of the transit industry are described, pricing, policy-making, marketing and public relations are covered, and information is presented on service, design modifications, labor relations, crime and vandalism. Transportation planning is the central topic of the last section which covers models, plan and program evaluation, community liaison and citizen participation, application of social science concepts and techniques, new technologies, the automobile, adapting transit to need, relating transportation to urban development, and adjusting to urban lifestyles.

Friskin, F Emby, G ; Toronto-York University Joint Program in Transp Research Report 30, Sept. 1975, 271 pp, Refs.

41 141293 A SYNTHESIZED TRIP-FORECASTING MODEL FOR SMALL-AND MEDIUM-SIZED URBAN AREAS. Because of the high monetary and time costs associated with home-interview surveys for urban transportation studies, planning analysts have sought to model travel demand by using other data sources such as 1970 census worktrip data. The purpose of the research reported in this paper is to examine trip distribution functions that may be appropriate for estimating zone trip interchange in small-to medium-sized urban areas. Several functional forms of travel impedance were investigated. For the city sizes studied, model accuracy is shown to be relatively insensitive to the form of the travel impedance function. Analytical deductions are used to develop a calibration technique for a 2-way, constrained gravity model using the simple negative exponential function. Calibration of the model can be accomplished without using extensive origin-destination survey data. The model is tested by using data from actual studies, and an outline is suggested for calibrating the distribution model by using the 1970 census data.

Zaryouni, MR (Rensselaer Polytechnic Institute) Kannel, EJ (Illinois University, Urbana) *Transportation Research Record* No. 569, 1976, pp 87-95, 2 Fig., 1 Tab., 15 Ref.; ORDER FROM: TRB Publications Off

41 141367 CITIZEN PARTICIPATION IN TRANSPORTATION SYSTEMS PLANNING. The Southwestern Pennsylvania Regional Planning Commission (SPRPC) has developed a long-range comprehensive transportation plan for a six-county region, encompassing 4,500 square miles and 2.4 million people. The final plan draft evolved from a series of consecutive planning cycles. The Cycle I testing and evaluation of transportation plans led to a Cycle II highway and transit system; Cycle II served as the basis for the second cycle of planning and the eventual recommended plan. In an effort to produce a transportation plan which achieved that elusive balance between technical and human elements in the planning process, SPRPC committed a special staff team and the necessary supportive resources to develop a program of citizen involvement (CI). For 18 months the CI team engaged a variety of groups and individuals in Pittsburgh and Allegheny County in meetings and small work sessions to secure community input to the plan. This report will describe the strategy employed by the CI team to include citizens in systems planning. The report will document the CI team's activities and evaluate the results.

Southwestern Penna. Regional Planning Commission No Date, 36 pp, 6 Fig., 5 Phot., 1 App.

The preparation of this report was financially aided by the Pennsylvania Department of Transportation, Federal Highway Administration, Urban Mass Transportation Administration, and in cooperation with the Counties of Allegheny, Armstrong, Beaver, Butler, Washington and Westmoreland as well as the City of Pittsburgh.

41 141405 PRAGMATIC EVALUATION OF TELEPHONES, ACTIVITY SCHEDULING, AND OTHER STRATEGIES TO MODIFY TRAVEL BEHAVIOR OF POPULATION SUBGROUPS (ABRIDGMENT). Social science literature and information from a comprehensive case study of a population subgroup's physical mobility were used to forecast behavioral responses to 8 strategies to overcome problems associated with urban transportation. Strategies included substituting telephone calls for trip making, reducing family household and personal stresses, reducing tensions from poor home design, increasing home-centered activities, expanding home deliveries of goods and services, increasing spatial distribution of trip generators, improving the household location decision, and rescheduling school and work activities. The case study population was male high school students from working-class Boston suburbs. These strategies appear unlikely to be implemented on a large scale. Formidable opposition from parents, town residents, and institutions (especially in working-class communities) is anticipated. Costs, adult indifference, and a lack of respect for teenagers and the importance of these strategies are key barriers to be overcome. Even if these strategies manage to be implemented, empirical evidence is lacking that reductions in trip generation, trip distances, peak-hour travel, and other strategy objectives will actually occur. Fundamental sociological and psychological factors

associated with the causes of travel behavior will remain unchanged. Optimistic predictions of the impacts of these strategies should therefore be avoided. Behavioral changes are likely to occur very slowly among non-middle-class subgroups. Transportation planners should consider trying to accommodate existing behavioral patterns rather than count on their modification.

Gurin, DB (Urban Mass Transportation Administration) *Transportation Research Record Conf Paper* No. 583, 1976, pp 29-35, 16 Ref.; Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

41 141411 TRANSPORTATION PLANNING AND STATUS OF TRANSPORTATION USER SUBGROUPS. Consideration of the social status of transit user groups as something more than a marketing characteristics leads to discussion of the workability of certain basic transit planning goals and means. Distribution and maintenance of the quality of a resource (transportation) are viewed as functions of primary user group status, altruism, and power of the controlling agency. Race and sex are basic social status variables. Four user groups are examined—white and nonwhite males and females. Travel behavior and attitude data are presented from the 1960 and 1970 censuses for 11 cities and from a home-interview survey conducted in Trenton, New Jersey, in 1973 (N = 548). Census data show that increasing proportions of minorities use transit over the period of general decline of transit systems. Also shown is the high level of dependence on this declining-quality transit system by the lowest status users. The Trenton attitude and behavior data show that improvements in transit are likely to draw only low-status users and that their increasing presence might further discourage use by high-status travelers. Furthermore, only direct restrictions on automobile use are likely to turn high-status travelers to transit. The uncomfortable conclusion of this analysis of planning ends and means is that planning to provide a system primarily for those without alternative or placing faith in being able to attract riders to transit by dealing only with transit system attributes is shortsighted. To be successful over the long term, a system must be substantially used by high-status groups who will probably not be users by choice.

Hunkins, LS (Princeton University) Althaus, RP *Transportation Research Record Conf Paper* No. 583, 1976, pp 84-94, 1 Fig., 5 Tab., 14 Ref.

Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

41 141495 ADJUSTMENT AND MOBILITY OF ELDERLY POOR AMID DOWNTOWN RENEWAL. Basic information is provided on the subpopulation of non welfare poor and on one type of residential arrangement. The informal social structures, adaptive mechanisms and spatial mobility in a hotel for non welfare poor are examined, and a set of recommendations are developed that emphasize planning strategies geared to the adaptive strengths of the marginally subsistent, but self-reliant poor. It is noted that citizen participation in urban renewal and relocation should be increased. Citizens aged 65 and over should be able to ride buses for half fare and

to buy a monthly bus pass at half the regular rate. This would not only benefit individuals on low income but also increase ridership. A minibus or dial-a-ride system for the elderly, possibly in collaboration with a taxicab company, should be established for those who are not adequately served by the bus system.

Stutz, FP (San Diego State University) *Geographical Review* Vol. 66 No. 4, Oct. 1976, pp 391-400, 4 Fig., 1 Tab., Photos., Refs.

41 142140 PRIORITY, INNOVATION AND RESTRAINT: SOME EMPIRICAL RESULTS. This discussion and review does not claim to be exhaustive, it simply attempts to draw together the information that is readily available on the most common types of priority, innovation and restraint, and to review it in terms of the overall objectives of (a) has public transport benefited and (b) have car users been persuaded, or cajoled, into leaving their cars at home. The discussion is organized under the following three headings: bus priorities (priority intersections, bus lanes); innovations (park-and-ride, dial-a-ride, superbus); and restraint (restricting car use). /TRRL/

Heggie, IG ; Oxford University, England *Monograph* No. 2, Oct. 1975, 23 pp, 9 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220730); ORDER FROM: 7605275

41 142357 SEGMENTATION ANALYSIS OF TRANSIT USERS AND NONUSERS (ABRIDGMENT). In a survey to evaluate factors that influence the use of public and personal transportation modes, a stratified random sample of households was used to ensure accurate spatial representation. Various techniques, including market segmentation analysis, were used to ascertain the attitudinal framework, which plays a key role in the use of transportation by Orange County Transit District residents. The survey identifies various demographic and psychographic profiles that may impact current, future, private and public transportation modes. The following are some of the key areas of concern identified by the survey: Social class and status analysis; funding public transit; psychological automobile captivity to transit dependency; vehicle availability and trip market profiles; conceptual awareness and anticipated use; anticipated demand for public rapid transit; marketing and advertising public transportation; advertising awareness and media analysis; message content and impact of advertising by selected media.

Blankenship, DP (Orange County Transit District, Santa Ana, Calif.) *Transportation Research Record* No. 590, 1976, pp 1-4; ORDER FROM: TRB Publications Off

41 142358 CITIZEN OPINIONS ON PUBLIC TRANSPORTATION ROLES, SERVICE, AND FINANCING. This report summarizes the results of a recent statewide public opinion survey conducted in 1000 households across New York State. Topics addressed include opinions on public transit performance, transit needs, public participation, transit users, automobile-oriented policies, and funding sources and financing. Results of the survey indicated that (a) New York State residents think that regular dependable local bus service is the most important transit need, (b) transit is used most frequently by middle-income (rather than low-income) groups,

and (c) there is strong support for special services or lower fares for the elderly and handicapped. / Author/

Weiss, DL (New York State Department of Transportation) *Transportation Research Record* No. 590, 1976, pp 5-8, 1 Fig., 2 Tab., 1 Ref.; ORDER FROM: TRB Publications Off

41 142939 THE BURDENS AND BENEFITS OF BART. A PRELIMINARY CASE STUDY OF RAPID TRANSIT IMPACTS. The burdens and benefits of the Bay Area Rapid Transit system are detailed. This is a preliminary report of findings from the BART Impact Program because BART services are not yet at "design" levels and because they are based on early surveys. The BART system and the Impact Program are described. BART costs and how their financing is accomplished are explained. The benefits and who receives these benefits, the third section, are followed by conclusions on the burden and benefit and the attitude of Bay Area citizens toward the perceived balances.

Shunk, GA English, W (Metropolitan Transportation Commission) ; Cross (Richard B) Company Proceeding 1976, pp 281-89, 2 Tab.; Seventeenth Annual Meeting of the Transportation Research Forum, Beyond the Bicentennial: The Transportation Challenge, held in Boston, Massachusetts, October 28-30, 1976.; ORDER FROM: Vietsch (Grant C), P.O. Box 405, Oxford, Indiana, 47971

41 142940 BENEFITS AND COSTS OF URBAN TRANSPORTATION: HE WHO IS INELASTIC RECEIVETH AND OTHER PARABLES. The determinations of incidence of benefits and costs of an urban transportation improvement and its financing are discussed. Important to policy makers are two main issues: How does one determine who benefits and who pays for transportation improvements, and how can information on the benefits and costs be used to formulate better urban transportation plans? Economists do what in welfare economics is assessment of overall benefits and costs. Policy makers are also interested in who receives these benefits and who bears the costs. Economists need to refine their methods to assure more rational public policies.

Boyd, JH (Motor Vehicle Manufacturers Association) ; Cross (Richard B) Company Proceeding 1976, pp 291-97, 3 Fig., 9 Ref.; Seventeenth Annual Meeting of the Transportation Research Forum, Beyond the Bicentennial: The Transportation Challenge, held in Boston, Massachusetts, October 28-30, 1976.; ORDER FROM: Vietsch (Grant C), P.O. Box 405, Oxford, Indiana, 47971

41 144034 PEAK-PERIOD TRAFFIC CONGESTION: OPTIONS FOR CURRENT PROGRAMS. The report describes options available within the present state of the art, compares their probable costs and benefits, and makes specific recommendations for solutions to different types of peak-period congestion. Twenty two individual techniques in eleven major categories are identified. They include social approaches, socioeconomic approaches, sociotechnical approaches, and technical approaches. The techniques were considered relative to their benefits and costs. Their effectiveness in treating different congestion problems was measured. Two aspects of timing of

impacts were considered. Nine categories of indirect benefits and disbenefits were identified as factors that should be weighted in decision to implement any of the techniques. The study concluded that: individual techniques should be packaged with other supportive techniques to create a cumulative or even synergetic impact; the relationship between peak-period traffic congestion and number of critical societal problems should be investigated and clarified; research is needed in the indirect benefits and disbenefits and the institutional constraints inherent in a number of techniques. To accomplish the last task eight packages of effective combinations of congestion-reducing techniques were selected and evaluated. The package which focused on transit treatments is rated as having the highest over-all applicability to the full range of common peak-period congestion problems, as well as being of moderate cost, and providing benefits to the community. The package which focused on land use changes presented the best permanent solution to congestion as well as many other critical urban problems.

Remak, R (Remak/Rosenbloom) Rosenbloom, S (Texas University, Austin) *NCHRP Report Res. Rpt. No. 169*, 1976, 65 pp, 12 Fig., 6 Tab.; Research sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the FHWA, DOT, and performed by Remak-Rosenbloom, Santa Barbara, California.; ORDER FROM: TRB Publications Off

41 144103 THE SELLING OF RAIL RAPID TRANSIT. This book is basically a critical review of rail rapid transit in the USA, and contains nine chapters as follows: (1) Transportation and urban location behavior in perspective; (2) Defining the problem: public transport criteria and rail rapid transit mythology; (3) Rail versus bus: the art of evaluating alternate modes; (4) Failure of a mission; (5) Metro: another monument for the nation's for capital; (6) MARTA: planning massive accessibility for central Atlanta; (7) Rail advocacy in autopia: the Los Angeles country case; (8) Rail rapid transit blues for St. Louis: the collapse of an illusion; (9) Concluding observations.

Hamer, AM; Teakfield Limited Book 1976, 353 pp, Figs.; ACKNOWLEDGMENT: TRRL (IRRD 221667); ORDER FROM: Teakfield Limited, 1 Westmead, Farnborough, Hampshire GU 14, England

41 144104 TRANSPORT-ACCOUNTABILITY AND CONSUMER CHOICE. To a large extent transport in the United Kingdom, especially transport of passengers, is seen as a public service. Market forces are not allowed to have much sway; and the result is that in many cases the benefits received by society do not match the costs. The fact that British rail is running at a vast loss is obviously important, but much more important is the fact that British rail is using society's resources in ways which are extravagant and wasteful. The contention of this article is that such waste will persist unless operations are made subject to market forces, and that these forces can best be brought to bear by competition. It does not necessarily follow that all sections of the industry should return to private enterprise, although such an idea has much to support it. It does mean, however, that many of the units should be smaller than they are at present.(a)

Hibbs, J *National Westminster Bank Quarterly Review* Feb. 1976, pp 58-68; ACKNOWLEDGMENT: TRRL (IRRD 221787X); ORDER FROM: National Westminster Bank Limited, 41 Lothbury, London, England

41 145003 INCREASE IN PUBLIC TRANSIT USE KEYS TO REVIVAL OF CITY CENTERS. A study is reported which noted two important steps which will encourage the use of public transportation: concentrate jobs and services in compact downtown centers; and increase the density of neighborhoods near the downtown area, especially around existing or potential bus or rail stops. The study also found that limiting automobile use does not necessarily increase transit riders. The study separately details costs both in dollars and resources of operating taxis, dial-a-bus, local buses, express buses, streetcars, light rail transit and commuter trains. The need is expressed for the right pattern of development which requires appropriate zoning by local officials and good site selection and design by private developers and public agencies at all levels of government. If the nation will strengthen its cities, then good transit service can be provided even in small urban areas and at suburban residential densities. The report notes that rail is preferred to buses and the feasibility of rail transit should be investigated for the largest downtowns and of streetcars on their own rights of way for medium-sized cities. The study is summarized in a booklet: Where Transit Works.

Transportation Research News No. 67, Nov. 1976, pp 8-11, 1 Fig., 4 Phot. ORDER FROM: TRB Publications Off

41 145012 CHARACTERISTICS OF NEW YORK STATE TRANSIT USERS. Studies using data from a 1000-household survey (in 1974) on public attitudes and transit usage found that more than 80% of all work trips in New York City are taken by transit. However, the characteristics of riders of the different modes varied. Subway riders exceeded bus riders 3 to 1, and the former are represented by middle income groups who were young, white males. Bus riders earned more than \$9,000 per year but were older and mostly female. Both classes of riders owned few automobiles. Transit also carries 49% of all non-work trips; the auto carries 44 percent. Buses carry twice the non-work trips that the subway does. In the rest of the state, only 50% of non-work trips are carried by bus.

Weiss, DL Donnelly, EP ; New York State Department of Transportation Aug. 1976, 61 pp, 2 Fig., 27 Tab.

41 145393 HUMAN FACTORS AND TRANSPORT. This article considers the man-transport relationship from two basic viewpoints: the use of transport services, and the provision of transport services. Three separate sections deal with: 1, characteristics of transport and factors affecting the optimum use of manpower in transport; 2, economic aspects of the optimum use of manpower in transport; and 3, social aspects of the labor force in transport. /TRRL/

Lolaric, V (Belgrade University, Yugoslavia) ; OECD Publications Office, (92-821-1036-2) Proceeding 1976, pp 5-70, 2 Fig., 6 Tab., 36 Ref. Presented at the 6th International Symposium on Theory and Practice.; ACKNOWLEDGMENT: TRRL (IRRD-222848)

41 145394 HUMAN FACTORS AND TRANSPORT. This paper considers the relationship between the type and structure of a transport enterprise or authority and the situation of the staff employed. The staffing structure and administration of road haulage, bus, and railway services in European countries is reviewed, and trends in productivity per man-hour are analysed. The lack of statistics and documentation on this subject is pointed out, as is the need to consider the social implications of economic and financial decisions taken at employer level or above. /TRRL/

Ribat, J (Secretariat d'Etat aux Transports, France); OECD Publications Office Proceeding 1976, pp 71-106, 1 Fig., 8 Tab.; Presented at the 6th International Symposium on Theory and Practice.; ACKNOWLEDGMENT: TRRL (IRRD-222849)

41 146645 VALUE OF TRAVEL TIME. The Record includes 6 papers covering important areas of travel time value analysis, such as travel time value theory, conceptual problems in travel time value, methods of deriving travel time values, review of empirical travel time value studies, applications to travel demand estimation, and applications to transportation investment analysis.

Gronau, R ; Transportation Research Board, Washington, D.C. TRB/TRR-587, ISBN-0-309-02553-2, 1976, 48p; Papers presented at 52nd Annual Meeting.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259556/9ST

41 147316 TRANSPORTATION AND TRAVEL IMPACTS OF BART: INTERIM SERVICE FINDINGS. BART IMPACT PROGRAM. PHASE I. The 71-mile Bay Area Rapid Transit (BART) System, serving San Francisco, Oakland, Berkeley and their suburbs, is the first regional-scale rapid transit system to open in the United States in 50 years. The final link of the system opened for service in September 1974. This report summarizes BART's initial impacts on regional transportation system performance and travel patterns. The report deals with the effects of interim BART service over the period September 1972 through June 1975. Impacts are assessed in terms of BART's design and operating characteristics; its service levels; changes in accessibility; the level and nature of BART's ridership; impacts on travel by bus and automobile; impacts on the service provided by the rest of the transit system; and impacts on traffic congestion. BART's capital costs, interim operating costs and revenues, and interim energy consumption are also analyzed. (Color illustrations reproduced in black and white.)

Ellis, R Sherrett, A ; Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Metropolitan Transportation Commission, (UMTA-CA-09-0025) Final Rpt. DOT-BIP-FR-6-3-75, Apr. 1976, 216 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261017/8ST, DOTL NTIS

41 147385 THEORETICAL FRAMEWORK FOR THE EVALUATION OF ECONOMIC AND FINANCIAL IMPACTS OF BART. The Working Paper outlines the theoretical framework for evaluating the economic and fiscal

impacts of the construction and operation of the Bay Area Rapid Transit system. Impacts described in the Working Paper include direct construction expenditures, operating expenditures, impacts on the economy because of changes in transportation services, fiscal burden and impacts on the use of bonded debt in the San Francisco Bay Region.

Grefe, R McDonald, AN McLeod, D ; Metropolitan Transportation Commission, McDonald and Grefe, Incorporated, Department of Transportation, Department of Housing and Urban Development Work Paper DOT-BIP-WP-25-7-76, July 1976, 76 pp; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Prepared by McDonald and Grefe, Inc., San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261362/8ST, DOTL NTIS

41 147453 THE ATTITUDES OF HOUSEHOLDS WITHOUT CARS TO PRESENT-DAY PUBLIC TRANSPORT [Billoesa hushaalls attityd till dagens kollektivtrafik]. Households which cannot or will not use a car to travel have lately received greater attention in the planning of traffic in general and public transport in particular. It has also been found that this category is numerically larger than had been thought. It has been found in surveys that (1) those without cars are more satisfied with the design of local public transport than those with cars; (2) 6 out of 10 people in households without cars thought public transport should have a prior claim to public resources, but only 4 out of 10 believed this would happen; (3) irrespective of the type of household, one third of those asked considered that improvements in public transport should be financed by increased taxation; (4) in both categories, dissatisfaction with public transport centred on service frequency, placing of routes and fares. Old age pensioners would prefer shorter distances to stops, ease of getting on and off, access to seats, and no interchanges. Young people wish to have greater frequency and later services. Both old and young had a negative attitude towards cars in town centres. /TRRL/ [Swedish]

Andreason, S *Vag-Och Vattenbyggaren* Analytic No. 5, 1976, pp 45-46, 1 Phot.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN38020E), TRRL (IRRD 222437)

41 147652 THE USE OF ECONOMICS IN URBAN TRAVEL DEMAND MODELLING: A SURVEY. This paper attempts to survey the recent innovations in urban transport planning & in particular to demonstrate the increasing importance being attached to economic analysis in the travel forecasting procedures employed. The article begins by setting out traditional economic notions as they relate to travel, progresses to illustrate their practical limitations for planners and then considers the applied work which has been attempted in this field. The paper is critical of the traditional sequential forecasting procedures and attempts to present a balanced picture of the current state of explicit demand modelling which has a firmer foundation in economic theory. /Author/TRRL/

Button, KJ (Loughborough University of Technology, England) *Socio-Economic Planning Sciences* Analytic Vol. 10 No. 2, 1976, pp 57-66, 3 Fig., 48 Ref.; ACKNOWLEDGMENT: TRRL

(IRRD-221208)

41 147859 TAMING THE TRANSPORT TIGER. Mechanised transport uses nearly 20 percent of the useful energy available in Britain, and almost one third of the petroleum products. Although the contribution of transport to economic and social progress is often ignored, the author examines means of minimising energy requirements by increasing efficiency of power plants, substitution of scarce or expensive fuel, and reducing demand. It is unlikely that battery powered vehicles could be made to function more efficiently than those powered by the internal combustion engine. Energy savings by a shift to rail transport would be small if road journeys at either end of rail travel were not eliminated. There is little sign that less expensive public transport can attract those with private cars readily available. The author argues that the demand for transport may reflect a failure to organise society efficiently and equitably; transport restraint may force a re-examination of the present pattern of activity with a resultant improvement in the style of life. /TRRL/

Silverleaf, A *New Scientist* Vol. 72 No. 1022, Oct. 1976, pp 12-13; ACKNOWLEDGMENT: TRRL (IRRD-222945); ORDER FROM: IPC Magazines Limited, 66-69 Great Queen Street, London WC2E 5DD, England

41 147865 PUBLIC VERSUS PRIVATE TRANSPORT. This book compares the economic and environmental characteristics of public and private transport modes, and reviews the potential for modifying modal split in each of the main sectors of the transport market. Opening with a review of the traditional "track-cost" argument on the relative merits of public and private transport, the author concludes that it is the comparison of costs and benefits of future infrastructure changes rather than historic revenue and cost comparisons that is relevant to the issue of choice of modal split. A consideration of the relative pollution and resource depletion caused by different modes furthers the conclusion that normal commercial criteria do not provide a good way of allocating resources in the transport sector. Alternative methods of modifying modal split are then considered. A chapter is devoted to each of the main sub-divisions of the transport market. On urban passenger transport it is concluded that a strategy based on major use of public transport rather than large-scale road building is feasible and has many advantages. In the inter-urban and rural passenger market, whilst there is evidence of resource misallocation the problem of how to deal with it is harder to resolve. Although much freight traffic is captive to road transport given patterns of institutions and land use- there is likely to be scope here too for beneficial changes not only in modal split but also more generally in methods of freight handling. The final conclusion is that it is only by looking at specific locations and specific traffics that the question of optimal division between public and private transport can be resolved. /TRRL/

Nash, C (Leeds University, England); Macmillan Press, Limited 1976, 96 pp, 9 Fig., 2 Tab., 130 Ref.; Published in the Studies in Economics Series.; ACKNOWLEDGMENT: TRRL (IRRD-222230); ORDER FROM: Macmillan Press, Limited, 4 Little Essex Street, London WC2R 3LF,

England

41 148068 COMMUTING ACCIDENTS IN THE STOCKHOLM REGION 1971. A preliminary study on an interdisciplinary project "commuting accidents" is presented. One part of the project concerns the commuting system, the other medical aspects of the accidents. The aim of the project is to study all sorts of accidents with personal injury occurring on commuting modes. The summary is concentrated on one group of the population, women who commute using public means of transportation. They were 21% of the working population but they had 38% of the time of impairment. This difference depends on a higher risk-figure and a longer average time of impairment. This study did not explain this difference, but the results hint that the strategic parts of the journey are the walks to and from the stopping-places. Especially dangerous was the walk to the stopping-place and to work. /TRRL/

Aldman, B Forsstroem, A Samuelsson, Y (Chalmers University of Technology, Sweden); Ircobi Secretariat Proceeding June 1975, pp 260-269, 2 Fig., 12 Tab., 1 Ref.; Proceedings of the Meeting on the Mechanics of Injury; ACKNOWLEDGMENT: Institute for Road Safety Research (SVOV58023E), TRRL (IRRD 223146)

41 148088 TRAFFIC IMPACTS OF WORK SCHEDULES CHANGES: A REDISTRIBUTION MODEL. This paper considers how one may estimate changes of traffic volumes at specific bottlenecks of the urban transportation system which would occur as a result of work schedule changes. An estimation procedure disaggregating trip volumes of traffic counts according to their generators i.e. workplaces is first established, followed by assignment of trips to small-scale time intervals. The staggering algorithm developed in this study is heuristic by nature. The data requirements of the model described here do not go far beyond the level of a carefully designed conventional work staggering campaign. In addition to employment and work schedule data, the model uses information on the transportation network-in the elementary form of a travel time matrix-and on the spatial distribution of the residential population. The time distribution of arrivals and departures is also considered. The results of the application of the model and the staggering algorithm to the morning peak of the Karlsruhe public passenger transport system are discussed.

Herz, RK (Karlsruhe University, West Germany) Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 45-55, 3 Fig., 18 Ref. This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

41 148094 COST BENEFIT ANALYSIS, ACCESSIBILITY, SOCIAL EQUITY AND SATURATION LEVELS. This paper discusses two problems associated with cost benefit and environmental analyses used to compare transport proposals: the error inherent in calculation which depends on subtracting numbers which are large compared with their difference; and the impossibility of making objective decisions when the various data describing consequences cannot be

related to each other. The first problem could be minimized by rejecting high cost proposals when the likely range of benefits includes zero. The second problem can be overcome by assigning cash values to the benefits gained by persons on arrival at destinations. It is suggested that any benefit formulation should conform with the law of diminishing returns. This leads to a final benefit calculation which favors proposals which provide social equity rather than the reverse. The need to recognise saturation levels beyond which increases in benefit are meaningless to the individual is briefly discussed.

Witherington, PF; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 171-179, 5 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

41 148102 COMFORT AND CONVENIENCE IN TRAVEL DEMAND MODELS: SOME RECENT ADVANCES. A psychological approach to the quantification of qualitative attributes is described. The basis of the method is to use quantitative comparisons made by subjects about stimuli to develop scales that describe the amounts of the qualities possessed by the stimuli. Two principal subgroups of the approach are available: a unidimensional scaling based upon an initial restrictive assumption that the attribute to be measured exists in a one-dimensional space and can be described along a linear continuum; and multidimensional scaling which may be used to define the dimensionality (in a Euclidean space) of the attribute. Three research tasks are identified: testing of the scaling concept in a transportation situation; fitting of the resulting scale values or indices into a travel demand model in order to determine whether there is a relationship between revealed behavior and perceived attribute ratings of alternative travel modes; the mapping of the psychological scale values onto engineering specifications and testing the resulting proxy variables in a revealed behavior nexus. The results are reported of testing the first 2 tasks and their application to the formulation of a convenience index and a comfort index.

Stopher, PR (Northwestern University, Evanston); Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 263-272, 1 Fig., 2 Tab., 29 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

41 148439 TRAFFIC GENERATION FROM LAND DEVELOPMENT PROPOSALS. The purpose of this paper is to simulate and predict the changes caused in the existing commuter travel pattern by new land development schemes within framework of a specific community. Particularly, this study is concerned with developing a residential location distribution model with special emphasis on the effect of socioeconomic factors of commuters on the travel time parameter of the model. The findings of the study may be helpful to the siting of new land development activities in the existing infrastructure of an urban system. The parameters of the model developed clearly indicate that the workers of a low socioeconomic group generally have more tendency to

live close to the place of employment as compared to high socioeconomic groups. The low group may choose to live close to the place of employment depending on neighborhood affiliation, land use infrastructure, type of housing, transit availability, or merely because the part of the income spent on commuting seems disproportionately large.

Sharma, SC Soliman, AH (Manitoba University, Canada) *ASCE Journal of Transportation Engineering* Vol. 102 No. TE2, ASCE #12153, May 1976, pp 243-254, 6 Fig., 2 Tab., 8 Ref., 2 App.

41 148979 FORECASTING INDEPENDENT VARIABLES: RESPONSIBILITIES AND TECHNIQUES. This report summarizes the economic activity forecasting undertaken to support urban transportation planning in Upstate New York metropolitan regions. Analysis of responsibility for economic activity forecasting is also developed with consideration of intraregional and interregional policy implications. Recommendations are developed indicating the appropriate responsibility for economic forecasting, considering staffing capabilities of both the Metropolitan Planning Organizations and the Planning and Research Bureau of the New York State Department of Transportation. A technical section that briefly describes techniques previously used to forecast economic activities for use in urban transportation planning is also included. The techniques described are not meant to be exhaustive, but may be considered for use by those charged with economic activity forecasting. /HSRI/

Gooding, DI Knighton, RG; New York State Department of Transportation Report No. 102, July 1976, 41 pp; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-35967)

41 149512 ATTITUDE-BEHAVIOR MODELS FOR PUBLIC SYSTEMS PLANNING AND DESIGN. This exploration of the potential applications of behavioral choice models in the planning of public systems, focuses on choice models involving attitudinal variables. The areas of application of these models include environmental design, structures and general cost-benefit analysis of systems. Methods of scaling preference and perception responses elicited through popular survey instruments are evaluated. Models are then investigated for explaining overall preference or choice of alternatives in terms of perceptions of the characteristics of the alternatives. An empirical example is presented in which policies concerning improvements in public transit bus system can be initially formulated using information obtained from an attitudinal model of urban residents' choice of travel mode for their work and shopping trips.

Golob, TF Recker, WW; General Motors Research Laboratories Rept. No. GMR-1906, 38 pp, 6 Fig., Refs.

41 149699 MOBILITY EVALUATION FOR URBAN PUBLIC TRANSPORTATION. The paper discusses the concept of mobility relative to the provision of transportation services. Mobility calculations of potential value to current evaluation procedures are outlined. An example is given of a typical mobility calculation. The model has been focused on a corridor line-haul system and results suggest that such a system will not

markedly improve existing transit mobility systems. The authors suggest that other methods should be explored before policies are finalized. The study includes a match factor between occupation and employment type in accessibility to employment. Alternative feeder transit systems to the corridor line with an improved collector service in the suburbs could increase mobility. /TRRL/

Popper, RJ (Virginia Polytechnic Institute & State University) Hoel, LA (Virginia University) *Transportation Planning and Technology Analytic* Vol. 3 No. 3, Sept. 1976, pp 131-141, 5 Fig., 39 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-223939); ORDER FROM: ESL

41 149780 GENERAL PUBLIC BEHAVIOR AND ATTITUDES, PART III: A REGRESSION ANALYSIS OF THE REASONS FOR USING MASS TRANSIT. This analysis which considered those individuals for whom there was real choice of methods of going to work, bears out a previous set of univariate analyses in which convenience seems to be the determining factor in whether or not a particular individual will use mass transit when it is available. The study indicates that only by making mass transit more convenient, or by making automobile transit less convenient, will it be possible to get individuals to go from individual automobile use to mass transit. The results discussed here are applicable to the Northeastern and Midwestern U.S. The most important nondemographic variable by a substantial margin was data relating to the question: "how serious a problem is heavy traffic jammed highways?" Persons using mass transit facilities think it is more important to spend money on mass transit while those using highways think it more important to spend money on highways. The most important demographic variables relate to the area in which an individual lives, with Northeasterners being more likely to use mass transit than midwesterners.

Opinion Research Corporation ORC #25005, July 1975, 5 pp; Prepared for the Office of Energy Conservation and Environment.

41 149824 A METHODOLOGY FOR EVALUATING THE PUBLIC INVOLVEMENT PROCESS USED IN PROJECT PLANNING. Although there is a long history of State Department of Highways and Public Transportation (SDHPT) public involvement and although the more structured Action Plan processes have been operating for over two years, there are no established methodologies or criteria for evaluating public involvement techniques. Therefore, the methodologies and analysis developed in this report will be of direct use to state and district offices for purposes of evaluation of public involvement processes.

Weiss, ME Fuller, TK ; Texas Transportation Institute, (Resh Rept. 190-3F) Intrm Rpt. TH-2-8-75-190-3F, Nov. 1976, 185 pp, 5 Fig., 20 Tab., 3 App.; Sponsored by the Texas State Department of Highways and Public Transportation. Research performed in cooperation with the Department of Transportation, Federal Highway Administration, SDHPT.; Contract Res Study 2-8-75-190; ORDER FROM: NTIS

41 149886 A REINTERPRETATION OF THE 'ATTITUDE' APPROACH TO TRANSPORT-MODE CHOICE AND AN EXPLORATORY EMPIRICAL TEST. A theory of cognitive structure is presented which is potentially capable of providing a conceptual framework for the study of transport behaviour, and by making use of this theory and the models derived from it, problematic areas in attitude and attribute research in transportation are discussed. An exploratory empirical study is described which successfully tests some of the relationships inherent in the theory in a transport context. Significant correlations were observed between overall attitude towards use of a travel mode and the products of evaluation and belief strength summed over a short series of perceived outcomes of use of that mode. The content, strength, and associated evaluations of salient beliefs about use of a travel mode were monitored during a period of change in the conditions of the service. Predictable changes in belief structure were observed, demonstrating the sensitivity of the techniques used. /Author/TRRL/

Thomas, K (Cranfield Institute of Technology) *Environment and Planning Analytic* Vol. 8 No. 7, 1976, pp 793-810, 8 Tab., 29 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-224069)

41 150438 PURPOSE, MODE, TIME OF DAY. Data obtained from the Chicago-Northwestern Indiana 1970/1971 home interview survey were analyzed, in order to measure certain basic characteristics of travel in the eight county study area. Specifically, the location, purpose, mode, and the time of occurrence of travel were investigated. In 1970, the number of trips occurring within the area surveyed in 1956 was about 30.5 percent greater than that observed in 1956, with most of the increase centered in suburban areas. Trips with nonwork purposes, other than to home, increased proportionately more than trips to work between 1956 and 1970. Trips with nonwork purposes constituted 38.0 percent of the total in 1970 compared to 36.1 percent in 1956, while trips to work accounted for 18.5 percent in 1970 and 20.4 percent in 1956. Among the nonwork trip purposes, shopping trips exhibited the greatest increase in relative frequency, while trips for personal business decreased the most in importance. From the 1970 data, it was observed that the amount of work travel decreased with increasing household income, except for households with very low income. The auto served as the dominant, all purpose mode throughout the region. The portion of trips by transit, including school bus, dropped from 24.3 percent in 1956 to 15.3 percent in 1970, with usage of transit from nonwork travel decreasing more than that for work. Like mass transit usage, the auto occupancy rate declined from 1.57 in 1956 to 1.47 in 1970. As observed in the 1956 survey, travel in 1970 peaked during the morning and evening work rush periods. However, in 1970 the peak periods were somewhat less pronounced, with midday travel increasing in importance. In addition, peaking of travel was observed to occur after the evening rush period in the 1970 data, but not in 1956. Throughout the study of 1970 travel data and its comparison with 1956 observations, the effects of the growth of auto usage were highly apparent. The auto largely made the suburban life style possible and, with expanding auto use, development in suburban areas mushroomed, as

reflected by the observed jump in the importance of suburban trips. Likewise, the great convenience of the auto mode undoubtedly was a factor in the observed increase in the level of midday (non-work) travel. The decline in auto occupancy can also be traced to greater auto availability. Of course, a direct consequence of increased auto use was the relative decline in travel on the mass transit modes. In general, then, it appears that the increased availability of the automobile, and the accompanying facilities to handle it, has had a major influence on the nature of urban travel.

Chicago Area Transportation Study, Northwestern Indiana Regional Planning Commission Nov. 1975, 67 pp, 26 Fig., 19 Tab., 6 Ref.

41 150548 CITIZENS' ATTITUDES TOWARDS ANCHORAGE LOCAL GOVERNMENT AND ISSUES OF PUBLIC POLICY: A COLLECTION OF REPORTS [Final rept]. This report is a collection of seven reports prepared by the Anchorage Urban Observatory to provide public attitude information to the municipality of Anchorage. The first report presents a broad discussion of citizen attitudes toward public services in Anchorage. The second report looks at public safety and the police function of government. Citizen support for the public library system is the focus of the third report. The fourth report deals with public attitudes toward taxes and taxing alternatives. Report number five examines citizen attitudes toward local government employees. Citizen involvement in local government is the subject of report number six. The seventh, and final, report provides an attitudinal comparison between general macro-level policy orientations, specific program implementations, and behavioral spending orientations.

Ender, RL ; Anchorage Urban Observatory, Alaska. Department of, Housing and Urban Development, Washington, D.C., Assistant Secretary for Policy Development and Research. UO-LCCM-ANC-76-002, 1976, 170p; Contract HUD-H-2196; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-260393/4ST

41 151164 BART IMPACT PROGRAM REPORT CATALOG. The report catalog contains the BART Impact Program management documents which are available through the National Technical Information Service. The report is divided into six sections: Section I and II: The Pre-BART data collection, Section III: Working Papers, Section IV: Planning Documents, Section V: Technical Memoranda and Section VI: Final Reports.

Timoney, A ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Plan Rpt. DOT-BIP-PD-24-1-76, July 1976, 83 pp; Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262676/OST, DOTL NTIS

41 153312 URBAN TRAVEL DEMAND-A BEHAVIORAL ANALYSIS. The book develops a theory of demand, for populations of individual economic consumers, which is believed to be a logical and natural generalization of traditional theory to include choice among discrete alternatives. The theory is developed in the following

chapters-(1) the scope and objectives of urban travel demand analysis, (2) a survey of urban travel demand models, (3) a theory of individual travel demand, (4) a theory of population travel demand behavior, (5) statistical estimation of choice probability functions, (6) data, sample and variables, and (7) estimation results and conclusions. /TRRL/

Domencich, TA (Charles River Associates, Incorporated) McFadden, D (California University, Berkeley); North-Holland Publishing Company Limited Monograph 1975, 215 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 224391)

41 153392 PROGRAM DESIGN TO DEFINE RIDE QUALITY REQUIREMENTS OF SURFACE TRANSPORTATION VEHICLES. A plan was developed for evaluation of the relationship between ride and ride quality of vehicles currently used in public transportation systems and new prototypes. The components of ride as the physical environment and ride quality as passengers response were defined and articulated. Three settings were recommended for conduct of research: a simulator, rides by captive passengers and rides by revenue passengers. A procedure was described for the implementation of experimental studies. Key features involved accumulation of a growing data bank describing ride-ride quality relationships and forecasting results of future experiments from the data bank. An experiment was conducted in the NASA Langley simulator to examine the relationships between ride vibrations derived from actual railway track signatures and ride quality as rated by subjects. When the design was replicated, comfort ratings by subjects were highly reliable. Subjects could discriminate between stimulus amplitudes for continuous rough track and diamond crossings; they could not discriminate amplitude variations well for roll. These data fail to show that subjects can discriminate well between the different types of vibration that define ride.

Havron, MD Westin, RA *Human Factors* Vol. 18 No. 6, Dec. 1976, pp 551-564; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

41 153961 BART IMPACT PROGRAM DATA CATALOG. The document is a description of all of the data sets that have been collected or used by the various parts of the BART Impact Program. It is divided into sections according to study areas or projects within the overall program. These areas and all of the data sets within an area contain subject keywords which appear in the index, in addition to identification keywords. This catalog is intended for use by persons who wish to access the data itself. It contains information about the physical form of the data and its physical location, plus an abstract of each data set which may be quite lengthy. (Portions of this document are not fully legible.)

Metropolitan Transportation Commission, Department of Housing and Urban Development, Department of Transportation DOT-BIP-PD-27-1-76, Dec. 1976, 149 pp; Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264613/1ST, DOTL NTIS

41 154011 A GUIDE FOR CITIZEN PARTICIPATION IN TRANSPORTATION. The means of achieving meaningful citizen participation in the transportation planning process involves more than the legally required public hearing. The various publics affected by a project in the planning purview area must first be identified and contacted: for such identification and contact a variety of methods are available. A number of processes and techniques are useful for insuring significant and concrete citizen participation in the planning process. These processes and techniques must be used bearing in mind the type of citizen energy used and the nature of the publics involved. The best psychological climate for planner-public rapport is one of mutual respect, co-operation and maturity. This climate is largely the responsibility of the planner.

Schuster, JJ Balog, JN Dreisbach, AF; Villanova University, Department of Transportation Final Rpt. DOT/TST-76/97, Mar. 1976, 29 pp; See also PB-265 052.; Contract DOT-OS-40098; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265051/3ST

41 154012 OPTIMIZATION OF CITIZEN PARTICIPATION IN THE TRANSPORTATION PLANNING PROCESS. Contents: Identifying the various participatory roles available to citizens; Legislative and administrative actions concerning citizen participation; Participative roles of citizens in the transportation planning process; Identification of the publics; Identification and classification of citizen participation processes and techniques; Psychological aspects of the planning agency's responsibility to effect citizen participation in the transportation planning process; Results of national conference and workshop on citizen participation and transportation.

Schuster, JJ Balog, JN Dreisbach, AF; Villanova University, Department of Transportation DOT/TST-76/96, Mar. 1976, 216 pp; See also PB-265 051.; Contract DOT-OS-40098; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265052/1ST

41 154040 THE SPECIAL STUDY OF ETHNIC MINORITIES IN THE BART IMPACT PROGRAM. The paper is an examination of one aspect of the BART Impact Program, its evaluation of impacts of the system on ethnic minorities. It is primarily a discussion of the rationale for the inclusion of specific ethnic minority concerns in the overall evaluation program. The BART Impact Program is a comprehensive assessment of BART's impacts on the social and economic life of the San Francisco-Oakland metropolitan area. Goals of the program are to elucidate the relationships between public transit and community development and assess costs and benefits of a rail rapid transit system. Specific objectives of the BIP are to determine what the impacts are, who is affected, why anticipated results are or are not occurring, and how this knowledge of BART may be useful to decision makers. (Color illustrations reproduced in black and white.)

McGuire, C; Metropolitan Transportation Commission, Department of Housing and Urban Development, Department of Transportation, (UMTA-CA-09-0042) DOT-BIP-WP-28-10-77, Apr. 1976, 47 pp; Prepared for Department of Housing and Urban Development, Washington, D.C.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-265210/5ST, DOTL NTIS

41 155371 IMPACTS OF BART ON BAY AREA HEALTH CARE INSTITUTIONS. BART IMPACT PROGRAM. The report describes the effects of Bay Area Rapid Transit System (BART) upon local health care institutions, as determined by surveys of patient travel to medical care facilities having varying degrees of public transit and BART service. Administrative personnel were also interviewed to discover and report upon institutional policy-making responses to the presence of BART.

Minkus, D Gelb, PM; Metropolitan Transportation Commission, Jefferson Associates, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech. Memo DOT-BIP-TM-22-6-77, Mar. 1977, 55 pp; Prepared by Jefferson Associates, Inc., San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266614/7ST, DOTL NTIS

41 155726 HOW TO MEASURE THE VALUE OF YOUR AIRPORT. An "Airport Economic Impact Study" technique which was pioneered with major airports serving air carriers is described. Depending upon enthusiasm and resources, a general aviation airport can adapt the idea. Basically, the study consists of a survey of all the individuals and businesses deriving an economic benefit from the airport, a compilation of their responses, and a publication of the results. Great care should go into preparing the list of those to be surveyed and the questions to be asked. Concepts to be kept in mind while constructing the study are the roles of an airport as an employer, a taxpayer, a purchaser of local goods and services, a lure to new industries, a benefit for current businesses, and a stimulus to travel. The basis for the list of those to be surveyed will include airport management, airport employees, airport users (home-based private and corporate operators, air taxis, commuter airlines, non-scheduled transient aircraft, airport-related businesses), local economic development organizations, U.S. Postal Service (for airmail figures), and others who receive or generate community revenue through the airport. Sample questions which may be asked are listed and discussed.

Airport Services Management Vol. 16 No. 10, No Date, pp 26-28 ACKNOWLEDGMENT: Massachusetts Institute of Technology

41 156017 INTRA CITY ORIGIN-DESTINATION TRAVEL SURVEY OF DELHI. This Paper deals with the results of an origin-destination intra-city travel survey conducted in Delhi in the year 1969 by household interview. The population characteristics, existing travel demands, travel characteristics of the journey made by the residents within the study area and the factors influencing the travel patterns in the city have been discussed. The study also reveals the role of socio-economic factors in the choice of mode of transport and travel characteristics. It also points out the need of improving the mass transportation system for achieving a desirable transportation balance. /Author/

Srinivasan, NS Agrawal, IC Suri, BL Prakash, A Central Road Research Institute, India Monog Ser Report No. 137, Oct. 1975, 35 pp, 3 Fig., 16

Tab., 5 Phot.; This paper has appeared in Volume 36-1 of Journal of the Indian Roads Congress, New Delhi.

41 156132 ATTITUDINAL MODELING OF TRAVELER BEHAVIOR: APPLICATION OF THE INFORMATION INTEGRATION APPROACH OF EXPERIMENTAL PSYCHOLOGY. Transportation researchers are becoming increasingly aware of the role of subjective judgment processes in traveler behavior. Experimental psychology, in general, and the information integration approach, in particular, have developed methodological tools and theoretical models for investigating human judgments in a variety of contexts. These models relate cognitive and affective components of human judgment to behavioral intentions and thus represent a single-phase attitudinal modeling approach. The present paper summarizes four recent experimental studies in which subjective perceptions and integrations of system characteristics are related to behavioral intentions for highway driving, car buying, car-bus mode choice, and carpooling. A theoretical framework is developed within which attitudinal factors can be related to human judgments in transportation. /Author/

Levin, IP; Iowa University Working Paper No. 17, Dec. 1976, 29 pp, 3 Fig., 3 Tab., Refs.

41 156253 N.J. RAILROADS PASSENGER SURVEY, 1974. In the Spring of 1974, the Port Authority, with the cooperation of the New Jersey Department of Transportation, the Tri-State Regional Planning Commission and the New Jersey commuter railroads sponsored a comprehensive survey of the New Jersey railroad passengers. This survey covered more than 100,000 rail patrons who were making eastbound trips on a typical weekday. It obtained data describing the patrons' entire trips, not just the rail portion. Information such as mode, distance and time of access to rail stations, parking at stations, mode of distribution at terminals, trip purpose, occupation and income, employment, residence mobility and much more was gathered in addition to the traditional data obtained in an origin and destination survey. This report summarizes the results of this survey for all passengers boarding Penn Central, Central Railroad of New Jersey, Reading, North Jersey Coast Line or Erie-Lackawanna commuter trains. In many cases, data is presented by individual railroad thus showing differences between patrons, facilities and conditions specific for each railroad.

Port Authority of New York and New Jersey Survey No Date, 76 pp, 3 Fig., Tabs., 1 App.; ACKNOWLEDGMENT: Port Authority of New York and New Jersey; ORDER FROM: Port Authority of New York and New Jersey, Planning and Development Department, One World Trade Center, New York, New York, 10048

41 156892 REACTION OF PASSENGERS TO PUBLIC SERVICE VEHICLE RIDE. A series of questionnaire studies is described which was carried out on passengers in public service vehicles in the United Kingdom, particularly cross-channel hovercraft, helicopter and train. The effectiveness of the different rating techniques employed is examined and it is demonstrated that useful and reliable information can be obtained on the effects of such physical parameters as

vibration, vehicle motion and noise using rating methods which involve no external standards. Some results obtained from analysis of the survey returns are presented. /Author/ /TRRL/

Clarke, MJ Osborne, DJ *Ergonomics Analytic* Vol. 8 No. 4, Oct. 1976, p 385; This paper was presented to the 1975 Ride Quality Symposium, November 1975, pp 437-470.; ACKNOWLEDGMENT: TRRL (IRRD-225508); ORDER FROM: ESL

41 157752 NON-USER PREFERENCE FOR IMPROVEMENTS, AND ATTITUDE TOWARDS FUTURE USE OF A BUS SYSTEM. This study was designed to determine transit non-user preferences towards improvements of the bus system in the Milwaukee area. The study was undertaken at the time when the bus system was still privately owned. Fare increase, reduction of service and decline in ridership has been the path, for the private system to stay in operation. Public acquisition of the system was being contemplated at the time of the study and was finally consummated in July of 1975, when Milwaukee County acquired the system. A questionnaire was distributed by mail to four study areas in Milwaukee, Wisconsin. The study areas all had existing bus service; however, their population constituted a majority of non-users for work trips. The study queried the non-user of the "most desired improvement," instead of the use of a preference scale to assess the need for improvements, and to measure the impact of improvements on ridership. This study concluded that a potential market does exist among non-users--approximately 40% being likely to use an improved system. In addition, a systematic relationship does exist between the areas of residence and the respondent's major preference in system improvement, giving rise to a desired improvement profile in each area. The study has also explored the factors which contribute to the willingness of the commuter to change mode and use an improved bus system. /Author/

Thomson, TL Bakr, MM Makowski, GG (Marquette University) *Socio-Economic Planning Sciences* Vol. 11 No. 2, 1977, pp 61-76, 2 Fig., 15 Tab., 8 Ref., 1 App.

41 157787 IMPROVING JOB ACCESS FOR THE URBAN POOR. Transportation planners are beginning to learn that different population groups have different travel needs. This paper summarizes what has been learned about the work-related travel requirements of the metropolitan poor. It begins with a description of likely travelers, the already motivated poor; their preferences for good jobs paying at least \$2.20 per hour; and the types of available jobs, most of which are unpleasant jobs paying unacceptable wages around \$1.60 per hour. The needs likely to be faced by poor people when they have to travel-in search of work, to apply for a job, and to commute-require flexibly routed and scheduled vehicles. The suitability of buses, car pools, and private autos to meet these needs is considered, and their availability and service inadequacies are identified. Programs are recommended to reduce the need to travel for work-related purposes, to foster self-help transportation by facilitating car ownership among non-car owning households, and to provide better transport options such as taxis or dial-a-bus systems for those who cannot help themselves. /Author/

Gurin, DB *Highway Research Record* No. 473, 1973, pp 16-27, 26 Ref.; This article appeared in *Highway Research Record* No. 473, Transportation for the Disadvantaged.; ORDER FROM: TRB Publications Off

41 157825 A DISAGGREGATE MODAL-SPLIT MODEL FOR WORK TRIPS INVOLVING THREE MODE CHOICES. This paper describes a disaggregate mode choice model with three travel modes: drive alone, car pool, and transit. A number of alternative model specifications were tested and the results analyzed. In general, the coefficients of in-vehicle time, out-of-vehicle time, and costs agree closely with the results of similar studies. Estimated coefficients of variables not included in previous logit model studies are also presented: Of these convenience, comfort, and flexibility influenced mode choice but mode unreliability and household income did not. Work location, cars per driver, and sex were the only socioeconomic variables for which statistically significant coefficients were found. Coefficients and models were also estimated for various subpopulations of commuters. The determinants of mode choice for CBD workers were different from those of non-CBD workers. differences in the cost and time coefficients among travel corridors and income classes were also examined. The estimated models were validated by successfully predicting the mode choices of the commuters for whom the model were estimated, of other commuters, and, finally, of commuters for whom changes in the level of service were made available. /Author/

Ganek, J (American Telephone and Telegraph Company) Saulino, R (Office of Budget and Management Systems, D.C.) *Transportation Research Record* No. 610, 1976, pp 25-29, 2 Tab., 6 Ref.; This article appeared in *Transportation Research Record* No. 610, Passenger Travel Demand Forecasting.; ORDER FROM: TRB Publications Off

41 158954 SYSTEMS MODELS FOR TRANSPORTATION PROBLEMS. VOLUME III: A COMPUTABLE COMMAND-CONTROL SYSTEM FOR A SOCIAL SYSTEM [Final rept. Jul-Aug 75]. The spectral characteristics of the urban center--at the level of the family, the functional organized units of society, and the essential compartment balances of the urban center--are spelled out in greater detail. These compartments are food, materials, energetics, manpower, productive function, economic balance, and technology governing the system. Ideal Carnot cycle efficiencies are characterized for the basic cyclic processes in each compartment.

Iberall, AS Cardon, SZ; General Technical Services, Inc., Upper Darby, Pa.*Transportation Systems Center, Cambridge, Mass. DOT-TSC-OST-76-12.II, Mar. 1976, 90p; See also Volume 2, PB-267 429. Also available in set of 4 reports PC E08, PB-267 427-SET.; Contract DOT-TSC-946; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267430/75T

41 159325 EXPERIMENTAL DESIGNS AND PSYCHOMETRIC TECHNIQUES FOR THE STUDY OF RIDE QUALITY. A major variable in both the cost of any new transportation system and rider acceptance of the system is the ride quality of its vehicles. At this time, there exists no

set of objective criteria which would allow the transportation system designer to determine what level of ride quality would be considered acceptable by a wide variety of potential passengers. The purpose of the study was to establish statistically acceptable techniques for the development of methods for relating physical measures of vehicle vibration to passenger estimates of ride quality.

Havron, MD Westin, RA ; ENSCO, Incorporated, Human Sciences Research, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-OST-76-54, May 1977, 301 pp; Prepared in cooperation with Human Sciences Research, Inc., McLean, Va. Sponsored by the Office of the Secretary, Office of Systems Development and Technology, Office of Systems Engineering, U.S. DOT.; Contract DOT-TSC-864; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268584/OST, DOTL NTIS

41 163017 EVALUATION OF THE RELOCATION ASSISTANCE PROGRAM FOR BUSINESSES AND INSTITUTIONS DISPLACED BY HIGHWAYS. The provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 were implemented by the Texas State Department of Highways and Public Transportation effective January 8, 1971. Since then, many of those displaced by highways have received relocation assistance provided by the act. The Texas Transportation Institute evaluated the effectiveness of this relocation program, and this paper presents the findings from data collected by personal interviews with those associated with businesses and institutions displaced by highway projects in several urban and rural areas in Texas. The sample is composed of 101 business relocatees and 7 institutional relocatees. The characteristics of a typical business are sole proprietorship, retail operation, fewer than 10 employees, single outlet, at least 50 year existence, renting facilities, and \$100,000 or less annual gross sales. The results of the survey indicate that over 75 percent of the respondents relocated their businesses and continued in operation for a while; 60 percent of those that ceased operations could not find suitable replacement facilities; and a majority of those that relocated thought the overall quality of facilities and neighborhood conditions were better or remained the same, even though almost half of them had to increase monthly payments for facilities. Most of the relocatees thought that relocation payments adequately covered relocation expenses, but over half of the owners thought that property payments were not enough. About 30 percent mentioned unsolved problems (mainly financial). Most of the relocatees expressed no need for additional relocation services, gave the program a substantially high rating, had a satisfactory relation with the relocation personnel, and felt pleased with the relocation experience. /Author/

Buffington, JL (Texas Transportation Institute) *Transportation Research Record* No. 617, 1976, pp 26-30, 11 Tab., 3 Ref.; This article appeared in *Transportation Research Record* No. 617, Social and Economic Factors in Transportation Planning.; ORDER FROM: TRB Publications Off

41 163605 PUBLIC INVOLVEMENT IN PARATRANSIT PLANNING. Repeated rate increases, allegedly declining levels of service, and growing community dependence on public transit due to rising costs of living and energy shortages

brought the Dade County, Florida, taxi system under sharp criticism. Transportation planners found that analyzing the situation and recommending corrective measures were complicated and difficult because of the largely unregulated, traditionally private-enterprise nature of the taxicab industry. A taxi study task force was, therefore, established that consisted of industry representatives from fleets of every size, local governmental officials, and (after a series of public hearings) interested citizens. Administrative and regulatory alternatives and possible operational improvements were presented to the task force for review and comment. The alternatives ranged from partial to complete control of the taxi industry by Dade County. The task force concluded that uniform county regulation of taxicab service was essential and legislation providing for county control of the taxi industry was passed by the Florida General Assembly in June, 1974. A model ordinance to establish a taxicab bureau with county jurisdiction was then submitted to the taxi task force and later approved and passed in modified form by the county commission. By late 1975 the county became involved in rate making and also in requesting the taxicab industry to provide service to the transportation disadvantaged. An important outcome has been the continuance of the taxi force, which perpetuates cooperation among citizens, government, and industry concerning transportation service issues that affect all. /Author/

Hinds, DH Wulkan, A (Metropol Dade Co, Fla Office of Transp Coordinator) Schimpeler, CC Corradino, JC (Schimpeler-Corradino, Associates) *Transportation Research Record* No. 618, 1976, pp 41-46, 3 Fig., 1 Tab.; This article appeared in *Transportation Research Record* No. 618, Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.; ORDER FROM: TRB Publications Off

41 163606 CITIZEN PARTICIPATION IN TRANSPORTATION SYSTEM PLANNING: A CASE STUDY. Techniques for citizen involvement are discussed in the context of the traditional urban transportation planning process. Deficiencies in past approaches to citizen participation and planning efforts are identified. A case of a current project in which an intensive effort is being made to achieve citizen participation as part of a small urban area study is reported. The citizen participation program seeks to identify the appropriate roles for citizen input to a multimodal system plan. The project demonstrates techniques and identifies weaknesses in both the citizen participation process and the planning process. Preliminary findings and recommendations are presented. /Author/

Miller, JH (Pennsylvania State University, University Park) *Transportation Research Record* No. 618, 1976, pp 47-52, 7 Ref.; This article appeared in *Transportation Research Record* No. 618, Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.; ORDER FROM: TRB Publications Off

41 163607 CITIZEN PARTICIPATION AND ROLE OF PUBLIC HEARINGS. This paper describes and comments on the procedures followed by state transportation agencies before and after public hearings on highway projects. Information was obtained through interviews with

public hearing officers, or their equivalents, in state highway and transportation departments. Items addressed include hearing administration, prehearing strategies, hearing formats, and post-hearing strategies. Hearing officers interviewed were also asked to submit written copies of their agencies' public hearing strategy and any other material pertinent to public hearings or citizen participation. From the information gathered, we have assumed that the procedures described are currently in use unless otherwise stated. State transportation agencies have either one of two administrative operations for conducting public hearings: 29 agencies have centralized administrations in which mandates emanate from the central office, and 21 agencies delegate the responsibility for hearings to district or regional offices. The trend is toward the use of independent moderators at public hearings, especially if the hearings are likely to produce controversy. The most efficient and widely used prehearing technique is the informal prehearing meeting, which all 50 agencies use in some form. Thirty-nine agencies hold hearings at night but only 3 agencies conduct morning hearings. Although the formats for public hearings held by state transportation agencies are similar, 12 agencies recess at the midpoint for 30 min to 1 h to answer questions, informally. /Author/

Perfater, MA (Virginia Highway & Transportation Research Council) *Transportation Research Record* No. 618, 1976, pp 53-58, 2 Ref.; This article appeared in *Transportation Research Record* No. 618, Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.; ORDER FROM: TRB Publications Off

41 163662 RADICAL DIFFERENCES IN COMMUTING BEHAVIOR: NEW EVIDENCE FROM THE PANEL STUDY OF INCOME DYNAMICS. Data from a national probability sample of metropolitan families reveal sharp racial differences in distance from home to work, commuting time, commuting speed, and mode of transportation. Black household heads are bound to spend about 25 percent more time commuting per hour worked than do whites, even though blacks on average live slightly closer to their place of employment. The proportion of black workers using public transportation is three times the whites' proportion, and reliance on this slow mode of transportation accounts for about half of the difference between whites and blacks in commuting time and commuting speed. The paper mentions some housing market and labor market implications of the findings. /Author/

Goodman, JL, Jr Berkman, M (Harvard University) *Review of Public Data Use* Vol. 5 No. 4, June 1977, pp 29-36, 3 Tab., Refs., 1 App.; ORDER FROM: NTIS

41 164231 THE ECONOMICS OF URBAN TRANSPORT. An attempt is made to analyse the economic problems arising in urban transport and to outline the economic principles upon which solutions may be formulated. In the introduction, urban transport is defined together with its relation with urban development in Britain and its control. The various topics discussed cover: urban traffic congestion, road pricing, the economics of parking and traffic management, urban public transport, urban freight movements, transport and the urban environment, urban transport planning and modelling, transport in-

vestment appraisal, and urban transport policy. An extensive bibliography is appended. /TRRL/

Button, KJ (Loughborough University of Technology, England); Saxon House, Teakfield Limited, (0 566 00148 9) 1977, 181 pp, 20 Fig., 15 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-226982)

41 164278 HARLOW BUS STUDY. FINAL REPORT VOLUME 1: MAIN REPORT. This report deals with a preliminary feasibility study of bus services in Harlow, intended to ascertain the problems existing in the use of public transport, and on the basis of the findings, to develop a job specification for more detailed studies. Existing data was largely used as a basis for the study, new field work being confined to meetings with interested parties, observations of bus operation, and a small scale household attitude survey. This volume contains 5 chapters dealing with: 1, background to the Study; 2, analysis of bus operation in Harlow; 3, public attitudes and demands; 4, evaluation of problem areas- perception and reality; and 5, suggested program of action. /TRRL/

Dick (Alastair) and Associates Analytic Apr. 1976, 93 pp, 4 Fig., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 225446)

41 164279 HUDDERSFIELD BUS STUDY-SUMMARY REPORT. This report summarizes the findings of the Huddersfield urban bus study. This major study of bus operations in Huddersfield was commissioned by West Yorkshire County Council and West Yorkshire Passenger Transport Executive, and was completed by LGORU in 1976. The study involved three main phases. First, a series of surveys was carried out, giving a comprehensive review of travel needs in the town and the role of the bus system in meeting those needs. Next, investigations were made and recommendations devised for immediate improvements to the bus network. Finally, studies were made of the likely effects of long-term trends and national and local policy over a longer time period. These three phases are reported fully in the three main volumes of the study report. Technical reports have also been produced covering specific aspects of the analysis. This report is set out in three chapters, which cover the three phases of the study and is a summary of the findings of the whole study. These chapters are followed by a brief summary of the most important conclusions and recommendations we have derived. /Author/TRRL/

Local Government Operational Research Unit Monograph Report No. C229, 1976, 24 pp, 4 Fig., 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 226964)

41 164377 DEMANDS FOR PUBLIC TRANSPORT MODES [Efterfragan av kollektiva transportmedel]. The main purpose of this study was to find out the attitudes of the individual to different qualities of the present transport modes. Interviews regarding behaviour and attitudes of travellers, cost dependence and the willingness to change from private to public transport have been carried out. From these interviews models describing the traveller's choice between private and public transport have been derived. The models comprise explanation and convenience factors. Empirical data applied to the models show that

the convenience factor is of great importance for the choice behaviour of travellers, while the explanation factor describing the fare systems is less important. /TRRL/ [Swedish]

Saevenstedt, G Waara, R; Umeaa University, Sweden Monograph 1976, 115 pp, 13 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-227522)

41 165569 FAMILY EXPENDITURE SURVEY DATA AND THEIR REFERENCE TO TRANSPORT PLANNING. An assessment of family expenditure survey data from the standpoint of transport planning and evaluation is given. The primary emphasis is on recently available Australian data, although comparisons are also made with overseas data where these are available. Issues covered include the following: basic organisational features of family expenditure surveys; general limitations in using this source of data; the practical value of family expenditure data in the appraisal of transport needs and demands; complementary sources of data and/or refinements to family expenditure surveys which are needed for transport planning purposes; and key research areas which are left untouched by family expenditure surveys. /TRRL/

Morris, J Wigan, MR (Australian Road Research Board); Victoria Ministry of Transport, Australia Proceeding May 1977, 56 pp, 2 Fig., 11 Tab., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use from the Transport Infrastructure"--Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227904), Australian Road Research Board

41 165570 FORECASTING CAR OWNERSHIP. Accurate estimates of future car ownership are important because the level of car ownership is a primary determinant of personal mobility, modal split, total vehicle miles of travel and energy use in the transport sector. Different methods of forecasting car ownership are reviewed and their forecasts compared. Income and the cost of motoring are suggested to be the key explanatory variables with minor influence from saturation effects. Public transport availability may be an additional important factor for urban areas. As the unit of ownership is commonly the household, forecasting household car ownership rather than on a per capita basis may be more behaviourally consistent and allows consideration of the difference between the marginal utilities of the first and subsequent cars with a household. A summary of some earlier unpublished work presents a model, and its results, for forecasting urban car ownership using these ideas. Extensions of this model are proposed to forecast total car ownership. These extensions take into consideration the effects of differences in household structure and location and the causes and consequences of a move to smaller cars. While no completely formulated and calibrated model is put forward, a framework is presented which may suggest future research work using data from the 1976 census. /TRRL/

Chaffin, M Hollywood, DH (Shell Company of Australia); Victoria Ministry of Transport, Australia Proceeding May 1977, 22 pp, Figs., 10 Tab., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use from the Transport Infrastructure" Melbourne, Australia, May

24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227883), Australian Road Research Board

41 165575 PATRONAGE ESTIMATION FOR STREET PUBLIC TRANSPORT. There is a need for public transport operators to have an accurate estimate of patronage levels for any proposed new route. The high costs involved in establishing new routes, requires that the limited funds available to operators for improvements are allocated in a rational way. An accurate estimate of the potential patronage is the first step to ensure this. This paper reviews current methods for patronage estimation. Large public operators have used the results of metropolitan-wide, land-use and transportation models to highlight deficiencies in their networks. Some problems from the operators viewpoint in using this type of forecast are described. The development of alternative methods for patronage estimation is outlined. The adaptation of the four-step modelling approach to transport planning is discussed together with the possible use of both direct demand and disaggregate behavioural models. Details are given of the application of these techniques to a case study. The suitability of the models to more general applications is outlined. /TRRL/

White, CJ Kinnear, RL (Melbourne and Metropolitan Tramways Board); Victoria Ministry of Transport, Australia Proceeding May 1977, 18 pp, 3 Fig., 1 Tab., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use From the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227899), Australian Road Research Board

41 165629 STUDIES OF THE SOCIAL EFFECTS OF CAR OWNERSHIP AND CAR TRAVEL [Studier Oever Bilsomens Sociala Effekter]. This report describes the studies made into the social effects of car ownership and car travel. Part 1 investigates theoretically the influence of car traffic on physical urban structure. Part 2 deals with the social effects of car traffic, with special reference to those without a car. After a general treatment of car ownership in Sweden, there is a description of the relationship of children, the old, the handicapped and women to cars, and the effect of car ownership on the labour market, shopping and leisure. Part 3 discusses theoretically the image which people have of their town, and the way car traffic affects this. Part 4 examines two specific areas with regard to trips to work, in relation to public transport facilities and the location of workplaces. /TRRL/ [Swedish]

Janusson, J Johansson, L; Uppsala University, Sweden Monograph 1977, 111 pp, 20 Fig., 6 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-227587), National Swedish Road & Traffic Research Institute

41 165688 PUBLIC INCONVENIENCE : ACCESS AND TRAVEL IN SEVEN SYDNEY SUBURBS. This monograph is about access in Sydney and the travel of residents getting to places of employment, schools, shops, health services, sport and recreation. The main purposes of the work are (a) to measure how conveniently these activities and facilities are located in relation

to where people live, (b) to see whether the process of urban development has resulted in a 'fair' distribution of facilities throughout the metropolitan region, and (C) to describe the journeys made on foot, by public transport and by private transport, and to assess the transport problems that arise when residents have poor access. /Author/IRRD/

Black, J ; Australian National University, (0 909778 15 9) Monograph 1977, 233 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 227942)

41 167393 SYSTEMS MODELS FOR TRANSPORTATION PROBLEMS. PART II. THE SOCIAL PHYSICS FOR MODERN SOCIETIES: THE ROLE OF THE CITIES. The objective of the research was to make use of a physically based social systems model, developed earlier, to study the determinants of city sizes and their national interactions. In particular, information on the role of a transportation system in affecting city sizes was required. In this second part, the relation between the urban settlements and a potential mapping that is related to the land (its population density, material and energy resources, activities, products, and consumption) is outlined. The dependence of the urban settlement distribution on long-distance international trade is discussed. The emergence of a new major social institution, the large corporation which is competitive with the urban settlement, is discussed. The socio-economic effects of transportation systems, and their modernization is described.

Iberall, AS Cardon, SZ ; General Technical Services, Incorporated, Transportation Systems Center Final Rpt. DOT-TST-OST-77-34.II, Sept. 1977, 161 pp; See also Part I dated Sep 77, PB-272 795.; Contract DOT-TSC-1157; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273184/2ST

41 168060 ATTITUDE SURVEYS, TRANSIT PLANNING, AND AUTOMOBILE-USE CONSTRAINTS. This paper summarizes the procedures, findings, and implications of an attitudinal survey of existing and potential transit users. Employees at work places having different levels of transit accessibility and different industry classifications were sampled about (a) the characteristics of a desirable transit service, and (b) the conditions under which they would use such a service. The approach used here appears to be more cost-effective and more accurate than the traditional home interview or bus rider attitude and market-research studies and was useful in market segmentation for transit-system planning purposes. Radical differences were found between transit users and nonusers in regard to acceptable transit-service levels. Even with a level of service acceptable to non-users of transit, most automobile drivers conditioned a change of regular modes of travel to work on motor-fuel supply restraints. /Author/

Hoey, WF Levinson, HS (Smith (Wilbur) and Associates) *Transportation Research Record* No. 625, 1977, pp 1-4, 4 Tab., 3 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

41 168063 ANALYSIS OF USER RESPONSE TO THE 1975 NEW YORK CITY TRANSIT-FARE INCREASE (ABRIDGMENT). This paper describes how before and after survey data were used to supplement aggregate ridership counts in describing the effects of a fare increase on patrons of the New York City transit system. While the overall rate-of-ridership decline may be sufficient for a financial analysis, the growing recognition of the role of transit in economic, social, and equity issues requires more in-depth understanding of the kinds of people who ride less or sacrifice mobility when transit-fare increases occur. Two surveys, one before the fare increase was announced and another 3 months after its implementation, allowed the analysis of a before and after pattern of transit use by a given sample of riders. (Except for those derived by inference, data on the effects of fare increases on the various groups of riders and the types of trips abandoned did not previously exist for the New York City transit system.) The author concludes that the 1975 transit-fare increase resulted in ridership reductions in roughly equal proportions from all major socioeconomic and demographic groups. The survey results support the theory of automobile availability as a major determinant in mode-choice decisions. The over representation of riders from double fare zones among the changers emphasizes the urgency of a comprehensive transfer policy to mitigate the effects of two fares on this group of riders.

Obinani, FC (Tri-State Regional Planning Commission) *Transportation Research Record* No. 625, 1977, pp 12-14, 2 Tab., 5 Ref.; This article appeared in *Transportation Research Report* No. 625, Transit Planning and Operations.; ORDER FROM: TRB Publications Off

41 168092 THE DECLINE IN PUBLIC TRANSPORT-CAN WE ARREST IT? The article considers the effect of some aspects of rail transport planning policy upon major conurbations. Commuters are the most important single consumer group, about 63 per cent of the LTE revenue and 77 per cent of British rail revenue in peak hour travel. The author discusses the basis used to determine the level of fare increases on commuter routes. The related issues of subsidies and staffing are examined; conditions vary considerably over the country but it is apparent that often labor and other resources are maldeployed. There is still a lack of co-ordination between surface British rail services and LTE buses and tube trains. A full study into the cost-effectiveness of subsidies for commuter fares is needed. It is explained how even small savings on subsidies could have serious implications on public revenue and expenditure accounts in large conurbations. Reasons are given why public transport should play a much greater role in the planning of conurbations and travel patterns within them. Greater emphasis should be put on the importance of commuter traffic.

Millman, R (North London Polytechnic, England) *Planner Analytic* Vol. 63 No. 5, Sept. 1977, p 134, 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-228912), Planner; ORDER FROM: ESL

41 168148 URBAN TRANSPORTATION SYSTEMS VIEWED AS SOCIAL SERVICES DELIVERY SYSTEMS. The recognition of urban transportation systems as social services delivery systems represents a major change in urban

transportation planning. This recognition emerged incrementally over the last 50 years and it is founded in the size of modern metropolitan areas, in the nature of the technology of urban transportation systems, and in the socioeconomic, demographic, and psychosomatic characteristics of urban populations. The acceptance of urban transportation systems-in both their highway and mass transit components-as social services delivery systems (SSDS) implies major changes in urban transportation planning requirements and in the evaluation of such systems. Six such major requirements are identified and discussed in this paper (universal availability, public determination of the level of service, universal funding, local planning and accountability in management, public determination of priorities, efficiency and effectiveness in committing and dispensing public funds). In addition a more comprehensive framework of a social evaluation of the urban transportation systems is presented and discussed. (a) /TRRL/

Tomazinis, AR (Pennsylvania University, Philadelphia) *Transportation Planning and Technology Analytic* Vol. 4 No. 1, 1977, pp 47-56, 1 Fig., 1 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 229046)

41 168906 IMPACTS OF BART ON BAY AREA INSTITUTIONS OF HIGHER EDUCATION AND THEIR STUDENTS. This report describes the impacts of BART upon institutions of higher education and student life styles. It provides findings on the impact of BART and mass transit systems on financial and physical considerations by campus administrators, and on choices of campus selection and life routines by students of 'commuter' campuses, at ten selected universities and colleges in the San Francisco Bay Area.

Lunsford, T ; Metropolitan Transportation Commission, Jefferson Associates, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT-BIP-TM-31-6-77, May 1977, 95 pp; Prepared by Jefferson Associates, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Report on BART Impact Program.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273396/2ST, DOTL NTIS

41 168922 THE IMPACT OF BART ON THE COMPETITIVE ADVANTAGE AND EFFICIENCY OF BAY AREA BUSINESS OPERATIONS. This technical memorandum evaluates the economic effects of BART's transportation service on the competitive advantage and efficiency of Bay Area business operations. The scope of the analysis includes potential economic impacts resulting from improved transportation service and accessibility for workers to jobs, impacts of regional competitive advantage due to locational advantage or regional image, and possible economic efficiencies associated with BART service. The study methodology, which is also documented, includes a shift/share analysis of Bay Area employment since 1962, extensive interviews with industrial and commercial Decision makers, and four case studies. (Color illustrations reproduced in black and white).

Grefe, R McDonald, AN Chase, E McLeod, D ; Metropolitan Transportation Commission, Mc-

Donald and Grefe, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT-BIP-TM-26-7-77, Aug. 1977, 123 pp; Prepared by McDonald and Grefe, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273485/3ST, DOTL NTIS

41 169620 AN EVALUATION OF POLICY RELATED RESEARCH ON CITIZEN PARTICIPATION IN MUNICIPAL SERVICE SYSTEMS: OVERVIEW AND SUMMARY. The project was conceived and structured as a means of providing municipal managers, interested citizens, and the academic community with concise reviews of the state-of-the-art and knowledge base concerning citizen participation processes in each of eight municipal service systems. This overview monograph includes: a statement of definitions and operational assumptions regarding the settings for citizen participation, a review of the state-of-the-art of the citizen participation literature, a summary of major policy relevant findings and recommendations, and suggestions for future research.

Falkson, JL ; Michigan University, Ann Arbor, Technical Assistance Research Programs, Inc, National Science Foundation NSF-RAS-74-044A, Nov. 1974, 46 pp; Pub. as Technical Assistance Research Programs Inst., Washington, D.C., Monograph No. 1. Prepared in cooperation with Technical Assistance Research Programs Inst., Washington, D.C.; Grant NSF-GI-39196; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273008/3ST

41 169705 THE URBAN TRAVEL DEMAND FORECASTING PROJECT. PHASE I FINAL REPORT SERIES, VOLUME VI. ATTITUDES, BELIEFS, AND TRANSPORTATION BEHAVIOR. This volume includes detailed descriptions of several studies based substantially on subjective data, reflecting travelers' beliefs, attitudes, and intentions. Research topics were: (1) the importance of various travel attributes as influences on choices among car, bus, and BART commuting, and (2) attitudes reflecting basic preferences for auto and transit travel. Chapter 1 presents definitions of beliefs, attitudes, and intentions for use throughout the text and it discusses the relationships of the concepts to each other, to objective measures of physical phenomena, to the concept of utility, and to behavior. Chapter 2 describes a study of ten different travel attributes and their relative importance as influences on choices among car, bus, and BART for traveling to work in the San Francisco Bay Area. Attributes include cost, total travel time, dependability, relaxation, safety from accidents, use of time while traveling, flexibility, seat availability, safety from crime, and waiting time. Chapter 3 describes two studies of attitudes related to the basic characteristics of auto and transit travel-characteristics that do not vary substantially for different trips. References, tables, and figures are included.

Johnson, MA ; California University, Berkeley, National Science Foundation Final Rpt. UCB-ITS-RR-77-12, NSF/RA-770281, Aug. 1977, 100 pp; See also Volume 8 dated Jun 77, PB-270 931 and Volume 11 dated August 77,

PB-274318. Performed under Grants NSF-GI-43740 and NSF-APR74-20392.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274317/7ST

41 172150 CRITICAL FACTORS INFLUENCING THE DEMAND FOR TRANSIT. This report identifies the direct, as well as latent demand for public and mass transportation services, and assesses the factors which are critical to developing expanded transit usage. Individual and behavioral characteristics explaining transit demand are assayed, as well as transit system and population characteristics influencing the demand for mass transportation. Transit demand forecasts by transit leaders are also included. The most significant personal and attitudinal characteristics which predict bus ridership are: the lack of an automobile, close proximity to a bus route and positive evaluation of buses relative to automobiles. The two indicators most explanatory of patronage for conventional buses: the lack of automobile, and the lack of limiting physical disabilities. The propensity to use buses among current nonriders was examined to determine the most critical factors that influence a decision to switch to public transportation. Three behavioral demand forecasting models are outlined for examining alterations or improvements in transit service. Macro-level indicators for demand forecasting were also assessed. Two systematic demand models for estimating daily ridership are presented.

Guseman, PK Hatfield, NJ Hall, J ; Texas Transportation Institute, (Res Report 1052-2) Final Rpt. UMTATX77-10522, Oct. 1977, 76 pp, 19 Fig., 23 Tab., 18 Ref.; Sponsored by the Texas State Department of Highways and Public Transportation in cooperation with the Urban Mass Transportation Administration.; Contract Study 2-10-76-1052

41 172522 ACCESSIBILITY MEASURES AND THE SOCIAL EVALUATION OF URBAN STRUCTURE. The measurement of accessibility and travel patterns in urban areas is described. The methodology presented includes graphical measures of physical accessibility, a numerical index of accessibility that is consistent with graphical measures, residents' accessibility weighted by transport availability, and the relationship between accessibility and travel behaviour. Some empirical results are presented for access and travel to male and female jobs in Sydney, with the use of data collected for the 1971 census of population and for the Sydney area transportation study. The consequences of some alternative arrangements of land use and plans to improve public transport on residents' accessibility are investigated. It is argued that accessibility measures are a useful aid to planners and policymakers in the social evaluation of urban structure.(a) /TRRL/

Black, J Conroy, M (New South Wales University, Australia) *Environment and Planning* Vol. 9 No. 9, Sept. 1977, pp 1013-31, 7 Fig., 5 Tab., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-229968)

41 172877 THE EFFECTS OF URBAN TRANSPORTATION CHANGES. This paper uses a general equilibrium simulation model of residential land use to study the long-run effects

of transportation changes in a closed city. The effects considered here include the aggregate benefits from the income distributional impact of the changes, in addition to the induced alternations in the physical characteristics of the city and in the location and modal choice of different income groups. The paper breaks new ground in its treatment of modal choice in a location theory model. An interesting point brought out in the simulations is the welfare-interdependence of different groups resulting from their spatial interaction. /Author/

Arnott, RJ MacKinnon, JG (Queen's University, Canada) *Journal of Public Economics* Vol. 8 No. 1, Aug. 1977, pp 19-36, 2 Fig., 15 Ref.

41 172878 AN ANALYSIS OF CITIZEN ATTITUDES TOWARDS THE ESTABLISHMENT OF BUS SERVICE IN THE CITY OF ROSWELL, NEW MEXICO. This report is based upon the discussion concerning potential usage and mean number of automobiles per family. Further, if the system required a tax increase to maintain operation, the majority of the population would accept the additional cost. This is evidenced by the fact that 47.6 percent of those surveyed said they would pay additional taxes as opposed to 38.7 percent who would not. According to the multifrequency results relating to age and races, the majority would support a tax increase if necessary. Based upon the multifrequency distributions of age, income level and ethnicity, the system would have a broad base of support. In most cases, there was a clear majority in favor of a bus system and the necessary tax increases to support it. Regarding handicapped individuals, it is evident that they believed a mass transit system would help relieve their unique transportation problems. This is illustrated by the fact that 62 percent of the families with handicapped members said they would use the system, 72 percent said they would favor the use of municipal funds for the project, 60 percent would support a tax increase, and 58 percent of the families with handicapped members with severe transportation problems said the bus would solve those problems. The findings of this study indicate a high degree of citizen support. This support justifies further studies into areas such as operating costs and tax considerations.

Morris, RB ; New Mexico University, Albuquerque UMTA-NM-09-0003, Oct. 1977, 28 pp, 19 Tab., 2 App.; Prepared for the New Mexico State Highway Department in cooperation with DOT, Urban Mass Transportation Administration.

41 173302 THE COMPREHENSIVE APPROACH TO TRANSPORT. The author investigates how does an individual transport user measure value for money, and how can telling people about transport assist this exercise. As an example, the success achieved by the Oxford City Council in their balanced transport policy which followed public unacceptability of a proposed road through Christ Church Meadow is discussed. The author develops the theme that a comprehensive approach to transport can only be successful if the community at large is aware of the value of money to the community of the many approaches to modes of travel within a community. Examples are given of the measures taken within the City of Oxford to improve the freedom of movement for pedestrians and motor vehicles by the provision of park-and-ride facilities, re-

served bus and cycle lanes and the understanding of land use implications for transport. The question of communication is discussed in relation to the changes in the method of government grants towards transport that have evolved following publication of the Local Government Acts of 1972 and 1974, and the need to inform the community at large of future transport policies and programmes. /TRRL/

Bodger, JM (City of Oxford Motor Services, Limited) *Chartered Institute of Transport Journal Analytic* Vol. 38 No. 1, Nov. 1977, pp 11-15, 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 230609)

41 173309 THE EFFECT OF FREE PUBLIC TRANSPORT ON THE JOURNEY TO WORK. The travel habits of public transport employees who had free travel concessions on public transport were compared with those of similar groups of workers who had to pay fares in seven provincial cities. The study used linear logit models to examine the effect of the many different travel and socio-economic factors on mode choice between car and public transport for the journey to work, on car availability for the journey to work, and on single and multiple car ownership. The results suggested that socio-economic variables were very important in explaining car ownership and availability, but less so in influencing mode choice, while the difficulty and cost of the public transport journey appeared to have an important effect on mode choice and car availability, and less so on car ownership. The best estimate of the effect of providing free public transport for the control group is that car use by peak-hour commuters who do not need their car at work would be reduced by 22 per cent, that 10 per cent of those workers who had a car available for the work journey would no longer have the choice and would travel by public transport if it were free, and that car ownership among commuting households would be reduced by a statistically non-significant 3 per cent. Much additional information on the factors influencing travel behaviour was also obtained, including estimates for the value of travel time of 50p per hour for time spent walking or in a public transport vehicle, 13p per hour for time spent driving to work, and 200p per hour for time spent waiting for public transport, though this latter figure is known to be an over-estimate. /Author/TRRL/

Daly, A Zachary, S ; Transport and Road Research Laboratory, (0305-1315) Monograph TRRL Supp Rpt 338, 1977, 28 pp, 2 Fig., 14 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230531), NTIS; ORDER FROM: NTIS; PB-277728/2ST

41 174107 LONGITUDINAL CHANGES IN PUBLIC PREFERENCE FOR ATTRIBUTES OF A NEW TRANSIT SYSTEM. This paper reports the results of a longitudinal study of public preference for attributes of a new bus system in Chapel Hill, North Carolina. A "before-after" approach was used to collect attitudinal, socio-economic, and travel data from a sample of residents. Multidimensional scaling was used to construct structural representations of the respondents on the basis of their preferences. These structures were interpreted using behavioral and socio-economic variables. The

analysis was performed with both "before" and "after" data sets, and a comparison of the results indicates that the patterns of preferences changed greatly between the two surveys. This result implies that market segment characteristics changed with exposure to the new bus system. /Author/TRRL/

Foerster, JF Young, FW Gilbert, G (North Carolina University) *Transportation Research* Vol. 11 No. 5, Oct. 1977, pp 325-336, 3 Fig., 6 Tab., 15 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230932)

41 175093 TRANSPORTATION AND URBAN ECONOMIC DEVELOPMENT. These discussion materials are prepared as part of a general review of key policy and program considerations underlying transportation and urban economic development. Their purpose is to help EDA in sorting out its role and potential contribution in the urban transportation arena. To this end, a specific objective of this document is to identify policy, program and administrative initiatives for EDA in the urban transportation field, including ways transportation can work to enhance urban economic development. A related objective is to summarize in the process: the present and prospective assistance policies and programs of the Urban Mass Transportation Administration and the Federal Highway Administration; previously federally-funded transportation programs and projects with a bearing on urban economic development; and local transportation planning practice, evolving roles of major participants in the process, and ways economic development entities are involved at area-wide (i.e. metropolitan areas) and sub-area (e.g. central city) levels.

Gladstone Associates, Economic Development Administration, (EDA-OER-99-7-13412) Final Rpt. EDA-OER-78-003, Nov. 1977, 135 pp; See also Technical Appendices, PB-275 563.; Grant EDA-PF-600; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275562/7ST

41 175094 TRANSPORTATION AND URBAN ECONOMIC DEVELOPMENT. (TECHNICAL APPENDICES). The report was prepared as part of a general review of key policy and program considerations underlying transportation and urban economic development with the purpose of helping EDA sort out its role and potential contribution in the urban transportation arena. The Technical Appendices consist of: Glossary of Transportation and Economic Development Terms; Literature on Federal Transportation Policy; Documents on Department of Transportation Policy and Programs; Urban Transportation Alternatives: Evolution of Federal Policy; Federal Register: Transportation Improvement Program; Federal Register: Major Urban Mass Transportation Investments; Federal Register: Transportation System Management; Notice of Proposed Policy-Paratransit; Progress Report for Paratransit/Special User Group; Service Innovations.

Gladstone Associates, Economic Development Administration, (EDA-OER-99-7-13412) Final Rpt. EDA-OER-78-004, Nov. 1977, 148 pp; See also PB-275 562.; Grant EDA-PF-600; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275563/5ST

41 175205 SOME SOCIAL ASPECTS OF PUBLIC PASSENGER TRANSPORT. Each type of passenger transport tends to be used predominantly by a limited number of identifiable groups of people, each for their own specific purposes. This paper reviews some of the existing data on the patronage of conventional stage bus services to identify the groups that comprise the market for bus travel. It is shown that about one sixth of bus passengers are children, one third men and one half women. The purposes for which bus trips are made is shown to vary between different types of area, but nationally to include about 35 per cent for work, 10 per cent for education, 21 per cent for shopping and 16 per cent for social purposes. It is shown that a major reason for not using a bus is having a car available. A similar analysis is made of the patronage of five experimental dial-a-bus services. It is shown that these have attracted considerable numbers of passengers to public transport, though only slightly from private cars. A higher than normal proportion of dial-a-bus passengers are women. There is little evidence of dial-a-bus services being used in ways that are different to the use of frequent conventional bus services, or of them satisfying a market that could not be satisfied by conventional buses. However, dial-a-bus is attracting passengers who more nearly represent a cross-section of the community served, than do passengers on conventional buses. (Copyright (c) Crown Copyright 1977.)

Mitchell, CGB ; Transport and Road Research Lab., Crowthorne, (England). 78 TRRL-SUPPLEMENTARY-2, 1977, 34p; Also pub. as ISSN-0305-1315.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276670/7ST

41 177146 THE IMPACTS OF FEASIBLE STAGGERED WORK HOURS AND COMPRESSED WORKWEEK POLICIES ON HIGHWAY NETWORKS, TRANSPORTATION ECONOMICS, ORGANIZATIONS AND EMPLOYEES. This study determines feasible work schedules of staggered work hours and 4-day workweeks and investigates their impacts on the operational efficiency of a highway network serving a high-density employment area in a medium size city. A sample of 140 employees from the main office of N.Y.S.D.O.T. in Albany, N.Y. were surveyed in September, 1976. Using 110 valid responses, the statistical algorithms Automatic Interaction Detection and Trade-Off, were used to determine the most important variables shaping attitudes toward flexible work hours and 4-day workweeks, and the schedules supported by the majority of employees. Traffic simulation techniques were then used to estimate changes in the operational efficiency of the transportation network and travel costs based on present and future traffic conditions. Results show that support for alternative work schedules stems from the desire to reconcile one's work and personal activities. The results show that out of 21 variables, the most important factors influencing favorability of alternative work schedules are leisure time, income, family size, age, congestion levels and carpooling. The most favored work schedules were found to be the 5-day-flexible, the 4-day-flexible, and the 5-day individual-specific-times programs. The greatest highway impacts of these schedules occur within a ring of two miles radius from the office site. The effect is less evident as the distance from the complex in-

creases. The estimated systemwide transportation economic benefits are over \$3 million (1976\$) per year, accruing to commuters during the peak hour, especially those who participate in flexible or 4-day work programs. The impacts on the organization and its employees are generally anticipated to be positive, especially on employee leisure, family time, job satisfaction, productivity, savings on gasoline, and rush hour commuting. However, the effects on employee fatigue and inter-intra-agency communication may be somewhat negative. /Author/

Tannir, AA ; New York State Department of Transportation Res Rpt. 129, Aug. 1977, 223 pp, 16 Fig., 43 Tab., 4 App.

41 177155 SOCIAL SERVICE AGENCY TRANSPORTATION SERVICES: CURRENT OPERATIONS AND THE POTENTIAL FOR THE INCREASED INVOLVEMENT OF THE TAXI INDUSTRY. This study analyzed the current transportation operations of social service agencies in three prototype communities in Texas: urban, rural, and rural with urban interface. The study was designed to identify and analyze the costs of direct provision of client transportation by social service agencies and to develop comparative cost indices for the same or similar classes of trips if delivered by alternative providers, including taxi operators, transit systems, and non-profit providers. Common classes of trips were identified, categorized by major operational characteristics and two sets of cost data were developed for trips directly provided by social service agencies to their own clients; actual costs and perceived costs. Actual cost figures, including expenses borne externally or through grants, were developed to allow policymakers to effectively evaluate the costs of direct transportation provision by social service agencies. Recognizing that Federal and state subsidies existed and would be used, perceived cost figures were developed to allow social service agencies to compare the advantages of alternative service provision to their out-of-pocket costs. While no one provider was found to be cost-effective for all types of client trips, it was found that some social service agencies were operating inefficient or ineffective transport systems and should actively consider an alternative provider. /Author/

Cox, WL Rosenbloom, SL ; Texas University, Austin Final Rpt. CFHR 3-10-76-1053-1F, Aug. 1977, 96 pp, 16 Tab., 4 App.; Sponsored by Texas State Department of Highways and Public Transportation and prepared in cooperation with DOT, Urban Mass Transportation Administration.; Contract Study 3-10-76-1053; ORDER FROM: NTIS

41 177357 CAR AVAILABILITY AND USAGE: A MODAL SPLIT MODEL BASED ON THESE CONCEPTS. This paper examines the influence of one variable, namely car availability, on modal split modelling. After a general introduction on the background to modal split and some of the problems with the existing approaches, a microlevel examination is made of the patterns of car usage during the day and during the week, disaggregated by purpose and household type. From this, the choice situation based on car availability is hypothesized and modelled by a category analysis approach. Certain policy measures are then input into the model, and the

changes in terms of modal split assessed. Finally the importance of car availability in modal split modelling is summarised. /Author/TRRL/

Bannister, D ; Reading University, England, (0305 5914) Monograph July 1977, 36 pp, 6 Fig., 16 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 230974)

41 177382 POLICY IN TRUE PERSPECTIVE. The article examines the purpose of transport policy and its consideration of the quality of life. It is argued that more attention should be directed towards analyzing the broader consequences of changes in transport policy and the nature of forces regulating them. A number of anomalies between present-day transport policy and practise are discussed covering public transport, car production, road construction, energy conservation and road safety. It is suggested that the parameters within which transport objectives are planned should be broadened and objectives set within the wider goals of society. /TRRL/

Hillman, M (PEP) *Built Environment* Vol. 3 No. 4, Dec. 1977, pp 284-285; ACKNOWLEDGMENT: TRRL (IRRD-231768)

41 178322 AN EVALUATION OF THE IMPORTANCE OF TRANSIT SERVICES TO MINORITY GROUPS IN SELECTED TEXAS CITIES. The results are presented of a survey which assessed the travel needs and other factors influencing the perceptions of minority (i.e., black) transit riders, determined their transportation needs, assessed the importance of public transit, and which attempted to quantify and measure the impact of their lower economic status and low level of automobile ownership on mobility. The findings tend to support the hypothesis that minority low income transit riders are constrained in their mobility by their economic predicament, the multiplicity of their travel behavior, and certain characteristics of the public transit system (e.g. no service to the suburbs where employment opportunities have moved from the central city in recent years). Policy implications and some suggested remedies, such as "feeder" subsidiary transit networks for implementing the findings are also presented.

Lede, NW ; Texas Southern University, (Tech Report 1054-1F) Final Rpt. Mar. 1978, 145 pp, 5 Fig., 23 Tab., 3 App.; Sponsored by Texas Department of Highways and Public Transportation and performed in cooperation with DOT, Urban Mass Transportation Administration.; Contract IAC (76-77)-1884; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297952/4ST

41 178740 ATTITUDES TOWARD TRANSIT SERVICE IN SMALL URBAN AREAS. An analysis of the attitudes of residents of several small urban areas toward transit improvement was conducted in an attempt to identify groups with similar preferences. The groups were described by several demographic characteristics: age, sex, auto owned. Two methods were used: a comparison of the preference rankings of each group across the cities; and discriminant analysis to identify groups with similar attitudes. The results indicate that there is some similarity within certain demographic groups, across the cities. However, respondents as a whole exhibited great similarity of preferred choices, irrespective of demographics or city. The two most preferred improvements were special vehicles for the handi-

capped and reduced fares for the elderly and handicapped. It is concluded that there exists some similarity in the attitudes towards transit improvement among the cities, but the development of any distinct groups proved impossible with the limited set of demographics available for use in this study. /Author/

Weiss, DL Neveu, AJ (New York State Department of Transportation) *Transportation Research Record* No. 661, 1978, pp 32-36, 3 Fig., 6 Tab., 3 Ref.; This article appeared in the Transportation Research Record N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

41 178750 TOWARD THE DEVELOPMENT OF AN ACCOMMODATION SERVICE POLICY. Continued public support for ever-increasing operating deficits of transit service demands that uneconomic services be curtailed. Nevertheless, a certain amount of service may be justified in terms of community welfare as "accommodation" to particular user groups—those which are dependent upon public transportation for mobility. This paper suggests that transit agencies no longer need make this judgment intuitively. A rigorous set of decision-making rules which test uneconomic routes or services for their efficacy in meeting community-welfare demands is presented. Under these rules, routes are successively evaluated against five criteria: operating ratio, effectiveness, intensity, captive riders and community welfare. A case study of the application of this algorithm to a medium-size transit system is presented to illustrate the method. The procedure, by specifying the threshold values for each parameter, may be adapted to the needs of any transit system—every segment of the system can be continually re-examined to determine whether the drain on financial resources is justified by the contribution made to community mobility. /Author/

Mauro, GT (United States Railway Association) Polin, L (Orange County Transit District) *Transportation Research Record* No. 662, 1978, pp 42-46, 1 Fig., 2 Tab., 3 Ref.; This article appeared in the Transportation Research Record No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

41 178751 FUTURE RIDERSHIP ON NEW YORK CITY'S RAPID TRANSIT SYSTEM (ABRIDGMENT). As a necessary step in the analysis of possible future requirements for the New York City rapid transit system a model to estimate ridership on the system is developed. Analysis of historic data reveals that annual ridership on the system is positively related to employment in the Manhattan Central Business District (CBD) and to the level of transit service, measured in car-miles; it is negatively related to the number of autos registered in New York City and to the transit fare, measured in constant dollars. These four variables explain 80 percent of the year-to-year variation in ridership. A relationship for peak hour ridership was also developed. The elasticity of demand with respect to CBD employment is found to be 0.75, with respect to fare, -0.25, with respect to service, 0.13. Statistically, the relationship of subway ridership to fares and to CBD employment is very strong. The relationship to auto registrations is weaker and to service weaker still. Because the model developed

relates to the economic health of the CBD and to the ownership of the automobile, it is particularly relevant to the current National goals of downtown revitalization and energy conservation. For example, it is shown that a resurgence in Manhattan CBD employment to 1969 levels would increase ridership by some 10 percent. Similar increases in transit would occur if a gasoline shortage eliminated the automobile as a CBD commuting mode. To explore alternative estimates of future ridership eight combinations of the independent variables are examined, including stable and declining CBD employment, stable and declining fares, and unconstrained and energy-constrained automobile ownership. The results suggest long-term changes in current ridership ranging from a 9 percent loss to a 34 percent increase. /Author/

Zupan, JM Pushkarev, B (Regional Plan Association) *Transportation Research Record* No. 662, 1978, pp 47-49, 1 Tab., 2 Ref.; This article appeared in the *Transportation Research Record* No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

41 179025 WHO PAYS THE HIGHEST AND LOWEST PER-MILE TRANSIT FARES? Transit fares paid per mile by different transit users are considered as the basis for uncovering inequities under present flat fare transit structures. Using data collected from a 1975 survey in Albany, N.Y. the ridership profile is studied to determine what inequities exist, and how they are related to rider characteristics. Automatic Interaction Detection (AID) and tabular summaries were used to determine the power of various independent variables to explain the variation of cost-per-mile. Variations in cost-per-mile for each individual variable are also studied. The key finding supports conventional wisdom: the short-trip, non-peak hour, non-work, inner city, urban rider who is generally less well off in society and is dependent on the bus as the only means of affordable transportation, is paying much more per mile for his bus trip than the longer trip, work trip, suburban rider. Thus, people requiring bus service most and least able to pay are being charged at the highest rate under current flat fare structures. /Author/

Leutze, CB Ugolik, WR ; New York State Department of Transportation Res. Rpt. 136, Feb. 1978, 35 pp, 5 Fig., 19 Tab., 9 Ref.

41 179040 COMPARISON OF ATTITUDES TOWARDS TRANSIT SERVICE IMPROVEMENTS IN SEVEN SMALL URBAN AREAS. An analysis of the attitudes of residents of several small urban areas towards transit improvement was conducted in an attempt to identify groups with similar preferences. The groups were described by several demographic characteristics: age, sex, autos owned, family size. Two methods were used: a comparison of the preference rankings of each group across the cities; and discriminant analysis to identify groups with similar attitudes. The results indicate that there is some similarity within certain demographic groups, across the cities. However, respondents as a whole exhibited great similarity of preferred choices, irrespective of demographics or city. The two most preferred improvements were special vehicles for the handicapped and reduced fares for the elderly and handicapped. It is concluded that there exists some similarity in the attitudes

towards transit improvement among the cities, but the development of any distinct groups proved impossible with limited set of demographics available for use in this study. /Author/

Weiss, DL Neveu, AJ ; New York State Department of Transportation Res. Rpt. 119, June 1977, 19 pp, 1 Fig., 7 Tab., 4 Ref.

41 179053 PUBLIC TRANSPORTATION OPERATING ASSISTANCE; EVALUATION AND OPTIONS. Since public transportation service provides numerous benefits to the economic, social, environmental, and transportation sectors of New York society, its continued availability to all New York residents is essential. The current transit operating assistance program has maintained fares and service levels, but has not generally provided for fare reductions or service increases. While adequate for 1974, the current program will fall short of needs for 1975. A number of inequities in the current program have been identified and solutions recommended. In 1973 Transit operating deficits (costs of operation minus revenues from riders) for New York State were about \$263 million for bus, subway, and commuter rail. Unless strong actions are taken to hold down rapidly rising costs of transit operations, these deficits are expected to rise to about \$642 million by 1975 and \$1,324 million by 1980, assuming that current fares and service levels are maintained. A continuing State program of operating assistance is recommended to insure the availability of public transportation service to all New York residents. The other recommendations are an incentive program to decrease transit ridership; and an incentive program to encourage and improve transit service. /Author/

New York State Department of Transportation Res. Rpt. 76, Jan. 1975, 59 pp, 5 Fig., 7 Tab., 1 App.

41 179385 PUBLIC ATTITUDES TOWARD TRANSIT FEATURES AND SYSTEMS. An attitudinal survey was made in the Dallas-Fort Worth metropolitan area in 1973-1974 to obtain representative public attitudes toward a comprehensive array of urban public transit features and systems. The sample population surveyed were demographically representative of the area. The questionnaire was structured such that the reasons for some of the attitudes could be deduced. It consisted of a series of questions about transit features or operational elements and a section about whole transit systems. An unbiased, informative audiovisual presentation accompanied the administration of the questionnaire, calling attention to various human factors, aesthetics, economics, and innovations regarding public transit. The questionnaire also incorporated a provision for quantification of attitudes by adding a question about money to be invested in a transit-system feature to the usual qualitative scale of answers. The importance scales were compared to the money-investment scales by using factor analysis, regression analysis, and other techniques. The five transit systems in the questionnaire were improved bus, dual rail, other-tracked vehicle, dual mode, and demand responsive (bus). This type of research is consistent with a contemporary philosophy of system development that emphasizes user-oriented techniques as an approach to enhancing public transit usage. /Author/

Haynes, JJ Fox, JN Williams, BT (Texas University, Arlington) *Transportation Research Record* No. 649, 1977, pp 42-48, 4 Tab.; This article appeared in *Transportation Research Record* No. 649, Preferences, Perceptions, and Market Segments in Travel Behavior.; ORDER FROM: TRB Publications Off

41 179522 PASSENGER TRANSPORT AND SOCIAL INTERVENTION. Reductions in public transport services, increased fares and highway congestion have led to three kinds of intervention: regulation and licensing, financial support and control and taxation of alternatives. The history and effectiveness of each method are discussed. The basic mechanism for controlling stage and express carriageway bus services is still the 1930 road traffic act, but the concept of cross-subsidisation between routes and runs at different times of the day is now difficult to apply. The 1968 act created new management structures for the bus industry and took large sections into public ownership. It also allowed both bus and rail services to be subsidised. The Railways Act 1974 altered the financial basis to bring the UK in line with EEC practice and widen the scope for the payment of grants to British Rail. Although capital grants became available for new transport infrastructure, it is now unlikely that wholly new commuter systems will be developed. It is concluded that the present decline in public transport usage and operation in the UK will continue because there is no determined application of positive subsidies or control or taxation of alternatives.

Harrison, GA *Chartered Institute of Transport Journal* Vol. 37 No. 9, Mar. 1977, pp 249-250; ACKNOWLEDGMENT: TRRL (IRRD 232082); ORDER FROM: Chartered Institute of Transport, 80 Portland Place, London W1N 4DP, England

41 179827 THROUGH THEIR EYES, PART II: THE PEOPLE SPEAK. A survey was conducted that examined the attitudes of American citizens towards transportation problems. The survey focused on determining the habits of Americans in using public and private transportation options. It was also designed to surface the population's general attitudes towards transportation problems, and how these problems related to other national issues. Specific attitudes and perceptions of individual transportation modes and frequently considered solutions and alternatives were also included. The report provides an overview of the survey results and explores some of their implications for the development of future transportation programs. The issues include a discussion of acceptable alternatives, the automobile, carpooling, public transportation, financing transportation improvements, the rail system and, a look at the future.

Department of Transportation Mar. 1978, 24 pp, 11 Tab.

41 179915 FACTOR ANALYSIS OF SOCIO-ECONOMIC VARIABLES IN TRIP GENERATION MODELS. Factor analytic study of the body of data obtained from home interview surveys show that only a few factors adequately represent the meaning explained by several socio-economic variables normally utilised in the development of trip generation models. Study involving males and females of different

occupational groupings and for various trip purposes has exhibited that there exist four basic traits identified as prosperity, stage in life cycle, facility for movement and location in the urban area explaining the meaning offered by various socio-economic indicators. Stepwise multiple regression analysis is performed on the same data to ascertain the variables that enter into the equations, and it is observed that there is a possibility for some of the correlated variables to enter into the final models. It is shown that when the independent variables are correlated with each other the factors present much more reliable and meaningful interpretation of the model formulation than normally possible through multiple regression techniques. /Author/TRRL/

Chari, SR Khanna, SK *Indian Roads Congress, Journal of Vol. 38 No. 1, July 1977, pp 65-90, 7 Tab., 21 Ref.*; ACKNOWLEDGMENT: TRRL (IRRD 232092)

41 180546 HIGHWAY AND FREEWAY PLANNING: SOCIAL AND ECONOMIC EFFECTS (A BIBLIOGRAPHY WITH ABSTRACTS). The reports cited in the bibliography deal with various socioeconomic facets associated with development of highways and arterial roads in urbanized and rural areas. Subjects include right of way acquisition and homeowner displacement, public attitudes, social impact on residential areas, economic aspects, and benefit cost analysis. Economic impacts are noted on local areas, such as Indian reservations, Appalachia, and villages. A number of local community studies are included for comparative purposes. (This updated bibliography contains 94 abstracts, 23 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service May 1978, 99 pp; Supersedes NTIS/PS-77/0442.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0449/5ST

41 180901 ECONOMIC IMPACTS OF BART CAPITAL AND OPERATING EXPENDITURES. The 71-mile Bay Area Rapid Transit (BART) system is the first regional scale rapid transit system to open in the United States in over 50 years. This technical memorandum assesses the economic impacts of BART's \$1.5 billion capital expenditures and \$60 million annual operating expenditures on the Bay Area's regional economy. The report documents the changes in regional output and employment in the nine-county San Francisco Bay Area, in each of 50 sectors, as a result of BART's expenditures. Two input-output models were developed of the San Francisco Bay Area, one for 1967 and one for 1974, to test these impacts. The models and the methodology for formulating them are described. BART's impact on employment opportunities during construction and its permanent staff is evaluated. The impact of BART's construction expenditures on construction wage rates within the region is also analyzed. (Color illustrations reproduced in black and white)

Grefe, R McDonald, A McLeod, D ; Metropolitan Transportation Commission, McDonald and Grefe, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT-BIP-TM-29-7-77, Oct. 1977, 190p; Prepared by McDonald and Grefe, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract

DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283061/OST, DOTL NTIS

41 182457 COMMUTING AND RESIDENTIAL RELOCATION IN THE METROPOLITAN FRINGE. In most empirical studies of commuting behaviour, commuting flows are seen to be responsive to the spatial patterns of residence and work sites. Drawing upon the residential relocation literature, it is suggested that the rates of change of these spatial patterns over time also affects the pattern of commuting. An empirical investigation is described which uses data on commuting flows from fringe areas into the Municipality of Metropolitan Toronto in 1964 and 1971. Recent residential relocation is found to have a significant effect on the level and direction of commuting. Further, this effect is found to be similar in 1964 and 1971 suggesting a stability in commuting behaviour. /Author/

Miron, JR (Toronto University, Canada) ; Toronto-York University Joint Program in Transp Res. Rpt. No. 49, No Date, 25 pp; ACKNOWLEDGMENT: Roads and Transportation Association of Canada, TRRL

41 183029 FLEX-TIME. The introduction for the Texas Department of Highways and Public Transportation came on August 10 when the Motor Vehicle Division initiated Flex-Time for some employees. Basically, Flex-Time permits an employee to put in an eight-hour day by selecting his individual working hours within an overall time. Flex-Time advantages, according to industry, include increased productivity and decreased absenteeism. /GMRL/

Warner, B (Texas State Department of Highways & Public Transp) *American Assn of State Hwy & Transp Off Quarterly* Vol. 56 No. 4, Oct. 1977, 8 pp

41 183129 THE SOCIAL AND ECONOMIC COSTS OF NOT HAVING PUBLIC TRANSPORTATION. The recent energy problems, environmental concerns and traffic congestion associated with auto-oriented transportation have revived interest in public transit. However, the overall costs of not having public transportation often are hidden or "shadow" costs which are not fully explored in decisions to obtain, or to discontinue, transit service. A means of further quantifying these distributive social and economic costs is necessary, so that city and state transportation decisionmakers can more ably determine the transit needs of specific groups and the levels of public transportation service required. /GMRL/

Guseman, PK McFarland, WF (Texas Transportation Institute) *Texas Transportation Researcher* Vol. 12 No. 1, Jan. 1976, pp 3-5

41 183137 TRANSPORTATION ECONOMICS AND PUBLIC POLICY: WITH URBAN EXTENSION. This book tries to integrate the three main aspects of public sector transportation analysis and decision-making-pricing theory and policy, cost theory and measurement, and investment choice-and to develop policy guidelines on the basis of welfare maximizing principles and real world complexities and constraints. Numerous empirical examples and case studies are provided to illustrate applications and suggest ways to bridge the gap between everyday data

limitations and the theory and concepts presented. Extensions to some aspects of urban transport economics and general urban economics are contained in Part 4. /GMRL/

Abouchar, A (Toronto University, Canada) ; Wiley-Interscience 1977, 326 pp;

41 183945 FACTORS AFFECTING MODAL CHOICE DECISIONS IN URBAN TRAVEL. This paper develops some further tests of the effects of prices and disaggregated time-related characteristics of public versus private transportation on individual modal choice behavior, as well as factors which differentiate households according to auto availability, income and occupational status. Parameter values pertain to a travel survey conducted in five parts of the Buffalo metropolitan area. Estimates are obtained by using logit and probit estimation techniques.

Williams, M (Northern Illinois University, DeKalb) *Transportation Research* Vol. 12 No. 2, Apr. 1978, pp 91-96, 29 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

41 184312 BUS PATRONAGE: CAR OWNERSHIP IS IMPORTANT. This article is a response to an article by Heggie and Bailey (see IRRD no: 224579) in which they asserted that "increasing car ownership has not contributed to declining public transport patronage in the way that is normally assumed". The author feels that Heggie & Bailey's analysis omitted the important factor of the substantial arresting effect of increasing real income on falling numbers of stage passenger journeys. Further evidence needs to be found to indicate that overall, bus passengers are not very responsive to fares changes. The unexplained downward trend in stage bus usage, and the similarly unexplained upward trend in car ownership require further investigation in the author's view. /TRRL/

Lowe, SR (Hammersmith London Borough) *Surveyor - Public Authority Technology* Vol. 151 No. 4496, Jan. 1978, pp 19-2, 3 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 232988)

41 184341 CONSUMERS AS PARTICIPANTS IN TRANSPORTATION PLANNING. Legal requirements for public participation in transportation planning increase the opportunity for transportation consumers to influence the design of systems they will use. However, the implementation of these requirements may also increase the possibility that system design will be dominated by the opinions of outspoken groups. This study postulates that public participation is biased, and seeks to test this proposition using data from an Oregon survey consisting of approximately 2400 respondents. Using automatic interaction detector and cross tabulation analyses, different participation rates were uncovered for groups identified by demographic, attitudinal and behavioral variables. /Author/TRRL/

Shary, PB Brown, DJ Becker, BW (Oregon State University) *Transportation (Netherlands)* Vol. 6 No. 2, June 1977, pp 135-148, 2 Fig., 6 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233296)

41 184342 THE IMPACT OF CAR AVAILABILITY ON URBAN TRANSPORTATION BEHAVIOR. Travel demand estimates that derive from the traditional sequential process often derive their values from some consideration of household car ownership. This variable may be misleading in that not all who live in households with cars may have access to a car; conversely, not all in households without cars are captive solely to other modes. It is proposed that another variable, car availability, be used in planning studies, to provide more accurately a description of an individual's access to a car. In a recent study, this variable took a two-dimensional form. One dimension considers how the car is available (driver, rider, or not at all) and the other describes the frequency with which it is available (from always to never). From this description, it is noted that a small percentage of people in car owning households have little access to cars, while a significantly high percentage of those in autoless households do have access to cars a great deal of the time (albeit as passengers only). The constrictions of availability affect the frequency with which someone will do a set of activities, and the mode by which he travels to his activities. Distinctions are shown to exist between car owners, non-car owners, those to whom a car is available and those to whom it is not, using activity frequency as a discriminator. It is seen that as car becomes less available a greater percentage of trips are used for fewer activities. Further as car becomes less available the selection of modes for these activities becomes more apparent. Car is used exclusively for a few selected purposes, then there are trade-offs to bus and walking depending on both car availability and trip purpose. No group then can be thought of as singularly transit captive. Comparisons are made between levels of availability and also between availability and ownership. /Author/TRRL/

Berechman, J Paaswell, RE (State University of New York, Buffalo) *Transportation (Netherlands)* Vol. 6 No. 2, June 1977, pp 121-134, 1 Fig., 3 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233297)

41 184374 FACTORS INFLUENCING THE INDIVIDUAL'S CHOICE OF TRAVEL MODE [Trafikanter val av faerdmedel-faktorer som bestammer valet]. The aim of this study was to determine the factors most strongly felt by individuals in their choice of travel mode within a city (Malmoe in Sweden), and by motorists in their choice of parking place. The problems were analysed by the use of behavioural models (logit models), of which several were systematically tested. Nearly 5000 people gave detailed accounts of their behaviour during 24 hours, and 12000 single trips were covered in this way. Each trip chain contains 19 explanatory variables, such as: bus waiting time, bus interchange time, weather index, number of cars in the household, straight line distance, the scarcity of parking places, cost of parking, running cost car, cost bus etc. Detailed attention is also given to the purpose of the trip. The author's main findings are that bus waiting time, bus interchange time, cost of parking and difficulties in finding parking place appear to be factors of importance when an individual makes his mode choice. Finally, comparisons are made with other studies covering similar problems conducted in cities in Europe and USA. The report comprises an English summary of ten pages. /TRRL/ [Swedish]

Wallstroem, C ; Lund University of Technology, Sweden Thesis Bulletin 20, 1978, 147 p., 12 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 233067), National Swedish Road & Traffic Research Institute

41 184593 SOCIAL DIFFERENTIATION AS A KEY TO ASSESSING THE SOCIAL EFFECTS OF TRANSPORT RELATED CHANGES. Social impact of (1) a change in accessibility to specific services and/or (2) disruption or community severance due to transport and related changes, will vary with individual and household characteristics: command of resources, class background, ethnic background, stage in life cycle, lifestyle orientation, etc. Census data on such characteristics are manipulated by multi-variate analysis to explore areal differentiation of Melbourne at CCD level and to yield frameworks for (1) initial assessment of impact of projects and (2) monitoring of potential "trouble spots". Allied with other techniques of social analysis, these frameworks can assist policy and project evaluation, and the planning of impact amelioration. /Author/

King, RJ (Melbourne University, Australia) ; Australian Road Research Board, (0 86910 3601) Monograph APR No. 83, 1978, 65 p., Figs., Tabs., 22 Ref., 1 App.; ACKNOWLEDGMENT: Australian Road Research Board; ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

41 184647 ENVIRONMENTAL IMPACTS OF BART AND PEOPLE'S RESPONSES. Results are intended for use in Federal transit policy making, in improvement of transit system design, and in simplification of the transit planning process. The study identified specific combinations of BART attributes and characteristics of its surroundings responsible for impacts. Adverse impacts included noise from trains on aerial trackways in quiet neighborhoods and the inconvenience and danger of large volumes of traffic and on-street parking by BART patrons in residential areas near some stations. Environmental benefits were largely visual, arising from the system's landscaping, linear parks under some of its aerial tracks, and encouragement of downtown street and pedestrian environments.

Graff, DL (Gruen Associates, Incorporated) Knight, RL *ASCE Journal of Transportation Engineering* Vol. 104 No. 5, Sept. 1978, pp 713-730, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

41 184952 EFFECTS OF SUBWAYS ON URBAN FORM AND STRUCTURE. A general equilibrium model was built which shows how the locations of employment and residences are related to alternative transportation systems. The model was applied to different size cities. The analysis suggests that the construction of a subway system will not necessarily result in the revitalization of the central business district (CBD) or in the reversing of the trend toward suburbanization. Although land rent is generally higher in the city without subway systems than in the city with subway systems, the steeper rent gradient at the peripheries of the former, along with other findings, suggest that the rate of suburbanization of the city without subway systems is not significantly higher than of the city with subway systems.

Kim, TJ *Transportation Research* Vol. 12 No. 4, Aug. 1978, pp 231-239, 7 Fig., 5 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 235533); ORDER FROM: ESL

41 185632 APPLICATIONS OF THE NEW ALTERNATIVE FUTURES PLANNING CONCEPT. Instead of using a point estimate of the future where all parameters have unique values, the method of alternative futures planning suggests that plans be developed based on several plausible futures. This paper discusses the concept, mentions some national level applications, and describes three varied local and regional applications. The first application description is of the long-range transportation system plan being done in Northeastern Illinois. Three futures for the region instead of one are being studied. These multiparameter futures are systematically defined. The second description is of a rail-network optimization study. Here future capital budgets and mode choices are being combined to define nine alternative futures. The last application described is an evaluation of the proposed discontinuation of service on a rapid-transit branch line. The branch is located in an area of urban decline which does, however, have the potential for massive redevelopment. The discontinuation was evaluated under various population futures for the area. After detailing these applications, the paper stresses the commonalities in the applications of the concept. The concept is not only viable but essential to decision making under an uncertain future. (ERA citation 03:040508)

Bernard, MJ, III ; Argonne National Laboratories, Department of Energy 1978, 23 p., 16 Ref.; Contract W-31-109-ENG-38; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; CONF-780138-1

41 185780 EXECUTIVE SUMMARY: BENEFIT-COST EVALUATION OF AN INTRA-REGIONAL AIR SERVICE IN THE BAY AREA AND A TECHNOLOGY ASSESSMENT OF TRANSPORTATION SYSTEM INVESTMENTS. The benefits and costs that would result from an intra-regional air service operation in the San Francisco Bay area were determined by utilizing an iterative statistical decision model to evaluate combinations of commuter airport sites and surface transportation facilities in conjunction with service by a given commuter aircraft type in light of area regional growth alternatives and peak and off-peak regional travel patterns. The model evaluates such transportation option with respect to criteria of airline profitability, public acceptance, and public and private non-user costs. In so doing, it incorporates information on modal split, peak and off-peak use of the air commuter fleet, terminal and airport costs, development costs and uses of land in proximity to the airport sites, regional population shifts, and induced zonal shifts in travel demand. The model is multimodal in its analytic capability, and performs exhaustive sensitivity analysis.

Haefner, LE ; Washington University, Seattle Tech Rpt. NASA-CR-152154-1, Mar. 1978, 37 p.; Grant NSG-2170; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-28988/1ST

41 186105 SOCIAL IMPACTS OF BART ON BAY AREA FAMILIES AND LIFE STYLES. The report describes the impacts of BART upon the families and life styles of Bay Area BART users. It evaluates the impacts of BART upon nine dimensions of family and life style routines. It also reports BART impacts on the experience of the region and riders' perceptions of safety and well being in the public space. Policy implications of the research findings are also included. (Color illustrations reproduced in black and white)

Minkus, D Polk, K ; Metropolitan Transportation Commission, Jefferson Associates, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT/BIP/TM-21-6-77, Nov. 1977, 146 p.; Report on BART Impact Program. (Bay Area Rapid Transit). Prepared in cooperation with Jefferson Associates, Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286509/5ST, DOTL NTIS

41 186226 STUDY OF HOUSEHOLDS' LOCATION DECISIONS. The paper examines BART's effects on households' location decisions in San Francisco's Mission District, suburban Walnut Creek, and East Oakland. In each study area, randomly selected households that had moved in the 1975-76 period were interviewed by telephone to determine factors affecting moving and location decisions, the relative importance of BART in neighborhood choice, current and prior commuting patterns, workplace location, and socio-economic characteristics of respondents. Reasons for moving from one neighborhood to another are summarized, and BART's role in the decision-making process is described, with particular attention to the issue of who is influenced by BART. A multiple regression model explaining the importance of BART in residence choice in terms of workplace location, current and prior BART use, work trip length, occupation, age, income, ethnicity, and household composition also is presented. The paper closes with assessment of policy implications. (Color illustrations reproduced in black and white)

Dyett, MV Fajans, MH Falcke, C ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development Work Paper DOT/BIP-WP-47-5-78, Feb. 1978, 94 p.; Report on BART Impact Program, Land Use and Urban Development Project. Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287798/3ST, DOTL NTIS

41 189463 THE COSTS OF URBAN TRAVEL IN CANADA [Les couts des déplacements urbains au Canada]. This report presents quantitative estimates of the costs of urban travel, including both private out-of-pocket costs and social costs, such as congestion, accidents, energy depletion and the provision of those roadways and parking facilities whose costs are not borne by the individual. The trip-maker's value of time is also taken into account. The estimates are based on conditions in Canadian urban areas in 1975. A

comparison is made between the costs of trips by automobile and by transit for 4 specific cases illustrative of typical urban trips. In general, the total costs of using transit are found to be below those of the automobile for trips into or out of the urban core during peak periods. For trips not oriented toward the core area or for trips in non-peak periods, transit costs are still below those of the automobile, but only if no consideration is given to travelers' time. /Authors/

Frayne, A Kagan, F ; Transport Canada Research and Development Centre TP 1594, Aug. 1978, 67 p., 8 Fig., 15 Tab., 8 Ref., 5 App.; In both French and English.

41 190486 STUDY OF THE HOUSING INDUSTRY. BART IMPACT PROGRAM. The working paper addresses BART's effects on the housing industry in nine areas: Daly City-Pacifica, Mission District, Fruitvale, Walnut Creek, Hayward, Fremont-Union City, Pittsburg-Antioch, Richmond, and East Oakland. Changes in housing supply and demand during the period 1962-76 are analyzed using building permit records, bank loan disclosure statements, BART Passenger Profile Survey data, and aerial photographs, supplemented by key informant interviews with residential developers, apartment managers, planning directors, and others knowledgeable about the housing market. The relationship between these findings and other topics yet to be addressed in the Land Use and Urban Development Project also is examined. (Color illustrations reproduced in black and white)

Dyett, MV Castel, GH ; Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-37-5-77, Apr. 1978, 70 p.; Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288676/0ST

41 190487 STUDY OF EMPLOYERS' LOCATION DECISIONS. The working paper examines BART's influence on employers' location decisions in the three-county BART service area. Individuals who had participated in or who were familiar with their firm's location decisions were interviewed, and relevant interviews from other studies of the BART Impact Program were reviewed. Specific issues addressed include BART's direct and indirect effects on location decisions, BART's influence on centralization or decentralization of businesses and industries, and the extent to which firms have located near BART in order to gain visual exposure. (Color illustrations reproduced in black and white)

Merchant, JP ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-46-5-78, Mar. 1978, 42 p.; Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288677/8ST

41 190914 TRANSPORTATION CASE STUDIES OF CITIZEN PARTICIPATION. The report demonstrates the current concept of citizen participation in transportation by an analysis and evaluation of four multi-modal transportation projects that have involved citizen participation programs. The selected projects are: (1) Proposed Pulaski Expressway, which demonstrates an extensive citizen participation effort in the development of the Environmental Impact Statement for the planned urban freeway link; (2) New York-Philadelphia AMTRAK Service, which illustrates the citizen participation efforts in formal public hearings; (3) West Chester Pike Bus/Car-pool Lane, which originated from a mandate of the Clean Air Act and involved citizens in a project feasibility determination for a plan that would benefit a metropolitan downtown area at the expense of suburban inconvenience; and, (4) Lindenwold High Speed Line, which involved a voluntary citizen participation process for a fare increase proposal.

Schuster, JJ Balog, JN Humbert, RJ ; Villanova University, Department of Transportation Final Rpt. DOT/RSPD/DPB50-78/19, IFTS-77, July 1977, 261 p.; See also report dated March 76, PB-265052.; Contract DOT-OS-40098; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289982/1ST

41 191033 STUDY OF RETAIL SALES AND SERVICES. The study focuses on how BART is influencing the distribution and volume of retail sales in the BART service area. Shoppers in six retail areas were surveyed to ascertain how their shopping patterns had changed since BART service began. Retailers throughout the BART service area were interviewed to determine whether BART influenced their location decisions or retail sales. Sales tax data in seventeen retail areas were analyzed to search for sales trends associated with proximity to BART. (Color illustrations reproduced in black and white)

Merchant, JP Gussman, V Falcke, CO ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-50-5-78, Apr. 1978, 84 p.; Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291443/0ST, DOTL NTIS

41 193969 PERCEIVED AND ACTUAL COSTS OF OPERATING CARS. The perception that drivers have of car operating costs is an important factor in determining modal split characteristics. Theoretical figures derived from discriminant analysis models suggest that drivers perceive only petrol costs, but this has not been corroborated by detailed surveys. This report examines in detail perceived and actual journey to work petrol costs of a sample of London commuters. The perception is also examined of related factors, such as petrol consumption and distance, in an attempt to throw some light on the perception mechanism itself. /Author/TRRL/ Malecki, AM (Metra Consulting Group Limited) *Transportation (Netherlands)* Vol. 7 No. 4, Dec. 1978, pp 403-415, 2 Fig., 4 Tab., 5 Ref.; AC-

KNOWLEDGMENT: TRRL (IRRD 237690)

41 194054 SOCIAL AUDIT OF PUBLIC PASSENGER TRANSPORT [Sozialbilanz im Oeffentlichen Personennahverkehr]. The customary methods of cost analysis undertaken by public utilities, with its total concentration on profit, provides only a limited perspective of the actual operating factors. Thus, in these calculations, the public utility aims of the public transport operator are not expressed. For this reason, an approach was devised for an actual public transport authority, which is termed "social audit". In addition to general discussions and possible expressions for this special authority, the authors present economic cost benefit analyses and output-orientated evaluations. /TRRL/ [German]

Wassmuth, H Ohlms, N (Stadtwerke Wiesbaden Ag) *Internationales Verkehrswesen* Vol. 29 No. 4, July 1977, pp 217-223, 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 307524), Australian Road Research Board

41 194130 TRANSPORTATION ENERGY SCENARIO ANALYSIS TECHNICAL MEMORANDUM NO. 2: HISTORICAL RATES OF CHANGE IN THE TRANSPORTATION STOCK. This report examines historical rates of change in the transportation stock as a result of the introduction of new or improved technologies. Organized by mode, it highlights selected technological changes in motor vehicles (including automobiles, trucks, and buses), light and heavy rail transit, rail passenger and freight systems, commercial and general aviation, merchant shipping, and pipeline systems. As appropriate, these improvements are related to salient features of the technology under examination, the transportation system into which it was introduced, and general social or economic conditions. As a tool for long-range planning in the area of technology commercialization, the document is intended to provide background material against which to gauge maximum and likely rates of change (or acceptance) that may be anticipated following the introduction of new or greatly improved transportation technologies.

Millar, M Bernard, MJ, III ; Argonne National Laboratories, Department of Energy ANL/EES-TM-6, Sept. 1978, 42 p.; Contract W-31-109-ENG-38; ACKNOWLEDGMENT: Energy Research Abstracts, NTIS; ORDER FROM: NTIS; ANL/EES-TM-6

41 194468 TRAFFIC PLANNING IN AN ENERGY CRISIS. STAGGERING OF WORKING HOURS IN LARGER URBAN AREAS [Trafikplanering foer energikris. Spridning av arbetstider i stoerre taetorter]. In the event of an energy crisis the public transport system has to be able to cope with the increase in work trip demand from people that normally use their own car to work. The estimated output increase potential of the public transport system is 30%, which is far below the expected 300% increase in work trip demand in an energy crisis. The one remaining possibility is to spread the travellers' working hours. This paper describes and presents the results of a study that was conducted in the city of Soedertaelje, Sweden. The purpose of the study was to determine the energy savings potential of spreading the travellers' work hours. A matrix of the total number of work trips was

obtained from the public census, and the distribution of work hours was found from a questionnaire that was sent to firms in the area. The utilization and the reserve capacity of the public transport systems was obtained through observations. It was found, that by increasing the output by 30%, and changing the work day by half an hour for 3000 of the city's 20000 employees, it is possible to reduce the consumption of energy needed for work trips by 65%. /TRRL/ [Swedish] Transportnaemnden Monograph 1978, 67 p., Figs., 13 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 238348), National Swedish Road & Traffic Research Institute

41 194488 MOBILITY FOR MAN AND SOCIETY. DOCUMENTATION. The symposium included the presentation of papers, commentaries and roundtable discussions. The topics covered include: Mobility and Imagination; Patterns of Mobility Among Hunting, Gathering People-An Ecological Comparative study of Bushmen and Pygmies; Mobility and Today's Technological Civilization; Searching Stable Parameters for the Control of Human Mobility; Characteristics of Excessively car-oriented people; Mobility and Human performance; Behavioral Patterns of Car Use in Relation with Residential Choice; Size, Density and Distribution of a City as an Environment of Mobility; Mobility in Present-Day Society; Seeking Stability in a Living Filter Man-Auto System; The Economic Aspect of Mobility Needs; Planning and Mobility; Higher Cost and Higher Mobility; Streets Without Cars; A Few Thoughts on Mobility in Urban Transportation Planning; Mobility for Humanity; The Lost World of Transportation; Mobility and Immobility; Mobility, Environment Man.

International Association of Traffic & Safety Sci 1978, v.p., Figs., Tabs.; From the IATSS Symposium on Traffic Science 1978 (September 20-22, 1978, Tokyo, Japan); ORDER FROM: International Association of Traffic & Safety Sci, 6-20,2-chome, Yaesu, Chuo-ku, Tokyo 104, Japan

41 194533 FLEXTIME TRAVEL CHOICE: A LITERATURE REVIEW AND FRAMEWORK FOR ANALYSIS. The study outlined in this paper will examine several aspects of time related travel demand. The research has been motivated by a desire to better understand the temporal aspects of transportation peaking, and through this understanding, to offer some remedial strategies to lessen peakings' adverse impacts. The study has been divided into two principal research areas--temporal management and temporal response. Temporal management implies the use of variable work hours programs such as flextime, staggered work hours, and the four-day work week for the purpose of congestion relief. Temporal response refers to the ways that travelers may respond to changes in the transportation system. The remainder of the paper documents the progress of the research in the area of temporal management and variable work hours. It reviews previous city-wide studies (New York City, Ottawa, Toronto, Vancouver, and others) and employer programs. It concludes with a description of the direction of future research.

Jovanis, PP May, AD ; California University, Berkeley UCB-ITS-WP-70-1, Jan. 1979, 56 p., Figs., Tabs., Refs., 2 App.; Working paper for the research project: Temporal Demand in Freeway Corridors. Sponsored by the California Depart-

ment of Transportation.

41 194617 THE ROLE OF CITIZENS IN IMPLEMENTING TRANSPORTATION PRICING. This is a report of a conference session dealing with the role of citizens in implementing transportation pricing. The session resulted from activities of the Committee on Citizen Participation to help implement research findings or transportation policies by improving general awareness and understanding of the research or policy. Schemes for pricing transportation facilities are summarized and reviewed here. For example, the Urban Mass Transportation Administration's experience with pricing to control traffic in several cities is summarized. Pricing approaches considered include parking licenses, morning peak surcharges, parking space charges, and revenue taxes. Experience indicates that these concepts are not now generally accepted or implementable. In Berkeley, an investigation to identify locations where pricing might alleviate traffic congestion failed for several reasons: public misunderstanding, uncertainty by the city council, and sponsorship by a non-local organization. In Madison, Wisconsin, some of the impacts of road pricing were estimated and analyzed. Failure of road pricing schemes to proceed apparently resulted from lack of understanding, especially by people who would have benefitted from reduced traffic in their neighborhood or better transit service. The session identified factors contributing to the demise of pricing schemes and made suggestions for implementing similar adventures in the future. For example, costs imposed by road-pricing are more likely to stimulate opposition than the benefits are to stir up positive response. /Author/

Transportation Research Circular No. 205, May 1979, 11 p. ORDER FROM: TRB Publications Off

41 194619 THE BERKELEY EXPERIENCE: "POST MORTEM". An UMTA transportation pricing study was approved by the Berkeley City Council but was never implemented due to vehement public opposition. There appears to be three factors leading to the very abrupt halt of the study: misunderstanding three factors leading to the very abrupt halt of the study; misunderstanding by the general public of the concept, the City Council was surprised by the sudden negative reaction, and lack of time to develop local grass roots support.

Olson, ML (Urban Institute) *Transportation Research Circular* No. 205, Mar. 1979, pp 3-4; This paper appeared in *Transportation Research Circular* No 205, *The Role of Citizens in Implementing Transportation Pricing*; ORDER FROM: TRB Publications Off

41 194620 THE MADISON EXPERIENCE. Members of several citizens commissions who in 1976 had voted not to continue a pricing study in Madison, Wisconsin, were interviewed a year later about the reasons for their decision. The reasons tended to revolve around such factors as the image of the city (i.e. "toll booths in the streets") questions of equity, concern about bus operating costs, and adverse comments from constituents. Apparently those in support of the idea felt less strongly about it than those opposed; the former made little effort to generate community support, leaving opponents with little to do to stop the studies.

Spielberg, F (Urban Institute) *Transportation Research Circular* No. 205, May 1979, pp 4-5; This paper appeared in *Transportation Research Circular* No. 205, The Role of Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

41 194621 CONCLUDING COMMENTS ON THE BERKELEY AND MADISON EXPERIENCE. This presentation briefly enumerates some of the lessons learned from the Berkeley and Madison experiences. Discuss the concept with community leaders and local media representatives good at communicating potentially controversial ideas on a one to one basis before holding larger meetings to avoid public misunderstandings. Have a good ombudsman or "lightning rod person" to answer citizens' questions. Be open to making changes in a concept as a result of feedback from the community. In addition to the usual citizen participation and transportation literature, policy analysis journals have had articles on Washington based health, education and housing projects which flounder on the local level which would be useful.

Higgins, T (Urban Institute) *Transportation Research Circular* No. 205, May 1979, pp 5-6; This paper appeared in *Transportation Research Circular* No. 205, The Role of Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

41 194622 A POLITICAL SCIENTIST'S COMMENTARY ON THE BERKELEY/MADISON EXPERIENCE. The experience with transportation pricing in Berkeley and Madison is a classic example of the political phenomenon whereby people are more likely to respond to sudden or large negative direct impacts (e.g. the inconvenience to motorists caused by a pricing scheme) than to long-term indirect benefits (e.g. better air quality or energy conservation). For this reason, the outlook is bleak for elected officials ever implementing pricing schemes.

Howitt, AM (Harvard University) *Transportation Research Circular* No. 205, May 1979, pp 6-8
This paper appeared in *Transportation Research Circular* No. 205, The Role of Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

41 194623 PANEL DISCUSSION OF THE CONFERENCE SESSION AT THE 57TH ANNUAL TRB MEETING. Public participation must be initiated during the earliest stages of the program planning. The existing organizational structures should be employed as a mechanism for accomplishing meaningful citizen involvement and great care should be taken to avoid a segmented concept in the introduction of a new project. Any proposal as complex as transportation pricing should be incorporated with regional or areawide planning. It is difficult to justify radical new concepts without first relating the benefits of such concepts to a total transportation package. The study presented as a great deal of merit; however, it should now be obvious that implementation of such projects will be extremely difficult in the absence of public support. /Author/

Robb, E (Virginia Department of Highways and Transportation) *Transportation Research Circular* No. 205, May 1979, p 8; From *Transportation Research Circular* No. 205, The Role of

Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

41 194624 PANEL DISCUSSION OF THE CONFERENCE SESSION AT THE 57TH ANNUAL TRB MEETING. In the opinion of the author the fate of pricing proposals in Madison and Berkeley stems from a failure to devote sufficient resources to consider, before the fact, the behavioral response of communities, especially in relationship to such sensitive issues as transportation planning.

Davis, S (Atlanta University) *Transportation Research Circular* No. 205, May 1979, p 8-9; From *Transportation Research Circular* No. 205, The Role of Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

41 194625 PANEL DISCUSSION OF THE CONFERENCE SESSION AT THE 57TH ANNUAL TRB MEETING. It is felt that a reason for the lack of public support for pricing schemes in Madison and Berkeley was a confusion of planning with implementation. Citizen participation is an integral part of the planning process, not a public relations tool to sell a preconceived plan. The pricing schemes were imposed from above, rather than growing out of the citizen participation activities.

Hixson, R (Federal Aviation Administration) *Transportation Research Circular* No. 205, May 1979, pp 9-10; From *Transportation Research Circular* No. 205, The Role of Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

41 196003 EFFECTS OF TRANSPORTATION SERVICE ON AUTOMOBILE OWNERSHIP IN AN URBAN AREA. A disaggregate automobile ownership choice model is applied to estimating the elasticities of automobile ownership with respect to household income, fixed costs of automobiles, travel times on urban roadways, and public transit service in a case study urban area. Focus is on the aggregate stock of automobiles held by all households and on the distribution of households owning zero, one, two, and three or more autos. Automobile ownership behavior of sociodemographic segments in the total population is also compared. Results indicate that the total number of automobiles owned is approximately three times more sensitive to household income than to automobile travel times. Furthermore, automobile ownership is twice as sensitive to automobile travel times as it is to public transit travel times. Finally, the automobile ownership decisions of inner-city dwellers and older families are more sensitive to all of these factors than are the decisions of suburban dwellers and younger families. It is demonstrated that transportation policies affecting urban traffic efficiency and public transit service are likely to impact on automobile ownership and these impacts will vary with geographical location and population sociodemographic segment. /Authors/

Golob, TF (Consultant) Burns, LD (General Motors Research Laboratories) *Transportation Research Record* No. 673, 1978, pp 137-145, 6 Fig., 13 Tab., 19 Ref.; This paper appeared in *TRB Research Record* No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

41 196421 SHOPPING DISTRICT TRANSPORTATION STUDY. The central portion of Bergen County, New Jersey, is unique in that it contains one of the highest concentrations of suburban retail commercial activity in the nation. To develop a recommended public transportation program for the shopping centers, a five step work program was performed. The first step involved a description of the existing transportation setting. This work element involved a review of previous studies as well as an extensive data collection effort including the conduct of numerous surveys and field observations. The next step was the development of service standards to assess the adequacy of existing transit services. These yardsticks were then used to pinpoint deficiencies in existing intermall transit services. The third study step was the formulation of several alternative transit plans and an examination of these schemes on the basis of operating performance and other relevant criteria. As a result of the prior task, a recommended plan was identified in sufficient detail to assure its implementation. The last step involved the preparation of a report describing not only the study findings and conclusions, but also the data collection and analysis techniques. The subsequent chapters of this report represent the performance of this last study effort. /Author/

Simpson and Curtin, Incorporated, Tri-State Regional Planning Commission, Urban Mass Transportation Administration Final Rpt. UMTA-IT-09-0037, Mar. 1978, 60 p., 22 Fig., 34 Tab., Apps.; ACKNOWLEDGMENT: UMTA

41 196495 TEMPORAL STABILITY OF MODAL CHOICE MODELS. A number of methods for evaluating the temporal stability of travel demand models are outlined. Several of the methods are applied to disaggregate modal choice models for CBD work trips in Detroit for 1953 and 1965. Graphical analysis is used initially to evaluate the probability of using the bus, auto driver, and auto passenger modes as a function of travel time difference and autos owned. Based on the graphical analysis, binary choice models using linear regression are developed and tested statistically for temporal stability. Chow's tests for the equality of two sets of regression coefficients confirms the graphically observed lack of temporal stability. Improved specification of the auto driver model by including the variable, number of transit captives, does result in temporal stability. The lack of excess time and cost variables limit the generality of conclusions based on the models developed. Compatible data for a third time period are necessary to test fully the temporal stability assumption.

Smith, RL, Jr (Wisconsin University, Madison) *ASCE Journal of Transportation Engineering* Vol. 105 No. 3, May 1979, pp 263-278, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

41 196670 APPLICATIONS OF VARIABLE WORK HOURS IN THE TWIN CITIES METROPOLITAN AREA. ABRIDGMENT. This paper describes a study conducted in 1976 to investigate the application of variable work hours in the Minneapolis-St. Paul metropolitan area. Although the primary focus was on the activity, travel, and transit routes of the central business district, suburban applications were also considered. The specific objectives of the research were to identify: possible benefits with respect to

transit operations, the degree to which traffic congestion could be decreased, any impacts on high-occupancy vehicle use, and institutional impediments to the implementation of variable work hours strategy. From the results of the study, it was concluded that: an extensive compulsory staggered work hours program has the potential to reduce the size of the bus fleet required and to reduce traffic congestion in the Twin Cities area; an areawide variable work hours program in a central business district characterized by diverse activity would be extremely difficult to implement under current conditions without substantial employee incentives or government dictate; a variable work hours program may cause a mode shift in work trip travel away from public transit, car pools, and van pools; and selective, individual-employer programs of variable work hours to reduce local traffic congestion or better schedule transit service appears to have the best chance for current implementation in the Twin Cities metropolitan area.

Scheuernstuhl, GJ (Denver Regional Council of Governments) Beltt, CZ (Barton-Aschman Associates, Incorporated) *Transportation Research Record* No. 686, 1978, pp 22-24, 3 Fig.; This paper appeared in TRB Research Record No. 686, Effects of Transportation on the Community.; ORDER FROM: TRB Publications Off

41 196809 THE MAIN FUNCTIONS OF TRANSPORT [Les grandes fonctions du transport]. Transport is not an end in itself: it is necessarily linked to another activity (work, leisure, culture, commerce, family life). Furthermore, each journey is composed of a chain of successive elementary transport steps. Transport planning involves the linking of the options constituting the transport policy to the socio-economic objectives being pursued. From the point of view of the policy choices which are the elements of a real transport strategy, the author successively studies: urban transport, inter-urban public transport, transport and business logistics, transport and foreign trade. /TRRL/ [French]

Frybourg, M *Annales des Ponts et Chaussées* No. 2, Mar. 1977, pp 23-32, 2 Tab., 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 105355), Central Laboratory of Bridges & Highways, France

41 196824 POTENTIAL MARKET AND DEMAND FOR ELECTRIC VEHICLES. The potential demand for electric vehicles as an alternative to the conventional car must be considered within the constraints set by their performance characteristics, particularly their limited range. Thus, the potential demand which they might satisfy would be for shorthaul intra-urban trips. Urban dwellers represent a major proportion of the Australian population; nevertheless, they are responsible for a significant proportion of non-urban car miles. The growth in multi-car households suggests that at least the second (or subsequent) vehicle may have a dominantly urban task, which would possibly be performed by an electric vehicle. Current cost and performance specifications of electric vehicles suggest however, that they will achieve very limited market penetration. /TRRL/

Reid, GK (Bureau of Transport Economics, Australia) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 39-57, 7 Tab., 10 Ref.; From: Electric Cars--Their Future Role in Urban Transport, Conference Papers, Can-

berra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236960), Australian Road Research Board

41 196845 STRUCTURAL ECONOMIC CHANGE: EFFECTS ON URBAN TRANSPORT. This paper examines those aspects of urban person and freight transport which are likely to be sensitive to structural economic change. The extent of the sensitivity is discussed using such empirical evidence as is available, and some speculation about future urban transport in Australia is presented. /Author/TRRL/

Ogden, KW ; Monash University, Australia, (01562126) Monograph Working Paper 78/4, Nov. 1978, 35 p., 7 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 236999), Australian Road Research Board

41 197153 ECONOMICS OF URBAN TRANSPORTATION. For people who live and work in Canadian urban areas, the major concerns with urban transportation are rush-hour congestion, pollution, and availability of public transit. Most of the important issues in urban transportation economics involve the use of government pricing, regulatory, and investment policies to deal with congestion, pollution, and public transit. The purpose of this monograph is to enable the reader to analyze and evaluate these public policy issues in Canadian urban areas. Chapters II and III present information on urban travel patterns and their determinants, particularly modal choice behavior. The discussion in these chapters provides background which is essential in evaluating the public policy issues which are analyzed in the following chapters. Chapter IV presents an economic analysis of the major pricing issues in urban transportation, including marginal social cost pricing of transportation facilities in the presence of congestion and pollution, and subsidization of public transit. Chapter V analyzes several important government regulatory policies, including regulation of roads to improve bus service, regulation of taxis and trucks, and automotive emission controls. Chapter VI applies the technique of cost-benefit analysis to the evaluation of transportation investment decisions, including expressway construction, railway relocation, and the choice between automobile, bus, and rail rapid transit systems. Finally, Chapter VII presents a critique of urban transportation planning practices. /Author/

Franicena, MW (Western Ontario University, Canada) ; Canadian Surface Transportation Administration TP 1927, Mar. 1979, 146 p., Figs., Tabs.

41 197340 BART IMPACTS ON TRAVEL BY ETHNIC MINORITIES. BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area. This report assesses BART's impacts on travel by ethnic minorities by analyzing data from (1) conventional large-scale travel surveys and (2) special "field station" data collection efforts conducted by participant observers in ethnic minority communities. The latter were conducted in the predominantly Spanish-heritage Mission District of San Francisco and the predominantly

Black city of Richmond. Minorities use BART rather less than suggested by their representation in the total population of the area served. Most minority BART riders are young, well-educated and have relatively high incomes, and like the white majority ridership, travel largely to central city destinations. Low-income disadvantaged minorities use the system little.

Frye, HT Gelb, PM Minkus, D ; Metropolitan Transportation Commission, Jefferson Associates, Incorporated, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT/BIP/WP-57-3-78, Nov. 1977, 77 p.; Prepared by Jefferson Associates, Inc., San Francisco, CA. and Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Program. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294672/1ST, DOTL NTIS

41 197462 A STUDY OF TRANSIT RIDER CHARACTERISTICS. The report presents the results of a set of transit rider surveys conducted in a relatively well-served, intense transit environment. The bus surveys conducted used an on-board distribution of a mail-back questionnaire which requested the following types of information: basic trip data; alternatives; demographics; and other characteristics. The surveys covered four fixed route bus routes (two in Queens and two in Brooklyn) and one rail rapid transit line on Staten Island. The intent of the bus surveys was to relate the ridership observed to both the source population and the ridership of other services, and to deduce differences which might be specific to the mode and/or which might be useful in planning services. The survey of the rail rapid transit line was generally comparable, but there was another objective of equal importance in this case: a detailed study of the specific origins and destinations on the service of both stations on and off and original origin and final destination. Results from other studies done previously or concurrently are integrated to provide a systematic view of the range of transport alternatives available to the individual in the environments studied. The ridership studies were complemented by an extensive origin-destination study on the rail rapid transit service. The report also discusses basic ridership characteristics, frequency and time, and articulation with other modes.

McShane, WR Menaker, PJ Roess, RP Gilroy, J Polytechnic Institute of New York, Urban Mass Transportation Administration Final Rpt. UMTA-NY-11-0014-79-3, Nov. 1978, 157 p.; Grant DOT-UMTA-NY-11-0014; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295107/7ST

41 199014 STAGGERED WORK HOURS STUDY. DESIGN AND IMPLEMENTATION OF STAGGERED WORK HOURS IN MANHATTAN. VOLUME I-EXECUTIVE SUMMARY--PHASE 1. The concept of staggered work hours is a proven "low capital-intensive" method of reducing transportation congestion. Experience has shown that the staggered work hours program in Manhattan has not only reduced congestion on transportation systems, but has improved efficiency in business operations by reducing lobby congestion and

improved employee attendance, punctuality and morale, all of which are additional non-cost benefits. The objective of this study was not only to further the staggered work hours program in the New York-New Jersey region, but also to determine means and methods to assist other communities in establishing their own staggered work hours program. This report, Volume I, provides a concise description of the work conducted during the study and includes the principle findings, a comparison of staggered work hours, flexible work hours, the four-day work week, and highlights the state-of-the-art of staggered work hours programs in the United States and abroad, based on a comprehensive survey of more than 200 cities throughout the world.

Port Authority of New York and New Jersey, Tri-State Regional Planning Commission, Urban Mass Transportation Administration, (UMTA-IT-09-0023/34) Final Rpt. UMTA-IT-09-0023-79-1, Aug. 1977, 73 p.; See also RRIS 23 199013, Bulletin 8001. Also published as Tri-State Regional Planning Commission, New York, Report No. TS-A520. Also available in set of 3 reports PC E10, PB-298 936-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298937/4ST

41 199015 STAGGERED WORK HOURS STUDY. DESIGN AND IMPLEMENTATION OF STAGGERED WORK HOURS IN MANHATTAN. VOLUME II-TECHNICAL REPORT--PHASE 1. The report, Volume II, consists of ten chapters which discuss in detail, broad categories such as the state-of-the-art survey, criteria for staggered work hours, work schedule surveys, design and implementation procedures for a successful program, transportation surveys and analysis, attitude surveys, and an evaluation of three different work schedule concepts--staggered work hours, flexible work hours, and the four-day workweek. Each chapter follows the same pattern of four major sections: objectives; work performed; analysis; and recommendations.

Port Authority of New York and New Jersey, Tri-State Regional Planning Commission, Urban Mass Transportation Administration, (UMTA-IT-09-0023/34) Final Rpt. UMTA-IT-09-0023-79-2, Aug. 1977, 415 p.; See also RRIS 23 199013; Bulletin 8001. Also published as Tri-State Regional Planning Commission, New York, Report No. TS-A520. Also available in set of 3 reports PC E10, PB-298 936-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298938/2ST

41 199016 STAGGERED WORK HOURS STUDY. DESIGN AND IMPLEMENTATION OF STAGGERED WORK HOURS IN MANHATTAN. VOLUME III-STAGGERED WORK HOURS MANUAL--PHASE 1. The report, Volume III, is intended to present an overall methodology for designing, implementing, and evaluating a staggered work hours program in an urban area. This volume is organized to cover the most important considerations involved in setting up a program in order to provide decision makers with the guidelines and tools necessary to first identify the need for a program, and then to promote, implement, and evaluate it.

Port Authority of New York and New Jersey, Tri-State Regional Planning Commission, Urban

Mass Transportation Administration, (UMTA-IT-09-0023/34) Final Rpt. UMTA-IT-09-0023-79-3, Aug. 1977, 34 p.; See also RRIS 23 199013; Bulletin 8001. Also published as Tri-State Regional Planning Commission, New York, Report No. TS-A520. Also available in set of 3 reports PC E10, PB-298 936-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298939/0ST

41 240244 THE SOCIAL FUNCTION OF REGIONAL TRANSPORT--THE POSSIBILITY OF RECONCILING ECONOMIC AND SOCIAL CONSIDERATIONS IN THE OPERATION OF REGIONAL PUBLIC TRANSPORT UNDERTAKINGS. OCCUPYING A POSITION BETWEEN THE NATIONAL RAILWAYS AND URBAN TRANSPORT, AND WITH AN AVERAGE JOURNEY LENGTH OF 10-20 KM, REGIONAL TRANSPORT COMPETES WITH THE PRIVATE CAR. IT IS RECOGNIZED THAT THE JOURNEY TIME FROM HOME TO WORK IS THE IMPORTANT FACTOR IN DETERMINING THE CHOICE OF PRIVATE OR PUBLIC TRANSPORT. RESERVED LANES AND MORE ATTRACTIVE BUSES (WITH NOISELESS ENGINES, COMFORTABLE SEATS, GOOD LIGHTING, SMOOTH ACCELERATION AND DECELERATION) WILL HELP IN THE COMPETITION. THE GROWTH AND SPREAD OF POPULATION AND THE EMPHASIS ON THE QUALITY OF LIFE, HAS CONFERRED A SOCIAL FUNCTION ON PUBLIC TRANSPORTATION. THERE IS A NEED FOR PUBLIC TRANSPORT TO BE STRENGTHENED AT THE EXPENSE OF THE PRIVATE CAR. GOVERNMENT RESPONSIBILITY IN THE SPHERE IS NOTED. PUBLIC TRANSPORT IS DISCUSSED IN RELATION TO THE PROBLEMS OF USE OF CAPACITY, TIME DISTRIBUTION, FREQUENCIES, AND LOSSES INCURRED BY WAGE INCREASES. THE INDUSTRY MUST BE MADE TO CONFORM TO CERTAIN GOVERNMENT REQUIREMENTS SUCH AS EFFICIENCY. THE ATTITUDE OF THE GENERAL PUBLIC TO PUBLIC TRANSPORT IS DISCUSSED AND THE FINDINGS OF AN OPINION SURVEY IN THE NETHERLANDS ARE SUMMARIZED. THE RELATIONSHIP OF REVENUE, TRANSPORT FARE AND GOVERNMENT CONTRIBUTIONS TO REGIONAL TRANSPORT IS CONSIDERED. IT IS CONCLUDED THAT THE EEC MUST GIVE EFFECT TO ONE OF THE PROVISIONS OF A REGULATION WHICH STATES THAT WITHIN 3 YEARS OF ITS COMING INTO EFFECT, A DECISION MUST BE MADE AS TO THE MEASURES TO BE TAKEN REGARDING PUBLIC SERVICE OBLIGATIONS FOR TRANSPORT ACTIVITIES NOT COVERED BY THE REGULATION. THERE IS A NEED FOR COLLABORATION OF ALL SUPPLIERS OF PUBLIC TRANSPORT AND THE SUBSIDIZING AUTHORITIES AND THE FORMATION OF CONURBATION-WIDE TRANSPORT COMMUNITIES IS SUGGESTED. FARE INCREASES IN REGIONAL TRANSPORT MUST NOT EXCEED THE LEVEL NECESSARY TO OFFSET INFLATION, AS OTHERWISE

THEY WOULD TEND TO DRIVE AWAY PATRONAGE. FOR HIGH QUALITY FAST PUBLIC TRANSPORT, COMPREHENSIVE INFRASTRUCTURE IMPROVEMENT MEASURES MUST BE ADOPTED. THEY ARE: PRIORITY IN PULLING AWAY FROM STOPPING PLACES; THE CONTROL OF TRAFFIC SIGNALS BY TRANSPORT VEHICLES; AND RESERVED BUS LANES. HIGHER VEHICLE QUALITY, ROLLING STOCK, STATION AND STOPPING PLACE FACILITIES, WILL INCREASE THE ATTRACTIVENESS OF PUBLIC TRANSPORT. IN VIEW OF THE SOCIAL FUNCTION OF PUBLIC TRANSPORT, GOOD CONTACT BETWEEN THE TRANSPORT UNDERTAKING AND THE AREA POPULATION IS URGED.

Van, ZUYLEN HJ ; Intl Union of Public Transport /Belg/ No. 2, pp 3-27, 7 Figs

41 260219 PUBLIC PARTICIPATION IN URBAN TRANSIT SERVICE. The trend in transit operations is toward public ownership and operation of services. The only questions are: when, how, and how much. The trend in public operations is to establish regional authorities or taxing districts with a provision of service to the urbanized area and to proportion taxes to the population served. Comparative statistics indicate that: (1) Large transit systems have fleets of reasonable age regardless of ownership; (2) smaller systems show private systems having fleets over 15 yr of age, and public operations with average fleet ages under 7 yr; (3) private systems provide service more efficiently than public operations with number of passengers carried per vehicle mile at 3.32 for private systems compared to 2.91 for public operations; (4) the number of annual transit rides per capital versus is higher for private systems (40.1 vs 34.2); (5) private systems have more employees per unit of service and per vehicle owned; and (6) private systems are more productive in terms of the number of passengers served.

Ferreri, MG, Executive Vice President (Simpson and Curtin Incorporated) *ASCE Journal of Transportation Engineering* Vol. 99 No. TE4, Proc. Paper 10121, Nov. 1973, pp 701-710, 1 Fig., 5 Tab.; This publication was presented at the July 17-20, 1972, ASCE National Transportation Engineering Meeting, held at Milwaukee, Wisconsin.

41 260284 REGINA TELEBUS STUDY. THE IMPACT OF TELEBUS. A study of the social and economic impact of a Demand Responsive public transportation system as related to the urban community is presented. The study includes related interests such as community attitudes, mobility of transit dependant segments of population, car ownership, and residential location and occupancy. Section II of the report relates to the overall physical structure of Regina with implications for urban land use planning and neighborhood development. /NTIS/

Atkinson, WG Suen, L Grimble, LG ; Regina Transit System Final Rept Mar. 1973, 53 pp; Paper copy also available from NTIS \$7.00/set of 3 reports as PB-225312-SET; ACKNOWLEDGMENT: NTIS (PB-225313/6); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-225313/6

41 260285 REGINA TELEBUS STUDY. TRANSPORTATION DATA REPORT. A study of community transportation requirements as related to the socio-economic characteristics of the community is presented. The study includes survey data regarding average daily trips by purpose and mode, age and sex breakdown of average daily trips, age profile of resident population, employment type and income classification, car ownership and attitudes towards regular transit operations as compared to Demand Responsive Transit services. /NTIS/

Atkinson, WG Suen, L Grimble, LG ; Regina Transit System Final Rpt. Feb. 1973, 60 pp; Paper copy also available from NTIS \$7.00/set of 3 reports as PB-225312-SET; ACKNOWLEDGMENT: NTIS (PB-225314/4); ORDER FROM: NTIS, Repr. PC, Microfiche; PB225314/4

41 260615 BEHAVIORAL ANALYSIS AND TRANSPORTATION PLANNING: INPUTS TO TRANSIT PLANNING. A distinction is drawn in this paper between behavioral information regarding feelings, attitudes, opinions, and the like and more sophisticated types of data dealing with individuals' intentions to respond in certain ways given certain configurations of stimuli (transportation variables). A methodological example as to how the first type of data--informational level data--can be collected and utilized in system planning is presented. Specifically, data collected along the lines of traditional attitude surveys is collected in an attempt to monitor changes in public "satisfaction" with the Iowa City, Iowa, bus system before and after major system innovations. Implications of the collection and analytical procedures are discussed.

Horton, FE Louviere, JJ *Transportation* Vol. 3 No. 2, July 1974, pp 165-185; ORDER FROM: Elsevier Scientific Publishing Company, P.O. Box 211, 1000 AE Amsterdam, Netherlands

41 260930 PLANNING URBAN TRANSPORTATION SYSTEMS FOR PRODUCTIVITY, EFFICIENCY, AND QUALITY OF SERVICES. This paper reports on current work and analysis of the problem carried on at the Transportation Studies Center of the University of Pennsylvania. Although the work has not yet been completed, the work undertaken enables the author to suggest that a new approach in urban transportation planning and a new type of urban transportation plan, based on studies of efficiency, productivity, and quality, may prove to be what the field needs for the 1970s. The urban transportation system is segmented into the network, the primary services offered, and auxiliary services.

Tomazinis, AR (Pennsylvania University, Philadelphia) *Transportation Research Record* No. 491, 1974, pp 52-59, 5 Fig., 14 Refs.; Publication of this paper sponsored by Committee on Transportation Systems Design.; ORDER FROM: TRB, Orig. PC

41 261520 URBAN TRANSPORT: STUDIES IN ECONOMIC POLICY. CHAPTER 1: ESTIMATING THE SOCIAL BENEFIT OF CONSTRUCTING AN UNDERGROUND RAILWAY IN LONDON. CHAPTER 2: THE VICTORIA LINE: SOCIAL BENEFIT AND FINANCES. Chapters 1 and 2 comprise Foster and Beesley's classic papers (first published in 1962 and 1965) on estimating the costs and

benefits to be obtained from construction of the Victoria line. In the first paper these costs and benefits are discounted over the life of the investment at three alternative discount rates. Calculations include assessments of generated traffic and attempts to include comfort and convenience valuations. The problems associated with this type of cost-benefit assessment were extensively covered both in the paper and in the subsequent discussion. The second paper arose in part from discussion of the first, and examines the effects of different methods of financing the project, emphasizing the difference between social and financial returns. It is concluded that a high proportion of social benefits would be lost if finance were obtained from a flat-rate percentage increase in fares. These losses could be reduced or eliminated if differential charging was applied to peak and offpeak periods, if Victoria line fares were increased more than other fares, or if congestion prices were imposed on roads. /TRRL/

Foster, CD Beesley, ME ; Butterworth and Company, Limited 1973, pp 1-97, 4 Tab, 32 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208982)

41 261711 THE CASE FOR PROVIDING SUBSIDIES FOR PUBLIC TRANSPORT. This paper offers a general outline of the case for subsidising public transport. Two main transport problems are distinguished: the declining image of public transport and the high social costs, especially in urban areas, of increasing car usage. A balanced strategy is required for the development of both public and private transport. The precise nature of this strategy must reflect the differing needs of different communities and be determined by human values as well as engineering efficiency, profitability and economic demand. Three kinds of subsidy are distinguished and briefly discussed: support for capital expenditure; subvention to daily operation and management; and subventions to help poor areas, regions or persons (eg concessionary fares). It is concluded that subsidies are a useful and flexible tool in the attainment of a comprehensive coordinated transport policy capable of meeting the needs of society. A discussion follows. /TRRL/

Taylor, WL ; Public Transport for Policy Makers Conference Conf Paper 1974, pp 3-20, 27 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208403)

41 262521 REFLECTIONS ON CITIZEN INVOLVEMENT IN URBAN TRANSPORTATION PLANNING: TOWARDS A POSITIVE APPROACH. The purpose of this paper is to explore an important and unique role which community participation and involvement can play in a revised transportation planning process. A review of diverse views about community participation, as well as a critique of the current urban transportation planning process, reveals that the former has played, primarily, ad hoc opportunistic and diverse roles, and that the latter is in desperate need for dynamic, subjective, "impact" information--required to assess attractive transportation systems. The contributions of several disciplines--economics, operations research, management science, political science, public administration, and others--are reviewed to assist in the development of a conceptual framework for a new community participation role, as a provider of key information to the

planning process. An eclectic, experimental approach is recommended to explore the possibilities further. /Author/

Steger, WA (Consad Research Corporation) *Transportation* Vol. 3 No. 2, July 1974, pp 127-146, 2 Fig., Refs.

41 263893 THE EVALUATION OF AMENITY IN RELATION TO TRANSPORT COSTS AND BENEFITS. THE PAPER DISCUSSES MEANS OF MEASURING AMENITY COSTS AND BENEFITS RESULTING FROM ALTERNATIVE TRANSPORTATION PROJECTS THAT ACCRUE TO MEMBERS OF THE COMMUNITY OTHER THAN ACTUAL USERS OF THE TRANSPORTATION SYSTEM ITSELF. METHODS ARE EXAMINED OF BRINGING INTO SUCH ANALYSIS CERTAIN OF THE OTHER COSTS AND BENEFITS COMING UNDER THE GENERAL HEADING OF AMENITY. FIRST A REVIEW IS MADE OF THE TREATMENT OF AMENITY IN TRANSPORT COST-BENEFIT ANALYSIS AND THEN OF THE NEED TO WIDEN SUCH ANALYSIS BEYOND THE ITEMS OF AMENITY TO THE WIDER RANGING REPERCUSSIONS OF TRANSPORTATION ON THE COMMUNITIES, ALTHOUGH THIS WOULD STILL NOT BE WIDE ENOUGH SINCE TRANSPORTATION SHOULD BE VIEWED AS PART OF URBAN AND REGIONAL PLANNING, AND SO SHOULD ITS EVALUATION. THE MAIN OBSTACLE TO THE APPROPRIATE TREATMENT OF AMENITY IN TRANSPORT COST-BENEFIT ANALYSIS HAS BEEN THE DIFFICULTIES OF MEASUREMENT. THE PROBLEMS SURROUNDING SUCH MEASUREMENT ARE EXPLORED AND SO IS THE NEED FOR MAKING THE MEASUREMENT IN MONEY TERMS. AN ACCOUNT IS GIVEN OF THE RESEARCH ADVANCES BEING MADE IN THE MEASUREMENT OF THE TRANSPORT IMPACT ON AMENITIES.

Lichfield, N (University College, London) ; Institution of Civil Engineers Conf Paper 1973, pp 157-169, 3 Fig., 2 Tab., 3 Ref.; Presented at the Transportation Engineering Conference and Exhibition held at the Imperial College of Science and Technology, London, April 18, 1972.; ACKNOWLEDGMENT: TRRL (IRRD 208767)

41 263928 CORRELATION OF SOCIOECONOMIC FACTORS WITH CORRIDOR TRAVEL DEMAND. Current interest in public transit to alleviate the urban transportation problem requires more research about the effects on urban structure of new modes. The purpose of this paper is to examine one aspect of this: the internal relationships between the socioeconomic characteristics of commuters and the transportation service characteristics they value in their mode choice to work. Specifically, the study is concerned with (a) the correlation of selected socioeconomic factors of individuals with their choice of travel attributes and (b) the effect of socioeconomic factors in causing car drivers to shift mode. Canonical correlation analysis illustrates that each modal group using a transportation corridor has unique socioeconomic characteristics and that these are related to the attributes of the transportation system. Car driv-

ers are less dependent on system attributes than bus riders, and therefore planned changes in the system (such as the introduction of rapid transit) will have less effect on this group than on bus users in terms of use of the system. There is also some indication that changes in bus frequency would have an effect on car ownership in a given corridor. Statistical tests, using discriminant analysis, on a subsample of automobile drivers indicates that the socioeconomic characteristics of an individual probably exert an influence on his tendency to shift mode and on his sensitivity to specific transportation service level changes in the system. In particular it was found that as income levels increase the tendency to shift mode decreases. The findings of the study have implications for mode split planning, travel demand modeling, and urban structure.

Brown, GR (British Columbia University, Canada) *Transportation Research Record* No. 499, 1974, pp 34-46, 11 Tab., 10 Ref., 1 App.; ORDER FROM: TRB, Orig. PC

41 263953 HOME INTERVIEW UPDATE AND SELECTED OPINION POLL. During 1963-64, the Tri-State Regional Planning Commission conducted a survey of households in a 1 percent random sample of occupied housing units and other special dwelling places in the New York metropolitan region to determine travel habits. Data obtained from the survey have subsequently been used to develop travel forecasts and plans for highways and transit. The 1972-3 home interview update conducted in Brooklyn was undertaken primarily to test the cost and reliability of updating key data items in the 1963-4 estimates. Three methods of data collection, all based on at least one face-to-face contact between an interviewer and a respondent member of a household, were used in the update survey. A qualitative measure of the overall stability of trip generation rates between 1963 and 1972 was provided using simple cross-classification analysis. Total person or household trips were cross-classified by the number of automobiles available (owned) by the household, structure size and household size. In general, the relationships between the independent and dependent trip generation variables were invariant over the two time periods. Chapters of the report include an introduction, findings, estimates from 1972 sample and data collection methods, trip generation rates, analysis of walk trips, analysis of travel behavior and the use of Downtown Brooklyn, and the relative effectiveness of data collection methods. Twenty-five tables are presented.

Obinani, FC ; Tri-State Regional Planning Commission, (IT-09-0014) UMTA-IT-09-0014-74-1, June 1974, 43 pp; Sponsored by Urban Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236656

41 264616 LAWSUIT CHALLENGES TRANSPORTATION PLANNING PROCESS. The Atlanta Coalition of the Transportation Crisis, the Eighth Ward Civic Association, Inc., the Inman Park Restoration Inc. and four individuals have filed suit challenging the master planning process of the Atlanta, Georgia region. They charge that the plan fails to allow sufficient input from citizens, that there is a failure to consider alternatives and the DOT has not renewed the

Atlanta Regional Commission's certification of the regional planning process for 1974. The cause of action is to enjoin DOT from approving the plan which would then cut off federal aid and they seek an injunction against two Georgia transportation agencies to prevent them from planning, designing or constructing and tollways until the regional plan has been approved. DOT will file answers to these contentions by late May. This case has broad implication as a precedent.

Engineering News-Record Vol. 192 No. 15, Apr. 1974, p 34

41 265391 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART II. VOLUME V. PREPARATION OF THE PRE-BART DATA FILE FOR THE SYSTEMWIDE SAMPLE. The report describes the data manipulation done in preparation for statistical analysis of data collected in the pre-BART responses to the environment study. The scope of the report includes data reformatting, reassignment of nonsubstantive response data, correction of errors, preparation of the data file, and data availability. Three appendices list the specific data changes that were made.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 44 pp; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 2, Volume 4, PB-236 731, and BART-2, Part 2, Volume 6, PB-236 733; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236732/4ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236732/4ST, DOTL NTIS

41 267004 REDUCING THE TRAVEL REQUIREMENTS OF THE AMERICAN CITY: AN INVESTIGATION OF ALTERNATIVE URBAN SPATIAL STRUCTURES. Little attention has been given to investigating the potential for gradually restructuring the city so as to reduce its built-in requirements for transportation. This report investigates this potential by analyzing the transportation requirements of some alternative urban spatial structures. The effort is to deal with what are perceived to be the basic causes of urban transportation transportation requirements instead of examining only the symptoms of these problems. A computer-directed search procedure was developed and tested using 2 simple urban structures. These experiments form the basis for an investigation of a larger urban structure based on the 1970 urban pattern of the western part of King County, Washington. This study has demonstrated that a simple search algorithm can be a useful tool for finding spatial structures that have desired characteristics. Results indicated that by moving about one third to on half of the people and about one third of the jobs to other locations, very substantial reduction (50 per cent or more) in travel requirements could be obtained while also improving overall access levels. While structural changes of this magnitude aren't feasible in near future, many cities may be growing by this much in the next 20-30 years. The potential for non-transportation solutions appears to be a significant but projections, initial transit system design and a theoretical According to the author, what is most needed now is a way of identifying

particular locations where it would be most beneficial to encourage new people/jobs to locate and orient programs and policies to encourage growth there.

Schneider, JB Beck, JR ; American Right of Way Association, (WA-11-0003) Univ Res UMTA-WA-11-0003-73-5, Aug. 1973, 35 pp; This paper was presented at the 53rd Annual Meeting of the Highway Research Board.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232317/AS

41 267021 LINEAR CITY RAPID TRANSIT AS A DETERMINANT OF URBAN FORM.

The purpose of this study was to forecast and describe some of the physical planning implications of implementing innovative types of public transportation in the Dallas-Ft. Worth region. In this context, the authors have sought to document in this report conclusions about some of the physical implications of the use of rapid transit to structure new forms of urban development and to depict, in words and images, impressions of the increased quality of life possible in these transit-structured communities. The study approach consisted of developing generalized concepts for structuring new urban growth based upon transit, and then particularizing these concepts by applying them to specific parts of the Dallas-Ft. Worth region. The initiation of this process involved gathering an extensive inventory of physical, economic and demographic data on the geographic area chosen as the focus of this study.

Texas University, Arlington UMTA-TX-11-0001-73-1, Sept. 1973, 50 pp; ACKNOWLEDGMENT: UMTA (TX-11-0001); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231540/AS

41 300044 PUBLIC PARTICIPATION IN URBAN AND RURAL PUBLIC TRANSPORT [Inpraak bij stads-En streekvervoer]. Consumer organizations of users of public transport increasingly ask for participation and want to be consulted on possible improvements or possible worsening measures of public transport. An inventory is given regarding public participation in urban and rural public transport in the Netherlands. Developments are considerable in this sector of public transport, apart from the sector of railbound transport. /TRRL/ [Dutch]

Bruggeman, JM *Openbaar Vervoer* Vol. 12 No. 2, Feb. 1979, pp 61-66, 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 240971), Institute for Road Safety Research

41 300046 PUBLIC TRANSPORT IN URBAN AREAS-A BENEFIT OR DISBENEFIT? Despite increased investment in public transport in urban areas and attention to its management, public transport is seen as being at a cross road in that the discrepancy between costs and revenue is so large that the community may react against subsidising the deficit amount. Past trends which led to the current deficit problems of public transport authorities are examined and future deficit prospects illustrated showing the limited impact of even substantial fare increases. Although operational and policy measures can be used to minimise operating costs and perhaps increase patronage, deficit confinement in the future will require a major review of urban public transport objectives, service levels and fare structure. /Author/TRRL/

Pak-Poy, PG (Pak-Poy (PG) and Associates Proprietary Limited); New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 676-682, 3 Fig., 1 Tab., 2 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April, 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239182), Australian Road Research Board

41 300095 URBAN CONSOLIDATION : A PRELIMINARY APPRAISAL OF ITS POTENTIAL FOR DEALING WITH STRATEGIC TRANSPORT ISSUES. Urban consolidation is a radical policy for redirecting future growth in households from low density peripheral locations to medium density housing in middle ring suburbs. It offers transport benefits to households who divert, but its strategic significance is likely to be small in the light of expectations of reduced population growth. In addition, its implementation would be constrained by the resistance of local government in middle ring suburbs and by consumer preference for a detached house and garden. It is argued that urban consolidation is symptomatic of a tendency toward achieving radical change by focussing on future growth. However, the major transport task now concerns the urban fabric. /TRRL/

Davies, A (Sydney University, Australia); New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 328-335, 15 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, April 18-20, 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239194), Australian Road Research Board

41 300543 WHERE HAVE WE BEEN—WHERE ARE WE GOING? This paper reviews some of the progress that has been made in recent years in the transportation field by behavioral scientists and human factors engineers. The major areas covered are public transportation systems, railroad systems, highway systems, and personal transportation systems. The report suggests what future problems may be encountered in these areas that will need the attention of human factors specialists.

Nicholson, RM (National Highway Traffic Safety Administration) *Society of Automotive Engineers Preprints* SAE 790011, 1979, 18 p., 72 Ref.; From the Meeting of 26 February-2 March 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

41 301052 TRAVEL DATA FROM THE U.S. CENSUS: A NEW FOUNDATION FOR TRANSPORTATION PLANNING. The 1980 U.S. Census of Population and Housing will include the largest source of urban transportation data ever available for a single point in time. To properly use these data requires that planners understand the difference between census definitions and those commonly used in transportation. This paper describes those differences as well as the data that will not be included in the census. It recommends methods of local data collection that can supplement the census data to complete the measurement of total travel. Finally, it proposes a method of keeping the census commuting data up to date without extensive inventory data for 1980. The method is suitable for small urban areas as well as large metropolitan regions. /Author/

Dunphy, RT (Metropolitan Washington Council of Governments) *Transportation Research Record*

No. 701, 1979, pp 22-26, 1 Fig., 6 Ref.; This paper appeared in TRB Research Record No. 701, Applications and Use of Transportation Data.; ORDER FROM: TRB Publications Off

41 301282 THE ECONOMIC AND SOCIAL IMPACT OF INVESTMENTS IN PUBLIC TRANSIT. No abstract.

Sheldon, NW Brandwein, R (Harbridge House, Incorporated); Heath Lexington Books, (0-669-90837-1) 1973, 192 p., Figs., Tabs.; Written with the assistance of Hiroko Sakai and Frank Remley.

41 301283 CONFLICT IN URBAN TRANSPORTATION. THE PEOPLE AGAINST THE PLANNERS. Using illustrative case studies, the author discusses the conflicts that arise when citizens are not involved in the planning stages of major transportation projects. He covers citizen protest activities, legal developments, and environmental concerns. /Lexington Books/

Steiner, HM (George Washington University); Heath Lexington Books, (0-669-02268-3) 1978, 144 p., Figs., Tabs., Refs.

41 301895 A DISAGGREGATED LAND USE-TRANSPORT MODEL FOR DELHI, INDIA. A Lowry-type land use-transport model stratified both by socio-economic group and urban sub-region is described. The parameters of this model are calibrated from a 1969 urban travel survey conducted in Delhi. Parameter magnitudes are estimated for several versions of the model and the qualities of these calibrations are reported. Applications of the calibrated models to the analysis of alternative development concepts for the Delhi urban region are described. /Author/TRRL/

Sarna, AL (Central Road Research Institute, India) Hutchinson, BG (Waterloo University, Canada) *Transportation (Netherlands)* Vol. 8 No. 1, Mar. 1979, pp 73-87, 5 Fig., 5 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241490)

41 302271 THE IMPLICATIONS OF TRANSIT INVESTMENT ON URBAN DEVELOPMENT, SOUTHEASTERN MICHIGAN. This study of the implications of transit-induced development patterns was intended to synthesize available information on the proposed transit alternatives for Southeastern Michigan. An investment in additional transit capacity in Southeastern Michigan would accomplish a number of regional objectives. It would stimulate the economic vitality of the region, improve accessibility, reduce traffic congestion, maintain air quality, provide for the flexibility to conserve energy, and slow urban sprawl. The Southeastern Michigan Transportation Authority has proposed six transit alternatives which are designed to fill transportation needs as well as this more comprehensive set of objectives for the future of this important urbanized metropolitan area. Each of the alternatives include improvements to the existing public transit system: small bus; express bus; feeder bus; commuter rail; and the addition of a downtown people mover for circulation in Detroit's central business district. Four of the alternatives also include a light rail system which differs in length and in the extent to which its alignment is subsurface. A major issue in public discussion has been the magnitude of the development which

would be stimulated within the region's urban core as a result of an investment in transit. Two purposes govern the analysis: 1) to interpret the findings of previous impact analyses in terms of the urban economic, environmental, and transportation policies and 2) to define the magnitude of the shift from suburban jurisdictions and to discuss the implications of these shifts in relation to the relative share of the cost borne by suburban communities or counties. This report discusses and analyzes the need for transit improvements, the policy context of these improvements, land use and urban development impacts, public service implications, financial and fiscal impacts, and equity considerations.

Grefe, R; Grefe (Richard) Associates, Urban Mass Transportation Administration, (RGA/79-001) Final Rpt. UMTA-MI-09-0030-79-1, Feb. 1979, 133 p.; Prepared for the Southeastern Michigan Transportation Authority and the Michigan Department of State Highways and Transportation. This document contributes to the final summary chapter of the Public Transportation Alternatives Analysis-Draft Environmental Impact Statement, Southeastern Michigan.; Contract MI-09-0030; ORDER FROM: NTIS; PB-300307/AS

41 302414 ESTIMATING SOCIOECONOMIC IMPACTS OF TRANSPORTATION SYSTEMS. This study develops a methodology to estimate the socioeconomic impacts of multimodal transportation plans and programs in Maryland. The impacts include government expenditures of plan implementation, socioeconomic impacts of expenditures (i.e., personal income, employment, and population), displacement of businesses and households, and land use, accessibility, safety, and socioeconomic impacts of new transportation services and facilities (i.e., personal income, employment, and population). The programs evaluated include the Port of Baltimore; Baltimore-Washington International Airport; general aviation airports; rail (commuter and intercity) facilities; mass transit (bus and rail rapid transit); Interstate, primary, and secondary highway systems; low-capital improvements; and operating programs. The methodology consists of 26 impact-estimating equations, each of which was developed for statewide, regional, and county levels of detail. As a test application, the equations were used to evaluate the impacts of a 20-year \$10-billion Maryland transportation plan. Socioeconomic impacts related to expenditures and new facilities or services were shown to generate \$18 billion in personal income over this period with an average annual employment impact of 48000 jobs and an average annual population impact of 100000 people. The Baltimore region experienced the largest impact (83 percent of total statewide impacts). The Baltimore city and Baltimore county areas experienced 60 percent of the Baltimore region's impact. (Author)

Taggart, RE Walker, NS (Ernst and Ernst) Stein, MM (Maryland Department of Transportation) *Transportation Research Record* No. 716, 1979, pp 9-20, 4 Fig.; This paper appeared in Transportation Research Record 716, Local and Regional Development and Transportation Needs.; ORDER FROM: TRB Publications Off

41 303076 IMPLICATIONS OF FUEL-EFFICIENT VEHICLES ON RIDE QUALITY AND PASSENGER ACCEPTANCE: WORKSHOP PROCEEDINGS WOODS HOLE, MASSACHUSETTS, SEPTEMBER 6-8, 1978.

Four workshops were conducted under the auspices of the Transportation Research Board. The topics of discussion included ride quality and passenger acceptance problems associated with enhanced fuel efficiency of automobiles (Group A) and aircraft (Group B); shifts in intermediate range (100-500 miles) travel for automobiles to public transit (Group C); and implications of increased size disparity for ground transport freight and passenger vehicles using shared guideways (Group D). In each group, major problem areas were identified and strategies for conducting pertinent research were outlined. A glossary of technical terms and a list of workshop participants are also included in the report.

Wichansky, AM, Editor Kuhlthau, AR, Editor (Virginia University); Transportation Systems Center, Department of Transportation, Langley Research Center, (DTS-532) Final Rpt. DOT-TSC-RSPA-79-21, NASA CP-2096, Aug. 1979, 118 p., Figs., Tabs., Refs., Apps.; ORDER FROM: NTIS

41 303478 ACCESSIBILITY AND BEHAVIOUR: INITIAL CASE STUDIES.

ARRB Project 268, social impact of transport related changes, is using a case study approach to explore the relationships between (1) accessibility to local services (schools, shopping, public open space etc), (2) accessibility to metropolitan-scale services (employment, tertiary education, etc), and (3) residents' behavioural responses to different levels of these accessibilities. From that exploration, it is hoped that behavioural responses to future changes in accessibility can be predicted, so that social effects of transport related changes can be assessed. The case study areas are contrasting residential areas in metropolitan Melbourne. This paper is intended as a progress report on the study. It specifically examines the relationships between accessibility and behaviour in three of the case study areas: in Springvale (low educational and professional status, early in the family life cycle, with generally poor accessibility to public transport), Camberwell (high educational and professional status, late in the life cycle, with generally good accessibility to public transport), and Northcote (low to middling educational and professional status, middling to late in the life cycle, and with part of its area well endowed with public transport). From this examination, speculations are advanced on the significance of the revealed relationships, thus on the likely social effect of future possible transport related changes on the three case study areas. (TRRL)

King, R (Melbourne University, Australia); Australian Road Research Board Monograph Intern Rpt AIR 268-2, Dec. 1978, 88 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239390), Australian Road Research Board

41 305087 POPULATION PROJECTIONS FOR AREA PLANNING. VOLUME 2. 1977-SEPTEMBER, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS).

Reports on predictions of population growth or change in state, regional, county, or municipal areas are cited and include reports on projections for area economic analysis, employment, land and resource use,

health, education, energy, and transportation needs and planning as affected by population change.

Young, ME; National Technical Information Service 1979, 217 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0997/1ST

41 307760 PASSENGER REQUIREMENTS AND ERGONOMICS IN PUBLIC TRANSPORT.

The basic requirements and comfort parameters of users of public transport are discussed with reference to results of some recent field investigations. The needs for city transport were found to consist of primary service associated with time saving and convenience, informational clarity, physical requirements, and environmental factors. The priorities of such needs were variable according to the purpose of travelling, such as commuting, visiting, shopping, business, and others; and also the users' occupations. The comfort of passengers riding a train was shown to be composed mainly of postural, mental, and microenvironmental components, to which differences in the class, journey purpose, car-type, and age of passengers significantly contributed. Comfort was also dependent on the journey length, changing at around 3 hours from the journey start. A field experiment showed that physiological responses and discomfort scores of passengers were remarkably enhanced when the crowding exceeded a certain limit, over which transport planning to avoid crowding would be a primary need. It is thus necessary to meet the dynamic needs of passengers, taking into account also discomfort resulting from newly mechanized systems. /Author/TRRL/

Kogi, K (Institute for Science of Labour, Japan) *Ergonomics* Vol. 22 No. 6, June 1979, pp 631-639, 4 Fig., 2 Tab., 16 Ref.; Congress of the International Ergonomics Association, 7th, Warsaw, Poland, August 27-31, 1979; ACKNOWLEDGMENT: TRRL (IRRD 242344); ORDER FROM: ESL

41 308011 URBAN ROAD PLANNING-SOME CURRENT CONSIDERATIONS.

This paper discusses some current considerations in urban road planning. In general, these considerations stem from the limited finance available for roadworks, the increasing emphasis on sociological and environmental aspects, evolving community attitudes and concerns, and current uncertainties in those matters that will affect future travel. The changing road planning process, and some matters relating to protection of longer term options for future road improvements, are discussed. Some aspects of travel forecasting, including the future outlook for energy for transport, are mentioned. Evolving procedures for assessment and evaluation of proposals, and for community participation, are described, and some compensation matters are also discussed. /TRRL/

Underwood, RT (Victoria Country Roads Board, Australia); Institution of Engineers, Australia, (0 909421 12 9) Conf Paper 1979, 8 p., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239318), Australian Road Research Board

41 308076 INSTITUTIONALIZATION OF MASS TRANSPORTATION IN THE COMMUNITY.

The findings which are presented here are based on a literature review, a questionnaire

survey of 150 public transit agencies, and on-site interviews with managers and board chairmen of transit agencies. These findings are relevant not only to the uncertainty of local finance problems, but also to the continuation and improvement of mass transportation services in the nation. The importance of local support for transit is noted and the differences between institutions and organizations are discussed. The process of institutionalization is outlined, including the establishment of the transit organization, the understanding of the community environment, the development of the institution, the developing of links with outside groups and individuals, the developing of support, institutionalization, and providing feedback to check on the success of institutionalization. A major stumbling block to institutionalization is that building community support in nonoperational ways is usually not an explicit goal of transit management.

Ross, HS (Louisville University, Kentucky) Smerk, GM (Indiana University, Bloomington) *Traffic Quarterly* Vol. 3 N Oct. 1979, pp 511-524, 4 Tab.

41 308079 BACK TO THE CENTRAL CITY MYTHS AND REALITIES.

This collation of available statistical data for speculation on the urban future, focuses on demographic trends and their policy inclinations. The future demand for central city transportation is a function of its resident population, of non-resident workers, and non-residents attracted to the city for a variety of non-job related purposes. The various aspects discussed include the decelerating population growth, changing household formations, population change determinants, and the net migration criterion. Central city aspects such as shrinking population, shifting importance, age structure shifts, household types, income shifts, and employment trends are discussed. It is noted that there has been little, if any, abatement in the broader centrifugal forces depleting the city. The dominant phenomenon of the 1970s (preceding the 1979 energy crisis) has been the resynthesis of the metropolitan activity system to the outer fringe adjacent to the circumferential transportation band. More dispersed, peripheral nonmetropolitan population growth may in part be considered "surrogate" metropolitan growth dependent on transport links to the new circumferential metropolitan economy. The spatial form of the latter exurbia appears as undocumented metropolitan extensions or outcroppings along new or improved transportation routes. The city core transportation issue is being blunted by a decline in need.

Sternlieb, G Hughes, JW (Rutgers University, New Brunswick) *Traffic Quarterly* Vol. 33 No. 4, Oct. 1979, pp 617-636, 7 Tab.

41 308519 EVALUATING THE EXPECTED RETURN-AS WELL AS THE RISK-OF A PROPOSED TRANSIT INVESTMENT.

A study was conducted at Kent State University to determine the feasibility of offering bus services to students who travel long distances to and from the main campus. Two services were selected for detailed study and a marginal cost-benefit analysis was made to predict the net returns for each of these services. Expected ridership was estimated using survey responses and an attitudinal demand model. The results of the model yielded valuable risk and return information. The 95%

confidence interval width of \$1238 reflected the uncertainty of the estimate for net revenue. The downside risk (chance of income loss) is essentially zero. An interesting result of the model is that the true expected return of \$1431 is not equal to the net cost-benefit figure of \$1647. In addition to the risk-return information, the probabilistic modeling approach is a very good technique for including difficult to define and intangible benefits such as reduced road congestion and lower pollution. The framework for the model is ideally suited for sensitivity or what-if analyses. One of the most positive features of the approach, however, is that the results are easily understandable to decision makers who do not have extensive quantitative backgrounds.

O'Leary, TJ (Arizona State University, Tempe) *Transit Journal* Vol. 5 No. 4, 1979, pp 19-28, 5 Fig., 1 Tab., 5 Ref.; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

41 308568 TRAVELER ATTITUDE-BEHAVIOR IMPLICATIONS FOR THE OPERATION AND PROMOTION OF TRANSPORT SYSTEMS. Alternative hypotheses on how traveler attitudes relate to system usage are examined to infer strategies for the operation and promotion of transport systems. Two different transport modes (carpools and buses) and two different data sets are analyzed. The analyses highlight the differential roles of perceptions of system attributes and modal affect in accounting for traveler behavior. In addition, the mutual dependence of attitudes and behavior on each other is confirmed. After these relationships are empirically demonstrated, some practical operational and promotional implications are developed. It is noted, for example, that system improvements by themselves can be insufficient to produce desired changes in system usage. Two specific promotional strategies that can complement system improvements and help increase system usage are described and linked back to the analysis of traveler attitude-behavior relationships. (Author)

Dumas, J (Transportation Systems Center) Dobson, R (Charles River Associates, Incorporated) *Transportation Research Record* No. 723, 1979, pp 64-71, 7 Fig., 24 Ref.; This paper appeared in TRB Record No. 723, Travel Behavior Methodology.; ORDER FROM: TRB Publications Off

41 309099 PUPIL AND REGIONAL PUBLIC TRANSPORT [Scholier en streekvervoer]. The decrease of the number of passengers on public transport depends greatly on the degree of vehicle ownership. Therefore public transport must be made more attractive for those persons having no car, such as children going to school, old people and commuter traffic. In this report the use of public transport modes by pupils in the age range 12-16 years is studied in a special region. In summertime the bicycle and the moped are the most used transport modes. In the winter only the bus is a real alternative, but even then pupils prefer to go by bicycle or moped. Measures for a better scheduling of the bus related to school hours and stops in the neighbourhood of schools are recommended. /TRRL/ [Dutch]

Catholic University, Netherlands Monograph Jan. 1979, 42 p., 23 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243431), Institute for Road Safety Research

41 309192 WHAT ARE PEOPLE SAYING ABOUT IMPROVING OLD OR MAKING NEW? The paper examines the influence of the community, working through the political system, on environmental, social and financial factors in the road planning process. It is generally assumed that society as a whole has shown a preference for the low cost upgrading of the existing system in the developed urban areas, but there are exceptions to this. Local community viewpoints often differ according to whether or not their environment is affected by existing traffic conditions or alternatives under scrutiny. These situations can pose a conflict for the planner-the responsibility to the different communities on the one hand, and the responsibility to the authority on the other. The paper examines how community attitudes can be determined and how they influence decisions. The authors present some of the practical lessons they have learnt from working in open participatory studies. (TRRL)

Evans, RG (Victoria Joint Road Planning Group, Australia) Bush, K (Victoria Joint Road Planning Group, Australia); Institution of Engineers, Australia Pub No. 79/11, 1979, pp 82-87, 1 Fig., 11 Ref.; Presented at the Transportation Conference, 1979, Adelaide, November 14-16, 1979; ACKNOWLEDGMENT: TRRL (IRRD 239401), Australian Road Research Board

41 310165 VOLUNTARY AND SOCIAL SERVICES TRANSPORT IN BIRMINGHAM, REDDITCH AND BROMSGROVE. This report is concerned with the use of small vehicles for providing communal transport as a form of welfare. A postal survey, supplemented by personal interviews, was carried out in Birmingham to identify the pattern of transport provided by voluntary organisations. Data were collected on vehicle-type, cost and finance, drivers, users, trip purposes, and the development of the service. It appeared that most services were associated with some social or recreational service provided for particular clients, although the characteristics of clients varied considerably between different voluntary organisations. Journeys to suit personal requirements were less common, and there was little diversion from public transport. Levels of vehicle utilization varied considerably, and the potential for improving the provision of such transport by better co-ordination between organisations is discussed. The operation of social services department transport in two areas was also studied. This is a sector of transport provision which has grown in a relatively unplanned way in recent years, as a function ancillary to domiciliary and day-care provision. A number of problems for both types of transport supplier are identified in the context of fleet management, organisation and finance. (Author/TRRL)

Bailey, JM (Oxford University, England); Transport and Road Research Laboratory Monograph SR467, 1979, 26 p., 3 Fig., 11 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244399)

41 312463 FRAMEWORK FOR INVOLVING LOCAL CITIZENS IN A SMALL URBAN AREA'S TRANSPORTATION PLANNING PROCESS. This paper presents a framework developed for involving citizens in transportation planning efforts in a small area. The paper describes the steps involved in the citizen partici-

pation process, provides a critique of the process, and outlines recommendations based on the results of the process. (Authors)

Lichtenheld, J (Straam Engineers, Incorporated) Etmanczyk, J (Wisconsin Department of Transportation) *Transportation Research Record* No. 731, 1979, pp 33-37, 8 Ref.; This paper appeared in TRB Record No. 731, Evaluating Transportation Proposals.; ORDER FROM: TRB Publications Off

41 313857 THE SOCIETAL COSTS OF CONGESTION IN NEW YORK CITY, WITH APPENDICES. The report is a study of the problem of vehicular congestion on the island of Manhattan with emphasis on its Central Business District. It defines the nature of Manhattan's congestion, traces its growth over the past century, assesses its costs, and evaluates various abatement strategies. The approach is in the manner of a case study of the impact of street congestion on the economic, social and environmental health of the city's residents. Abatement strategies considered include several dealing with traffic management and goods movement, uniform bridge tolls, free transit fare zones, and the development of extensive pedestrian areas.

Ketcham, BT Pinkwas, S Wilder, SF; Citizens for Clean Air, Incorporated, Environmental Protection Agency Final Rpt. EPA-902/4-79-007, Dec. 1979, 193p; Contract EPA-68-02-2860; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-147366

41 314231 DETERMINANTS OF NEIGHBORHOOD QUALITY: AN ANALYSIS OF THE 1976 ANNUAL HOUSING SURVEY. Using 1976 Annual Housing Survey data, this paper assesses the contributions to overall neighborhood quality of peoples' evaluations of environmental conditions and public services. The analytic model takes into account (1) the extent to which the presence or absence of conditions influence ratings of neighborhoods, (2) the relative importance of condition and service evaluations in explaining overall neighborhood ratings, and (3) the extent to which the evaluations in households with different background characteristics differ in importance in explaining overall neighborhood ratings. Findings suggest that most Americans are quite content with their neighborhoods; in fact, four in five rated them as either excellent or good. The presence or absence of neighborhood conditions (as measured by respondent's perceptions) account for only one-sixth of all variations in neighborhood quality ratings. People's feelings about conditions around them are more significant to their assessment of neighborhood quality than are perceptions of local government services. Most important among these conditions are neighborhood and housing upkeep, street noise, and crime. Among public services, police protection, public transportation, and health-care facilities are most valued. Population subgroups differed significantly in their ratings of neighborhoods--poorly educated, young black renters were most likely to give negative overall neighborhood ratings. Ratings by selected attributes did not vary significantly. These findings stimulate several suggestions: (1) future surveys should contain questions covering combined attributes, (2) the use of a different battery of evaluative questions for rural and

urban neighborhoods should be considered, and (3) questions on persons' intentions to move from their present residences should be added. Study data and a bibliography are provided. (Author abstract modified).

Marans, RW ; Michigan Univ., Ann Arbor. Inst. for Social, Research. Department of Housing and Urban, Development, Washington, DC. Office of Policy, Development and Research. HUD/PDR-474, Mar. 1979, 40p; Paper copy available from the Sup. of Docs., Stock number 023-000-00544-1.; Contract HUD-H-2257-78; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-173164

41 314364 THROUGH THEIR EYES, PART II: THE PEOPLE SPEAK. The report provides a summary of American attitudes toward transportation and various transportation policies, and is based on a survey conducted in December 1977. The survey found Americans expected major changes in their life style and that transportation was supposed to be a major contributor to those changes. The report finds a strong distaste for mandatory solutions to transportation problems, particularly gas taxes or fuel rationing. The public would also seem to support additional investment in public transportation relative to highways, in highway maintenance, and in rail systems. The report contains backup tables, and excerpts from the survey instrument used to develop the data.

Paulhus, NG, Jr ; Department of Transportation Final Rpt. DOT-I-78-2, Mar. 1978, 31p; See also part 4, PB-298 952.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-183346

41 315010 A SURVEY OF AMERICAN ATTITUDES TOWARD TRANSPORTATION. The U.S. Department of Transportation sponsored a major survey to examine the attitudes of American citizens toward transportation problems. The survey used a specially designed sample of 1538 people, chosen to represent a valid cross-section of the American adult population. The survey focused on determining the habits of Americans in using public and private transportation. It also covered the perceived relationships between transportation and other national issues as well as specific attitudes toward individual modes. This report contains the full results of the survey, as well as descriptive material on the sampling techniques involved. (Author)

Hart (Peter D) Research Associates, Incorporated, Department of Transportation Final Rpt. DOT-I-78-1, Jan. 1978, 249 p.; Contract DOT-OS-80025; ORDER FROM: NTIS

41 315159 DELAWARE RIVER PORT AUTHORITY TRANSIT IMPROVEMENT PROGRAM. VOLUME II: ENVIRONMENTAL AND SOCIAL PLANNING. TECHNICAL STUDY. The Delaware River Port Authority (DRPA) has been engaged, since June 1970, in progressing a comprehensive Mass Transit Study which was directed toward developing specific recommendations regarding the DRPA Mass Transportation Development Program. This three-volume study contains the eleven regional transportation-related technical studies conducted by the DRPA and sponsored by UMTA in coordination with the Delaware Valley Regional Planning Commission. Volume II, this report, contains the following project/final reports: 1) Environmental Impact Analysis (II); 2)

Improvements for Better Serving the Elderly and Handicapped (IX); and 3) Environmental Improvements to the Existing PATCO System (X). This report contains information regarding the projects evaluated environmentally, namely, the Philadelphia-Mt. Laurel Line, and the Philadelphia-Glassboro Line. The report examines methods of serving the elderly and handicapped and high speed rail transportation facilities operated by PATCO (Port Authority Transit Corporation); SEPTA (Southeastern Pennsylvania Transportation Authority); METRO (Washington Metropolitan Area Transit Authority); and MARTA (Metropolitan Atlanta Rapid Transit Authority). The report also reviews the need and recommends methods for providing environmental improvements to the existing PATCO system, such as noise abatement; station modification; user information services; landscaping for aesthetic improvements; and modifications to existing parking facilities.

Delaware River Port Authority, Delaware Valley Regional Planning Commission, Urban Mass Transportation Administration UMTA-IT-09-0032-80-2, Apr. 1978, 260 p.; See also Volume 1, PB80-186174. Report available in microfiche only.; ORDER FROM: NTIS; PB80-186182

41 316685 A REGIONAL TRANSIT PERSPECTIVE: PHASE 1. TRANSIT SERVICE AREA COMPARISON TO REGIONAL SOCIO-ECONOMIC AND TRAVEL CENTER PROFILE. This technical report reviews various aspects that are related to the public transportation systems in the OKI Region, an area encompassing nine counties in Ohio, Kentucky, and Indiana. These various aspects include the identification of those areas served by public transportation (i.e. either served by a demand responsive system or within a quarter mile of a fixed bus route) and the identification of major travel generators (e.g. colleges and universities, major places of employment outside the CBD's, hospital complexes, major shopping areas, high school, and cultural centers). Also, in those areas not currently served, several factors which would indicate a need for public transportation are analyzed. These include population density, level of automobile ownership, and percentage of the population that are minority groups, elderly and/or low income and hence more likely to use public transit.

OKI Regional Council of Governments Apr. 1980, 54p, Figs., Tabs.; Grant OH-09-0069; ORDER FROM: OKI Regional Council of Governments, 426 East Fourth Street, Cincinnati, Ohio, 45202

41 317414 AN ASSESSMENT OF THE BAY AREA RAPID TRANSIT (BART) IMPACT PROGRAM. This report is a brief summary of assessment of the BART Impact Program conducted by the Metropolitan Transportation Commission of the San Francisco Bay Area. Two federal agencies funded the Impact Program, started in 1972 to collect and analyze information about effects of this large public-works project so that the effects of Bay Area Rapid Transit could be understood and dealt with in its own region and so that other areas planning and operating rapid transit systems might benefit. The principal contributions of this study of effects of a major

new rapid transit system on a major metropolitan area can be found in its development and analysis of information about environmental effects, the effects on transportation and travel behavior, and the high costs of operating BART. Least successful elements dealt with effects of BART on land use, urban development and the local economy which are all long-term effects not sensitive to short-term study. The BART Impact Program demonstrates the importance of conducting impact studies of the effects of various transportation projects during implementation and suggest a method financing such investigations.

National Academy of Sciences-Natl Research Council 1980, 175 p., Figs., Tabs., 2 App.; ORDER FROM: National Academy of Sciences-Natl Research Council, BART Impact Program Advisory Committee, Washington, D.C., 20418

41 318092 TRANSPORTATION USERS: DEMANDS AND NEEDS. 1964-FEBRUARY, 1980 (CITATIONS FROM THE NTIS DATA BASE). The bibliography covers research on the needs and demands of transportation users. These users include the general public and specific groups including the elderly, the poor, commuters, and students. Most of the studies are concerned with urban mass transit systems and methods to predict their passenger usage. Studies covering specific localities as well as the U.S. in general are included. Predictions and needs of user groups are researched through questionnaires, counting techniques, and mathematical models. (This updated bibliography contains 170 abstracts, 26 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Final Rpt. Apr. 1980, 177p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-809411

41 318164 AN ANALYSIS OF USER COST AND SERVICE TRADE-OFFS IN TRANSIT AND PARATRANSIT SERVICES. The Xenia Model Transit Service served as a test of several alternative transit services operated in a small city setting. This project was undertaken as an aid to the evaluation of transit and paratransit systems in Xenia, Ohio, and as a test of a new technique for assessing travel demand. The technique, direct utility assessment, was designed to test a new method for assessing user trade-offs in costs and service based on attitudinal methods. A tradeoff survey was administered as part of a home interview survey. Data from the tradeoff survey were used to develop separate equations for each sample respondent to explain and describe their tradeoffs over transit fare, travel time, walk distance, type of service, and headway. An aggregate equation was also developed, assuming that all respondents shared common tradeoffs. These equations were employed to retrospectively predict changes in transit system patronage (since 1974). Both sets of models performed well, producing forecasts that were in the same direction and range of experience, although magnitudes were somewhat different.

Louviere, J Kocur, G ; Cambridge Systematics, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Final Rpt. DOT/TSC-UM927-R9742, Aug. 1979, 208p; Contract DOT-TSC-1405; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-192412

41 319277 MANCHESTER TRAVEL-TO-WORK SURVEY: SURVEY METHOD AND PRELIMINARY RESULTS. A travel-to-work survey of 3000 employed adults was carried out in three areas of greater Manchester. An inner area and two outer areas were selected for the study. This report gives a resume of the survey method and presents preliminary results on the differences of socio-economic characteristics and travel behaviour in the three study areas. The preliminary results show that the main components of travel behaviour (such as mode, journey distance and journey time) varied considerably between the three areas. Workers living in the inner area made much more use of public transport than those living elsewhere in the metropolitan area. The use of a car as the main mode of transport to work is generally higher in outer areas. It is notable that although the levels of motor vehicle ownership and licence holding are similar in the inner area and in Wythenshawe, car use is much higher in the latter area. The report also shows that journey distances were higher in Wythenshawe than in the inner area (specially for bus journeys). However, in the traditional suburb of Swinton and Pendlebury where the local employment base is strong, people tend to live and work in close proximity and journey distances were shorter than in the inner area and the proportion of walk journeys was high. Despite the shorter distances, the average journey time in the inner area was greater than that in Wythenshawe. (a) (TRRL)

Dasgupta, M ; Transport and Road Research Laboratory Monograph TRRL SR538, 1980, 27p, 9 Fig., 19 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247073)

41 319574 TRANSPORT MOBILITY AND DEPRIVATION IN INTER-URBAN AREAS. This book contains 10 chapters dealing with: (1) background and context to the study; (2) the selection by cluster analysis of the parishes for sample survey; (3) background to the survey, questionnaire and sample selection; (4) coding, editing and survey response rates; (5) mobility, travel patterns and levels of access in the survey parishes; (6) car availability, usage and sharing and attitudes towards public transport; (7) trade-off analysis of certain transport policy alternatives; (8) consumer choice for characteristics of alternative modes; (9) latent demand, transport deprivation and accessibility; (10) the policy context and conclusions. There are 4 appendices: (1) clustering procedures; (2) variables used in the cluster analysis; (3) trade-off game instructions; and (4) notes to table 9.6. An extensive bibliography and index complete the work. (TRRL)

Banister, DJ (Bartlett School of Architecture & Plan, England) ; Teakfield Limited Monograph 1980, 209p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL

41 319577 TRANSPORT STUDIES AND THE QUALITY OF LIFE. A definition of transport studies is offered with the claim that the purpose of this field of study is to obtain understanding that can be used to help to improve the economic, social, and physical conditions of people's lives to the extent that these are affected by the transport system and its use. A number of examples of this process in action in the fields of transport

planning, operation, and safety are described and discussed, emphasising how the achievement of improvements depends upon understanding not only what changes are likely to be beneficial but also how people will respond to attempts to bring about these changes. The examples are concerned with injury to occupants of colliding vehicles, accidents associated with driving after drinking alcohol, the competition between activities and movement for space in congested urban areas, and the operation of a main radial route into a city centre. In conclusion, current attempts to assess the wide range of effects that transport changes can have upon the quality of life are related to the writings of Jeremy Bentham, whose thinking contributed strongly to the foundation of University College London 150 years ago. (a) (TRRL)

Allsop, RE (Univ Of Hong Kong) Wong, VLP (Univ Of Hong Kong) *Environment and Planning A* Vol. 12 No. 3, Mar. 1980, pp339-356, 10 Fig., 2 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 247539)

41 319622 PASSENGER DATA COLLECTION MAKES ECONOMIC SENSE. Data needs to be collected and analysed as an aid to county council and bus operator management decision making. The authors describe the development and use of a system introduced by the county of Glamorgan some three years ago. A Swiss perforated data punch machine is used because it is easy to operate, is reliable and produces a computer compatible punched paper tape which needs to be changed only once a week. Uniformed bus company staff are used to operating the machine to collect data from every passenger on selected trips. The paper tape format is discussed and examples are given of its use of codes to denote such items as passenger class, type of ticket, trip purpose and waiting time. A zoning system has been developed for the county, with bus stops "pooled" into groups of up to nine located within individual zones. A suite of computer programs is used to produce a selection of bar charts and origin/destination matrices. Two types of survey have been employed-regular sampling and specific surveys. It is estimated that 100000 interviews will be completed annually from 1980 producing data that can be used to monitor proposals from the market analysis project (map) in addition to other schemes. (TRRL)

Surveyor - Public Authority Technology Vol. 4577 No. 155, Feb. 1980, pp11-13, 2 Fig., 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD 247849)

41 322222 URBAN ACTIVITIES, TRAVEL, AND TIME: RELATIONSHIPS FROM NATIONAL TIME-USE SURVEY. Results are presented on how people allocate time for their out-of-home activities, including related travel. The information is derived from analyses of the daily activity patterns of urban residents recorded in a 1975 national time-use survey. The analyses indicate a variety of relationships between out-of-home activity time, travel time, and household variables for weekdays and weekends. They also suggest broad out-of-home time budgets and travel-time budgets for households and persons. The detailed activity descriptions in the data base required considerable aggregation, the best results for which came from functional activity groupings rather than traditional land-use-based trip-purpose groupings. These functions were

related to scheduling and planning characteristics of the activities as well as their potential for substitution of individual participants. The analyses do not substantiate the fixed daily work schedule assumed by some activity analyses. Rather, daily work time is quite variable, and this variability is a primary independent variable explaining allocation of time to other activities. The relationships between these activities and work time were strengthened by the inclusion of in-home work time, confirming that some in-home household activities will affect out-of-home behavior. (Author)

Pant, PD Bullen, GR *Transportation Research Record* No. 750, 1980, pp 1-6, 5 Tab., 7 Ref.; This paper appeared in *Transportation Research Record* No. 750, Household Activities, Budget Constraints, and Stability of Travel.; ORDER FROM: TRB Publications Off

41 322679 METRO IMPACT STUDY II. This report is the second in a series of studies evaluating the potential for land use changes and new development in the vicinity of Metrorail stations. It was funded by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation. The information contained within this report has been reviewed by and received valuable guidance from the staffs of the Washington Metropolitan Council of Governments (COG) and the Urban Mass Transportation Administration. The primary purpose of this report is to address the types of land uses and activities which will be encouraged and explain how the proposed character will be integrated into the existing area fabric. The report covers 12 Metrorail stations in the District of Columbia. They are Foggy Bottom-GWU, Farragut West, McPherson Square, Federal Triangle, Archives, and Eastern Market all on the Orange Line of the regional system. Additional stations covered, all on the Red Line, are Friendship Heights, Tenley Circle, Farragut North, Rhode Island Avenue, Brookland, and Takoma. The report is divided into five sections, one for each ward discussed in this volume. Recommendations are directed towards long range goals and concepts and provide a framework for future development around the stations. There are three main sections included in each station analysis. In the first section, existing conditions and trends are analyzed. In the second section, planning problems are illustrated and potential development sites located. The third section offers proposals and recommendations concerning the long term kinds of development that should occur. These studies represent initial concepts and plans which, if carried out, could create viable community service centers related to rapid transit. (Author)

District of Columbia Planning and Dev Office Mar. 1980, 142p; ORDER FROM: District of Columbia Planning and Dev Office, 1420 New York Avenue, NW, 6th Floor, Washington, D.C., 20004

41 322799 THE DIFFERENTIAL IMPACT OF RESIDENTIAL LOCATION ON CHOICE OF MODE IN THE SAN FRANCISCO BAY AREA. The effect on location of residence when different forms of public transport are available in an urban region was examined with reference to the San Francisco Bay region. A survey was made of new residents with their

choice of location possibly being based on accessibility to the following modes: Bay Area Rapid Transit, Southern Pacific commuter trains, and bus. A model of modal choice was developed and conclusions of the study are listed.

McCarthy, PS (Purdue University) *Logistics and Transportation Review* Vol. 16 No. 1, 1980, pp 33-58, 2 Fig., 7 Tab., Refs.; ORDER FROM: British Columbia University, Canada, Faculty of Commerce, Vancouver V6T 1W5, British Columbia, Canada

41 324321 FACTORS INFLUENCING THE USAGE OF URBAN MASS TRANSIT. The interrelationships of situational variables, attitudes toward using public transportation, and specific object attributes were analyzed using multiple discriminant analysis. The analysis showed that "regular" users of the public transit system were those who used the system four times or more per month, and that these "regular" users hold similar attitudes to those who never use the system. The data also show that individual attitudes assume a more significant note in modal choice behavior than the more limited one assigned by other studies. Several classes of variables may be necessary to adequately predict ridership behavior. These classes relate to attitudes about specific attributes present in a particular transit system, general attitudes about the transportation system, and the socioeconomic and demographic characteristics of the rider. Travel behavior is a complex set and accurate predictive models should include not only the above mentioned, but also interrelated environmental elements. For the transit manager, this implies a coordinated market approach and a redefinition of what a public transit system is, and should do.

Belohlav, JA (Ball State University, Indiana) Shell, RL (Cincinnati University) *Logistics and Transportation Review* Vol. 16 No. 2, 1980, pp 99-108, 2 Tab., 30 Ref.; ORDER FROM: British Columbia University, Canada, Faculty of Commerce, Vancouver V6T 1W5, British Columbia, Canada

41 324463 TSM AND AUTO DISINCENTIVES IN RESORT AREAS. Destination resorts accommodate a large proportion of America's indoor and outdoor recreational activities. The very success of such major recreational attractions often creates substantial automobile-related conflicts with the quality of the attractions themselves, and with the cities or towns which form a part of their context. Experience has shown that high quality public transit alone is not likely to lure substantial numbers of tourists (or local residents) from their cars without auto disincentives. Based on a series of destination resort studies, a systematic approach to "controlling" automobile impacts through TSM has been developed. The analysis is based on disaggregating local travel, targeting specific trip-makers, and calibrating a combination of auto-disincentive measures. Pitkin County, Colorado, the site of Aspen and Snowmass, constitutes one of the largest year-round, automobile-based outdoor attractions in the country. Recently, the County embarked on an ambitious investigation of ways to "manage" the automobile through a wide range of auto disincentives. Based on an analysis of visitor and resident behavior, programs were developed including direct and indi-

rect measures aimed at both pre-arrival and on-site travel behavior. Innovative physical, economic, and regulatory measures were combined into strong and moderate disincentive programs with the help of citizen groups. These programs were tested along with transit improvement for their effectiveness in reducing congestion, noise and air pollution, and improving mobility and the quality of the visitor experience. The County has adopted a strong program and is seeking funding for implementation. The Pitkin County experience illustrates an approach which may be useful in other contexts. (Author)

Lockwood, SC *PRC P&E Tech Notes* Vol. 6 No. 2, 1980, 10p, 6 Fig.

41 325206 ATTITUDES AND URBAN TRAVEL BEHAVIOR: A CASE STUDY IN TRENTON, NEW JERSEY. This paper presents some results of an urban transportation-related attitude survey of Trenton, New Jersey. Changing views on the relationship of attitude and behavior are examined. The complexity of the relationship is stressed, as well as the multiplicity of factors affecting behavior and the importance of interaction among attitudes. The survey of Trenton's travel behavior is described.

Kornhauser, AL (Princeton University) Hunkins, LS *Journal of Advanced Transportation* Vol. 13 No. 1, 1979, pp 39-65, 21 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

41 325754 THE PUBLIC IMAGE OF PUBLIC TRANSPORT BY RAIL AND ROAD [Image de marque des transports collectifs ferroviaires et routiers]. The results of interviews carried out in different social groups has allowed the psycho-sociological factors which influence the attitudes of population groups towards local public transport to be analysed. The analysis is made in terms of the requirements for movement according to three variables: habit, obligation and desire. The dominant image is of the attachment to public transport and more particularly to transport by rail. [French]

Direction des Transports Terrestres Monograph Apr. 1979, 125p, Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 105811), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM: Direction des Transports Terrestres, Seretes, Boulevard Saint-Germain 244, Paris, France

41 325940 FINAL POLICY AND PROPOSED GUIDELINES ON CITIZEN PARTICIPATION IN LOCAL TRANSPORTATION PLANNING. With this notice, DOT issues a Policy Statement on Citizen Participation in Local Transportation Planning, as well as Proposed Guidelines on that subject. The Policy Statement clarifies and strengthens DOT's existing position of encouraging citizen participation in transportation planning. The Proposed Guidelines would support and amplify the Policy Statement by identifying and explaining key elements of active citizen participation; all concerned segments of the public are invited and urged to comment on these Proposed Guidelines. The Policy Statement will apply to all DOT requirements for citizen participation in the local transportation planning process. The Proposed Guidelines would also apply to the same require-

ments. These requirements are listed in the Appendixes. Appendix A lists Federal-aid programs; these are programs whose laws and regulations require State and local agencies using DOT funds to provide for public involvement in transportation planning and project development. Appendix A also includes brief explanations of how Federal-aid programs are administered in various DOT operating administrations. Appendix B lists other DOT requirements for citizen participation. (Author)

Federal Register Vol. 45 No. 2/2, Oct. 1980, p 71938 ORDER FROM: GPO

41 326475 THE ECONOMIC AND FINANCIAL IMPACTS OF BART (BAY AREA RAPID TRANSIT). The economic impacts of the San Francisco Bay Area Rapid Transit System's (BART) capital and operating expenditures on the Bay area's regional economy are assessed. The hypothesis that rapid transit in the Bay area would have an impact on regional economic development was not supported. Capital expenditures on BART, however, have had a positive short-term impact on the region's economy. The cost of building and equipping BART was about \$1.5 billion, of which \$1.2 billion was spent in the nine-county Bay area. Including all secondary impacts of this construction, the total increase in goods and services purchased in the region was \$3.1 billion between 1964 and 1976. Construction expenditures increased employment opportunity for minorities in the construction trades, but did not necessarily enhance minority job skills. BART's transit expenditures will have a total impact on the regional economy, including all the secondary sales and income generated, of nearly \$149 million per year, including an increase of nearly \$52 million annually in personal income.

Grefe, R McDonald, AN ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-04, Apr. 1979, 121p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001647. Prepared by McDonald and Grefe, Inc., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118093, DOTL NTIS

41 326478 IMPACTS OF BART (BAY AREA RAPID TRANSIT) ON BAY AREA INSTITUTIONS AND LIFESTYLES. The report focuses on the effects of BART on the Social Institutions and Life Styles of Bay Area residents. The project addresses the impacts of BART on three primary institutional spheres and their clients: local political institutions including community responses to BART; Institutions of Higher Education and their students; and Health Care Institutions and their clients. The study of life style impact focuses upon direct and indirect impacts of BART upon the use and experience of different transportation modes, commuters, household routines, family routines, and the family as an institution. BART has had limited impacts on Bay Area life styles and social institutions. It has had the greatest impact upon commuters from suburban residential communities to the central business districts of San Francisco and Oakland.

Minkus, D ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-06, Apr. 1979, 113p; Also

pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001681. Prepared by Jefferson Associates, Inc., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118127, DOTL NTIS

41 330166 SHORT-TERM IMPACTS OF A SUBURBAN RAIL RAPID TRANSIT STATION: STUDY RESULTS FOR SILVER SPRING, MARYLAND. Results of a before-and-after study for the Silver Spring station of the Washington, D.C., Metro rail rapid transit system are presented. The study focused on the short-term impacts on the Silver Spring business district of the initiation of rail service and coordinated changes in collector and community transit services. Findings are reported for several impact categories, including transit use, changes in travel habits, traffic and parking impacts, and the community's perceptions of Metro. There were significant initial increases in transit use in the station service area: about 100 percent for regional service and about 200 percent for local services. The percentage of transit work trips to Silver Spring increased from 10 to 13 percent. Approximately 40 percent of midday nonwork trips made by Silver Spring employees into the District of Columbia were made by Metro. Surveys at the station show that a significant proportion--approximately 60 percent--of Metro riders in the morning peak period get to the station by bus and another 16 percent walk. Parking became the most serious negative impact of the station; 1500 daily parkers were added to the parking supply in Silver Spring, which increased the peak-hour occupancy for long-term spaces from 80 to 92 percent. However, this was partly offset by increased use of transit to Silver Spring. Special attitudinal surveys of Silver Spring businesses and residents indicated that, in

spite of short-term problems, the overall impact of the station was positive. (Authors)

Winick, RM (National Capital Park and Planning Commission, Md) Smith, SA (JHK and Associates) *Transportation Research Record* No. 760, 1980, pp 1-7, 3 Fig., 5 Tab., 3 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

41 330167 PHILADELPHIA CENTER CITY COMMUTER RAILROAD CONNECTION. The city of Philadelphia has undertaken major construction to connect two separate commuter railroad systems in Center City to offer ubiquitous access to commuters. The rationale of such great investment in so small an area is explored. The basic theoretical justification is determined by the benefit/cost ratio, but physical impacts on passengers and service providers are also analyzed. Time saved is not evaluated in dollars. Commuter time savings produce no cash dollars to amortize costs but do generate more revenue and less expense, the net effect of which is favorable. The obvious direct advantages are not sufficient in themselves to fully justify the investment. The greater single positive factor is the revitalization of the Philadelphia central business district east of City Hall. This has already begun and is being coordinated with project construction. The city is expected to benefit by more than \$20 million/year in real estate and wage tax increases. Highway traffic will benefit from reduced congestion. Numerical values have been refined by various analysts over a period of 20 years. Data are based on final engineering plans, regional planning studies, and the author's work on the subject. To date, most of the actual construction bids have been near or below estimates, inflation notwithstanding. Double-digit

inflation may change this, but 90 percent of the contracts have now been let. The strategic importance of careful operational implementation in achieving the best results is also analyzed. (Author)

Tennyson, EL *Transportation Research Record* No. 760, 1980, pp 8-15, 6 Fig., 6 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

41 330257 SPATIAL ECONOMIC BEHAVIOUR. THE MICROECONOMIC FOUNDATIONS OF URBAN AND TRANSPORT ECONOMICS. The aim of this text is to provide a rigorous introduction to the analysis of various decisions involving a spatial dimension, and to integrate them more closely into a unified theory of spatial economics. There are four parts to the development of the analysis. First the economics of choice is extended to consider simple decisions about choice of travel mode and destination, residential and other locations and activities with a spatial dimension. Following this, various complications are introduced to cover choice under uncertainty, the theory of search, and conflicts between different groups of decision-makers in local economies. In the third part an attempt is made to relate the various sectors of the local economy together in both equilibrium and disequilibrium adaptive frameworks. Finally the various themes are drawn together with suggestions for future methods of analysis and planning in spatial economics. (TRRL)

Vickerman, RW (Kent University, England) ; Macmillan Press, Limited, (0-333-25851-7) Monograph 1980, 197p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 251126)

42 046705 URBAN AND REGIONAL GROUND TRANSPORTATION. The purpose of this textbook is to establish suitable course material that will bring into a proper perspective some of the dominant factors in ground transportation. It is divided in five main chapters: (1) Human Factors; (2) Planning Factors; (3) Technological Factors; (4) Economic Factors; and (5) Systems Factors.

Murray, JJ ; Planning-Transport Associates, Incorporated Text Book 1973, 474 pp; ACKNOWLEDGMENT: Planning-Transport Associates, Incorporated; ORDER FROM: High Speed Ground Transportation Journal, Box 4824, Duke Station, Durham, North Carolina, 27706 Orig PC

42 046369 TORONTO PUTS PUBLIC TRANSPORT FIRST. Transport policy in Metropolitan Toronto has swung from highway to public transport orientation in recent years. Cancellation of the half-completed Spadina expressway in 1971 has been followed by increased support for public transport operators, and more controversially by a search for new intermediate rapid transit technology. Tom Parkinson, who represents the Toronto Transit Commission on the Metropolitan Toronto Transportation Plan Review, discusses these changes and their effect on existing and planned commuter rail, rapid transit and tramway services.

Railway Gazette International Vol. 129 No. 6, June 1973, pp 212-215, 2 Fig, 3 PhotORDER FROM: IPC Transport Press, Repr PC

42 046703 STATEWIDE TRANSPORTATION PLANNING. The emerging statewide transportation planning process is described and compared to a typical transportation needs study. The view taken is that the statewide transportation planning process represents the gradual merger of transportation needs studies with the urban transportation planning process. Statewide transportation plans are now being developed for single modes, i.e., highways, considering (1) User as well as nonuser goals; (2) the formulation of alternative systems; (3) analytical models to predict the demand for future travel; and (4) comprehensive evaluation criteria. Also, traditional highway needs studies are being replaced by the National Transportation Planning studies which represents a starting point for estimating total transportation multimodal needs. As experience is gained with single mode transportation planning Studies, emphasis will be expected to shift to multimodal planning.

Wegmann, FJ Carter, EC *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE2, 9734, May 1973, pp 323-338; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

42 046713 A SURVEY OF URBAN ECONOMICS. A large literature has grown up in urban economics in the last decade. It can be broadly classified into: 1) studies of the growth, composition (industry and population), and spatial form of urbanized areas; and 2) analyses of problems such as congestion, discrimination in housing and employment, and the fiscal difficulties of cities. This paper concentrates on the former, where the contributions from other disciplines have been as important as those from economics. Part One of the paper deals with models of growth and intra-urban land use. Part Two is devoted to

urban simulation and efforts to build large scale statistical models for analyzing, among other things, the impact of alternative government policies on patterns of urban development.

Goldstein, GS Moses, LN (Northwestern University, Evanston) *Journal of Economic Literature* 1973; ACKNOWLEDGMENT: Journal of Economic Literature; ORDER FROM: American Economic Association, 1313 21st Avenue, South, Nashville, Tennessee, 37212 Repr PC

42 046714 PARTICIPATION PLANNING FOR BOSTON METRO-AREA TRANSPORTATION. Participation of private citizens, organized groups, and local officials in the transportation planning and decision-making process are important elements of the new approach to Boston metro-area transportation. Transit for access to the city center, improvement of existing transportation corridors, increased emphasis on local road and transit needs, the management of existing facilities for more efficient use and improved formulas for funding are goals of the new approach, after community objections led to the halting of work on two Boston area freeway projects.

Watford, JG *ASCE Civil Engineering* Apr. 1973, pp 78-81; ACKNOWLEDGMENT: ASCE; ORDER FROM: ASCE, Repr PC

42 046857 URBAN RAILWAYS IN LARGE CITIES: REFLECTIONS BEFORE THE LAUSANNE IRCA/UIC CONFERENCE. It used to be a rule of thumb in discussions about "urban" (usually underground) railways a generation ago that at the 2 million population mark a city was beginning to feel the need for an underground system; but the rise of the private motor car has already made something more like 1 million the "threshold" point, and Rotterdam and Oslo have found underground lines to be needed well before reaching the million mark. The suburban services of main-line railways make their contribution to big-city movement in different proportions.

Robbins, RM *Rail Engineering International* Vol. 3 No. 5, June 1973, 2 pp; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

42 046998 PATRONAGE AND REVENUE ESTIMATES FOR THE SAN FRANCISCO AIRPORT ACCESS PROJECT. In many cities around the world concurrent growth of air transportation and congested urban development around airports have created an urgent need for fast, reliable, and safe ground access between airports and areas which they serve. This paper discusses a particular aspect of ground access for San Francisco International Airport—an extension of the San Francisco Bay Area Rapid Transit System for about 10 miles (16 kilometers) from its existing terminus at Daly City. Background for the problem, the approach to solving it, and one major aspect of the solution thus far, the development of patronage and revenue estimates, will be described.

Altshuler, E Lathrop, WH *Traffic Quarterly* Jan. 1973, pp 65-76, 1 Fig., 9 Ref.; ORDER FROM: Eno Foundation for Transportation, Incorporated, P.O. Box 55, Saugatuck Station, Westport, Connecticut, 06880

42 047002 THE SCOPE FOR SUB-SURFACE TRANSPORT AND ITS INFLUENCE IN URBAN PLANNING. This article consists of the discussions of the three named men on this subject. The discussion includes planning for tunneling if tunneling becomes more common for cities, and more financially attractive. The philosophy of city center development is a factor. The resistance to highways predisposes the public toward subways.

Bridle, RJ (Department of the Environment, England) Copas, BA (Government Printing Office) O'Reilly, MP (Transport and Road Research Laboratory) *Tunnels and Tunnelling* Vol. 5 No. 4, July 1973, pp 333-339; ORDER FROM: Morgan-Grampian Limited, 30 Calderwood Street, London SE18 6QH, England Repr PC

42 047411 RECOMMENDATIONS FOR ANALYZING THE DEVELOPMENT OF RAPID TRANSIT IN SELECTED NORTH AMERICAN CITIES. The Secretary of the U.S. Department of Transportation requested qualified firms to bid on an analysis of 25 rapid transit systems in North America. In response BOSTI submitted Recommendations for Analyzing the Development of Rapid Transit in Selected North American Cities. This proposal documents the planning, systems design, implementation, and performance considerations of this systems. Also included is How to Write a Research Proposal, by Michael Brill.

Buffalo Organization for Social & Techn Innovation ; ORDER FROM: Buffalo Organization for Social & Techn Innovation, 812 Kenmore Avenue, Buffalo, New York, 14216 Repr PC

42 047903 STATE-OF-THE-ART IN URBAN TRANSPORTATION PLANNING OR HOW WE GOT HERE. The effect of three important conferences and government legislature on urban transportation planning is reviewed. Topics covered include environmental impact, land use, governmental cooperation, multi-modal transportation and citizen involvement.

Holmes, EH *Transportation* Vol. 1 No. 4, Mar. 1973, pp 379-401; ACKNOWLEDGMENT: EI (EI 73 047903); ORDER FROM: ESL, Repr PC, Microfilm

42 048013 URBAN TRANSPORTATION PLANNING. A major crisis confronting today's cities is the complex problem of transportation. Movement of both people and goods becomes increasingly slow, costly, unpleasant, and dangerous each year. Yet a wide knowledge gap exists between those with experience in transportation planning and those responsible for making decisions in the area. This book is specifically designed for those who need to know: engineers, urban planners, economists, government executives, businessmen, civic and political leaders. Focusing on overall planning methods rather than on specifics that change from city to city, Mr. Creighton discusses the large body of systematic knowledge now available about travel, land use, and transportation networks, and its significant implications for metropolitan and regional planning. He emphasizes the need for close coordination between transportation and land use planning, treats basic problems and policy issues of transportation, and describes the critical steps in the urban transportation planning process.

Creighton, RL; Illinois University Press; ORDER FROM: Illinois University Press, Urbana, Illinois, Repr PC

42 048021 THE ELEMENTS OF THE PLANNING OF A NEW RAPID-TRANSIT SCHEME. An urban service has a different function from the outer-suburban service for the needs of commuters. Need for careful selection of the route and branches. The factors affecting line capacity; selection of a new line; planning of stations and interchanges.

Follenfant, HG (Mott, Hay and Anderson) *Rail Engineering International* Vol. 3 No. 6, July 1973, 3 pp; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

42 048163 RAIL'S PLACE IN THE CONURBATION TRANSPORT SCENE. More than 300 delegates attended last month's enlarged IRCA Management Committee meeting in Lausanne to examine both the opportunities and problems posed by acceptance of rail as the primary passenger transport mode in large urban agglomerations.

Railway Gazette International Vol. 129 No. 7, July 1973, pp 261-264, Figs ORDER FROM: IPC Transport Press, Repr PC

42 048190 THE MAKING OF CITIES. Until recently planning was a technical subject understood only by professionals and specialists. But nowadays planning problems in general, and urban problems in particular, are invading every aspect of life. More and more people of all kinds want to be able to understand the issues and to participate in debate and action. It is of course impossible to participate effectively without understanding the subject. And the subject of planning is extraordinarily complex and hard to grasp. Urban planning has undergone radical changes in recent years and is now using a highly sophisticated methodology with its own language which is virtually incomprehensible to the uninitiated. As the planning process diversifies, so the range of disciplines which come together in the planning team expands—physical planners, architects and engineers are joined by, amongst others, economists, sociologists and management scientists. Within this context, a vast new literature has been produced in recent years by professional planners and specialists for their professional colleagues in an effort to advance the frontiers of knowledge in various fields of planning. Chapter 8 deals directly with urban transport, and chapter 13 has material on urban transportation planning.

Bor, W; Barnes and Noble Books Book 256 pp; ORDER FROM: Barnes and Noble Books, 49 East 33rd Street, New York, New York, 10016 Repr PC

42 050318 PLANNING A NEW URBAN TRANSIT COMPANY. The author outlines in detail the necessary steps in developing various voyage pro formas for the management of a proposed hydrofoil transportation network to serve the New York metropolitan area. Once operations begin, the pro forma figures constitute management's initial budget which can be altered as actual operation experience and costs become available.

Boyle, ET *Management Advisor* Sept. 1973, pp 15-26; ACKNOWLEDGMENT: Management Advisor; ORDER FROM: American Institute of Certified Public Accountants, 666 5th Avenue, New York, New York, 10019 Repr PC

42 050325 PLANNING FOR IMPROVED TRANSPORTATION OF PEOPLE AND GOODS IN URBAN AREAS. The Port Authority of New York and New Jersey is responsible for certain other types of transportation as well as ocean transportation. The Port Authority makes use of various planning tools including sampling techniques to plan the facilities provided by it. Most recently, the Port Authority has assumed responsibility for the airports in the area. The Port Authority Trans Hudson Corporation took over the Hudson & Manhattan Railroad in 1962 and now operates it as the PATH rapid transit line. New cars were purchased and new or refurbished terminals are being provided, and ridership has increased.

Gilman, RH; National Academy of Engineering 1973, pp 76-85; The Chapter is from Transportation and the Prospects for Improved Efficiency, Eighth Autumn Meeting of The National Academy of Engineering, 12-13 October 1973.; ORDER FROM: National Academy of Sciences, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

42 050441 STATE EYES RAIL LINE. Preliminary studies are underway in the Bureau of Urban and Public Transit within the Department of State Highways and Transportation to determine feasibility of a modern commuter rail line between Detroit and Ann Arbor. The proposed rail service would utilize trackage owned by the Penn Central railroad and be subsidized with state and federal funds.

Michigan Roads and Construction Vol. 70 No. 43, Oct. 1973, p 4 ORDER FROM: State Review Publishing Company, P.O. Box 780, 302 Hollister Building, Lansing, Michigan, 48903 Repr PC

42 050654 COMPUTER PROGRAMS REDUCE TRANSIT PLANNING. A new library of computer programs for transit system analysis, design and evaluation can take years of transit planning. TRANS-ADE, developed by BRH Mobility Service Co., Houston, is composed of six programs. They include passenger flow analysis, vehicle-train performance analysis, vehicle-train operations simulation, operating and maintenance cost analysis, and cost flow analysis. BRH can take data gathered by other agencies about a proposed system or can generate its own input for clients. The programs can simulate a system in conception and go on through planning, design, engineering, and actual operation and management, accurate for over 30 years, according to BRH.

Engineering News-Record Feb. 1973, p 34 ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020 Repr PC

42 050660 MULTIMODAL NATIONAL URBAN TRANSPORTATION POLICY PLANNING MODEL. This multimodal version of the model system of the Transportation Resource Allocation Study employs aggregate modeling techniques that treat each urban area as a single

analysis unit. A level of investment is specified, and within that level are mixes of 4 types of transportation facilities: freeways, arterials, conventional bus, and rapid transit. For each alternative, travel projections are made on the basis of both socioeconomic variables and the nature and extent of the transportation system. Travel is split between automobile and transit modes. System performance measures are estimated on the basis of the interaction of system supply and travel demand. Travel times and costs are calculated for each mode. In addition, the model calculates external effects such as land consumed, air pollution, and fatalities. The model tested the effects of 12 alternatives consisting of 4 mixes of transportation facilities for the 63 urbanized areas that will have populations of more than 500,000 in 1990.

Weiner, E (Office of the Secretary of Transportation) Kasso, E (Maryland Department of Transportation) Gendell, DS (Federal Highway Administration) *Highway Research Record* Vol. N No. 58, 1973, pp 31-41, 13 Fig, 9 Ref; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

42 050800 ON DEVELOPING A MODEL FOR COORDINATING MULTI-MODAL TRANSPORTATION PLANNING WITH LAND USE PLANNING. The paper addresses the issue of developing a model which would provide a methodological approach to multi-modal transportation planning which would be coordinated with land use planning. The research focuses on the task of integrating multi-modal considerations into the land-use allocation technique called TOPAZ, a computer process which was created to provide a workable tool to aid in sketch-plan generation and analysis.

Scholl, RA Dickey, JW; Virginia Polytechnic Institute & State University June 1973, 63 pp; ACKNOWLEDGMENT: NTIS (PB-223900/2); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223900/2

42 050856 TRANSPORTATION PLANNING IN THE SAN FRANCISCO BAY AREA-A HISTORY OF INSTITUTIONAL FRUSTRATION. This article presents a brief description of the transportation situation in the Bay Area, and a short history of the transportation planning processes in that area. The area has the typical American urban situation, widely divided authority shared by numerous counties and cities. The Metropolitan Transportation Commission was established in 1970. MTC will decide such issues as whether there will be a BART extension to Livermore, etc.

Watt, PC; National Academy of Engineering 1973, pp 179-185; Transportation and the prospects for Improved Efficiency, Symposium sponsored by the National Science Foundation, Department of Transportation, Department of Housing and Urban Development and the National Academy of Engineering at the Eighth Autumn Meeting, 12-13 October 1972.; ORDER FROM: National Academy of Engineering, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

42 050857 CHICAGO PLANNING AND DEVELOPMENT. This article describes transportation planning and development in the Chicago area, including the median strip rapid transit

operations in several freeways. Mention is made of the special evening and night operations to reduce the crime hazard to passengers.

Pikarsky, M ; National Academy of Engineering 1973, pp 201-218, 11 Fig; Transportation and the Prospects for Improved Efficiency, Symposium sponsored by the National Science Foundation, Department, of Housing and Urban Development Department of Transportation and National Academy of Engineering, at the Eighth Autumn Meeting, 12-13 October 1972.; ORDER FROM: National Academy of Engineering, 2101 Constitution Avenue, NW, @ashington, D.C., 20418 Repr PC

42 050858 A MULTILEVEL SYSTEM FOR DOWNTOWN DALLAS. This article describes transportation planning for Dallas, including a proposed downtown subway, and a proposed regional system involving rail transit to the regional airport.

Ponte, V ; National Academy of Engineering 1973, pp 219-252, 34 Fig; Transportation and the Prospect for Improved Efficiency, Symposium Sponsored by the National Science Foundation, Department of Housing and Urban Development, Department of Transportation and the National Academy of Engineering at The Eighth Autumn Meeting, 12-13 October 1972.; ORDER FROM: National Academy of Engineering, 2101 Constitution D.C. 20418, Repr PC

42 051508 ESTIMATION OF OUTPUT MEASURES FOR TRANSPORTATION SECTORS: 1947 AND 1958. The report provides detailed historical estimates of private and for-hire transportation activities for 1974 and 1958. The detail matches that of other work on the Department of Transportation input-output model for 1965 and 1970 with projections to 1980. Thus, the data are useful for developing trends which can be compared with projected future growth. The report is also valuable in that it presents data sources and methodologies which can be used in further developing historical series on transportation activities.

Woehicke, C ; Faucett (Jack) Associates Final Rpt JACKFAU-73-54C, Aug. 1973, 122p; Contract DOT-OS-20096; ACKNOWLEDGMENT: NTIS (PB-224747/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224747/6

42 051555 THE ROLE GROUND TRANSPORTATION CAN PLAY IN THE AIRPORT SITE SELECTION PROCESS. This paper relates significant aspects of the mass transit system analysis activity associated with the recent South Florida Airport Site Selection Program. The configuration, performance, cost, and service characteristics of the quasi-conceptual ground access transportation systems continually represented one of the main decision factors as the Review Authorities deliberated on each candidate airport site. Discussion of the transportation system impact on these deliberations is essentially the prime objective of this presentation.

McGinnis, NF (TRW Transportation and Environmental Operations) ; American Society of Mechanical Engineers Paper 73-ICT-70, Sept. 1973, 16 pp, 11 Fig, 7 Tab; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27,

1973.; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL

42 051895 TRANSPORTATION PLANNING IN 1875: THE AMERICAN SOCIETY OF CIVIL ENGINEERS AND THEIR PLAN FOR RAPID TRANSIT IN NEW YORK CITY. This paper is concerned with an early example of urban transit planning. During much of the period before the Civil War, American cities were restricted in their spatial growth by the absence of a system of public transit. Cities such as Boston, Philadelphia, and Pittsburgh were essentially "walking cities" with very high densities in their core areas. In the 1840's and 1850's, however, the development of omnibus lines, of streetcar systems, and of commuter railroads allowed a number of middle and upper class urbanites to move from the central city to less congested residential areas. Increased distance separated workplace and residence, and journey to work patterns by public transit developed. The omnibus and the horsecar, however, due to their relatively slow speed, did not solve the transit problems of large cities. New York City, especially, which more than doubled in population from 1840 to 1860, suffered from high population densities and congestion. The result of this situation was a plethora of proposals for rapid transit, some of which provided for subways, others for depressed roadways, and many for elevated roads. The profusion of plans for a New York rapid transit system motivated the American Society of Civil Engineers to appoint a committee in 1874 to investigate the question and to make recommendations. The ASCE committee examined seventy-five proposals and recommended the building of an elevated system, one line to run along Third or Fourth Avenue east of Central Park and one to run along Seventh, Eighth, or Ninth Avenues west of the Park. The report had a large impact on the deliberations of the New York Rapid Transit Commission of 1875 which authorized the building of New York City's first successful elevated rapid transit lines. These lines penetrated relatively unpopulated areas, allowing the city's population to spread beyond the previously built-up sections.

Tarr, JA (Carnegie-Mellon University) *High Speed Ground Transportation Journal* Vol. 7 No. 2, June 1973, 24 pp, Figs, 12 Ref; ACKNOWLEDGMENT: High Speed Ground Transportation Journal; ORDER FROM: ESL, Repr PC, Microfilm

42 051899 TRANSIT PROGRAM FOR HOUSTON. The City of Houston organized the "Transit Action Program" to evaluate the feasibility of specific transit improvements in the Houston urban area. The work and report are a continuation of preliminary transportation and transit planning done by the Texas Highway Department and the Houston-Galveston Area Council. However, Transit Action Program work is the first in-depth investigation in recent times of short-and long-range mass transit needs. The new technical work has been complemented by a major effort to involve the community to a degree not commonly attempted, with significant and satisfying benefits from a better understanding of citizen attitudes and desires.

Voorhees (Alan M) and Associates, Incorporated Sum Rpt 1973, 41 pp, 2 Fig, 1 Tab; The preparation of this report has been financed in part through a grant from the U.S. Department of

Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964, as amended.; ORDER FROM: NTIS, Repr PC; PB-220864, DOTL HE4491.H6V6

42 052067 AMERICAN GROUND TRANSPORT. A PROPOSAL FOR RECONSTRUCTING THE AUTOMOBILE, TRUCK, BUS, AND RAIL INDUSTRIES. This report, which was presented to a Senate Subcommittee, is primarily concerned with competition in the transportation industry. It contains sections on the demise of street railway and interurban electric railway systems, of the political opposition to rapid transit, and on the replacement of New Haven electric locomotives by diesels. The report blames the economic power of certain auto makers for many of the present day transportation problems in the U.S.

Snell, BC ; Government Printing Office 27-540 0, Feb. 1974, 103 pp, Tabs, Photos, Refs; Presented to the Subcommittee on Antitrust and Monopoly, Committee of Justice, U.S. Senate, Feb. 26, 1974.; ORDER FROM: GPO, Repr PC

42 053734 ECONOMIC BALANCE SHEET. To improve rail passenger services in the large conurbations, it is necessary to undertake certain operations, or carry out certain projects. The term operation (or project), is understood to mean an investment and operational programme. The economic balance sheet must enable a reply to be given to the following questions: (a) Financial justification of the operation: is the operation envisaged worth the trouble, or is it worth-while from an economic point of view? (b) Choice of the optimum date for carrying out the operation: should, from the economic point of view, the proposed investment be made immediately, or at what date in the future? (c) Choice between various alternatives for an operation: of a number of alternatives for the same operation which arise, which is to be preferred from an economic point of view? (d) Classification of several operations which it is possible technically to carry out simultaneously, which are those to which preference should be given from an economic point of view?

Baumgartner, JP (Swiss Federal Railways) *Rail International* No. 1, Jan. 1973, 14 pp, Figs, Tabs; ORDER FROM: ESL, Repr PC, Microfilm

42 053760 S-BAHN IN HAMBURG. Renowned for its integrated transport system, Hamburg is now concentrating on developing its S-Bahn system. The responsibility for the provision of public transport in the Hamburg conurbation is vested in the Hamburger Verkehrsverbund (HVV). This body was established in 1965 and is responsible for planning, marketing, and publicity, together with the organization and financing of public transport. There are eight partners in the HVV and it is they who operate the bus, express bus, tram, U-Bahn, S-Bahn and ferry services. The Hamburg conurbation covers approximately 50 km by 60 km (30 miles by 40 miles) and has a population of 2.4 million.

Hellewell, DS *Modern Railways* Vol. 31 No. 304, Jan. 1974, 5 pp, Figs, Tabs, Photos; ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England Repr PC

42 053826 PASSENGER TRANSPORT AUTHORITIES IN THE UNITED KINGDOM. THE RAIL CONTRIBUTION. This editorial provides a review of planning and operations of passenger services on the various levels in the United Kingdom. Both Urban and Intercity passenger transportation are covered, but the emphasis is on local transportation.

Beagley, TL, Deputy Secretary (Transport Industries Dept of the Environment, Eng) *Rail International* No. 11, Nov. 1973, 7 pp; ACKNOWLEDGMENT: Rail International; ORDER FROM: ESL, Repr PC, Microfilm

42 053835 ALTERNATIVE MULTIMODAL PASSENGER TRANSPORTATION SYSTEM: COMPARATIVE ECONOMIC ANALYSIS. The objectives of this project were to review currently used methods of evaluating the economics of alternative transportation systems, develop a framework within which to evaluate the economics of alternative multimodal metropolitan transportation systems, and develop quantification methods for such factors as accessibility and capacity that relate them to all modes. The research was to include sensitivity analysis to identify those aspects of a modal investment policy that have major impacts on the output variables and therefore should be included in the results presented to transportation decision makers.

Frye, FF (Creighton, Hamburg, Incorporated) *NCHRP Report Prog Rpt.* No. 146, 1973, 68 pp, 27 Fig., 37 Tab., 96 Ref., Apps.; ORDER FROM: TRB Publications Off

42 053987 NATIONAL TRANSPORTATION POLICY--THE BASIC PREREQUISITE FOR PROGRESS. The fact is that large segments of our transportation systems are unreliable, inefficient and wasteful; their environmental impact is often harmful; but above all, one of the basic findings of the Doyle Report from 1961, that our national transportation does not represent a system, is probably as correct today as it was at that time.

Vuchic, VR (Pennsylvania University, Philadelphia); Vuchic (Vukan R) Mar. 1974, 11 pp; ORDER FROM: Vuchic (Vukan R), Towne Building, 220 South 33rd Street D3, Philadelphia, Pennsylvania, 19174 Repr PC

42 054344 COMMUTING PATTERNS OF INNER-CITY RESIDENTS. This article reports on the extent of suburban jobholding by inner-city residents in six major U.S. cities and the mode of transportation they use to get to those jobs. The proportion of inner-city workers who commuted to suburban jobs ranged from about one-tenth in Houston and New York to more than one-third in Los Angeles. In each of the areas, inner-city men were more likely to travel to suburban jobs than women. In every area except Los Angeles, a larger portion of blacks traveled to the suburbs than whites. The role of transportation in determining where inner-city residents usually work is difficult to isolate, since other influences were clearly present.

McKay, RV *Monthly Labor Review* Vol. 96 No. 11, Nov. 1973, pp 43-48; ORDER FROM: GPO, Repr PC

42 054452 AN ANALYSIS OF SYSTEM TRADEOFFS TO IMPROVE ACCESS TO SPECIAL GENERATORS. The objective of the study is to identify the role of alternative transportation systems in providing access to special areas, such as airports, universities, shopping centers, hospitals, etc. A computerized model was developed and applied to an urban university, located in a hypothetical city. Results indicate that efficient, frequent, low cost service will encourage increased patronage by the model university community. To alleviate the expense of providing costly service additions to the entire regional transit system, specialized transit services such as express shuttle bus service might be instituted.

Wegmann, FJ Ojo, J Kennedy, M; Wisconsin University, Milwaukee Final Rpt Aug. 1973, 158 pp; ACKNOWLEDGMENT: NTIS (PB-228349/7); ORDER FROM: NTIS, Repr PC, Microfiche; PB-228349/7, DOTL NTIS

42 054540 FOSTERING URBAN TRANSPORTATION ACTIVITIES IN UNIVERSITIES: RECOMMENDATIONS TO THE URBAN MASS TRANSPORTATION ADMINISTRATION. The study is the outcome of the exploration an UMTA commissioned study team at George Washington University (GWU) to undertake an investigation of the possibilities of university-based centers for urban transportation. After discussion of scope and method of approach, findings and recommendations are put forth. Among findings is that UMTA grants to universities have significantly increased the amount of research produced and students trained in the field of urban transportation. Also found was that whether a university is public or private has little relevance to its ability to serve as a resource for a region larger than a single state, although other institutional characteristics may affect this ability.

George Washington University, (UMTA-DC-11-0004) Final Rpt Feb. 1974, 113 pp; ACKNOWLEDGMENT: NTIS (PB-229613/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-229613/5

42 054541 DES MOINES AREA TRANSIT STUDY (DATS). The study analyzes transit service and needs in the Des Moines, Iowa, urban area. The study was designed to provide equitable and practical immediate action and short-range improvement programs, guidelines for long-range transit planning. The present status of public transportation is examined. Land use and population data were developed, and transit characteristics and patterns discerned. Continuance of present operations without assistance, a municipal operation, a metropolitan transit authority, or payment of direct subsidy to the private owner are considered alternatives.

Des Moines City Plan and Zoning Commission, (UMTA-IA-09-0003) Final Rpt July 1973, 226 pp; Prepared in cooperation with Alan M. Voorhees and Associates, Inc., St. Louis, Mo.; ACKNOWLEDGMENT: NTIS (PB-229669/7); ORDER FROM: NTIS, Repr PC, Microfiche; PB-229669/7

42 054654 DOT SECRETARY BRINEGAR: "I CAN SEE A HARDER THRUST TOWARD RAIL." In an interview, DOT Secretary Claude S. Brinegar discussed the energy crisis and its

impact on railways. He predicts a continued growth in rail freight and a strong revival of inter-city and urban rail passenger traffic. The fuel shortage is creating problems in obtaining diesel fuel but it is not yet critical. Brinegar is strongly opposed to nationalizing the railways and believes that the problems can be solved by private ownership. He is also very critical of the present government attitude to urban rail transit. He believes that cities should be required to finance a larger proportion of the cost of urban transit and there should be an incentive program attached to federal funds that would encourage the cities to operate efficient transit systems.

Lewis, RG Miller, LS *Railway Age* Vol. 175 No. 2, Jan. 1974, 4 pp; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: XUM, Repr PC

42 054738 SYSTEMS APPROACH TO COST-BENEFIT ANALYSIS OF URBAN TRANSPORTATION. The government and public are currently considering how increases in traffic congestion, land committed to freeways, and air pollution might be simultaneously ameliorated by suitable new rapid transit systems. What is not clear is the extent to which people would actually use new rapid transit systems, and what some of the indirect socioeconomic effects might be if they did. The overall objective of urban transportation analysis is to study the effects of a new transportation system such as the rapid transit, on the environment and on the socioeconomic conditions of a city.

Sastry, MVR (Chico State College) *Transportation Journal* Vol. 12 No. 3, 1973, pp 39-45, 2 Fig, 3 Tab, 5 Ref; ACKNOWLEDGMENT: Transportation Journal; ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr PC

42 054755 ISSUES IN PUBLIC TRANSPORTATION. This is the report on a conference held in July 1972. At the first general session, discussion focused on problems in the entire field of public transportation. The second session, on the financing of public transportation, covered collective bargaining, subsidies, fare-box revenues, and the interrelation of service costs, quality, and quantity. The third session covered operations, the fourth session covered marketing, and the fifth covered the role of the professional in developing strategies and his relation to the administrator.

Transportation Research Board Spec Rpt #144, 1974, 130 pp, Figs, Refs; Proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972.; ORDER FROM: TRB, Repr PC

42 054763 REAPPRAISING METROPOLITAN TRANSPORTATION NEEDS. The purpose of this paper is to describe: (1) The process used to reappraise the transportation needs in Boston, Mass., and the results of that endeavor; (2) the new and revitalized comprehensive, cooperative, and continuing transportation planning process that has been established throughout Massachusetts as a means of bringing the transportation decision-making process closer to the citizens of the Commonwealth; and (3) the relationship of the new transportation planning process to the development of the Action Plan, a

recent requirement of the Federal Highway Administration. The experience of the BTPR was utilized in establishing similar open and participatory planning processes throughout the state. This has resulted in a shift in emphasis, from a centralized planning effort in Boston, to a locally based planning effort focusing on the 12 regional planning agencies that encompass nearly all the 351 communities in Massachusetts.

Humphrey, TF *ASCE Journal of Transportation Engineering Proc Paper* Vol. 100 No. TE2, #10532, May 1974, pp 353-362; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

42 054808 PROBLEM SOLVING IN URBAN TRANSPORTATION. After recalling the various theories on the subject, this article suggests in particular that transport policy-making must begin at the level of a district in the town, and be aimed first of all at creating satisfactory local living conditions for the inhabitants, taking into account their specific needs, which may differ widely from one town area to another (well-off districts, pensioners, ghettos, etc.).

Barkley, BT *Traffic Quarterly* Oct. 1973, 12 pp; ACKNOWLEDGMENT: UIC (7); ORDER FROM: Eno Foundation for Transportation, Incorporated, Westport, Connecticut, 06880 Repr PC

42 054918 WHICH U.S. CITIES NEED RAIL TRANSIT? BRINEGAR HEDGES. Two opposing programs on the future of urban transportation are being debated in Washington. On one side is the Nixon Administration represented by DOT's Secretary Brinegar that is arguing for the Unified Transportation Assistance Program (UTAP) that will promote buses and discourage rail systems and offer transit subsidies on a population basis. On the other hand are the transit planners and operators that argue that UTAP will provide less money for major projects than is currently available, that population formula subsidies would help the cities that least need it and that other systems than buses must be considered in some cases.

Railway Age Vol. 175 No. 7, Apr. 1974, pp 34-35
ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: XUM, Repr PC

42 056762 SYSTEMS APPROACH TO MASS TRANSPORTATION. Construction of a mass transit system is usually among the largest of civil projects, running into billions of dollars. The disruptive act of building exclusive mass transit rights-of-way through densely populated areas will further aggravate existing modes of transportation. The general case of a metropolitan area whose population is in excess of a million people is examined with regard to selection and design of a mass transportation system. Systems that can handle 100,000-200,000 passengers during morning and evening rush hours are discussed.

Harrison, RH ; Society of Automotive Engineers Preprint N740224, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740504620); ORDER FROM: ESL, Repr PC, Microfilm

42 056784 ANALYSIS OF SATELLITE AIR TERMINAL SYSTEM. A systems approach is used to analyze the concept for large metropolitan areas. A mathematical model formulates the

problem as a fixed charge selection-allocation problem, and computes optimum locations for the satellites in the megalopolis. The analysis enables comparison among the transportation modes used to transfer passengers between the satellite collection ports and the main airport. A heuristic algorithm is used in conjunction with the model to compute locations for collection ports when a rapid transit network is used.

Sud, IK (International Bank for Reconstruction and Develop) Gray, P *ASCE Journal of Transportation Engineering Paper* Vol. 99 No. TE4, Nov. 1973, pp 935-953, 22 Ref; ACKNOWLEDGMENT: EI (EIX740203441); ORDER FROM: ESL, Repr PC, Microfilm

42 056826 STRESS MODEL FOR MASS TRANSIT SYSTEMS. The variables which describe a mass transit system are combined in a statistical model to produce a new set of mutually independent variables called principal components which also describe the system. The principal components are combined in a generalized n-dimensional model which in three dimensions is identical to the shear and normal stress on the octahedral plane, a well-known concept from engineering mechanics. The normal stress is a measure of the system's tendency to grow without structural change; the shear stress is a measure of the tendency to change structurally without growth. These stresses are compared with the energy and employment requirements and dollar of various bus systems.

Hannon, B (Illinois University, Urbana) Puleo, F American Society of Mechanical Engineers Paper N73-WA/Ener-5, Nov. 1973, 10 Ref; ACKNOWLEDGMENT: EI (EIX740303056); ORDER FROM: ESL, Repr PC, Microfilm

42 056882 MASS TRANSIT: WHAT ARE THE LIMITS? The reconfiguration of urban design, the reduction of pollution, and the democratization of the transportation system can be achieved by mass transit. However, there are other urban problems that would remain largely unaffected. These include economic ills, the nature of urban politics, fiscal problems, urban crime, and urban education. The means of transportation--autos, buses, trains--have no value in themselves. Their value is merely functional. The same can be said of the city. The city and the transportation network in combination can be considered as a communications system.

Cornehls, JV Taebel, DA ; Consulting Engineer Vol. 42 No. 3, Feb. 1974, pp 128-135; ORDER FROM: Consulting Engineer, 217 Wayne Street, St Joseph, Michigan, 49085 Repr PC

42 056889 RELATIONSHIPS BETWEEN THE TRANSIT OPERATOR AND THE REGIONAL PLANNING AGENCY IN A LARGE METROPOLITAN AREA. Previous arrangements have resulted in a mismatch between the kinds of transportation facilities that are locally desired and the kind that can be delivered by existing federal and state transportation agencies. If this is to be overcome, such relationships will have to change. Many of the freeways in the area have been mandated by state and federal plans. The newly created nine county Metropolitan Transportation Commission will fail in its charge without fundamental changes in existing financing and institutional arrangements in the San Francisco region.

Watt, P (Metropolitan Transportation Commission) Dahms, LD (Bay Area Rapid Transit District) *Highway Research Record* #475, 1973, pp 14-17; This article is one of seven reports prepared for the 52nd Annual Meeting of the Highway Research Board and is contained in the Highway Research Record entitled "Federal, State, and Local Roles in Transit Planning" which sells for \$1.80.; ORDER FROM: TRB

42 056890 THE STATE'S ROLE IN THE TRANSIT ASPECTS OF LONG-RANGE TRANSPORTATION PLANNING. This paper describes the role of Penn DOT in transportation. It states the goals and discusses the steps taken to realize the goals. It concludes with some recommendations to the federal government to facilitate urban mass transit programs and transportation system planning.

Kinstlinger, J (Pennsylvania Department of Transportation) *Highway Research Record* #475, 1973, pp 26-29, 1 Ref; This article is one of seven reports prepared for the 52nd Annual Meeting of the Highway Research Record entitled "Federal, State, and Local Roles in Transit Planning" which sells for \$1.80.; ORDER FROM: TRB

42 056946 JOURNEY TO WORK PATTERNS OF TRANSPORTATION CONSUMERS AMONG THE URBAN DISADVANTAGED.

The primary objective of this study of journey-to-work patterns of transportation consumers among the urban disadvantaged was to determine the problems these workers have in getting to their jobs. Cost, time and mode of transportation of low-income workers in selected cities were analyzed by race, earnings, occupation and industry. The impact on employment opportunities of the suburbanization of industry in the metropolitan areas of these cities has also been assessed. The 12 cities selected for study were: Atlanta, GA; Buffalo, NY; Dayton, OH; Denver, CO; Houston, TX; Louisville, KY; Miami, FL; Milwaukee, WI; Portland, OR; San Francisco, CA; Washington, DC; and Wichita, KS. Ethnic data are also included.

Piovia, ES Hill, RB Leigh, W ; National Urban League, Incorporated Final Rpt Dec. 1973, 12p

See also PB-230704.; Contract DOT-OS-10191; ACKNOWLEDGMENT: NTIS (PB-230703/1); ORDER FROM: NTIS, Repr PC, Microfiche; PB-230703/1, DOTL NTIS

42 056947 JOURNEY TO WORK PATTERNS OF TRANSPORTATION CONSUMERS AMONG THE URBAN DISADVANTAGED.

The transportation problems of the disadvantaged residents of poverty areas are particularly acute, since they do not either live or work in the CBD's. The central business district is often encompassed by census tracts defined as poverty or low-income areas. Moreover, because disadvantaged poverty area residents constitute a relatively small segment of the total metropolitan area population, their transportation needs are often overlooked. In order to place the transportation needs of the urban disadvantaged in proper perspective, the report examines the extent of suburbanization of industries in metropolitan areas in order to assess their impact on future employment opportunities of disadvantaged workers in the central cities. It then seeks answers to some critical questions.

Piovia, ES Hill, RB Leigh, W ; National Urban League, Incorporated Final Rpt Dec. 1973, 184p; See also PB-230 703; Contract DOT-OS-10191; ACKNOWLEDGMENT: NTIS (PB-230704/9); ORDER FROM: NTIS, Repr PC, Microfiche; PB-230704/9, DOTL NTIS

42 056951 TEST AND EVALUATION OF DATA FROM THE STANDARD PACKAGE OF CENSUS DATA FOR URBAN TRANSPORTATION STUDIES. The census data consist of 1970 census of population and housing data which were specifically selected and assembled for use in the urban transportation planning process. It is based on the 15 and 20% census count data which were assigned to locally used small areal identifiers such as traffic zones. The socioeconomic data is assembled into zone of residence and zone of work tables. In addition, there is a home-to-work trip table by mode of transportation. Phase I of this project tests the validity of the zone of residence data by comparing it to local data and other census sources. Phase II of this project determined the usability of the Standard Package in the transportation planning process. The analysis of the Standard Package led to a number of recommendations and conclusions about its contents. These include comments on the usability of the current package, recommendations to the user, and suggestions for improving it.

Howell, K Davenport, A ; Middle Rio Grande Council of Government Final Rpt Apr. 1973, 192p; Contract DOT-FH-11-7930; ACKNOWLEDGMENT: NTIS (PB-231168/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231168/6, DOTL NTIS

42 056992 LINEAR CITY: RAPID TRANSIT AS A DETERMINANT OF URBAN FORM. A STUDY BY THE DEPARTMENT OF ARCHITECTURE. The purpose of the study was to forecast and describe some of the physical planning implications of implementing innovative types of public transportation in the Dallas-Ft. Worth region. In this context, the authors have sought to document conclusions about some of the physical implications of the use of rapid transit to structure new forms of urban development and to depict impressions of the increased quality of life possible in these transit-structured communities. The study approach consisted of developing generalized concepts for structuring new urban growth based upon transit, and then particularizing these concepts by applying them to specific parts of the Dallas-Ft. Worth region.

Texas University, Arlington, (UMTA-TX-11-0001) Sept. 1973, 51 pp; ACKNOWLEDGMENT: NTIS (PB-231540/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231540/6, DOTL NTIS

42 057165 TUNNELING FOR TRANSPORTATION. This paper discusses the role of the transportation tunnel. The state-of-the-art is discussed for tunneling technology, and general areas needing research and development are identified. The problems to be solved are difficult ones; they will require a high degree of technical competence and innovation on the part of those who solve them. With a projected demand greater than \$14 billion for the decades of the 70's and 80's, achievable technological improvements leading to 30 percent cost savings and 100-200

percent increases in construction rates will produce savings of over \$2 billion for the Nation. Additional fringe benefits related to an improved environment and better energy utilization cause the transportation tunnel to be called an important tool for achieving national goals.

Foster, EL (Department of Transportation) ; American Society of Mechanical Engineers 1973, pp 143-152, 1 Fig, 6 Ref; Presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, Nov. 11-15, 1973, sponsored by the Applied Mechanics Division and the Automatic Controls Division. Papers presented at this meeting are compiled in "Surveys of Research in Transportation Technology", AMD-Vol. 5; ACKNOWLEDGMENT: ASME; ORDER FROM: ESL, Repr PC, Microfilm

42 057258 RAIL TRANSIT: THE OPERATORS VIEW. Rail transit has contributed to the development and maintenance of the vital urban core in American cities. Those that have central business district subways have retained the strength and vitality evidenced in Chicago's Dearborn Street, Philadelphia's Market Street and Manhattan's 6th Avenue. The two distinct, but closely interrelated, aspects affected by rail transit are: its influence on the physical shape of the community, and its influence on the community's economy.

Chicago Transit Authority 28 pp, Figs., 3 Tab., Photos; ACKNOWLEDGMENT: Chicago Transit Authority; ORDER FROM: Chicago Transit Authority, P.O. Box 3555, Merchandise Mart Plaza, Chicago, Illinois, 60654 Repr. PC

42 057344 TRANSPORTATION AND EQUITY: TOWARDS A FRAMEWORK FOR DISTRIBUTIVE ANALYSIS. The report addresses the need to be beyond the consideration of social, economic and environmental impacts of transportation planning in the aggregate, and take into account the detailed distribution of positive and negative effects of transportation planning decisions on various subgroups with specific needs and disadvantages. Distributive analysis can help to open up the politics of transportation planning by making complex information more accessible, raising hidden issues and sparking debate. If accompanied by explicit attention to distributive effects at new points in the planning process, an expanded range of possible interventions to consider strategies outside transportation itself, and bringing new participants into the planning and decision making process, along with a new set of roles and expectations, distributive analysis can make possible more equitable policy outcomes.

McKoy, JH Harris, J ; Association of Bay Area Governments, (HUD-CPA-CA-1028) ABAG-HUD-1028-2.01-A, Sept. 1973, 56 pp; Conference on Transportation Horizons: Rebuilding Urban Environments held at Berkeley, Calif. on 20-25 Sep 73; ACKNOWLEDGMENT: NTIS (PB-232188/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232188/3, DOTL NTIS

42 057345 SOME EXAMPLES OF UNDERGROUND DEVELOPMENT IN EUROPE. This report describes six developments where considerable use has been made of the underground to provide transport facilities. Three are part of the planned transport network for Brus-

sels, two are multi-modal interchanges at the middle of Essen and the La Defense development near Paris and the last is an underground road junction in Rome. The schemes show how the underground can be used in solving central urban transport problems.

O'Reilly, MP ; Transport and Road Research Laboratory TRRL-LR-592, 1974, 35p; ACKNOWLEDGMENT: NTIS (PB-231959/8); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231959/8, DOTL NTIS

42 057350 PLANNING MODE SELECTION AND ECONOMIC FEASIBILITY REPORT CHARLOTTE-HENRIETTA TRANSIT CORRIDOR, VOLUME I. PLANNING AND PRELIMINARY MODE SELECTION. The purpose of the report is to provide the necessary documentation by which an evaluation may be made of the economic and technical feasibility of the proposed Charlotte-Henrietta Rapid Transit System in Rochester, New York. Presented are an analysis of present conditions, the determination of future transit requirements and an initial analysis of alternative transportation systems. Requirements for rapid transit are based on population projections, employment projections, existing land use, proposed land use plans, patronage projections and resultant service characteristics. The three alternative rapid transit modes which best satisfy all of the criteria established for Rochester were the grade separated conventional rail, light rail and busway system.

Rochester-Genesee Regional Transportation Auth, (UMTA-NY-09-0006) Tech Study Feb. 1974, 322 pp; Prepared by Corddry, Carpenter, Dietz, and Zack Engineers, Rochester, N.Y.; ACKNOWLEDGMENT: NTIS (PB-232347/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232347/5, DOTL NTIS

42 057353 URBAN TRANSPORTATION POLICY: AN ANNOTATED BIBLIOGRAPHY. The purpose of the bibliography is to provide a collection of material dealing exclusively with urban transportation policy. It is designed to enable policy analysts, planners and government officials to understand how urban transportation policy is formed and how current arrangements may be altered to influence future outcomes. The bibliography is organized to emphasize the demands that shape policy, the institutional framework that constrains policy alternatives and how these factors shape supply strategies. Sections present overviews of urban transportation problems and prospects, literature on the demand or input side of transportation, transportation decision-making and management, policy-making arrangements in the U.S., transportation facilities and foreign transportation policies.

Stroh, PAL ; Michigan University, Ann Arbor, (UMTA-MI-11-0001) Nov. 1973, 120 pp; ACKNOWLEDGMENT: NTIS (PB-232264/2); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232264/2, DOTL NTIS

42 057369 A SHORT-RANGE TRANSIT DEVELOPMENT STUDY. These memoranda provide background and supporting information pertaining, to the existing transit system in the Tuscaloosa, Alabama urban area. The procedures and assumptions used in the development of

performance indices and other data contained in the final report are identified. Peak-period directional passenger counts showing present patronage trends are discussed and a table presented showing transfer volume on the existing system. Also presented is the analysis and evaluation procedure used to develop the proposed transit system as described in the final report.

Tuscaloosa County Parking and Transit Authority, (UMTA-AL-09-0003) Tech. Memo Mar. 1974, 50p; Prepared in cooperation with Bartholomew (Harland) and Associates, Memphis, Tenn. See also PB-232 332.; ACKNOWLEDGMENT: NTIS (PB-232333/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232333/5

42 057507 MODAL SPLIT AS AN ESSENTIAL LINK BETWEEN LAND USE PLANNING AND TRANSPORT PLANNING. Modal split, the choice between different modes or means of transport, has nowadays become a slogan, at present especially related to the promotion of public transport. To take an influence on modal split, however, is not as simple as is often assumed. That is because the modal split depends on several, different influence factors such as the urban structure, the social importance of the transport system, the standard of living, etc. Moreover, each traffic category has its own intrinsic laws so that, even in this respect, a corresponding classification appears to be called for. In the present paper, the attempt is made, first of all, to survey the essential features under the headings of urban development, society, and space planning, and secondly, to illustrate by practical examples modal split models for different traffic categories.

Hidber, C Kobi, F (Federal Technical University, Switzerland) *Rail International* No. 3, Mar. 1974, pp 239-251, 12 Ref.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL, Repr. PC, Microfilm

42 057524 HANDBOOK ON URBAN PLANNING. Urban planning is one of the most pressing subjects of the times with the majority of the people living in urban areas in North America and Europe and those areas continuously growing. The motivation of the authors also includes their desire to place in the hands of planners (professional and lay) a positive and useful book (a) to offset the dire predictions of the future, so in vogue, with principles, methods, and standards of planning that will ensure a hopeful instead of a hopeless future, (b) to recognize the order and abundance that exists and to capitalize on them for the benefit of all, and (c) to instill a faith in man's ability to solve any problem he makes. Several uses are intended for the handbook in the fields of education, professional planning, and political science in Canada, the United States, and other American nations.

Claire, WH (Gathers (Charles) and Associates) Benckert, KW, Special Assistant to Group Executive-ICO (International Telephone and Telegraph) Goetsch, HA, Commissioner of Public Works (Milwaukee, City of, Wisconsin) Mayer, HM (Kent State University) Riley, RH (Bartholomew (Harland) and Associates); Van Nostrand Reinhold Company Book 1973, 393 pp, Figs, Tabs.; ACKNOWLEDGMENT: Van Nostrand Reinhold Company; ORDER FROM: Van Nostrand Reinhold Company, 450 West 33rd Street, New York, New York, 10001 Repr. PC

42 071622 REPORT ON JOINT CONFERENCE ENO FOUNDATION BOARD OF DIRECTORS AND BOARD OF CONSULTANTS NOVEMBER 7 AND 8, 1973. This two-part report, summaries of panel discussions, deals with Trends in Transportation Policy and then with Issues in Transportation Development. Transportation accounts for 20% of the Gross National Product of the U.S. and about 55% of the transportation portion involves passenger movement (by all modes, including the private automobile). The changing involvement of government is covered in its various facets with particular attention given to railroad and transit problems.

Traffic Quarterly Vol. 28 No. 3, July 1974, pp 325-370 ORDER FROM: Eno Foundation for Transportation, Incorporated, P.O. Box 55, Saugatuck Station, Westport, Connecticut, 06880 Repr. PC

42 071766 PROGRAMMING APPROACH TO URBAN TRANSIT PLANNING. A mathematical programming model based on the objective of maximizing net social benefits is developed to evaluate the effect of introducing a personal rapid transit system into the Minneapolis transit environment. The initial solution modeled on the Minneapolis Cordon Count considers the model characteristics of a system consisting of auto, bus, and PRT. The assumption that the demand for transit is a given function of transit characteristics underlies the derivation. The two characteristics of fare and time per trip are considered. Two sets of simulations are conducted. The first consists of the analysis of changes in transit demand. The second consists of changing the modal service characteristics which involves changing the average trip time. The major conclusions are: (1) The introduction of PRT is likely to result in a greater relative reduction of automobile than in bus use; (2) changes in PRT demand and efficiency have small effects on auto and bus use; and (3) reduction in the relative time of a bus trip to be the key to increasing bus utilization.

Roe, T Shane, M *ASCE Journal of Transportation Engineering* Vol. p 57 No. -584, 7 Fig. 3 Tab., pp 571-584; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

42 071768 TRENDS IN URBAN TRANSPORTATION. This paper develops a comparative basis for examining trends in urban transportation. The important variables included in the study are indicative of vehicle capacity, demand density, and size of the transportation system in vehicles per square mile. Related variables such as privacy, residential density, travel cost, and convenience in terms of waiting time are also considered. Trends in transit usage since the turn of the century are reviewed to gain insight into the relative importance of the variables and to estimate possible trends in transit service developments during the remainder of the century. It is shown that new door-to-door demand activated transit systems can fill an important gap in urban transportation services.

Notess, C *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE3, 9955, Aug. 1973, pp 655-674; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

42 071972 URBAN PUBLIC TRANSPORT IN THE UNITED STATES. The fuel shortage, plus emission control requirements on cars that decrease fuel efficiency, should contribute to alternatives for buses and automobiles for transportation. Systems described include rapid transit line haul, rubber-tire rapid transit, modified bus service, door-to-door service (dial-a-bus) and major activity center distribution techniques. Romualdi, JP (Canadian Transport Commission) *Transportation Planning and Technology* Vol. 2 No. 3, 1974, pp 195-204, 2 Fig., 1 Tab., 4 Ref.; ACKNOWLEDGMENT: EI (EIX740904868); ORDER FROM: ESL, Repr PC, Microfilm

42 072037 PUBLIC TRANSPORT IN THE ADELAIDE METROPOLITAN REGION. The metropolitan Adelaide area is relatively uncongested for a city of its size. Current and predicted future expansion is on a north-south axis. In planning transportation for the area, objectives include maintaining the environmental quality of the area, using existing facilities fully, and keeping costs at a level justifiable on an economic basis. At present, public transport is most used during peak periods. This pattern is expected to continue. It is to be encouraged in order to avoid traffic congestion at these hours. Fare and parking policies will be used to accomplish this. The five-year transport plan will bring the existing network to a standard necessary to serve the existing city. This includes electrification of some routes, vehicle purchases, and rail extensions. Further expansion will be made in the long-term (thirty year) program.

South Australia Department of Transport Sept. 1973, 64 pp; ACKNOWLEDGMENT: TSC; ORDER FROM: South Australia Department of Transport, Adelaide, South Australia, Australia Repr. PC

42 072078 MAN SHALL HAVE PRIORITY. A GUIDE TO TRANSPORTATION POLICY [Der Mensch hat Vorfahrt. Kurshuch fuer die Verkehrspolitik]. The transportation policy of the Federal Republic of Germany is to be determined by social needs, rather than by technical and economic considerations. This paper explains the detailed effects of this attitude on specific modes and issues. Projections based on current population, land use, production and transportation patterns indicate an increase in private automobile transportation, and hence an increase in public transit deficits, traffic accidents, pollution, and highway building in crowded areas. Road transport is expensive, and because most of the costs are borne by the general public in taxes, the expense is hidden. In addition, the time lost to traffic congestion lowers production. Therefore, public transportation is a major priority, for both passengers and goods. Specific measures are noted in traffic safety, infrastructure policy, legislative policy, and international policy. Lauritzen, L ; Ministry of Transport, West Germany 31 pp; ACKNOWLEDGMENT: TSC

42 072105 URBAN TRANSPORTATION IN METROPOLITAN ADELAIDE. This working paper contains four separate reports selected to demonstrate four alternative responses to the transport land use interrelationship in metropolitan Adelaide. The first paper, entitled, "Land Use and Transportation Planning discusses road hierarchies, the need for bus routes, and the potential for rail access in the "North-West Development

area". The second paper looks at existing transport facilities and services and how better use can be made of them. The third paper discusses "Staggered or Flexible Working Hours". It reviews the experience of staggered working hours and flexible work time around the world. The fourth paper, "Some Environmental Aspect of a Transportation Problem and/or Solutions", looks at the environmental implications of transport in six subdivisions in metropolitan Adelaide. The author emphasizes the domination of the automobile in subdivision planning, and the fact that if we must worship the car, perhaps we can do it more cheaply both in terms of finance and human lives. He suggests increased use of "T" junctions in subdivisions rather than cross-roads.

Adelaide University, Australia Dec. 1974, 107 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TSC

42 072137 ILLUSTRATION OF TRANSPORT ECONOMY 1974. As indicated by the title "Illustration of Transport Economy '74", this book presents Japanese transportation economic trends and developments up to 1973 by graphs. The first chapter "Social Economic Activities" includes general topics such as public transportation services, Gross National Products, and etc. The second and third chapters deal with the trends of national cargo and passenger transport. Chapter 4.: International Transport; chapter 5.: Transportation and Energy; chapter 6.: Big City Traffic versus Light Traffic; chapter 7.: Organization of Traffic Facilities; chapter 8.: Transportation Labor and Management; chapter 9.: Modernization of Transportation; chapter 10.: Traffic Accidents and Hazards; and chapter 11.: Comparing Japan to Other Countries. [Japanese]

Japan Transport Economics Research Center Mar. 1974, 114 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TSC

42 072139 NEW TOWN TRANSPORT TASK STUDY. The prime objective of this study has been to examine transport/land use system parameters for a new town in order to provide standards and performance criteria within planning of a transport system, without cars, can be undertaken. Secondly, a framework and guideline to enable the evaluation of alternative transport plans which might be considered appropriate to a new town of the order of 200,000 population. The two main phases included historical data studies which were analyzed to establish broad standards of performance for transport systems in Australian cities. The second phase of the study has been aimed at testing the sensitivity of transport system operations to changes in urban structure, in particular the location and density of residential and employment centers, and to changes in actual transport system operating characteristics. It was concluded that city planning should be closely integrated with the planning of public transport services.

Pak-Poy (PG) and Associates Pty Limited Feb. 1975, 56 pp, Figs., Tabs., 1 App.; ACKNOWLEDGMENT: TSC

42 072145 PUBLIC TRANSPORTATION. VOLUME 29, NUMBER 5-6. This issue of *Trasporti Pubblici*, May-June 1972, contains articles on: (1) disk brakes; a comparison is made between disk and drum brakes, with particular regard to mechanical and technical characteris-

tics. Particular attention is given to dealing with the problem of vibrations; (2) the transporting of dangerous goods, which is increasing all the time. The experiences abroad are discussed, together with some proposals to restrict itineraries and loads; (3) harbor policy in the European community; (4) an article on the problems of vehicle braking; (5) vehicle safety through the study of impact, e.g. decelerations affecting the passenger compartment in case of front-end collisions, both against another vehicle and against a standing obstacle; (6) the International Conference on Vehicle and Traffic Safety, and (7) the effects of impact between two vehicles. Calculation is made of the values which may be assumed for safety headway intended as minimum between two vehicles. [Italian]

Trasporti Pubblici Vol. 29 No. 5-6, May 1975, 139 pp, Figs., Tabs., Photos. ACKNOWLEDGMENT: TSC

42 072164 MODERN TRANSPORT: THREE CANTOR LECTURES. This issue contains three articles on the subject of transportation. The first entitled, *An Integrated Transport System*, attempts to see where the line should be drawn and what scope there is for integrating the components which together make up Britain's transport system. The author suggests that the scope for integration lies primarily in those areas where there is severely wasted competition between the available systems leading to either a surplus, of transport capacity or to deprivation of means of transport. The prime examples may be listed as follows: (1) urban areas where the car competes with public transport services, which leads to an excess of car traffic; (2) direct competition between road and rail for long-distance passenger transport; (3) direct competition between road and rail for both long and short-haul freight transport. This is an extremely difficult field. No one doubts the value of rail haulage for the long distance transport of bulk commodities such as coal, iron ore, cement and petroleum products; (4) direct competition between cars and buses in rural areas. The author concludes that it is futile to talk of integration unless all the authorities concerned can develop a common outlook and agree on the objectives, including the professional staffs behaving in the same manner.

Royal Society of Arts, Proceedings Vol. 122 No. 521, Feb. 1974, pp 107-178 ACKNOWLEDGMENT: TSC; ORDER FROM: Royal Society of Arts, London, England Repr. PC

42 072173 ILLUSTRATED TRANSPORT ECONOMY OF JAPAN 1974. This is a fully illustrated version of the 1974 transport economy of Japan. It includes chapters on economic and social activities; aspects of domestic goods transport; domestic passenger transport; international transport; transport energy; large city traffic, including bus lanes, subsidies for local buses and coaches; improvement of transport facilities with a chart reflecting underground railways; management and labor aspect of transport enterprises; modernization of transport showing charts on expansion of the freightliner network and modernization of aircraft. Chapter 10, which discusses traffic accidents and environmental pollution by transport, contains charts on causes of death; railway accidents; road traffic accidents; marine accidents; air accidents; composition of exhaust gas from motor vehicles; airport noise; and deaths caused by traffic accidents in the world's major countries.

Japan Transport Economics Research Center ; ACKNOWLEDGMENT: TSC; ORDER FROM: Japan Transport Economics Research Center, (105) 1, Shibakotohira-cho, Minato-ku, Tokyo, Japan Repr. PC

42 072346 TRANSPORTATION ECONOMICS: GUIDE TO PUBLICATIONS. Each chapter of this report is followed by an extensive list of publications pertaining to the respective subject. The first chapter, transportation problems in economic and social development covers such topics as social overhead capital, recession and investment, industrial location, development planning, motorization, and transport policies. It notes that a new type of community must be constructed which will fit the coming new high-welfare society. The second chapter deals with the problems of air and noise pollution, environmental standards, and energy. The third chapter advocates that technological developments should be determined by their suitability to the society they are intended to serve. The chapter on public subsidy and financial burdens for public transportation heavily emphasizes the fact that the old regulations for public transport fares must be changed so that the revenue from fares can sustain the operational costs of all public transport agencies. The next chapter, the function of intra-city transportation modes identifies the transportation problem in inner-and intra-cities over congestion. The intra-city transportation problem is rising due to the increase of commuters and transportations inability to meet their new needs. The final chapter deals with the movement of passengers and freight and points out that future transportation planning must take into account leisure travel, as well as freight terminals which facilitate the transportation of freight from their terminal to the consumer.

Institute of Transportation Economics July 1975, 78 pp, 6 Fig.; ACKNOWLEDGMENT: TSC

42 072456 SPATIAL EQUILIBRIUM AND JOURNEY TO WORK. The length of the journey to work may depend on choice of residence from a fixed job site or on choice of job from a fixed residence. The authors consider the factors that influence both in southeast England, and the effects on males and females separately. The authors suggest that rising car ownership increases the variance of journey-to-work lengths, and that the changing demands for skills may also be influential.

Beesley, ME (London Graduate Business School) Dalvi, MQ (Leeds University, England) *Journal of Transport Economics and Policy* Vol. 8 No. 3, Sept. 1974, pp 197-222; ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England Repr. PC

42 072470 TRAVEL DEMAND, MODE CHOICE, AND SYSTEM ANALYSIS. The seven papers examine various aspects of travel demand, modal choice and system analysis. The first examines the effects of a fare reduction in Atlanta. The second paper investigates the potential for gradually restructuring urban areas to reduce the built-in requirements for transportation. The third studies the socioeconomic characteristics of commuters and the transport service characteristics they value in their choice of mode

for work trips. Two papers consider the problems of airport access. A methodology called Special Area Analysis is described in the sixth paper. The final paper describes the problem of integrating system and project planning to include all community and environmental concerns.

Transportation Research Record No. 499, 1974, 94 pp, Figs., Tabs., Refs. ORDER FROM: TRB, Repr. PV

42 072495 PARAMETRIC ANALYSIS OF TRANSIT SYSTEM CAPACITY. In designing a passenger transportation system, two problems are the total passenger carrying capacity and the sensitivity of this capacity to variations in performance characteristics of the operating and control equipment. This paper presents a faster, more direct method than has been available to answer these questions. The equations, examples and graphs presented show that a typical urban transit route employing on-line passenger stations, trains about 450 ft long and approximately 20 second dwells can be expected to carry an average 600 ppm while operating at scheduled headway of 90 seconds and approaching stations at up to 70 mph. The calculations are a guide to early estimating of carrying capacity in a wide scope of transportation systems.

Burgess, PM (Kaiser Engineers) ; Institute of Electrical and Electronics Engineers, (74 CHO 833-41A) Proceeding Part 1, 1974, pp 323-338, 8 Fig., 3 Tab.; This paper was presented at the Ninth Annual Meeting of the IEEE Industry Applications Society, Pittsburgh, Pennsylvania, 7-10 October 1974.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

42 072558 METROPOLITAN TRANSPORTATION PLANNING. While emphasizing the transportation planning process, the contributors to this volume offer an insight into an interdisciplinary approach to solving metropolitan transportation problems. Consisting of engineers and planners as well as an architect, urban designer, and landscape architect, these contributors provide a modular "problem solving" framework into which further information on various aspects of metropolitan transportation planning can be integrated. Information on different types of transportation service and impact problems is included as well as discussion on goal identification techniques. Relevant legislation and land use control mechanisms and mathematical programming techniques in solution generation and specification are offered.

Dickey, JW (Virginia Polytechnic Institute & State University) ; McGraw-Hill Book Company ISBN 0-07-016795-8, 1975; ACKNOWLEDGMENT: McGraw-Hill Book Company; ORDER FROM: McGraw-Hill Book Company, 1221 Avenue of the Americas, New York, New York, 10020 Repr. PC

42 072659 PRINCIPLES OF URBAN TRANSPORT SYSTEMS PLANNING. The processes involved in urban transport strategic planning are described in depth and within a systems type framework by the author of this precedent-setting text. Recent advances as well as the commonly used analytical methods are described thoroughly. The first part of the book covers the techniques used to estimate the travel demands that are likely to be created by a given land use arrangement including trip generation analysis,

modal split analysis, trip distribution analysis and traffic assignment analysis. A family of Lowry type land use models is presented and current applications of these models to regional spatial planning are discussed. Other topics covered by this book include transport technology, concepts of urban structure, economic evaluation, urban information sources and urban goods movements.

Hutchinson, BG (Waterloo University, Canada) ; Scripta Book Company 1974, 444 pp; ACKNOWLEDGMENT: Scripta Book Company; ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020 Orig. PC

42 072697 PROBLEMS OF TRAFFIC CONGESTION AND OF COMMUTERS IN THE PLANNING OF METROPOLITAN AND RAILROAD SERVICES [I problemi della congestione del traffico e dei pendolari nella pianificazione dei servizi metropolitani e ferroviari]. Individual automobile transport as the main cause of traffic congestion in urban areas and the remedies to solve the commuter problem are considered. The system adopted in London by the British Transport Commission, to keep quite separate urban transport from suburban and regional is explained and recommended. A comparison is made between short distance and inter-city commuter services, which involves change of trains and the accompanying difficulties. It is suggested that metropolitan lines be gradually extended to the points where there is sufficient traffic intensity, with a traffic distribution as uniform as possible, attempting to balance it on two radial sections of a transversal line of the city. [Italian]

Patrassi, A *Ingegneria Ferroviaria* Vol. 29 No. 5, May 1974, pp 17-22; ACKNOWLEDGMENT: EI (EI 74 065265); ORDER FROM: ESL, Repr. PC, Microfilm

42 072767 TRANS GUIDE: A COMPENDIUM OF INFORMATION ON PUBLIC TRANSPORTATION WITH EMPHASIS ON CALIFORNIA. The changing role of the State Department of Transportation, exemplified by the emerging Division of Mass Transportation, has revealed a need for a central source of reference on other transit organizations, both in State and nationwide. This guide was developed in response to that need. In addition to organizational information, this volume contains several reports on the status of "State of the Art" of various transit modes and transit related operations.

California Department of Transportation Jan. 1974, Figs., Tabs.; ACKNOWLEDGMENT: California Department of Transportation; ORDER FROM: California Department of Transportation, Division of Mass Transportation, Sacramento, California, 95807 Repr. PC

42 072860 CITIZEN PARTICIPATION IN TRANSPORTATION PLANNING: THE BOSTON EXPERIENCE. This book examines "citizen participation" and the way it influences changes in basic public policy. It focuses on the recent experience of metropolitan Boston with its transportation plan and program—a program which was dramatically altered by recent decisions of the governor of Massachusetts to scrap

plans for completing expressway projects that had been in the process of construction for some years. Behind the governor's decisions is the story of a new method of doing business in transportation planning, a method that among other features called for "public participation" in the process of drawing up plans and recommending programs.

Sloan, AK ; Ballinger Publishing Company 1974, 180 pp; ACKNOWLEDGMENT: Ballinger Publishing Company; ORDER FROM: Ballinger Publishing Company, 17 Dunster Street Harvard Square, Cambridge, Massachusetts, 02138 Repr. PC

42 080046 ADVANCED SYSTEMS AVAILABLE NOW. The steady decline of mass transit systems in the United States has led to a critical condition which is destined to become much worse before it improves. Only mass transit systems offer real solutions to cities' problems of congestion, pollution, energy consumption and fatalities. Modern transportation systems are available now to cope with the problem.

Beck, NJ (Rohr Industries, Incorporated) ; Institute of Electrical and Electronics Engineers 73 CHO 783-1 AES, 1973, pp 66-72; IEEE Electron and Aerospace System Conv, Rec, Washington, D.C., 17-19 September 1973.; ACKNOWLEDGMENT: EI (EI 74 065258); ORDER FROM: ESL, Repr. PC, Microfilm

42 080212 SOUTH SHORE RAIL RAPID TRANSIT EXTENSION. PRELIMINARY IMPACT STUDY. The major goal of the report is to increase the understanding of impacts of this transit extension with the view toward the planning of future extensions. The major data source for the study was a ridership survey. The questionnaire was developed to determine a variety of ridership characteristics and transit extension impacts; i.e., time of use, mode of transportation to the station, previous mode of travel, origin, destination, reasons for use, propensity to transfer, time saved or lost, and a variety of socio-economic characteristics. A sample questionnaire is included in this report. Chapters include the introduction-methodology, historical review, planning considerations, engineering design aspects, ridership characteristics, impacts on traffic volume and patterns, economic impacts, and land use impacts. Conclusions are presented. A bibliography is furnished.

Boston Metropolitan Area Planning Council, Urban Mass Transportation Administration, Massachusetts Bay Transportation Authority, (UMTA-MA-09-0010) Oct. 1973, 175 pp; ACKNOWLEDGMENT: NTIS (PB-237048/4ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237048/4ST, DOTL NTIS

42 080419 SOFTWARE SYSTEMS DEVELOPMENT PROGRAM. DEMAND MODEL SELECTION MANUAL. The manual describes procedures for selection of demand models used in forecasting urban travel. It was prepared for UMTA under its Software Systems Development Program (SSDP) and is designed as an integral part of the UMTA Transportation Planning System (UTPS). The purpose of the manual is to instruct the planner on how to develop criteria and formulate hypotheses to guide the selection and testing of demand models in the context of overall travel forecasting process.

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Cambridge Systematics, Incorporated, (UMTA-IT-06-0050) URD.PMM.75.5.1, June 1974, 53p; See also PB-236847 thru PB-236-849, TRIS 080419-080422.; Contract DOT-UT-20020; ACKNOWLEDGMENT: NTIS (PB-236089/9SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236089/9SL, DOTL NTIS

42 080420 SOFTWARE SYSTEMS DEVELOPMENT PROGRAM. INTRODUCTION TO URBAN TRAVEL DEMAND FORECASTING. SUMMARY. The summary report serves as a guide to Volumes I and II. An overview of UTPS is presented and the purposes of travel forecasting in terms of sketch planning and long-range and short-range planning are discussed. Within the scope of transportation planning, the range of options, impacts and principles are considered. Guidelines to the use of the manual are outlined. References are furnished.

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Cambridge Systematics, Incorporated, (UMTA-IT-06-0050) URD.PMM.74.3.1, Mar. 1974, 45p; Paper copy also available in set of 3 reports as PB-236 846-SET, PCS\$15.00.; Contract DOT-UT-20020; ACKNOWLEDGMENT: NTIS (PB-236847/OSL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236847/OSL, DOTL NTIS

42 080421 SOFTWARE SYSTEMS DEVELOPMENT PROGRAM. INTRODUCTION TO URBAN TRAVEL DEMAND FORECASTING. VOLUME I. DEMAND MODELING. The Urban Mass Transportation Administration Transportation Planning System provides a wide range of analytical and computerized tools for making travel forecasts for existing and proposed transportation systems. The manual provides an introduction to travel forecasting to enable transportation planners and analysts to utilize UTPS effectively. It provides a comprehensive overview of the methodology of travel forecasting, the analytical tools available and their appropriateness for typical problems the transportation planner faces, input requirements, outputs needed for proper evaluation, and appropriate levels of effort for various stages of analysis. The manual is divided into three parts: The Summary; Volume I-Demand Modelling; and Volume II- Evaluation.

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Cambridge Systematics, Incorporated, (UMTA-IT-06-0050) URD.PMM.74.1.1, Mar. 1974, 313p; Paper copy also available in set of 3 reports as PB-236 846-SET, PCS\$15.00.; Contract DOT-UT-20020; ACKNOWLEDGMENT: NTIS (PB-236848/8SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236848/8SL, DOTL NTIS

42 080422 SOFTWARE SYSTEMS DEVELOPMENT PROGRAM. INTRODUCTION TO URBAN TRAVEL DEMAND FORECASTING. VOLUME II. EVALUATION. In the report, Volume II, an evaluation of transportation alternatives is made and discussion centers around the evaluation problem, methods of community interaction, prediction of and incidents of impacts, evaluation methods, and extended evaluation method. A summary is presented and references are furnished.

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, Cambridge Systematics, Incorporated, (UMTA-IT-06-0050) URD.PMM.74.2.1, Mar. 1974, 80p; Paper copy also available in set of 3 reports as PB-236 846-SET, PCS\$15.00.; Contract DOT-UT-20020; ACKNOWLEDGMENT: NTIS (PB-236849/6SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236849/6SL, DOTL NTIS

42 080471 URBAN TRANSPORTATION FACTBOOK. PART 2. The FACTBOOK is organized into Parts I and II to aid handling convenience. Part I contains Section I, a summary highlighting the most important transportation related phenomena occurring in major metropolitan areas today and Section II, a comparison primarily among the 33 largest SMSAs of selected city transportation and growth characteristics. Part II contains one section consisting of additional detailed transportation and growth statistics for the 33 largest SMSAs. Part II consists of detailed tables for each of the 33 SMSAs included in this edition of the FACTBOOK. The basic organization presents the statistics for each city in finer geographic detail, including statistics on a county-by-county basis and distinguishing between central city and outside-central-city residents. Finally, source notes for the tables in each volume are given at the end of that volume. It should be noted that most of the statistics presented in the FACTBOOK were previously available in other published sources, but generally in publications prepared for different purposes. As a result, the key transportation-related variables were not previously presented in a convenient form for either inter-metropolitan comparisons or intra-metropolitan trend analyses. A major contribution of the FACTBOOK consists of assembling and displaying in one place the data collected by a variety of agencies for a variety of purposes.

Barton-Aschman Associates, Incorporated Mar. 1974, 203 pp. Tabs.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-30833)

42 080472 URBAN TRANSPORTATION FACTBOOK. PART 1. The FACTBOOK is organized into Parts I and II to aid handling convenience. Part I contains Section I, a summary highlighting the most important transportation related phenomena occurring in major metropolitan areas today and Section II, a comparison primarily among the 33 largest SMSAs of selected city transportation and growth characteristics. Part II contains one section consisting of additional detailed transportation and growth statistics for the 33 largest SMSAs. The Summary gives a national overview of transportation and growth trends, focusing primarily on the 33 largest Standard Metropolitan Statistical areas—all those whose 1970 populations exceeded one million. Comparative figures are provided for each of the 33, along with regional and national summaries. Section II was planned to permit detailed comparisons among cities. The material in this section is organized into four basic categories: 1) characteristics of the city, including population and demographic variables, residence and workplace location, and land-use patterns; 2) demand for urban transportation, concentrating on worktrip statistics for all SMSA residents and for residents of selected low-income areas; 3) supply of urban

transportation costs, including statistics on auto availability, highway and transit facilities; and 4) transport costs, including statistics on highway and transit investments and expenditures. A glossary of terms follows the City Comparisons section. The glossary precisely defines the variables which appear in the tables. For statistics derived from the Census, the definitions come from the Census Users Guide; for computed data the basis of calculation is explained. The glossary serves as a bridge between Part I and Part II, which may be viewed as a "technical appendix".

Barton-Aschman Associates, Incorporated Mar. 1974, 94 pp, Tabs.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-30832)

42 080655 1972 NATIONAL TRANSPORTATION STUDY. POPULATION PROJECTIONS BY STATES, URBANIZED AREAS AND OTHER GEOGRAPHIC AREAS. The report, tabulated from demographic data in support of 1972 National Transportation Report, provides the user with population projections by state, urbanized areas and small urban, and rural under 1990 Boundaries. Because 1990 Boundaries are the basis for National Transportation Requirements, the 1960 and 1970 population detail is adjusted for those areas less than 50,000 persons, but which would contain such population by 1990, and are therefore treated as urbanized areas. Totals for urbanized areas may not be consistent to Census totals for these reasons but agree with state control totals and national aggregates.

Department of Transportation May 1973, 60 pp; ACKNOWLEDGMENT: NTIS (PB-237512/9SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237512/9SL, DOTL NTIS

42 080663 PAPERS PRESENTED AT THE AMERICAN TRANSIT ASSOCIATION WESTERN CONFERENCE HELD IN VANCOUVER, CANADA, ON MAY 6-9, 1974. The contents are: Preparation for instituting Calgary's contra-flow bus lane; Criteria for establishing exclusive bus lanes; The current status of high capacity bus development; UMTA's transit marketing project; Transportation for senior citizens and the disadvantaged; Ontario's approach to personalized rapid transit.

American Public Transit Association, Urban Mass Transportation Administration, Ontario Development Corporation, California Department of Transportation, Calgary City Transportation Department ATA/WC-74-1, Oct. 1974, 153 pp; ACKNOWLEDGMENT: NTIS (PB-236564/1SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236564/1SL

42 080760 SPATIAL PATTERNS OF THE JOURNEY-TO-WORK AND MASS RAPID TRANSIT IN LOS ANGELES. The proposed mass rapid transit system for the Los Angeles metropolitan region is examined and evaluated. Data describing the journey-to-work function in the region is analyzed in order to delineate the major patterns that exist, along with the major centers of attraction. The techniques used are those of factor analysis, modal analysis and cluster analysis. All three techniques delineate lightly similar patterns and define identical centers of attraction within the system. The emergent structure is compared with the proposed rapid transit network and comments are made regarding the possible success of the future system.

Clayton, C *Annals of Regional Science* Vol. 8 No. 3, Oct. 1974, pp 39-60

42 080775 PLANNING MASSIVE ACCESSIBILITY FOR CENTRAL ATLANTA: A STUDY OF MISLEADING PROJECTIONS. Urban transportation planning in Atlanta has evolved in the 1950's and 1960's on the premise the massive new accessibility is needed for the Central Area of the city to accommodate vast increases in downtown trips. Projections have been made with little concession to reality, stemming from an unwillingness to collect and study existing data and trends. Peak hour trips to the Central Area have stabilized, but more radial capacity is being proposed. The Atlanta fixed rail rapid transit program has been justified by the doctrine of massive new accessibility for the downtown area. Little consideration was given to busways, and benefit/cost studies did not compare alternate systems. Also, instead of casting mass transit as a substitute for additional freeway construction, the local transit agency, MARTA, has agreed to support a new expressway network also focusing on the Central Area.

Hamer, A Hartshorn, T (Georgia State University) *High Speed Ground Transportation Journal* Vol. 8 No. 3, 1974, pp 291-302, 3 Fig., 24 Ref.; ACKNOWLEDGMENT: High Speed Ground Transportation Journal; ORDER FROM: ESL, Repr. PC, Microfilm

42 080816 URBAN CORRIDOR DEMONSTRATION PROGRAM. The plans are summarized of eleven urban agencies participating in the Urban Corridor Demonstration Program the purpose of which is to test and demonstrate the concerted use of available highway traffic engineering and transit operations technology for relieving traffic congestion in radial corridors serving major urban centers. The program which is directed to metropolitan areas of over 200,000 population, emphasizes low-capital intensive improvements rather than new major construction to demonstrate whether rapidly implementable, relatively inexpensive projects can effectively relieve urban traffic congestion. This report which is presented with the purpose of apprising public officials and citizens of ideas that will help relieve peak-hour traffic, discusses highlights of proposed projects, provides relevant information for prospective applicants and lists of participating agencies and proposed projects.

Department of Transportation DOT P6500.1, Oct. 1974, 83 pp, Figs., Tabs., Photos., Refs., 4 App.; This project was sponsored by DOT's Office for Environment, Safety, and Consumer Affairs, FHWA and UMTA. Refer also to DTO P 6500.2: Status of the Urban Corridor Demonstration Program, July 1974, 86 pp, available from Government Printing Office, Repr. PC, \$1.80, Stock No. 5001-00080.

42 080922 APPRAISING URBAN TRANSPORT POLICY-THE NEW REGIME. The nature of the defects which existed in urban transport policy planning are examined, as well as the ways in which new administrative arrangements will revolutionize the process. The new policy will reform the planning enquiry and participation process, reform local government structure, and reform the financial arrangements for urban transportation. Corollary developments

necessary to structure planning are discussed, and the structure planning process itself is detailed. Local planning, it is noted, shall incorporate procedures both of public participation and of independent assessment. Two separate planning processes that require improvement are identified as (a) planning delay, and (b) planning misdirection. Four fundamental philosophies about the purpose of the enquiry process are identified as: conflict resolution; technical checking; examination of the relationship between the political objectives and the technical plans; and judgement of the values implicit in the plan. Skills required by an enquiry of this kind are both technical and political, and the procedures adopted need to be formal. The role of the central government is discussed as well as local government structure particularly as related to the transport planning field. The creation of intermediate institutions of planning are outlined. It would be useful to develop a planning advice service which might have a central staff of planning experts for technical services and a number of small regional bureaus. The government should produce policy guidelines which indicate the framework within which local political discretion should operate. With regard to the appraisal procedure, it should be clearly required that the statements make clear and explicit reference to the fundamental objectives and judgement on which the plan is based.

Gwilliam, KM ; Leeds University, England July 1974, 17 pp, 6 Fig.; Presented at the PTRC Summer Annual Meeting, Warwick University, England, 8-12 July 1974.

42 080952 URBAN TRANSPORTATION: PERSPECTIVES ON MOBILITY AND CHOICE. A study of urban transportation systems are presented characterized by intensive scrutiny of many ideas, philosophies, and academic perspectives. This report is intended to communicate some dimensions of the urban transportation problem to the general public. /NTIS/

Sincoff, MZ Dajani, JS Arnold, GR Bird, JW Brooks, CM ; Old Dominion University NASA-CR-140584, 1974, 196 pp; Grant NGT-47-003-028; ACKNOWLEDGMENT: NTIS (N74-35358/2SL); ORDER FROM: NTIS, Repr. PC, Microfiche; N74-35358/2SL

42 081002 TRANSPORTATION ATTITUDE SURVEY FOR MODAL-SPLIT FORECASTING AS PART OF LONG-RANGE TRANSIT PLANNING. The Orlando Urban Area Transit Study included a community attitude survey in its long-range transit planning process. The primary purpose of the attitude survey was to provide input to a modal-split model designed to determine patronage on a future transit system. Criteria for long-range planning of the regional transit system where obtained from potential users' attitudes. The basic information obtained from the survey is (a) attributes that the public considers important in satisfying what it perceives as acceptable transportation service; (b) minimum levels of service necessary to generate significant patronage of the future system; (c) factors that may cause choice riders to use transit rather than automobiles; (d) trip purposes for which the future public transit system would be used; (e) whether individual respondents would use a future transit system that met their specifications, as a rough indication of modal split; (f) socioeco-

nomic groups with a greater tendency to use a future transit system; (g) determination of automobile-captive, transit-captive, and free-choice ridership for different system alternates, trip purposes, and income levels. A pilot attitude survey of community leaders, coupled with a slide show presentation on regional public transit system concepts, preceded the telephone survey of the tricity Orange-Seminole-Osceola region. An additional consideration in this study was that traditional calibration of a modal-split model would not be possible. Current bus service does not reflect the type of well-designed regional transit system for which we want to forecast patronage. This suggested use of a model that had been calibrated in a different urban region and that could be justified as "universally applicable" in theory. The community attitude survey served to confirm the basic assumptions of the disutility model that was adopted and provided the captive rider endpoints, thus making the model more realistic for application to the Orlando urban area.

Levinson, LM Gersten, MC (Howard, Needles, Tammen and Bergendoff) *Transportation Research Record* No. 508, 1974, pp 13-22, 6 Fig., 1 Tab., 25 Ref.; ORDER FROM: TRB Publications Off; Repr. PC \$4.20

42 081133 INTEGRATED ANALYSIS OF SMALL CITIES INTERCITY TRANSPORTATION TO FACILITATE THE ACHIEVEMENT OF REGIONAL URBAN GOALS. The research focuses upon intercity transportation and its relationship to socioeconomic characteristics in essentially rural regions. The study area consists of the nine administrative planning regions in Iowa that do not include a community of 50,000 population or more. The research objective was to relate the intercity transportation system of small urban communities to their ability to attract and absorb growth. This relationship, as established, suggested a structured set of conditions regarding transportation planning, regulation, policies, and programs that would be supportive of growth in the study regions and in similar rural regions in other states.

Brewer, KA Richards, RO Carstens, RL Ring, SL Millett, MLJ ; Iowa State University, Office of the Secretary of Transportation, (ERI-1034) Final Rpt. ISU-ERI-AMES-74067, ISU-ERI-AMES-74129, June 1974, 653p; Contract DOT-OS-30106; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236612/8ST, DOTL NTIS

42 081194 BART-I: TRAVELER BEHAVIOR STUDIES. PART III. TRAVEL DEMAND FORECASTING STUDY. The report summarizes the results of phase one (pre-BART) of the travel demand forecasting study--the collection of pre-BART data from a household survey, with a coordinated collection of data on travel time and costs. Chapters include sample design and field results, the study interview forms, trip report forms, auto travel times for selected trips in the BART service area, and calculation of transit-trip descriptions.

McFadden, D ; California University, Berkeley, Aspects Techniques Securite Routiere, Department of Transportation Final Rpt. May 1973, 286p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Part 2, Volume 2, PB-236

738, and BART-1, Appendix C, PB-236 740; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236739/9ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236739/9ST, DOTL NTIS

42 081297 IMMEDIATE IMPROVEMENTS IN PUBLIC TRANSPORTATION. PORTLAND VANCOUVER METROPOLITAN AREA. This report describes the analyses, conclusions and recommendations concerning immediate improvements in regional public transportation to be implemented in the next few years. The report describes present transit service in the area, outlines surveys and analyses performed, articulates objectives and standards, recommends a plan for transit improvements, presents estimates of financial results of operation and outlines an implementation program. A summary of the conclusions and recommendations is included at the beginning of the report. Part II, which is not yet finished, will be the 1990 PUBLIC TRANSPORTATION MASTER PLAN. The implementation of the plans presented in both parts will result in a regionwide bus rapid transit system operating on exclusive busways, reserved busways on existing streets or in mixed traffic, with the capability to be converted to a new technology of public transportation systems as that technology unfolds. The performing organization worked closely with the staffs of the Columbia Regional Association of Governments (CRAG), the Tri-County Metropolitan Transportation District (TRI-MET), the City of Portland, the Oregon State Highway Division, and staff members of the various cities and public agencies throughout the metropolitan area. Meetings with civic, professional and community groups were held to inform the public and to receive comments on the plan. Two large maps, one on existing transit service as of 1971 and one on the recommended transit plan, are included.

De Leuw, Cather and Company Tech Study UMTA-IT-09-0008-73-2, June 1973, 191 pp; Prepared for the Columbia Regional Association of Governments.; Contract IT-09-0008; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche

42 081310 HOMOGENEITY OF MODELS OF TRANSPORT MODE CHOICE: THE DIMENSIONS OF TRIP LENGTH AND JOURNEY PURPOSE. This paper reports the development of disaggregate, behavioral models of transport mode choice along two new dimensions. The scope of disaggregate modeling is extended to an intercity context and the range of journey purposes is broadened to include social/recreational and business travel, as well as the journey to/from work. The intercity models developed should be viewed in the context of recent trends in demand modeling. Instead of arbitrarily selecting a mode as a base on the grounds that in term of speed, or cost, or comfort, the approach advocated in this paper examines the choice actually made by the traveler. The results reported lead to the conclusion that doubts as to the homogeneity of the transport mode choice decision are fully justified. This paper has investigated mode choice behavior stratified along two dimensions, journey purpose and trip length, and the analysis clearly demonstrates that the same mode choice process is not reflected in each case.

Watson, PL *Journal of Regional Science* Vol. 14 No. 2, Aug. 1974, pp 247-257

42 081536 HIDDEN CITY. In studying the problems of modern cities, students and professors at the Harvard Graduate School of Design are exploring some of the possible uses of artificial hills and trying to see how these might relate to the more familiar kinds of buildings. A city in which all of the major windowless services are clustered in hills may also contain service mounds accommodated the main roads and facilities for parking, one could conceive of plans which would permit the development of adjacent pedestrian areas, possibly serviced by monorails, subways, electric minibuses and moving sidewalks.

Nelson, G *Architecture Plus* Vol. 2 No. 6, Nov. 1974, pp 70-77

42 081592 CHALLENGES IN URBAN TRAVEL FORECASTING. This paper discusses the need for travel forecasting models which take into account the current needs in urban planning. These models should reflect the socioeconomic changes that have occurred in recent years. They should be concerned with distribution systems, peripheral parking concepts, traffic-free zones, bicycle and taxi modes, movement of goods, noise and air pollution, mobility for the disadvantaged, and many other recent developments. Current models have many disadvantages, which make them unsuitable for use in urban planning. Not only are they costly and time-consuming, but they do not easily respond to the increasing number of legislative requirements for such matters as air quality and energy conservation. It is concluded that the past efforts in travel demand forecasting were largely successful for the purposes for which they were intended, but the current transportation-related issues are far more complex and require a concerted effort on the part of the profession to meet the challenge. Another topic addressed in this paper is the value of travel time. It is concluded that it should be used as a policy variable in public investment analysis, rather than as a basis for evaluating alternative courses of action.

Gendell, DS (Federal Highway Administration) *Transportation Research Board Special Reports* No. 149, 1974, pp 7-9, 1 Ref.; Presented at a conference in South Berwick, Maine, July 8-13, 1973, sponsored by TRB, DOT and the Engineering Foundation.; ORDER FROM: TRB Publications Off, Repr. PC

42 081628 MASS TRANSIT AND THE POLITICS OF TECHNOLOGY: A STUDY OF BART AND THE SAN FRANCISCO BAY AREA. This is a book about the political consequences of technological choice. The substantive portion of the book deals with two public transit agencies in the San Francisco Bay Area. The author is more concerned, however, with the issues of politics and technology than with those of transportation. This is, therefore, a book about how two different technologies coping with transportation problems can produce significantly different consequences. The intention is to demonstrate how proposals for large-scale technological systems, such as BART, have social and political consequences that were neither intended nor anticipated.

Zwerling, S *Praeger Special Studies in US Eco Soc & Pol Issues* 1974, 159 pp; ACKNOWLEDGMENT:

ASME Journal of Mechanical Engineering; ORDER FROM: Praeger Publishers, Incorporated, 111 Fourth Avenue, New York, New York, 10003 Orig. PC

42 081636 SUMMARY DESCRIPTION 1995 TRANSPORTATION SYSTEM PLAN. The 1995 Transportation replaces the Regional Transportation Interim Plan and Program of 1971. The Chicago Area Transportation Study and Northwestern Indiana Regional Planning Commission, aided by the City of Chicago and Northeastern Illinois Planning Commission prepared this plan to provide a better transportation system for more than 3 million citizens of an eight-county area. The Plan is a coordinated multimodal approach involving transit (composed of commuter railroads, rapid transit and bus), the highway system, airport system for commercial and general aviation, and the freight system involving rail, water, truck and energy corridors. The plan strives to meet 11 regional objectives which are listed.

Chicago Area Transportation Study, Northwestern Indiana Regional Planning Commission Nov. 1974, 34 pp, 13 Fig., 4 Tab., Refs.; This study has been funded in part by the Urban Mass Transportation Administration.; ORDER FROM: Chicago Area Transportation Study, 300 West Adams Street, Chicago, Illinois, 60606 Repr. PC

42 081830 MACROPLANNING APPROACH TO THE ASSESSMENT OF REGIONAL BUS RAPID TRANSIT SYSTEMS. Bus systems provide the major public transportation services in the Seattle area. System viability has become a matter of increasing concern in recent years, in many urban areas, as ridership has fallen and operating deficits have increased. There is considerable sentiment, however, that public transit should not be allowed to collapse, because this would leave many people with no economical means of transportation and place even greater reliance than at present on the private automobile and freeways. An approach to the problem is bus rapid transit, which would provide a different route structure and operating philosophy than present bus systems. A bus-based system has merit because it offers the possibility for relatively high-speed movement of people on existing arterials, highways, and freeways without the very high capital investment required for a rail system.

Meier, RC Vederoff, GE Porter, D (Washington University, Seattle) *Transportation Research Record* No. 513, 1974, pp 15-22, 4 Fig., 3 Tab., 10 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

42 081845 A PRELIMINARY PROPOSAL FOR HIGH AND INTERMEDIATE LEVEL TRANSIT IN THE DETROIT METROPOLITAN AREA. This proposal results from a refinement of previous regional transit planning efforts by the Southeast Michigan Council of Governments (SEMCOG), and SEMTA. While this booklet focuses on public transit, the proposal stems from a coordinated transportation planning review incorporating both highways and transit. Input to the process has been provided by a joint effort of SEMTA, SEMCOG, and other appropriate city and county agencies. This input, in the form of goal formulation, regional land use planning, total travel projections, and transit

travel projections, forms the basis for all recommendations. Recent projections indicate that between 1970 and 1990 the population of the seven county SEMCOG region will increase by 28% to a total of 5,950,000. The number of households will increase by 38%, thus indicating a decrease in family size and an increase in both the number of wage earners and the demand for rush hour work trips. Even more significant, the number of private automobiles in the region is expected to more than double by 1990. These and other factors, including pollution abatement, socio-economic disparities, and land use considerations, lead to the conclusion that development of a viable public transit system is of paramount alternative to the automobile for must provide a competitive alternative to the automobile for certain types of trips. To meet this need, a potential 1990 transit network was developed by SEMTA and SEMCOG in early 1972. This test network builds upon the existing bus and limited commuter railroad system. It incorporates the best features of previous studies together with the performance characteristics of the most modern transit systems. The test network has been subjected to refined analysis, the results of which are presented herein. /HSRI/

Southeastern midigan transportation Author Mar. 1974, 57 pp, Figs., Tabs.; Study sponsored by UMTA and the State of Michigan.; Contract 1971-10; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-30946)

42 081855 EVALUATION: 1995 HIGHWAY-PUBLIC TRANSPORTATION NETWORKS. This evaluatory report of six alternative transportation networks (public transportation and highways are combined in these networks) for the 8-county Chicago-Gary Region, assesses the social, economic and environmental consequences including the compatibility of the alternatives with adopted comprehensive plans for the Region. This evaluation is a part of the reappraisal component of the planning work program which is a systematic recycling of the planning activities which leads to periodic changes in plans and programs, and consists of three cycles: annual review, major review, and complete plan re-evaluation. Details are given of the methodology, as well as of the results of the overall assessment and the analysis of variable runs. Conclusions based on the study are presented.

Northwestern Indiana Regional Planning Commission 1974, 77 pp, Figs., Tabs., 27 Ref., 5 App.

42 081901 AN ANALYSIS OF TWO FEDERALLY-ASSISTED DEMONSTRATION PROJECTS. This report is an analysis of two demonstration projects. Demonstration projects resulted from the passage of the Housing Act of 1961 which marked the beginning of the Federal government's role in providing funds to aid urban areas in solving their transportation problems. One of the demonstration projects examined was undertaken by the Southeastern Pennsylvania Transportation Compact (SEFACT) from October 1962 to October 1965; and the other by the Mass Transportation Commission of the Commonwealth of Massachusetts (MTC) from December 1962 to March 1964. Both projects provided data for the purpose of predicting the effects on ridership levels of various changes in fares and frequencies. Both projects were analyzed from regional and national viewpoints. It

was determined what could be learned from these projects and what could have been done to obtain more information that might have increased their worth to both the Federal government and the local area. It should be recognized that while other modes were included in the demonstrations, only commuter rail experiments (which comprised the largest group) were considered for the purpose of analysis in order to limit the size of the study. Appendices contain the letter to B&M's passengers and an excerpt from the Housing Act of 1961. A selected bibliography is furnished and there is a list of those contacted for the structured interviews and telephone conversations.

Adams, Jr ; Northwestern University, Evanston UMTA-IL-11-0005-74-1, Aug. 1974, 126 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238816/AS

42 081947 AN AGGREGATE URBAN TRANSPORTATION MODEL: ECONOMETRIC SPECIFICATION. Many transportation researchers have concerned themselves with a single problem. They have devoted a great deal of effort to estimating the user and socio-economic impacts of routes. Their work presumes a description of the location and physical capacities of a set of existing and proposed routes. This route-specific approach requires much engineering design work before estimates of user and socio-economic impacts can be made. When specific routes are not important, estimating the total travel volumes of various modes within a region can be approached more simply. The purpose of this paper is to derive a model of aggregate transportation relationships within an urban region.

Burright, BK ; Rand Corporation P-5108, Oct. 1973, 32 pp; ACKNOWLEDGMENT: NTIS (AD-786714/6SL); ORDER FROM: NTIS, Repr. PC, Microfiche; AD-786714/6SL, DOTL NTIS

42 082956 FOUNDATION FOR MASS TRANSIT PROGRAM DEVELOPMENT IN THE TAMPA BAY REGION MANAGEMENT REPORT. The Tampa Bay Regional Planning Council (TBRPC) has pursued a vigorous program of transportation planning for the Tampa Bay Region. Resulting from this effort has been the identification of the need for establishment of a public mass transit planning and operating authority to execute studies related to the eventual development and operation of a mass transit system in the Tampa Bay Region. The study was performed as part of the 'Coordinated Support Services Management Study' of the Tampa Bay Regional Planning Council for the Authority.

Research Group, Incorporated, Urban Mass Transportation Administration, Tampa Bay Regional Planning Council, (UMTA-FL-09-0010) Dec. 1973, 80 pp; Prepared by Tampa Bay Regional Planning Council, St. Petersburg, Fla.; ACKNOWLEDGMENT: NTIS (PB-238115/0SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238115/0SL, DOTL NTIS

42 083078 THE REGIONAL IMPACTS OF NEAR-TERM TRANSPORTATION ALTERNATIVES: A CASE STUDY OF LOS ANGELES. This report attempts to provide a consistent and comprehensive comparison of several transportation system alternatives in terms of their impacts on the region and its people. The

three main objectives of the study were to determine pollution emissions, evaluate the effectiveness of transportation management tactics, and developed feasible transportation strategies for implementation by 1977.

Mikolowsky, WT Gebman, JR Stanley, WL Burkholz, GM ; Rand Corporation 1974, 127 pp; ACKNOWLEDGMENT: ASCE Civil Engineering; ORDER FROM: Rand Corporation, 1700 Main Street, Santa Monica, California, 90401 Repr. PC

42 083082 ATTITUDINAL AND SITUATIONAL VARIABLES INFLUENCING URBAN MODE CHOICE: SOME EMPIRICAL FINDINGS. A mode choice decision structure incorporating travel attitudes toward modes and situational constraints is investigated. The major hypothesis tested is that mode choice is determined primarily by situational constraints, such as auto ownership and income, secondly by the quality of alternative modes. The structure of the mode choice process is analyzed with respect to (1) applicability of certain criterion forms; (2) psychological weighting of modal attributes in the choice criterion; (3) strength of logit, probit, and discriminant functional forms; (4) the relative strength of socio-economic and attitudinal variables in predicting mode choice. An evaluation is made of 50 binary choice models fitted to a sample of 471 randomly drawn urban travelers. Results indicate that (1) the four choice criterion forms tested are all about equal in predictive strength; (2) psychological weighting has no effect on model strength, but does influence which modal attributes appear to determine choice; (3) the three functional forms tested are all about equal in strength; (4) situational factors account for 80-90% of variation explained by the models, attitudes toward modes 10-20% thus confirming the primary hypothesis. Implications of these results for mode choice modeling and transit planning are discussed.

Hartgen, DT (New York State Department of Transportation) *Transportation* Vol. 3 No. 4, Dec. 1974, pp 377-392, 2 Fig., 4 Tab., Refs.; ACKNOWLEDGMENT: Transportation; ORDER FROM: Elsevier Scientific Publishing Company, P.O. Box 211, Amsterdam, Netherlands Repr. PC

42 083083 TRANSPORT PLANNING AND THE POLICY-MODELLING INTERFACE. Evidence of the inability of transport models to elucidate policy is cited and reasons for this weakness are then suggested. Attention is drawn to the fundamental changes in both opinion and policy currently taking place. There is less concern with accessibility per se and rather more concern with the provision of adequate or minimum accessibility for certain social groups. More emphasis is placed also on the environmental aspects of transportation. The implications of these changes are outlined. It is not at all clear that the need to adapt and up-date models is appreciated widely enough. Finally, it is considered whether fundamental changes in methodology may help to make transport models more responsive to policy needs.

Starkie, DNM (Reading University) *Transportation* Vol. 3 No. 4, Dec. 1974, pp 323-334, 1 Fig., Refs.; ACKNOWLEDGMENT: Transportation; ORDER FROM: Elsevier Scientific Publishing Company, P.O. Box 211, Amsterdam, Netherlands Repr. PC

42 083154 TRANSPORTATION RESEARCH IN UNIVERSITIES. The relation between research and educational programs is established initially, as is the current level of university involvement in transportation research. Descriptions are given of current research programs such as RANN (Research Applied to National Needs), UMTA (Urban Mass Transportation Administration), HPR (Highway Planning and Research), NCHRP (National Cooperative Highway Research Program) and PUR (Program of University Research). The summary observations presented include discussions of: freedom in problem definition; continuity and adequacy of funding; institutionalization; interdisciplinary approach; requirements for response; real-world interaction; and prospect for implementation. The author discusses the implications of changing values and the trends to be set by them.

Larson, TD (Pennsylvania State University, University Park) *Transportation Research Board Special Reports Conf Paper No. 150, 1974, pp 23-34, 2 Fig., 2 Tab.*; Presented at a conference conducted by the Transportation Research Board Sept. 7-8, 1973, at the University of Pennsylvania, Philadelphia, and cosponsored by the Transportation Studies Center, University of Pennsylvania, in cooperation with the 1907 Foundation.; ORDER FROM: TRB Publications Off, Repr. PC

42 083288 MODAL CHOICE MODELS: INTRODUCTION AND SELECTED BIBLIOGRAPHY. The introduction to this bibliography discusses briefly the concept of modal split models, including the characteristics of both pre-distribution and post-distribution models. It is indicated that the data base used for predicting modal split allocation among the competing modes is obtained from origin-destination surveys, the U.S. census, and attitudinal and behavioral data. A literature review disclosed that, with respect to modal split models, most of the literature has addressed the question of preferences indirectly, by focussing on the decision to use one mode of transportation rather than another. The studies have primarily been concerned with the journey to work and research has fallen into three general areas. First, there is the type of study which relates mass transportation usage to physical and social characteristics of the city, such as size, density and age, population, income, race and automobile ownership. Secondly, models of modal choice have been developed to explain and predict public transport and private car usage for the work trip between specified geographic zones in urban areas. Thirdly, some researchers have developed models to explain and predict individual modal choice behavior, taking account of individual travel and household characteristics. The bibliography contains references to articles, books, and reports.

Davies, S Alpert, MI (Texas University, Austin) Council of Planning Librarians #692, Nov. 1974, 43 pp, 360 Ref.; Exchange Bibliography.; Contract DOT-OS-30093; ORDER FROM: Council of Planning Librarians, P.O. Box 229, Monticello, Illinois, 61856 Orig. PC

42 083585 A TRANSIT DEVELOPMENT PROGRAM FOR HUNTINGTON, LONG ISLAND. This report documents the work performed and the conclusions reached in the Huntington (NY) Mass Transportation Study.

Two broad objectives were established: (1) to identify problems associated with transit services and the local access elements of commuter railroad service in the Town, and to identify alternative opportunities for service improvement; and (2) to develop policy and program directions that would help the town better cope with the weakness of near total reliance on the auto. In the first phase of the study, existing transit services, population, employment, and economic data were collected. About 20 interviews with representatives of potential transit user groups were conducted. Three surveys related to existing and potential transit use were conducted. In the second phase, existing transit services were analyzed, needs for additional transit services were defined, alternative improvements were identified and preliminarily screened, and findings were presented. In the final phase, alternative transit improvements were analyzed in detail and a Transit Development Program was developed and detailed. The program includes 4 categories of services: (1) fixed route services; (2) commuter services; (3) specialized services; and (4) a cooperative taxi program for special user groups. Appendices contain the transit rider, commuter access and potential needs surveys, potential user interviews and preliminary program proposal. /UMTA/

Voorhees (Alan M) and Associates, Incorporated, (IT-09-0023) Final Rpt. UMTA-II-09-0023-74-1, June 1974, 206 pp; Prepared for the Town of Huntington, New York.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238686/AS

42 083587 LOUISVILLE METROPOLITAN TRANSIT IMPROVEMENT PROGRAM. Louisville is Kentucky's largest city and the 40th largest in the U.S. Located on the Ohio River, its population was 361,472 in 1970. The study area for the Louisville Metropolitan Transit Improvement Program constitutes the original SMSA boundaries-Jefferson Co., Kentucky, and Clark and Floyd Counties, Indiana. This area also includes 26 incorporated communities. The purpose of this report is to provide a short-range (five-year) transit improvement program. This program is designed to offer the Louisville community a specific course of implementation and several alternate funding sources whereby transit can be shaped to accommodate the community's needs. This report has included an on board origin-destination survey, public hearing, goals-based alternate systems analyses, and financial/legislative research to define practical avenues to implement the recommended plan. Chapters address the background of the area, community involvements, transit goals and objectives, adequacy of service, valuation of physical assets, characteristics of transit users, alternate ownership/management framework, alternate transit systems, program for implementation, and continuing transit planning and improvement program. Figures and tables are numerous.

Schimpler-Corradino, Associates, (KY-09-0004) Tech Study UMTA-KY-09-0004-73-1, Nov. 1973, 355 pp; Prepared for the Kentuckiana Regional Planning and Development Agency.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238913/AS

42 083816 COST-BENEFIT ANALYSIS FOR EVALUATING TRANSPORTATION PROPOSALS: LOS ANGELES CASE STUDY. Although most economists and public officials understand the theory of cost-benefit analysis, there seems to be great difficulty when it comes to applying this technique to "real world" problems. This paper critically examines a cost-benefit study undertaken for a proposed rapid transit system in the Los Angeles metropolitan area in order to illustrate the problems and to suggest alternative methods for treating them. For the proposed Los Angeles rapid transit system, the benefit cost ratio is favorable (exceeds unity) only because: (1) many benefits are incorrectly calculated due to such factors as inflation, anticipated unemployment reductions and expenditure decreases, along with double counting and the inclusion of non-quantifiable benefits; (2) many costs are understated or omitted entirely; and (3) the passenger estimates are overly optimistic. This last point is particularly important since passenger estimates are crucial to a cost-benefit study of any rapid transit system. /Author/

Peterson, T (Central Michigan University) *Land Economics* Feb. 1975, pp 72-79, 2 Tab, Refs.

42 083973 TRANSPORTATION POLICY AND THE DELIVERY OF SOCIAL SERVICES IN A SMALL CITY. The study examined the ways in which social service agencies in a small city cope with the transportation problems of immobile clients. The study documents unmet needs as well as underused capacity. Inefficiency stems from the tendency for many agencies to operate 1 or 2 vehicles only a brief time during the day. Low-vehicle utilization combines with high driver cost to produce per client trip costs as high as \$7.60. Demand for services appears to be poorly coordinated with the available supply of vehicles. Consolidation of transportation services would eliminate this inefficiency, but economic, institutional, and legal barriers stand in the way of effective merger of transportation programs. Interim solutions include exchanges among agencies of data on volunteers and vehicle availability and increased reliance on public transit modes. Longer range solutions involve application for federal funds through local governmental channels for service development and capital improvement programs.

Kidder, AE (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 516, 1974, pp 21-27, 4 Tab., 5 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 083975 INCOME DISTRIBUTION EFFECTS OF THE ATLANTA TRANSIT SYSTEM. This paper reports on a pilot study to evaluate the income-distribution effects of the proposed Atlanta transit system. The incidence of benefits and costs to each of 8 traffic zones is estimated. The zones have annual incomes per family varying between \$5,000 and \$18,000. Benefits accruing to each zone as a result of savings in time, vehicle ownership and operating costs, transit fares, parking, and accidents are estimated and compared to transit fares and additional sales taxes that must be paid by the residents of that zone. The net benefits accruing to each zone seem to be more, both per family and per trip, in zones where family incomes are lower. This pattern, however, is strongly influenced by both the location of the zone relative to the closest

transit station and the level of interaction between the zone and the central business district. Other factors affecting the distribution of income in the Atlanta metropolitan area are also discussed.

Dajani, JS Egan, MM (Duke University) *Transportation Research Record* No. 516, 1974, pp 35-46, 9 Tab., 12 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 083977 URBAN TRIP DISTRIBUTION FRICTION FACTORS. Trip distribution study reports are summarized and graphs are presented which show friction factors that were developed by various cities (taken from final reports and various technical reports). The curves are grouped by purpose and city size and are plotted directly from the given information. The graphs or composites could be utilized for synthesis, or borrowed to run a gravity model for a city. They may also be useful as an initial set of factors to any city calibrating a gravity model using origin destination data.

Federal Highway Administration 1974, 90 pp, 22 Fig., 4 App.

42 084380 TRANSIT DEVELOPMENT PROGRAM: FY 1975 TO FY 1976. TECHNICAL BACKGROUND FOR SELECTING PUBLIC TRANSPORTATION IMPROVEMENTS. In an effort to place the needs of the public and private transit carriers into a single document (to better ascertain the appropriateness of the needs and to call for the implementation of the long-range transportation planning effort on a continuing basis), the basis is documented for developing a fundable program for transit development in the Chicago-Northwest Indiana Region. In an evaluatory report of the existing conditions, all the various transit aspects are summarized. The anticipated 5-year capital needs (FY 1975- FY 1979) are presented, and documentation is provided of the 5-year capital needs of the region as input for determining regional priorities. Estimates of costs by funding sources, implementation responsibility, the maintenance of the transit development program, coordination of transit systems, past and current assistance efforts, results of research, development and demonstration, noncapital intensive solutions and congestion relief are other aspects discussed.

Chicago Area Transportation Study CATS 352-02, Sept. 1974, 500 pp, 13 Fig., 23 Tab., 1 App.; Prepared in cooperation with the Federal Highway Administration and financed in part by a grant from the Urban Mass Transportation Administration.

42 084776 PUBLIC TRANSPORT. The papers are published here that were presented at the Seminar on Public Transport held during the PTRC Summer Annual Meeting. The 14 papers grouped in two categories, namely, communication and control, and experimental services, include the following: Benefits of Radio-Assisted Centralized Control of Bus Services; Control of Bus Operations in Dublin; Communication and the Passenger; Changing Occupational Structure in the Road Passenger Transport Industry and its Implications for the Future; Manpower Planning in the Public Sector of the Transport Industry; Problems of Recruitment and Retention of Bus Drivers in London; Factors Affecting Recruitment and Wastage among Bus Drivers in Lon-

don; Park and Ride at Suburban Railway Stations on Merseyside-Some Demonstration Project Results; Stevenage "Superbus" Public Transport Demonstration; Some Results from the Second Stevenage Superbus Experiment; Chaffeur Coach-An Experiment by the West Yorkshire Road Car Company in Personalized Transport at Harrogate; Experience with a Personalized Bus Service for Heathrow Airport Staff; Local Transport in City Centres: Problems and Possibilities for Travelators; and Research Requirements for Dial-A-Ride in Britain.

Planning and Transport Res and Computation Co Ltd Proceeding PTRC/P/99, July 1974, 245 pp, Figs., Tabs.; Proceedings of the Seminar on Public Transport held during the PTRC Summer Annual Meeting, July 8-12, 1974 at the University of Warwick.

42 084915 TECHNICAL EVALUATION OF THE RECOMMENDED 1995 TRANSPORTATION SYSTEM IN THE CHICAGO-GARY REGION. This report is confined to the functional evaluation of public transportation and highway modes. The procedure involves a standard methodology developed for the urban transportation planning process: A methodology consisting of a sequence of technical studies designed to simulate 1995 future travel over the proposed public transportation and highway networks. In the latter stages of this process, performance measures are defined and the functional characteristics of the proposed networks are described at the simulated levels of transportation demand.

Chicago Area Transportation Study June 1974, 125 pp, 32 Fig., 52 Tab.; ACKNOWLEDGMENT: Chicago Area Transportation Study; ORDER FROM: Chicago Area Transportation Study, 300 West Adams Street, Chicago, Illinois, 60606 Repr. PC

42 084992 IRT ANNUAL CONFERENCE DIGEST. Proceedings of the annual meeting here presented, cover various aspects of transportation policy planning, construction, legislation, environmental and economic issues. The Southern California rapid transit district development plan was reviewed, and the problems encountered by BART are discussed. Governmental and public pressures for public transport, the consideration of all funding options, the need for analysis of mass transportation alternatives, suggestions for a national transportation policy, and the economic issues of construction are examined. Panels discussed changes taking place in the Federal-Aid Highway Act, as well as new legislative objectives, and the expanding role of light rail cars. Environmental issues were covered, in addition to research and development programs, and the importance of marketing programs. Subjects such as graffiti, vandalism, and citizen participation were also covered.

Institute for Rapid Transit 1974, 72 pp, Photos.

42 084994 METHOD FOR DESCRIPTION OF THE STANDARD OF A PUBLIC TRANSPORT SYSTEM. A method is described of comparing the ability of different public transport systems to satisfy different types of travel requirements, and which may also be used to study the influence of the location of the different activities. The method is designed to describe the public transport standard in a region from the point of

view of the user, and to show how this varies for different groups and different travel purposes in conjunction with journeys to all areas in the region. This report summarizes and discusses the literature review on the subject, and outlines the standard descriptive model.

Friberg, G Holmberg B ; National Swedish Council for Building Research S:36, 1974, 2 pp, 1 Fig.; This document is taken from the National Swedish Building Research Summaries published by the National Swedish Council for Building Research.

42 090125 URBAN TRANSPORTATION ALTERNATIVES. A MACRO ANALYSIS. The objective of the study was to evaluate the relative performance and effectiveness of seven transportation systems deployed on a regional basis: Highway (with limited bus), Comprehensive Bus, Exclusive Bus, Rapid Rail, Dial-A-Ride, Dual Mode, and PRT. The systems were analyzed in a hypothetical scenario reflecting the projected 1990 characteristics of the 30 largest U.S. urban areas (excluding the three biggest) as regards transit ridership, application for which it appears to be most suited, and urban transportation needs.

Benjamin, P Barber, J Heaton, C Paules, G Ward, D ; Transportation Systems Center Final Rpt. DOT-TSC-OST-74-10, Dec. 1974, 142 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-238775/1ST, DOTL NTIS

42 090327 SOCIO-PSYCHOLOGICAL ASPECTS OF TRANSPORTATION: A BACKGROUND/RESOURCE PAPER FOR THE UPPER GREAT LAKES UNIVERSITY CONSORTIUM FOR TRANSPORTATION RESEARCH. Contents: Social science and transportation research; Cost-benefit analysis; The policy evaluation model; The experimental model; The process oriented qualitative model; Social impacts of transportation Policies; Psychological impacts of transportation policies; Dial-a-ride transportation systems; Decentralized medical care delivery systems; A socio/environmental impact analysis of the proposed development of U.S. Highway 2; Pilot survey--feasibility of DART system in superior, Wisconsin; Underdeveloped project ideas.

Kulisheck, R ; Michigan Technological University, Department of Transportation, Northern Michigan University, Upper Great Lakes University Consortium-Transp Res Final Rpt. Sept. 1973, 45p; Prepared in cooperation with Upper Great Lakes Univ. Consortium for Transportation Research. See also PB-231 542.; Contract DOT-OS-30096; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238938/5ST

42 090342 THE DETERMINATION AND EVALUATION OF OBJECTIVE ACCESS TIMES TO PUBLIC TRANSIT FOR DISAGGREGATE TRAVELER BEHAVIOR MODELING. The paper investigates methods of overcoming the deficiency of zonal aggregate transit network data for representing local walk access variations. Alternative methods of determining transit access in a real setting are reduced to five, based on modifications of transit network coding procedures. These are evaluated by comparison with values from travelers' reports, bus

time tables, and zonal networks. A method of manually coding alternative access links from known individual trip-ends to standard network nodes is found to give a four-to-one improvement in the resulting walk access variance of a trip sample compared to an interzonal representation access for the trips. Numerous other sources of differences between calculation methods and reports for all components of a transit trip were investigated.

Reid, FA ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, California University, Berkeley Tech. Memo MTC-TM-10-15-74, Nov. 1974, 59 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239212/4ST

42 090445 PLANNING MODE SELECTION AND ECONOMIC FEASIBILITY REPORT. CHARLOTTE-HENRIETTA TRANSIT CORRIDOR. VOLUME II. MODE SELECTION AND ECONOMIC FEASIBILITY. The document provides a comprehensive economic analysis of the three selected alternative rapid transit systems for the Charlotte-Henrietta Corridor. The results of this analysis indicate the economic feasibility of an optimal system and lend to the recommendation of a specific mode. Requirements for implementing the most feasible rapid transit system in the Charlotte-Henrietta Corridor at the earliest possible time are identified.

Rochester-Gennessee Regional Trans Authority, Urban Mass Transportation Administration, New York State Department of Transportation, Corrdry, Carpenter, Dietz, and Zack, (UMTA-NY-09-0006) Oct. 1974, 259 pp; See also Volume 1, PB-232 347 and Volume 2/app, PB-238 916. Prepared by Corrdry, Carpenter, Dietz, and Zack, Rochester, N.Y.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239806/3SL, DOTL NTIS

42 090450 NEBRASKA STATEWIDE ACCESSIBILITY STUDY. The accessibility analysis has been structured to measure the transportation service to necessary community facilities (hospitals, schools, recreational facilities, etc.) available to different groups of residents (young, old, wealthy, poor, white, non-white, etc.) via alternate modes of travel (auto, public transit). Information generated as a result of this analysis enables the transportation planner to more completely evaluate the benefits and disbenefits of both existing and proposed facilities.

Comis Corporation, Department of Transportation, Nebraska State Office of Planning & Programming Final Rpt. Aug. 1974, 45 pp; Prepared for Nebraska State Office of Planning and Programming, Lincoln.; Contract DOT-OS-20160; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239835/2SL

42 090466 THE CHARACTERISTICS OF NEW TOWN TRAVEL: A CASE STUDY OF RESTON, VIRGINIA. New towns often have been proposed as a significant factor in alleviating transportation problems in urban areas. To test this hypothesis, a comparative study was made between Reston and Vienna, Virginia. Both towns are located on the outskirts of Washington, D.C., with the former being a new town and the

latter a typical suburb. The results of this study refer to the automobile ownership and average total mileage driven, the average distance for journey to work, the average number of person trips, the number of walking trips, and the roadspace required and noise levels.

Morgan, KR Dickey, JW ; Virginia Interuniv Transportation Study Group, Allan (Ian) Limited Intrm Rpt. VITSG-7412, May 1974, 81 pp; Contract DOT-OS-30097; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239876/6SL

42 090502 FHWA COMPUTER PROGRAMS FOR URBAN TRANSPORTATION PLANNING, EQUIPMENT-INFORMATION PAPER. The paper presents information to assist FAA Flight and maintaining the program library of computer programs community on Federal Communications Commission (FCC) contains program documentation to enable the user to code and execute the package of 59 Urban Planning Programs in the library. The programs deal with traffic assignment, trip generation, trip distribution, and some utility and special analysis categories such as statistical, plotting, and network evaluation.

Davis, JA ; Federal Highway Administration, (FAA-75-788-130A) July 1974, 33 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240716/1SL

42 090517 PROCEEDINGS OF THE GREATER SAINT LOUIS TRANSPORTATION SEMINAR (WITH EMPHASIS ON PASSENGER SYSTEMS) HELD AT STOUFFER'S RIVERFRONT INN, ST. LOUIS, MISSOURI ON 11-12 OCTOBER 1973. Southern Illinois University at Edwardsville, in cooperation with the University of Missouri at Columbia, held an intermodal, interdisciplinary transportation seminar. Local, regional, state, and national participants were selected. The general public was also involved. The purpose of the conference was: (1) To facilitate comprehensive transportation; (2) to involve the public with transportation needs and trends; and (3) to consolidate transportation and land use planning for the St. Louis region.

Southern Illinois University, Edwardsville, Department of Transportation, Missouri University, Columbia Final Rpt. May 1974, 161 pp; Sponsored in part by Missouri Univ., Columbia.; Contract DOT-OS-30117; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238424/6ST, DOTL NTIS

42 090549 CONCEPTUAL DESIGN FOR AN URBAN TRANSPORTATION PLANNING INFORMATION SYSTEM. The system is designed to help state and local planning agencies maintain a current data base to support the 'surveillance' component of the continuing urban transportation planning process. Particular emphasis is placed on the needs of urban areas of 50,000-500,000 population and on the use of existing, local government data sources. Separate sections deal with: (1) The continuing transportation planning process; (2) system design and data sources; (3) computer requirements and software support; (4) system implementation and management; and (5) estimated staff and resource requirements.

Worrall, RD ; Peat, Marwick, Mitchell and Company, Federal Highway Administration May 1973, 46 pp; See also PB-233 246.; Contract FH-11-7826; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240639/5ST

42 090559 GUIDEBOOK FOR PLANNING TO ALLEVIATE URBAN RAILROAD PROBLEMS. This report is the third of four volumes reporting the results of a project to analyze the nationwide magnitude of the urban railroad relocation and to prepare methodology for future relocation studies. Volume 1 is an executive summary; Volume 2 is a community guide for preliminary assessment of the potential for planning to alleviate urban railroad conflicts; and Volume 4 presents a nationwide estimate of the nature and magnitude of urban railroad relocation. The purposes of Volume 3 are to suggest an appropriate approach to planning for community policy makers, to outline analytical processes to be used by technical specialists, and to provide supporting data.

Moon, AE Carter, J Frank, J Danzig, JC Whipple, B ; Stanford Research Institute, Federal Railroad Administration, Federal Highway Administration, TOP-On-Line Service, Incorporated, Gruen Associates, Incorporated Final Rpt. Aug. 1974, 327 pp; Prepared in cooperation with Federal Highway Administration, Washington, D.C., TOPS On-Line Service, Inc., San Francisco, Calif., Gruen Associates, Los Angeles, Calif., and Kaiser Engineers, Oakland, Calif.; Contract DOT-FR-20037; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240676/7ST, DOTL NTIS

42 090879 TRANSPORTATION CONTROLS TO REDUCE AUTOMOBILE USE AND IMPROVE AIR QUALITY IN CITIES. THE NEED, THE OPTIONS, AND EFFECTS ON URBAN ACTIVITY. The report discusses the problem of implementing the national air quality standards in certain metropolitan areas. This will require reductions in automobile emissions greater than those achievable by new car emissions controls, inspection/maintenance, and retrofit. Accordingly, transportation controls to reduce automobile emissions by reducing automobile use have been developed and are being implemented in the affected areas. The approaches to reducing automobile use most frequently used are transit improvements, carpooling programs, and parking restrictions. Programs that combine all three approaches could reduce automobile emissions by as much as 30 percent through diversion of automobile drivers to transit and carpools. However, because of the cost disadvantages created by the underpricing of automobile use, programs not incorporating parking restrictions or other disincentives to low-occupancy automobile travel are unlikely to achieve emissions reductions greater than 5 to 10 percent.

Horowitz, J Kuhrtz, S ; Environmental Protection Agency Final Rpt. EPA/400/11-74-002, Nov. 1974, 75 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240006/7ST

42 091305 INTEGRATION OF TRANSIT SYSTEMS. No Abstract.

Interplan Corporation May 1973, 872 pp; A 4

Volume Set which includes PB-241270 thru PB-241273, and TRIS 091306 thru 091309; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC; PB-241269-SET/ST, DOTL NTIS

42 091306 INTEGRATION OF TRANSIT SYSTEMS. VOLUME 1. CONCEPTS STATUS, AND CRITERIA. The institutional, operational and physical forms of transit integration and the intermodal and interagency approaches are defined and discussed. Current transit integration efforts are described. Standards for evaluating existing transit systems are developed from a concept of an ideal system and typical deficiencies of U.S. systems and their causes are described. These standards are then used to evaluate and compare transit systems of London, Hamburg, and Paris with those of three U.S. urban areas. Criteria are presented for selecting demonstration projects. Also considered are benefits and costs involved in improving public transit through integration and related measures.

Krzyczkowski, R Vuchic, V Remak, R ; Interplan Corporation, Urban Mass Transportation Administration, (UMTA-RI-06-0005) Vol. 1 7123-R, May 1973, 145 pp; Paper copy also available in set of 4 reports as PB-241 269-SET, PC\$25.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241270/8ST, DOTL NTIS

42 091307 INTEGRATION OF TRANSIT SYSTEMS. VOLUME II. INTEGRATED EUROPEAN TRANSIT SYSTEMS. This is the second of a three volume report designed to assess the potential for interagency and intermodel integration of transit systems in U.S. urban areas, drawing on an analysis of the successful experience of European systems. This volume describes in detail four major European transit systems (London, Hamburg, Paris, and Munich); gives brief descriptions of six others (Newcastle upon Tyne, Edinburgh, Stockholm, Gotenburg, Copenhagen, and Oslo); and summarizes and appraises the applicability to U.S. transit systems of techniques which have contributed to the success of these European systems.

Krzyczkowski, R Vuchic, V Remak, R ; Interplan Corporation, Urban Mass Transportation Administration, (UMTA-RI-06-0005) Vol. 1 7123-R, May 1973, 322 pp; Paper copy also available in set of 4 reports as PB-241 269-SET, PC\$25.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241271/6ST, DOTL NTIS

42 091309 INTEGRATION OF TRANSIT SYSTEMS. VOLUME 4. SUMMARY. This summary volume contains conclusions reached in the three main volumes of the report, 'Integration of Transit Systems.' The objective of the report is to assess the potential for interagency and intermodal integration of transit systems in U.S. urban areas, drawing on an analysis of the successful experience of European transit systems.

Krzyczkowski, R Vuchic, V Remak, R ; Interplan Corporation, Urban Mass Transportation Administration, (UMTA-RI-06-0005) Vol. 4 7123-R, Oct. 1973, 73 pp; Paper copy also available in set of 4 reports as PB-241 269-SET, PC\$25.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241273/2ST, DOTL NTIS

42 091615 RIDERSHIP AND REVENUE STUDY BRANCH AVENUE ROUTE ALTERNATIVES. The objective of the study is to estimate the patronage, revenue and operating costs of five alternative transit systems in the Branch Avenue Corridor. These five alternatives include a base alternative, the Adopted Regional System (ARS) Metro alignment to the Branch Avenue and the South Capital Street busway, and four alternatives which include shuttle rail lines or a change in the ARS Alignment to Branch Avenue. The study was designed as a comparative analysis of these five alternatives. The study uses an analytical approach which combined the information from the extensive 'Traffic Revenue and Operating Cost' report with the travel demand models recently developed by the Metropolitan Washington Council of Governments. The report contains a glossary of terms and a brief appendix.

Washington Metropolitan Area Transit Authority, Pratt (RH) Associates, Incorporated WMATA-75/17, June 1974, 39 pp; Prepared in cooperation with Pratt (R. H.) Associates, Inc., Kensington, Md.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241520/6ST

42 091847 METRIC CONVERSION AND THE TRANSIT INDUSTRY. The mass transit industry will be affected by the transition to the metric system and must plan for it. The potential effects of metric conversion on the transit industry are discussed based on an assessment of the most probable course of action to be followed as an advocacy of metric conversion.

Phelps, DR ; Transit Development Corporation, Incorporated Final Rpt. TDC/500-74/5, June 1974, 11 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241484/1ST, DOTL NTIS

42 092029 A GENERALIZED NO-BART ALTERNATIVE TRANSPORTATION SYSTEM. The report formulates the generalized No-BART alternative transportation developments for use in the BART Impact Program. Based upon policy assumptions defining the probable decision environment in the San Francisco Bay Area, alternative transportation developments which are likely to have been implemented in the absence of the Bay Area Rapid Transit system have been identified. The policy assumptions are documented by interviews with decision-makers and documentary research in decision variables such as planning, growth trends, transportation demands, interest group influences, and financing sources.

Metropolitan Transportation Commission, Department of Transportation, McDonald and Smart Incorporated, Peat, Marwick, Mitchell and Company Final Rpt. FR-1-14-75, Mar. 1975, 220 pp; Prepared in cooperation with McDonald and Smart, San Francisco, Calif., and Peat, Marwick, Mitchell and Co., San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242438/0ST, DOTL NTIS

42 092030 TRANSPORTATION SYSTEM AND TRAVEL BEHAVIOR PROJECT RESEARCH PLAN. The Transportation System and Travel Behavior (TSTB) Project of the BART Impact Program will assess the impacts of BART upon the characteristics and performance of the

Bay Area transportation system--including BART, parallel and complementary transit services, and the highway system--and the responses of travelers to BART and related transportation system changes, including traveler perceptions, attitudes, and behavior. The report includes discussion of a conceptual framework of the impact processes, the major research questions to be addressed, the priorities for the research, the research methods, and finally, the major work elements of the TSTB Project.

Ellis, RH Worrall, RD Sherret, A ; Metropolitan Transportation Commission, Department of Transportation, Urban Mass Transportation Administration, Peat, Marwick, Mitchell and Company, (UMTA-09-0025) Plann Doc. PD-14-3-75, May 1975, 122 pp; Prepared in cooperation with Peat, Marwick, Mitchell and Co., San Francisco, Calif., and Urban Mass Transportation Administration, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242439/8ST, DOTL NTIS

42 092047 NATIONWIDE PERSONAL TRANSPORTATION STUDY. REPORT NO. 9, MODE OF TRANSPORTATION AND PERSONAL CHARACTERISTICS OF TRIP-MAKERS. The report presents personal characteristics of all individuals 5 years old and over who reported making a one-way trip by a motorized vehicle, including automobile (driver and passenger separately), motorcycle, truck, school-bus, taxicab, bus, subway, train, and airplane. The percent distributions of these trips by mode are related to age, sex, race, and place of residence in unincorporated areas and incorporated places.

Randill, A Greenhalgh, H Samson, E ; Federal Highway Administration Final Rpt. Nov. 1973, 51 pp; Paper copy also available in set of 11 reports as PB-242 884-SET, PC\$33.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242893/6ST, DOTL NTIS

42 092153 PROCEEDINGS OF THE SYMPOSIUM ON REGIONAL PUBLIC TRANSPORTATION. The contents include discussion of: Integrating highway and transit plans for the region; Dallas area transit plan; Fort Worth transit plan; Research results on metro area public attitudes; Evaluation of rail rapid transit and express bus service in the urban commuter market; Financing alternatives for urban public transit.

Fox, JN ; Texas University, Arlington, Urban Mass Transportation Administration, (UMTA-TX-11-0001) UMTA-TX-11-0001-74-1, July 1974, 89 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243654/1ST, DOTL NTIS

42 092214 TODAY'S R AND D BUILDING A BASE FOR BETTER TRANSPORTATION. The report presents a concept of a strategic R and D plan for the Department of Transportation. It also presents the concept of a core program of R and D and sets forth the DOT core program in its present stage of development. The plan shows the relationship within the DOT between socio-economic R and D and R and D in the areas of engineering and in the physical, technical, and life sciences, and presents scenarios for the time frame

circa 2000 A.D. for transportation systems for urban passenger, intercity passenger, and freight. Against this background, ongoing R and D programs are described as practical examples of the foregoing conceptual structure. The strategic R and D plan is presented as one with the flexibility to be changed with changing socio-economic patterns, political situations, and break-throughs in the fields of science and engineering.

Virginia Research, Incorporated, Department of Transportation Final Rpt. DOT/TST-75/111, Apr. 1975, 46 pp; Contract DOT-OS-50101; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243667/3ST, DOTL NTIS

42 092315 INVOLVEMENT IN TRANSPORTATION THROUGH CAREER AND CURRICULUM PLANNING. SEMINAR PROCEEDINGS, JACKSONVILLE, FLORIDA, 18-22 JUNE 1973. Papers included in the proceedings are categorized as follows: The economic, social and political significance of transportation; transportation services; government and transportation; transportation issues and answers; transportation career opportunities; transportation and the curriculum. The Seminar brought together career counselors, curriculum planners, students, industry representatives from both the private and public sectors, and faculty of the University of North Florida. A workshop format was utilized in developing an understanding of transportation career opportunities and manpower requirements. By-products of this conference were an insight into the current and future regional manpower requirements for the private and public sectors, as well as a more complete knowledge of how the educational counseling process operates. Perhaps the most important understanding reached by those attending the conference was that the ability to analyze, measure, and project manpower resources into the future is essential to constructive solution of a wide range of questions and decisions related to transportation.

Smith, JAJ; University of North Florida, Department of Transportation Final Rpt. DOT/TST-76/1, Mar. 1974, 36p; Contract DOT-OS-30114; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244253/1ST

42 092487 REGIONAL TRANSPORTATION PLAN. TECHNICAL SUMMARY REPORT. VOLUME I. The report is the technical summary of the Regional Transportation Plan for the San Diego region. It contains an overview of the plan's development process; describes the existing transportation system; summarizes the Regional Transportation Plan by modal elements; contains adopted regional development and transportation goals, objectives and policies, the implementation strategy (financial plan), proposals for changes in institutional arrangements (operations plan), and a description of the continuing planning activities to be undertaken to further refine and assist in plan implementation.

San Diego County Comprehensive Planning Organization, Urban Mass Transportation Administration, (UMTA-CA-09-0037) CPO-TRANS-RTP1-75, Mar. 1975, 240 pp; See also PB-244 894. Supplemental Report.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244893/4ST, DOTL NTIS

42 092488 REGIONAL TRANSPORTATION PLAN. FINANCIAL PLAN. VOLUME II. This report documents the financial analysis undertaken in the Regional Transportation Plan. Following a brief description of the plan elements, the report describes the basic assumptions used for cost and revenue escalation and source of funds. A cost/revenue comparison for the transit and highway elements is presented and the additional transportation funding needs are identified. The final chapter discusses three financial policies adopted to support plan implementation. A five-part appendix documents the history of transportation revenues and expenditures in the San Diego region, describes the cost constrained financial plan, and contains the detailed project listings and revenue and expenditure forms required by the California Department of Transportation.

San Diego County Comprehensive Planning Organization, Urban Mass Transportation Administration, (UMTA-CA-09-0037) CPO-TRANS-RTP2-75, Mar. 1975, 99 pp; See also PB-244 895. Supplemental Report.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244894/2ST, DOTL NTIS

42 092489 REGIONAL TRANSPORTATION PLAN. DEVELOPMENT OF THE PLAN. VOLUME III. The report describes the methodology used to develop the Regional Transportation Plan and documents the major elements of that methodology, including the regional goals and objectives program, the citizen participation program, the plan development alternative studies, the evaluation criteria utilized to select a development strategy, the policy selection process, and the plan refinement and staging process.

San Diego County Comprehensive Planning Organization, Urban Mass Transportation Administration, (UMTA-CA-09-0037) CPO-TRANS-RTP3-75, July 1975, 191 pp; See also PB-244 893. Supplemental Report.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244895/9ST, DOTL NTIS

42 092491 GUIDELINES FOR TRIP GENERATION ANALYSIS. The report documents the uses and techniques of trip generation analysis, a key variable in the urban transportation planning process. Three approaches to the subject are discussed: regression analysis; land area trip rate analysis; and cross-classification analysis. The report presents new techniques and statistical procedures brought to light in recent research and reevaluates data obtained from the analysis. The bibliography provides the most complete list of publications on the topic.

Federal Highway Administration, (HPR) Final Rpt. Apr. 1973, 125 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244925/4ST

42 092497 TRAFFIC ASSIGNMENT, AUGUST 1973. METHODS, APPLICATIONS AND PRODUCTS. The guide has four major purposes: first to present the techniques currently available for estimating loads on a transportation

network; second, to discuss operational decisions involved in applying traffic assignment techniques; third, to describe the uses for the traffic assignment procedure; and finally, to present an evaluation of the products of the assignment. The report will prove useful to transportation planning personnel and to administrators in Federal, State, and local government. In addition, the publication includes a significant bibliography of traffic assignment procedures and techniques.

Comsis Corporation, Federal Highway Administration Final Rpt. Aug. 1973, 212 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244954/4ST

42 092814 IMPACT ON RIDERSHIP AND REVENUE OF SELECTED EXTENSIONS TO THE ARS. The purpose of the study was to estimate ridership, revenue, and operating costs for the year 1990 that would result from the extension of two lines of the Metro rapid rail system which is to serve the Washington metropolitan area.

Washington Metropolitan Area Transit Commission, Pratt (RH) Associates, Incorporated WMATA-75/19, Oct. 1973, 29p; Forecast: 1990. See also PB-184237. Prepared by Pratt (R.H.) Associates, Inc., Kensington, Maryland.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242836/5ST, DOTL NTIS

42 093012 GUIDEBOOK FOR PRELIMINARY ASSESSMENT OF URBAN RAILROAD PROBLEMS. The report is the second of four volumes and prepares a methodology for performing future railroad relocation studies. The purposes of Volume 2 are to acquaint community leaders with the problems and opportunities that are presented by planning for railroad relocation, and to enable local government personnel, with assistance from railroad company and highway department sources, to prepare a preliminary estimate of the feasibility for improving a local railroad system—including rough costs, economic consequences, and other community impacts, using minimum resource outlay. Charts, tables, and worksheets aid in estimating costs and impacts of alternative approaches to improving the local railroad system. Volume 1 is an executive summary; Volume 3 is a guidebook for community policymakers and technical specialists for conducting detailed relocation planning projects; and Volume 4 presents a nationwide estimate of the nature and magnitude of urban railroad problems.

Moon, AE; Stanford Research Institute, Federal Railroad Administration, Federal Highway Administration, Tops-On-Line Service, Incorporated, Kaiser Engineers Final Rpt. FRA/RP-31-Vol-2, Apr. 1975, 79 pp; Prepared in cooperation with TOPS On-Line Service, Inc., San Francisco, Calif., and Kaiser Engineers, Inc., Oakland, Calif.; Contract DOT-FR-20037; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245063/3ST, DOTL NTIS

42 093021 TRAFFIC EQUILIBRIUM METHODS: STATE-OF-THE-ART PAPERS. Twelve papers, selected from those presented at the International Symposium on Traffic Equilibrium Methods held at the Universite de Montreal, November 21-23, 1974, summarize the current

state of model research, computation and practice in this area. The papers are on topics as follows: 'Equilibrium versus Optimum in Public Transportation Systems'; 'Integrated Equilibrium Flow Models for Transportation Planning'; 'Equilibrium Methods for the Study of a Congested Urban Area'; 'Area Traffic Control and Network Equilibrium'; 'Delay Functions in Assignment Problems'; 'Analysis and Comparison of Behavioral Assumptions in Traffic Assignment'; 'Supply Functions for Public Transport-Initial Concepts and Models'; 'Equilibrium Methods for Traffic Assignment'; 'Freeway Corridor Assignment Equilibria'; 'Network Equilibrium Capabilities for the UMTA Transportation Planning System'; 'The Choice of Assignment Techniques for Large Networks'; 'Equilibrium Models in Use-Practical Problems and Proposals for Transport Planning'.

Montreal University, Canada, Urban Mass Transportation Administration, (UMTA-FN-06-0001) UMTA-FN-06-0001-75-1, Jan. 1975, 260 pp; Contract DOT-UT-50003; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245136/7ST

42 093348 A COMPARISON OF METHODS FOR EVALUATING URBAN TRANSPORTATION ALTERNATIVES. The objective of the report was to compare five alternative methods for evaluating urban transportation improvement options: unaided judgmental evaluation cost-benefit analysis, cost-effectiveness analysis based on a single measure of effectiveness, cost-effectiveness analysis based on multiple measures of effectiveness, and scoring function methods. Each method was assessed within the framework of eight methodological criteria relating to the three major concerns of feasibility, reviewability, and relevancy. The following conclusions are drawn: (1) the judgmental method is satisfactory in several respects, but its subjectivity, lack of specificity might create difficulties in a federal review of the local decision process; (2) of the systematic evaluation methods, cost-effectiveness analysis based on multiple measures of effectiveness poses the fewest difficulties in simultaneously serving the local and federal purposes.

Bronitsky, L Misner, J ; Transportation Systems Center, Urban Mass Transportation Administration, (MA-06-0050) Final Rpt. DOT-TSC-UMTA-75-5, UMTA-MA-06-0053-74-1, Feb. 1975, 62 pp, Tabs., 10 Ref.; ACKNOWLEDGMENT: NTIS, Highway Safety Research Institute (HSRI-33327); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245312/4ST, DOTL NTIS

42 093375 CHARACTERISTICS OF URBAN TRANSPORTATION SYSTEMS. A HANDBOOK FOR TRANSPORTATION PLANNERS. The objective of the handbook specifically for use by transportation planners in the evaluation of alternative systems, is to provide a single simplified reference source which characterizes the most important (from the standpoint of evaluation) performance characteristics of the following contemporary urban transportation systems: (1) Rail (commuter, rapid, and light); (2) local bus and bus rapid transit; (3) automobile-highway system (automobiles and other vehicles); (4) pedestrian assistance systems; and (5) activity center systems--people mover systems that have been installed at airports, zoos, amuse-

ment parks, etc. The handbook assesses the supply or performance aspect of urban transportation dealing with passenger demand implicitly. Seven supply parameters studied are: speed, capacity (service volume), operating cost (vehicle), energy consumption (vehicle or source), pollution, capital cost, and accident frequency.

De Leuw, Cather/STV, Urban Mass Transportation Administration, Urban Institute, (UMTA-IT-06-0049) UMTA-IT-06-0049-75-1, May 1975, 193 pp; Supersedes PB-233 580/AS. Prepared in cooperation with Urban Inst., Washington, D.C.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245809/9ST, DOTL NTIS

42 093441 UMTA TRANSPORTATION PLANNING SYSTEM REFERENCE MANUAL. Developed by the Urban Mass Transportation Administration, the UMTA Transportation Planning System (UTPS) is a collection of IBM System/360-370 computer programs for use in planning multimodal urban transportation systems. The objective of UTPS is to provide transportation planners with readily available, tested, and easy to use planning tools. This document summarizes information on the function and use of the UTPS program. It discusses general program operation and contains each individual program's operating instructions. This manual also describes all UTPS datasets, and explains how UTPS is installed at a user's computing facility. Sections of the manual include system control statements, subject program control statements, program writeup organization, software system description, data file formats, cataloged procedures, and program writeups.

Urban Mass Transportation Administration, (UMTA-IT-06-0050) UTP.40.74.1.5, UMTA-IT-06-0050-75-1, June 1975, 512 pp; Supersedes PB-231 865; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-246187/9ST, DOTL NTIS

42 093471 A HISTORY OF THE KEY DECISIONS IN THE DEVELOPMENT OF BAY AREA RAPID TRANSIT. The report describes the key decisions in the planning and implementation of Bay Area Rapid Transit (BART) during the period 1947 through 1974. The decisions are evaluated in terms of the influences brought to bear upon the decision-making process to determine decision outcomes.

Grefe, R Smart, R ; Metropolitan Transportation Commission, Department of Housing and Urban Development, McDonald and Smart Incorporated Final Rpt. FR-3-14-75, Aug. 1975, 229 pp Prepared in cooperation with Dept. of Housing and Urban Development, Washington, D.C., and McDonald and Smart, San Francisco, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245617/6ST, DOTL NTIS

42 093483 IMMEDIATE TRAVEL IMPACTS OF TRANSBAY BART. The Bay Area Rapid Transit (BART) System started service beneath San Francisco Bay in September 1974. The report analyzes travel patterns in the transbay corridor in the period before and immediately after the start of transbay BART service. Aggregate transbay travel by automobile and transit are analyzed in terms of historical trends and seasonal and short-term variations as the basis for assessing the

impacts of BART. Impacts on traffic congestion are analyzed using highway travel time survey data. The results of on-route questionnaire surveys of transbay travelers using automobile, BART, and bus in October 1974 provide descriptions of the origin-destination pattern of transbay trips, their purposes, and the profiles of travelers. Traveler choices between BART and the alternative modes are analyzed in terms of reported travel times and costs and ratings of perceived importance and satisfaction for a set of 14 travel factors (impedances) included in the survey questionnaire. Portions of this document are not fully legible.

Sherret, A ; Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration Tech. Memo MTC-TM-15-3-75, May 1975, 153 pp; Prepared in cooperation with Peat, Marwick, Mitchell and Co., Burlingame, Calif.; Contract DOT-OS-301-76; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245983/2ST, DOTL NTIS

42 093634 A COMPREHENSIVE POLICY TO AMELIORATE ADVERSE IMPACTS OF TRANSPORTATION FACILITIES. Transportation facilities impose numerous adverse economic, social and environmental impacts on surrounding communities. These adverse impacts significantly detract from the overall positive effects of such facilities. A number of initiatives have been developed which help ameliorate adverse transportation impacts at the source, and through facility location and design. There are, however, additional outside the right-of-way measures which might be taken to reduce adverse impacts. In this report, the available alternatives for outside the right-of-way action are reviewed, and a package of viable program techniques including noise regulation, grants in aid, and untied compensation is proposed. Draft legislation is outlined which makes provision for: (1) Acquisition of land or development rights in land outside the right-of-way, (2) construction of berms and sound-absorbing barriers, (3) sound-proofing of private and public structures, (4) short-term loans to municipalities and small businesses financially impacted, and (5) cash compensation to homeowners suffering property value losses.

Blackburn, AJ Oster, S Oksman, C ; Urban Systems Research & Engineering, Incorporated, Office of Environment, Safety and Consumer Affairs Final Rpt. DOT/OS-40058-5, May 1975, 138 pp; See also PB-247 824.; Contract DOT-OS-40058; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247823/8ST, DOTL NTIS

42 094242 RANN UTILIZATION EXPERIENCE. CASE STUDY NO. 21. TECHNOLOGY IN CITY OPERATIONS. This project, referred to as 'Totem 1,' is demonstrating the extent to which science and technology can help city officials improve the delivery of municipal services. The focus is on identification of technology that can be transferred successfully into city operations and on the subsequent transfer and beneficial application of that technology. Efforts have been varied: for example, hardware innovations in the fire department; computer software applications directed at public transit, courts, and

police problems; and training and organization changes in several departments. At present the most impressive applications are the computer software products, but the hardware technologies promise significant returns in the future. The anticipated benefits suggest that additional technology transfer projects should be attempted.

Donaldson, W ; Research Triangle Institute, N.C.*National Science Foundation, Washington, D.C., Tacoma, City of, Washington NSF/RA/G-75-049, 1975, 22 pp; Also included in complete report and summary, PB-247 243. PC\$13.00, MF\$2.25. Prepared in cooperation with Tacoma, Wash.; Grant NSF-C927; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247264/5ST

42 094663 INTEGRATED MASS TRANSPORTATION SYSTEM STUDY/DEFINITION/IMPLEMENTATION PROGRAM DEFINITION. Specific actions needed to plan and effect transportation system improvements are identified within the constraints of limited financial, energy and land use resources, and diverse community requirements. A specific program is described which would develop the necessary generalized methodology for devising improved transportation systems and evaluate them against specific criteria for intermodal and intramodal optimization. A consistent, generalized method is provided for study and evaluation of transportation system improvements. (Author)

Ransone, RK Deptula, DA Yorke, GG ; Virginia University NASA-CR-145961, ESS-4764-102-75, Dec. 1975, 34 pp; Contract NGR-47-005-181; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N76-14979/8ST, DOTL NTIS

42 095295 TRANSPORTATION PLANNING FOR A NEW CITY IN A DEVELOPING COUNTRY. With rapid urbanization, planning and constructing new cities is, perhaps, equally common in the developing and the developed countries. The methods evolved for transportation planning (an important component of the urban planning process) for the developed countries would not, however, be directly applicable to the situation in the developing countries. A developing country has severe constraints; mainly relating to limited resources, the need to depend on and conserve indigenous resources, the paying capacity of the average citizen and the effect of the cost of transportation on the overall economy. An urban transportation plan for a new city near Bombay in India was evolved under such constraints. The article describes the criteria evolved for the transportation plan and describes the methodology of evolving a land use-transportation system for the new city. The factors which controlled the evolution of this plan have also been discussed.

Ajgaonkar, RB (City & Industrial Development Corp. of Maharashtra) *Transportation Planning and Technology* Vol. 2 No. 4, 1974, pp 263-270, 1 Fig., 3 Tab.; ACKNOWLEDGMENT: Transportation Planning and Technology; ORDER FROM: ESL, Repr. PC, Microfilm

42 095523 SUBURBANIZATION AND ITS IMPLICATIONS FOR URBAN TRANSPORTATION SYSTEMS. The basic premise of this report is that with the growing trend toward suburbanization, more effective transportation systems must be developed to meet the needs of

the low-density, suburban population. Up until this time, urban transportation systems have focused on the CBD of the large city. It is evident now, however, that more flexible forms of transportation must be developed in conjunction with fixed-route systems. The paper is divided into two sections, the first of which summarizes the current trends of suburbanization and their effects on transportation. It also outlines the implications of Federal RD&D, which include technology sharing, state-of-the-art advancement, and demonstration support. Section II details urban demographic and transportation trends, utilizing graphs to show the growth of suburban population in recent years. Transportation system options are described, including the automobile, bus, rapid rail transit, and demand-responsive systems. Discussion of future systems includes personal rapid transit and dual mode. Each system discussed is then classified according to its role in the total transportation system: i.e. high density vs. low-density transportation. In the final analysis, it is accepted that development of urban transportation systems has not kept pace with the changing nature of cities in recent years. A system which offers a modal selection to its residents is what is needed. The complexities of integrating such a total transportation system with urban planning techniques is what transportation planners must consider in designing the most effective system for an area's residents.

Ward, JD Paulhus, NG, Jr ; Department of Transportation, (TST-10) Final Rpt. DOT-TST-74-8, Apr. 1974, 52 pp, 18 Fig., 33 Ref.; ORDER FROM: NTIS, Repr. PC, Microfiche

42 095585 LET'S ATTACK THE REAL URBAN TRANSPORTATION PROBLEM. This paper examines different interpretations of the transportation problem and its solution and argues for an interpretation that takes as its point of departure the near term and the present supply of urban transportation resources and that gives greater weight to the economic forces influencing the behavior and performance of the urban transportation market. It suggests a range of noncapital and low-capital alternatives that reduce the demand for vehicle trips, increase the effective capacity of existing systems, or do both. Policy considerations and the advantages and obstacles of the low-cost approach are discussed, and policy implications are developed.

Hedges, CA (Department of Transportation) *Transportation Research Record* No. 519, 1974, pp 10-25, 2 Fig., 5 Tab., 43 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 095587 SUBURBAN TRANSIT PLANNING AND FORECASTING. Problems and policy issues of particular concern to suburban transportation planners are identified, including dispersed trip-making, high income and automobile ownership, low densities, significant transit-dependent population, increasing peak-hour freeway congestion, growth policy issues, and short-term availability of less expensive or non-union labor. Experience in Orange County, 4 areas of Los Angeles County, and Chicago suburbs is discussed. Unique suburban approaches in the planning process are identified, and forecasting problems are discussed. For forecasting implications, 3 high-quality suburban-to-CBD transit services are compared with

the range of calibration values for the LARTS model in southern California. Variables compared include the system characteristics in the marginal utility mode-choice model, socioeconomic characteristics of trip-makers, attitudes of trip-makers, and resultant trip-making behavior. The last category focuses on transit's market share, which appears to be a more appropriate planning statistic than the percentage of all trips using transit, as called for in mode-choice models. Some uniquely suburban transit organizational and planning process issues are discussed.

Benson, DE (Smith (Wilbur) and Associates) *Transportation Research Record* No. 519, 1974, pp 36-45, 1 Tab., 13 Ref.; Prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Orig. PC

42 095685 RAIL TRANSIT CAR COSTS. A REVIEW ANALYSIS AND PROJECTIONS.

The purpose of the report is to provide the elected officials and technical staffs involved in transportation planning in Southern California with some essential background data to the planning efforts for rail transit. Considering the lead time between planning and implementation and the current rate of inflation and technological advances being engineered into rail transit vehicles, this paper attempts to forecast car costs for rapid transit, commuter rail and light rail vehicles. The operational characteristics of each of the rail systems is discussed under System Characteristics. This includes headways, speeds, power etc., as well as, a tabulation of the equipment used by each operator and a summarization of system characteristics. The Analysis chapter looks at the division of the rail car market by the manufacturers. It also compares the expenditures made for each of commuter rail, rapid transit and light rail transit by City, by Transit Property and by Type of Equipment including a further breakdown for locomotive-hauled cars versus electrically-propelled cars. The Prognosis chapter attempts to forecast what cars will cost between 1975 and 1980 based on a complete documentation of all car orders between 1962 and the present. A major finding of the study has been the possible cost projection for the various rail car types in use throughout the U.S. and Canada and what the cost of equipment suitable for the Los Angeles area might be.

Southern California Association of Governments, Urban Mass Transportation Administration, (UMTA-CA-09-0035) Tech. Rpt. UMTA-CA-09-0035-75-1, May 1975, 158 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: Southern California Association of Governments, NTIS; ORDER FROM: Southern California Association of Governments, 600 South Commonwealth Avenue, Suite 1000, Los Angeles, California, 90005 Repr. PC, NTIS; PB-255835/IST, DOTL NTIS

42 096053 EVALUATION OF LONG-RANGE TRANSIT ALTERNATIVES. An evaluation methodology was developed to measure the relative and absolute performance of alternative transit plans in a major Minneapolis travel corridor. A major element of the transit analysis was to identify the extent and location of exclusive transit facilities. One unusual feature of the analysis was that the transit mode was not specified since such a question is to be resolved at

the regional level. Each of the transit facilities was evaluated in terms of factors influencing travel population, employment, and trip ends. The alternative transit plans were evaluated not only in terms of aggregate measures of socioeconomic and travel characteristics, but they were also considered in terms of efficiency measures—per mile and per station. An ordinal ranking procedure was developed as a final step in the evaluation procedure to select the best combination of transit facilities for the corridor.

Cherwony, W Polin, L. *ASCE Journal of Transportation Engineering Proc Paper* Vol. 101 No. TE2, ASCE 11282, May 1975, pp 199-210

42 096062 ATTACK BY CHARLATANS. Rail transit has found its enemies in the zealous advocates of buses and automobiles. The proponents of these two modes of transportation claim that the construction of rail transit is too costly and time consuming. They set out to prove the efficiency of buses over rail transit but since the fuel consumed by buses and cars is in short supply, it seems likely that a transit system dependent upon central station generation of power is more likely to win out. Bus transportation is labor intensive, and rail transit is capital intensive, a fact which has been used to promote bus transit. However, where a great volume of riders exists, capital intensive systems are more of an economic advantage. Other factors besides cost must also be considered in choosing the most suitable transit system. Supporters of bus and auto transportation insist that rail transit will be unable to attract riders, but facts have shown otherwise: BART has attracted thousands of riders and has reduced automobile use. It is not too soon to start building transit systems that will alleviate the problems of the 1980's. Costs will continue to rise, so long-term planning will prove to be the better solution in the long run. The ultimate solution is a carefully planned, community responsive mix of buses, cars, and rail transit systems.

Myers, ET *Modern Railroads* Vol. 29 No. 11, Nov. 1974, pp 68-70, 3 Fig., 3 Phot.

42 096063 A NEW GEORGIA PEACH. Construction on Atlanta's new rapid rail transit system (MARTA) will begin this year. The task of acquiring right-of-way will receive much attention, since provision must be made for relocation of the people who will be displaced by the construction. Most of the planned route, though, will follow existing rights-of-way. A critical path system is being used for all construction and planning, with emphasis on critical areas so that revenue trains may begin running in 1978. Full completion is expected by 1980. The choice of car design was considered so important it has taken a year to design the one that will be used. Rather than lend itself to experimentation, MARTA has decided to go with proven designs. It has learned from BART's mistakes, and has allowed more time for testing before becoming an operating reality. It intends to operate initially on a 15 cent fare, which will be increased until 1982, when fares will have to defray 50 percent of its costs.

Myers, ET *Modern Railroads* Vol. 30 No. 2, Feb. 1975, pp 60-62, 1 Fig., 3 Phot.; ORDER FROM: Cahners Publishing Company, Incorporated, Watson Publications, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

42 096145 ATTRIBUTES OF TRANSIT DEMAND. The sample of observations for this study was acquired from a cross-sectional data base consisting of 20 medium-sized cities. Data for each city were collected at the census-tract level, and two basic types of data were collected for each census tract: socioeconomic characteristics of the rider, and level-of-service characteristics provided by the transit firm. Regression analyses of the data revealed that transit may not be routed in such a manner as to provide an optimum level of service to the public. The finding that the number of workers employed in the CBD is not an important attribute for explaining the demand for work trips on public transit tends to support this conclusion and suggests that there may be potential transit user markets to which transit firms could justify new service. Examination further reveals that there are regional variations for the demand for work trips on public transit; this finding should discourage attempts to develop an aggregate travel-demand model which would be applied indiscriminately to various areas.

Costantino, DP *Traffic Quarterly* Vol. 29 No. 2, Apr. 1975, pp 243-257

42 096309 TRANSPORTATION PLANNING PRACTICE. Ten papers were presented on five major topics at the seminar on transportation planning practice. One paper was presented on the topic of management of medium term transportation studies. Three papers on the topic of preparation of alternative medium term plans, covered the following areas: the formulation of such plans; the development of transport alternatives; and alternative strategies for the specific case of Nottingham, Gt. Britain. The papers which reviewed medium term plan evaluation process include: Option Design and Evaluation in Transportation Studies; Equity and Incidence in Transport Evaluation, and Urban Transportation Planning Decision Making. In the area of programming and implementation factors, a paper described the modernization of the Glasgow underground. Papers which made an assessment of the future role and nature of transportation planning include the following: Appraising Urban Transportation Policy; and Practical Transport Planning.

Planning and Transport Res and Computation Co Ltd PTRC/P/102, July 1974, 163 pp, Figs., Refs.; Presented at Seminar P of the PTRC Summer Annual Meeting, Warwick University, England, 8-12 July 1974.; ORDER FROM: Planning and Transport Res and Computation Co Ltd, 167 Oxford Street, London W1, England Orig. PC

42 096442 DETERMINATION OF FUNCTIONAL SUBREGIONS WITHIN AN URBAN AREA FOR TRANSPORTATION PLANNING. It is axiomatic that large urban areas are not spatially homogeneous with respect to transportation demand, supply, and impact phenomena. This paper addresses this heterogeneity in terms of the transportation planning process. A technique for using areawide travel, land use, and population data to divide an urban area into a set of functional subregions is presented. Each subregion represents a planning area, and interregion planning is proposed on a different scale of analysis. The technique is based on the statistical decomposition of origin-destination

flow matrices. The decomposition method can be considered a generalized type of factor analysis in which raw data observations are used as opposed to variable correlations. The units can be any spatial aggregation of people and activities, such as census tracts or minor civil divisions, and the travel can be trips for any specific purpose or a composite of all trips. Selection in both cases depends on the objectives of the planning process. Multiple discriminant and regression analyses are then used to define the subregions in terms of differences in population and land use characteristics. Results from an application of the technique in the Detroit area are presented as a case study. Six subregions, composed of groups of minor civil divisions and central city subcommunities, were found and successfully described for home-based work travel in this urban area. The results support urban economic theories of a central city core area, suburban industrial centers, and satellite cities.

Golob, TF Hepper, SJ (General Motors Research Laboratories) Pershing, JJ, Jr (Fairfax County Planning Commission, Virginia) *Transportation Research Record* No. 526, 1974, pp 16-25, 2 Fig., 12 Tab., 5 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 096443 STRUCTURE OF PASSENGER TRAVEL DEMAND MODELS. This study is concerned with the structure of travel demand models. Two alternative structures are defined, simultaneous and recursive, that are based on different hypotheses about the underlying travel decision-making process. The simultaneous structure is very general and does not require any specific assumptions. The recursive structure represents a specific conditional decision structure, i.e., the traveler is assumed to decompose his trip decision into several stages. Thus, simultaneous and recursive structures represent simultaneous and sequential decision-making processes. Theoretical reasoning indicates that the simultaneous structure is more sensible. Moreover, if a sequence assumption is accepted, there are several conceivable sequences, and generally there are no a priori reasons to justify a selection among them. A simultaneous model, however, is very complex because of the large number of alternatives selection among them. A simultaneous model, however, is empirical study is conducted to investigate the feasibility of a simultaneous model and to appraise the sensitivity of predictions made by a travel demand model to the structure of the model. The data set for the study was drawn from conventional urban transportation study data. Included in a trip decision are destination and mode choices. With the same data set, three disaggregate probabilistic models are estimated for the shopping trip purpose: a simultaneous model and two recursive models with two possible sequences. The simultaneous model proved to be feasible in terms of the computational costs and the estimation results. The results of the recursive models showed that estimated model coefficients vary considerably with different model structures. The simultaneous model structure is recommended.

Ben-Akiva, ME (Massachusetts Institute of Technology) *Transportation Research Record* No. 526, 1974, pp 26-42, 2 Tab., 20 Ref.; ORDER FROM: TRB Publications Off, Orig PC

42 096446 STRUCTURAL MODEL FOR EVALUATING URBAN TRAVEL RELATIONSHIPS. Urban travel forecasting equations are typically developed by analyzing only the relationships between several possible explanatory variables and the ultimate variable of interest, trip production. Seldom is the full degree of interaction among explanatory variables such as automobile ownership, household size and income, and accessibility understood. In this paper, a structural model is used to examine the relationships among an entire system of variables rather than just the simple isolated effects. The basic concepts and limitations of the modeling approach are discussed, and models of urban household trip production are evaluated. Several conclusions about the causal structure of urban travel relationships are drawn. The structural model is felt to be an important methodological tool for developing urban transportation theory.

Kannel, EJ (Illinois University, Urbana) Heathington, KW (Tennessee University, Knoxville) *Transportation Research Record* No. 526, 1974, pp 73-82, 3 Fig., 3 Tab., 13 Ref.; ORDER FROM: TRB Publications Off, Orig PC

42 096583 INTERACTION BETWEEN PUBLIC TRANSPORT AND URBAN TRANSPORT. This report, prepared for the UITP 1975 International Congress, examines metropolitan transportation after first pointing out that the central city cannot be considered as a separate element. Public transport has to be a vital element in the implementation of planning. Conceding that there is a role for the automobile, it is concluded that further demands for urban mobility that accompany economic growth will have to be met primarily by public transport. Among the recommendations: Public surface transport must be given absolute priority; public underground transport must be provided or extended; land development must be planned to locate secondary centers of expansion close to the more developed and congested central zones. Finally separate fare systems and administrations must be abandoned.

Paschetto, A ; International Union of Public Transport 1975, pp 5-57, Figs., Tabs., 24 Ref.; Presented at the 41st International Congress, Nice, France, 1975. Also available in French and German.; ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium Repr. PC

42 096756 TPPS-ROUND TWO COMING UP. The author discusses problems associated with the introduction of the new transport policies and programmes (TPP) system, the need for authorities to take a critical look at their own TPPs and the way in which they can do this. The main part of the article is concerned with the sort of approaches that authorities should be adopting, the question of evaluation and the involvement of other agencies. Details are given of a check list of items requiring consideration namely; an integrated approach to the problems facing the area as a whole; the preparation of a position statement for existing policies and programmes, the development of a base for the understanding of the transport problem; the production of a clear statement of the objectives in operational terms derived from an analysis of needs and the position statement; the need for flexibility of plan and for keeping options open particularly in the earlier years; a study of the part to be played by public

transport including methods of overcoming constraints and making an analysis of the operation of services; and the encouragement of new approaches. Mention is made of the problems of evaluation particularly in relation to policy decisions, the effectiveness of policies and the need for a policy impact statement in all TPPs. After stating the need for the involvement of other agencies including British Rail, NCB and district councils, the author concludes with a brief reference to the future. /TRRL/

Eddison, T (Bristol University, England) *Surveyor - Public Authority Technology* Vol. 144 No. 4293, Sept. 1974, pp 29-31; ACKNOWLEDGMENT: TRRL (IRRD 211601); ORDER FROM: IPC Building and Control Journals Limited, Dorset House, Stamford Street, London SE1 9LU, England Repr. PC

42 096984 CHANGING DIRECTIONS. A REPORT FROM THE INDEPENDENT COMMISSION ON TRANSPORT. This book presents a detailed discussion of all aspects of transport. The need for such a study is briefly discussed and some basic statistics on transport in Great Britain are given. Resource needs are considered together with a projection of resource supply, with particular attention to energy. Details of costs such as accidents, pollution, and the over-use of the natural environment are provided. The need for mobility is discussed and the effects of relative changes in it are analysed in terms of both locational effects and the effects on different user groups. Techniques used for formulating transport policy and for decision-making are described, with particular attention to cost benefit analysis and car ownership forecasting. Policy for urban situations is suggested, using physical restriction and subsidy; in rural areas subsidy is particularly important and for the inter-urban travel re-appraisal of the roads programme, rail plans and freight movement is necessary. The summary and conclusions suggest a wide range of measures and appendices include additional information such as the position of the three major political parties on transport, urban mobility problems of the elderly, impact on rural life of declining public transport services, transport in Scotland etc., mention is made of the TRRL's methods of forecasting future transport. /TRRL/

Montefiore, H ; Coronet Books, Hodden Paperbacks, Limited Textbook 1974, 365 pp, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 212264)

42 097114 MEASUREMENT OF USER'S PREFERENCES FOR PUBLIC TRANSPORTATION THROUGH COMPUTER ASSISTED INTERVIEWS. Citizens' preferences concerning bus transportation in Boulder, Colorado, were ascertained by two different but related techniques. The primary method was through a computerized game ('CARTFED,' or Computer-Aided-Real-Time Feedback Decision) in which subjects are asked to design a desirable bus system by choosing values for system characteristics. Subjects enter these in a portable computer-terminal and the computer calculates and reports the associated deficit, whereupon subjects reiterate making trade-offs to reduce the deficit to an acceptable level. A prerequisite to the CARTFED program was the estimation of citizens' preferences by a different technique, which

took the form of a questionnaire survey in which respondents were presented with randomly-generated profiles of possible bus systems and asked how often they would use such a system. Multiple regression analysis of the responses yielded the demand function necessary for the CARTFED program. This paper describes both techniques and their results.

Kalfon, C Yordon, W Menkes, J *Transportation Science* Vol. 9 No. 1, Feb. 1975, pp 21-32

42 097234 MEASUREMENT OF URBAN TRAVEL DEMAND. This paper suggests approaches to advancing the behavioral theory of travel demand and discusses some currently unresolved empirical questions on the determinants of travel behavior. Urban travel demand is the result of aggregation over the urban population, each member of which is making individual travel decisions based on his personal needs and environment. Travel is not normally an end objective of the consumer but rather a concomitant of other activities such as work, shopping, and recreation. Thus, it is natural to analyze travel demand within the framework of the consumption activity--i.e., household production models. Selected results are presented from a pilot study of rapid transit demand forecasting in the San Francisco Bay Area.

McFadden, D *Journal of Public Economics* Vol. 3 No. 4, Nov. 1974, pp 303-328; ORDER FROM: North-Holland Publishing Company, P.O. Box 211, Amsterdam, Netherlands Repr. PC

42 097286 PUBLIC TRANSPORTATION PLANNING ISSUES. This compilation of eight reports covers a number of issues of interest to planners, administrators and professionals in the field of public transportation. Topics include funding sources, determination of market sectors, operations and levels of service. Hedges advocates low-capital and non-capital alternatives. Anderson and Hoel present an analysis of latent demand at various service levels. Benson discusses suburban transport planning. Wilson et al discuss marketing aspects of transit. Mix and Dickey report on rural transport problems. Vuchic et al discuss Pennsylvania DOT's guidelines for local transit operations. Botzow describes a system of patron service variables, applicable to any mode.

Transportation Research Record No. 519, 1974 Reports prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

42 097289 TOWARD THE DEVELOPMENT OF MEASURES OF CONVENIENCE FOR TRAVEL MODES. This paper describes a research project aimed at investigating the effect on disaggregate, behavioral, modal-choice models of the inclusion of 2 alternative measures of convenience. The 2 measures investigated compare a proxy variable for convenience, which could be included in many existing models without further data collection, a scale index that was developed from the use of psychological scaling techniques, which will require longer term development and additional data collection. Both measures correlated highly with travel mode choices, although data limitations prevented any actual model building with the scale index. The proxy variable for convenience was found to add significantly to the explanatory power of a modal-choice model

and to improve substantially the specification of the model. This paper describes the data sets used to generate these results and discusses the analytical processes used to derive scale information from preference and attitude data. A survey of previous work in the topic area, which is also included, shows that this paper reports on one of the first successful attempts to incorporate a measure of convenience in an urban modal-choice model.

Stopher, PR (Northwestern University, Chicago) Spear, BD Sucher, PO (Cornell University) *Transportation Research Record* No. 527, 1974, pp 16-32, 7 Fig., 4 Tab., 31 Ref.; Report prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

42 097501 BART-II PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES, PART II, VOLUME III, RESIDENTIAL QUALITY PRIOR TO THE OPENING OF BART. The report is an account of the efforts as empirical definition of the factors involved in residents' perception of environmental quality by means of verbal response indicators. It includes a discussion of the problem of environmental quality and the need for environmental indicators, and a detailed overview and summary of the BART residential impact study. Chapters include-developing dimensions of residential quality, discussion, future work on empirical dimensions, identifying the determinants of residential quality, and future work to identify determinants and add indicators.

Appleyard, D ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 139 pp; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also Bart-2, Part 2, Volume 2, PB-236729, and Bart-2, Part 2, Volume 4, PB-236731.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236730/2ST, DOTL NTIS

42 097607 TRANSPORT IN TOKYO. A detailed account is given of Tokyo's various transport problems and their causes. The supply of transport in the city is reported to be unable to handle the high level of demand. Increased road congestion in the city centre and the spread of congestion to the suburbs are ascribed to the poor layout of existing roads, to the low road ratio and to the lack of parking facilities. Congestion is considered to be a major cause of the decline in bus patronage. Rush hour trains are reported to be crowded to 2.5 times their normal capacity, despite improvements to the rail network. The rapid population growth, particularly in the suburbs of Tokyo, and the concentration of economic, academic and cultural functions in the city centre, together with the dislocation between production and distribution facilities, are cited as the major causes of the tremendous increases in demand. Environmental problems are discussed in terms of accident rates, lack of pedestrian facilities, air pollution and noise levels. Transport policies in Tokyo are examined, and it is suggested that in the short-term the problem of curtailing or adjusting demand, possibly by shift-

ing transport volumes from one system to another should be investigated. Ultimately it is suggested that a complete change in the structure of the city will be necessary to cope with the growing transport problems. /TRRL/

Wheel Extended Vol. 4 No. 1, 1974, pp 4-13, 5 Fig., 5 Phot. ACKNOWLEDGMENT: TRRL (IRRD 212140); ORDER FROM: Toyota Motor Sales Company, Limited, 3-18, 2-chome, Kudan-Minami, Chiyoda-ku, Tokyo 102, Japan

42 097667 DISAGGREGATE SIMULTANEOUS URBAN TRAVEL DEMAND MODELS: A BRIEF INTRODUCTION. This paper is intended to provide a general background to the two following papers, "a simultaneous destination and mode choice model for shopping trips" and "some estimation results of a simultaneous model of auto ownership and mode choice to work." Some of the deficiencies of the conventional urban transport modeling system are reviewed and a case is made for the use of simultaneous models estimated with disaggregate data. /Author/TRRL/

Richards, MG (Bura Gondappel & Coffeng BV) *Transportation* Vol. 3 No. 4, Dec. 1974, pp 335-342, 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212130)

42 097669 TRANSPORTATION PLANNING IN NAIROBI. Although a high proportion of trips in developing countries are invariably made on foot or by bicycle, insufficient importance has been placed on them in the past. This article describes the methods adopted in a study of Nairobi in which such trips were fully considered, being included in all stages of the modelling procedure in which a novel modal split model was developed to deal with three modes. In the survey, 4000 households were interviewed and a comprehensive traffic survey was undertaken. Particular attention was given to ensuring that the data for walk, cycle and public transport trips were adequate. Some results of this survey are presented and discussed. An outline of the modelling procedures adopted together with an indication of the results is given. The calibration of the transport model is described in detail. Two alternative public transport systems were examined in long-term tests, one entailing the use of rail rapid transit where demand was sufficient, the other embodying the use of exclusive busways. The transportation network for 1985 is shown and the recommendations for the 1985 transportation plan are given. /TRRL/

Mogridge, MC (Colin, Buchanan and Partners) *Traffic Engineering and Control* Vol. 16 No. 1, Jan. 1975, pp 40-46, 5 Fig., 7 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212128)

42 097721 A FEASIBILITY STUDY OF MORGANTOWN PRT SYSTEM FOR THE CENTER CITY OF RICHMOND, VIRGINIA. The feasibility of implementing a PRT movement, similar to the one presently under construction in Morgantown, West Virginia, is studied for the center city of Richmond, Virginia. A travel demand model is first developed for forecasting travel patterns on the basis on trip characteristics within the study area. A benefit-cost analysis is then performed with the benefits derived from the relief of travel congestion and the PRT system costs obtained from currently available data sources. Results of the study indicate that it

would be economically feasible to install the Morgantown system in the Richmond CBD under a set of assumed conditions.

Yu, JC (Utah University) Argo, PS (S E and A Engineers and Planners) *High Speed Ground Transportation Journal* Vol. 9 No. 1, Mar. 1975, pp 473-481, 3 Tab., 16 Ref.

42 097825 GWENT TRANSPORT POLICIES AND PROGRAMME 1974 APPLICATION FOR: TRANSPORT SUPPLEMENTARY GRANT & SUBMISSION FOR 1975/76. This document gives details of the Transport Policies and Programme (TPP) for the New County of Gwent, which is aimed at securing the integration of approaches to overall transport needs. It provides a foundation for the evaluation and development of policies for future years. The existing facilities and policies, against which future developments can be considered, are discussed. All aspects of transportation in the county are reviewed and an indication is given of how the county council propose to develop overall transport policies. Alternative ways of implementing these policies are evaluated. This document is to be submitted as an application for a transport supplementary grant. The new system of grants is designed to cover current and capital expenditure on roads and public transport. /TRRL/

Gwent County Council, Wales R&D Rpt. 1974, 105 pp, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 212174)

42 097883 STATE TRANSPORTATION IN TRANSITION. The institutions upon which state government places the responsibility of providing citizens with transportation services are changing to meet changing needs in an orderly fashion, without disrupting existing state transportation programs that continue to provide needed services to the people. Public transit is viewed as an alternate to the open-ended approach of building more highways, especially in urban areas where the financial, environmental, and social costs of new highways are becoming exceptionally high to individual communities and the states.

Smith, DJ ; Kentucky, State Government of Vol. 48 No. 2, 1975, pp 67-73

42 097949 AN END TO URBAN MOTORWAYS? A COMPARISON OF TRANSPORT PLANNING IN PARIS AND LONDON. The article compares the problems facing the transportation planners of London and Paris where some 13M trips are made daily, of which half are made by private car, 40% by public transport and the remainder by two-wheeled vehicles. Over a period an increase in private car usage in Paris of about 8% per annum has been accompanied by a reduction in the use of public transport attributable to declining bus patronage. Parisian planning authorities are required to work within the broad framework of the SCHEMA DIRECTEUR plan adopted in 1965 for the development of new towns on the perimeter of Paris with a network of urban motorways, high-speed metros and modernised commuter services. Details are tabulated of the public transport systems of Paris compared with that of London. Increases in fuel costs are lately seen to have resulted in a growing demand for public transport and a reduction in the use of

private transport. With more public transport funds and subsidies now available the Parisian transport authority, RATP, is presently proceeding with measures to improve and to increase the usage of public transport. /TRRL/

Britton, FEK Greestein, D *Built Environment* Vol. 3 No. 10, Oct. 1974, pp 502-505, 1 Fig., 1 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212015); ORDER FROM: Architecture and Planning Publications Limited, P.O. Box 135, 4 Catherine Street, London WC2B 5JN, England Orig. PC

42 097960 TRANSPORTATION PLANNING PRACTICE. PROCEEDINGS OF THE SEMINAR ON TRANSPORTATION PLANNING PRACTICE HELD DURING THE PTRC SUMMER ANNUAL MEETING, 25-29 JUNE, 1973 AT THE UNIVERSITY OF SUSSEX (STREAM H). The following papers were presented at the seminar: Development of a Plan for the West Midlands, Williams, JK; Tyre Wear Plan, Murray, RA; City of Edinburgh Planning and Transport Study-Derivation of a Recommended Plan, Foyster, MJ; the Torbay Transportation Study, Latchford, JCR and Pickering, D; Transport Policies and Programmes, Collier, JC; Transport Policies and Programmes-A Local Authority Viewpoint, Cooper, JB; The Potential Usefulness of Structure Plans, Truelove, P; The Environmental Evaluation of Transport Plans, Lassiere, A; Sub-Metropolitan Transportation Planning: The Environmental Issues, Joyce, FE, Hodgins, H and Williams, HE; Public Participation, Macewan, A. /TRRL/

Planning and Transport Res and Computation Co Ltd Conf Paper No. PTRC/8/83, No Date, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 211972)

42 098013 TRANSPORTATION ECOLOGY MODEL-CONCEPTUAL DEVELOPMENTS. It has been clear for some time that no single transportation mode is the panacea of all metropolitan transportation problems. This paper puts forth a conceptual foundation for a general transportation ecology model (a model representing the functional environment of transportation systems). The empirical and theoretical considerations necessary for the foundations, as well as the expectations of the model concept, are explored.

Hansen, RC (Bell Laboratories) Kahne, S *IEEE Transactions on Systems Man and Cybernetics* No. 2, Vol. SMC-5, Mar. 1975, pp 157-166, 25 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

42 098516 NORWALK BUS TRANSPORTATION STUDY. This report seeks to review the existing bus system of Norwalk, Connecticut and how it evolved, and then to offer a series of four alternative courses of action that will provide adequate levels of transit service to Norwalk citizens. Structured so that they can be phased in sequence, these alternatives can be presented separately in such a way that combinations of features can be made to form new alternatives which may be more responsive to local inputs. The four alternatives proposed are: (1) preserve existing bus service; (2) Traditional transit improvements; (3) Norwalk local system (This would eliminate intercity service by local bus transit to enable concentration of resources in

Norwalk and in other neighboring cities with local bus systems. The intercity traveler would use the railroad or anticipate new service by an intercity bus carrier.); (4) New concept approach for comprehensive transit improvement. (Two types of service would be structured to complement one another; the bus subsystem is point to point; major traffic generators would be connected along a corridor. The taxi element of the system is continuous point to point service for trips originating and terminating in neighborhoods beyond the scope of the spine bus route. Chapters include the 5 year transit development program, existing transit system, bus passenger survey, recommendations, findings and implementation.

Tri-State Regional Planning Commission, (TS H-120(7610)) Tech. Rpt. UMTA-IT-09-0014-73-1, Jan. 1973, 110 pp; This report was sponsored by the Urban Mass Transportation Administration, Department of Transportation.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB 241-423/AS

42 098822 MASS TRANSPORTATION AND MINORITY TRANSPORTATION. The American Mass Transportation System consists of three principal elements: part of the land area of the nation is dedicated as rights-of-way for the system; there are one hundred million individually operated vehicles; approximately 125 million Americans have varying degrees of competence in negotiating these vehicles on thoroughfares. This entire auto-highway system is financed from a mixture of sources. Every other method of moving people in or between cities is trivial by comparison; every other mode is a minority system. These systems are contemporaries of the automobile, having been invented at approximately the same time, and have been defeated by the auto in direct competition.

Bruce-Briggs, B *Public Interest* No. 40, Apr. 1975, pp 43-74

42 098978 MOBILITY INDEX BASED ON THE SOCIOECONOMIC CHARACTERISTICS OF HOUSEHOLDS. Data for this examination of the relationship between certain socioeconomic characteristics and household trip making were from two trip origin and destination studies involving random sampling of over 10,500 households in Lansing and Kalamazoo, Michigan. Present findings suggest that three factors can be used for mobility analyses to summarize differences between households rather than using a dozen or more other socioeconomic characteristics. These are mobility opportunity, social class and life cycle. A mobility index was computed which measures the change in the variable in question while holding all other variables constant. Transportation research and planning can be improved by combining households into districts; determining needs of each district keeping in mind that the lower the mobility opportunity the greater the need, the lower the social class the greater the need, and the more advanced the stage of the life cycle the greater the need; the allocating transportation facilities in relation to the need of each district.

Massman, F Faria, AJ *Traffic Quarterly* Vol. 29 No. 3, July 1975, pp 347-367

42 099136 PUPIL TRANSPORTATION: A COST ANALYSIS AND PREDICTIVE MODEL. This paper analyzes the system characteristics and operating costs of pupil transportation systems in Texas, and describes the model for predicting operating costs in comparison to other models developed to predict the costs of urban transit. Because pupil transportation differs considerably from public transit in its system characteristics, absolute cost figures for pupil transportation in rural areas are an unreliable indicant of likely public transit costs. However, cost comparisons for pupil transportation between rural and urban areas provide some indication of the likely costs involved in rural as against urban public transit. The conclusion to be drawn from the data in this study is that the cost differential may not be as large as might be expected. For instance, operational costs in rural areas are only 23% higher than in central cities.

Briggs, R Venhuizen, D ; Texas University, Austin Res. Memo. No. 20, Apr. 1975, 31 pp; Contract DOT-OS-30093

42 099157 URBAN TRANSPORT IN DEVELOPING COUNTRIES. It has been predicted that between 1950 and 2000 in developing nations, the population living in towns will rise from 500M to 2200M. Tables are presented which show the forecast population growth rate in various cities between 1970 and 1985 and also the changes in urban populations in various developing countries from 1968-1972. Along with the growth in population, increases in car ownership are to be expected. In many developing countries a high proportion of all cars in the country is concentrated into one major city, making the traffic situation there very difficult. The congestion in third-world cities is mainly due to three factors: the layout of the road network; poor utilisation of roads; ineffective traffic management schemes. All these factors result in a decline in the standard of public transport. In the short term, the situation may be improved by using traffic management schemes to increase the efficiency of the present system. Careful planning in the long term should aim at reducing the volume of travel and improve employment, social amenities and the environment. Examples of successful long term schemes are discussed. /TRRL/

Jacobs, GD Fouracre, PR (Transport and Road Research Laboratory) *Traffic Engineering and Control* Vol. 15 No. 20, Dec. 1974, 4 pp, 1 Fig., 5 Tab., 2 Phot., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212123)

42 099183 TRANSIT POLICY AND OPERATIONS IN EUROPE AND CANADA. This article describes and compares city planning policies as related to transit planning and transit operations in Europe and Canada. While transit is the traditional travel mode in Europe, authorities there are now experiencing the general decline in ridership that accompanies increased car ownership, the case in North America. One reason for larger transit usage in Europe is the difference in attitudes of authorities responsible for mass transportation. In Europe there is willingness to experiment and innovate, even if it means attacking the privileges of the automobile driver, and whether or not the new measure will benefit the transit authority in monetary terms. Canadian and British systems have low costs because they pare down unprofitable services so as not to incur a deficit.

Morrall, J Finn, N *Traffic Quarterly* Vol. 29 No. 3, July 1975, pp 385-402, 6 Fig., 4 Tab.; ORDER FROM: Eno Foundation for Transportation, Incorporated, P.O. Box 55, Saugatuck Station, Westport, Connecticut, 06880 Repr. PC

42 099205 THE BIAS IN TRANSIT PLANNING. It is difficult to compare the advantages and disadvantages of highway transit versus rail transit, quantitatively. Road and rail transit both have unique characteristics that make them best suited for certain purposes. Transportation is now recognized as a public service that reflects a wide range of needs. It is not valid to measure the cost of service against the direct benefit of the user. Historically, there has been a strong bias against rail transit.

Modern Railroads Vol. 30 No. 5, May 1975, pp 70-73 ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr. PC

42 099235 RESEARCH NEEDS FOR EVALUATING URBAN PUBLIC TRANSPORTATION. This Special Report contains the results of a 3-day conference organized by the Committee on Public Transportation Planning and Development of the Transportation Research Board to devote attention to the research needed for evaluating urban public transportation. There is an introductory survey of the need for evaluation of urban public transportation, followed by the five formal papers presented to the conference as a setting for workshop discussions. Part III of the Special Report contains the workshop reports describing the general discussions and any consensus reached. Part IV contains the 57 research project statements which were the important products of the workshop groups. The research statements were developed independently by the individual workshops, and thus there are certain overlaps in various tasks of the research called for. An index is provided as a cross-reference to the subject topics of the research project statements. The conferees were not reticent in designation of costs, priorities, and establishment of research urgency. The total suggested costs to undertaken all the identified research in the 57 projects amount to nearly \$8,000,000.

Transportation Research Board Special Reports No. 155, 1975, 123 pp For abstracts of individual paper see HRIS Numbers 099237-099247.; ORDER FROM: TRB Publications Off, Orig. PC

42 099236 THE NEED FOR EVALUATION. The basic steps involved in the urban transportation planning process are reviewed, along with past efforts which to date have proved unsuccessful in establishing a viable public transportation system. From this review, the necessity for a meaningful evaluation of public transportation at all levels of government is apparent. For this purpose a conference was organized. Its objectives, as stated in this introduction to the proceedings, were as follows: (1) to provide all attendees with a better understanding of the perspectives and needs of the users, transit authority boards, planners, operators, and grantors; (2) to identify current approaches being used by each of these groups to evaluate performance; (3) to identify steps that need to be taken to provide information

necessary to plan, design, operate, finance, and effectively evaluate public transportation; and (4) to identify research projects, complete with work statements, that are needed to increase the effectiveness of each of the groups as they interact to fulfill their respective roles.

Heathington, KW (Tennessee University, Knoxville) Graeb, WC *Transportation Research Board Special Reports* No. 155, 1975, pp 3-5; ORDER FROM: TRB Publications Off, Orig. PC

42 099238 A PLANNING PERSPECTIVE ON EVALUATING URBAN PUBLIC TRANSPORTATION. The first part of this paper outlines some of the basic differences between highway and transit planning which should be recognized and accounted for if successful public transportation operations are to be achieved. In the second part of the paper, several steps to be followed for achieving a meaningful evaluation of public transportation systems are discussed. These steps are as follows: (1) establish specific and quantifiable goals and objectives for public transportation; (2) select alternative means of accomplishing the objectives; (3) define the criteria that will be used to evaluate an alternative in terms of meeting the objectives; (4) firmly establish the constraints under which the objectives are to be accomplished; and (5) develop the methodologies to be used in evaluation of each alternative. It is pointed out that these steps are applicable at all levels of government.

Heathington, KW (Tennessee University, Knoxville) *Transportation Research Board Special Reports* No. 155, 1975, pp 14-23, 1 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 099239 TRANSIT ANALYSIS. Using the transportation problems faced by California as examples of the problems which various transportation planning agencies might be faced with, this paper points out some of the areas where there is a need for evaluation criteria. It is found that such criteria are needed for defining roles, for judging the adequacy of existing and proposed programs, for resolving the debates between facility and service strategies and between the commuter and the transit-dependent, and for help in analyzing the impact of labor costs and the role of the private sector. Also, evaluation criteria are needed that will allow people at the neighborhood level to control the institutions providing transit service.

McCausland, S (California State Assembly) *Transportation Research Board Special Reports* No. 155, 1975, pp 24-28; ORDER FROM: TRB Publications Off, Orig. PC

42 099244 WORKSHOP 3: THE PLANNER'S ROLE. The purpose of Workshop 3, which viewed the evaluation of urban public transportation from the planner's perspective, was to identify the steps in the planning process and to evaluate current ability to perform each of these steps in terms of available procedures and knowledge. This report of the proceedings of Workshop 3 identified the following research projects as being necessary for an adequate evaluation of urban public transportation: (1) development of a participatory multimode transportation planning process; (2) evaluation of alternative institutional structures and agency responsibilities for transportation planning; (3) deriving goals and objectives for transportation in urban areas; (4)

matching transportation system criteria to transportation goals; (5) methodology to match transportation modes to different markets; (6) techniques for segmenting the public transit market; (7) manual of performance and operating characteristics of transit modes; (8) identification and measurement of transportation system costs and benefits; (9) transit and paratransit forecasting techniques; (10) sketch planning techniques for low-capital alternatives; (11) methodology for measuring transportation impacts on land use; and (12) determination of the length of time required for transportation impacts to occur.

Weiner, E (Department of Transportation) *Transportation Research Board Special Reports* No. 155, 1975, pp 40-44; ORDER FROM: TRB Publications Off, Orig. PC

42 099247 WORKSHOP 6: THE COLLECTIVE PERSPECTIVE. Workshop 6 was the "collective group" and viewed the problem of evaluating urban public transportation from many different perspectives. Due to the breadth of the subject area, the problem could not be dealt with as comprehensively as desired. Nevertheless, the following research projects were identified as being necessary for an adequate evaluation of urban public transportation: (1) effects of the absence or decline of scheduled public transportation services on those who are expected to be dependent on transit; (2) benefits of transforming institutional constraints to incentives for innovative transit service; (3) economic impact of labor practices on transit efficiency and the implications of current trends; (4) improved techniques for identifying and serving transit market requirements; (5) benefits of the transit system stratified by city size (not limited to dollar measures); (6) advantages of scheduling activities in which transit users engage to be more compatible with efficient transit operations; (7) transit alternatives for non-CBD travel; (8) development of measures and standards to assist definitions of travel service levels; (9) development of aggregate measures providing comparison between cities of levels of services; (10) identification and development of standard definitions and techniques for collecting data required for evaluation and performance measures; (11) development of standardized benefit measures for transit evaluation; (12) public transportation versus other community services and facilities; (13) classification of alternative service concepts and identification of major similarities and differences in layman's terms; (14) analysis of the relationship between transit system evaluation measures and the variables being controlled that affect the evaluation measures; and (15) development of guidelines for methodology and research design for the evaluation of transit service demonstrations and trials of innovations.

Deen, TB (Voorhees (Alan M) and Associates, Incorporated) *Transportation Research Board Special Reports* No. 155, 1975, pp 51-53; ORDER FROM: TRB Publications Off, Orig. PC

42 099268 URBAN TRANSPORT-SELECT POLICY PAPER. This book reviews the current situation and prospects of urban transport in developing countries, suggests possibilities for improvement, and discusses the activities of the World Bank in the urban transport field. Urban transport in the developing world is found to be

inadequate both in levels of service and in the areas served. Commercial transport is suffering heavy expense from severe congestion, poor road surfaces and inadequate terminal facilities. Underlying urban transport problems is an acute shortage of resources, along with increasing costs for such resources. The result foreseen, if such trends are allowed to continue, is a rapid deterioration in urban transport conditions. There are, however, possibilities for combating this deterioration. First, more rational use of transport facilities, particularly of road space in congested areas, must be ensured. Second, large improvements are needed in the efficiency of transport undertakings and their coordination. Third, transport requirements should be considerably reduced by closely relating transport facilities to improvements in urban physical patterns. The World Bank's activity in the urban transport sector of developing countries is a highly concentrated program that averages around two or three projects a year. This limitation stems less from the financial resources available—though the Bank's contribution will inevitably remain very small in comparison with total investments in this sector—than from the limitations of staff and consultants. Fundamental to the Bank's approach is the need to place the physical elements of urban transport projects in the context policy measures, institutional development and management solutions. Urban transport projects presented to the Bank are considered in the context of their contribution, direct and indirect, to the wider problems of improving the basic urban transport system and the form of urban growth.

World Bank May 1975, 103 pp, Figs., Tabs.

42 099512 CHANGES IN POPULATION DISTRIBUTION AND AUTOMOBILE OWNERSHIP AND IMPLICATIONS FOR URBAN TRANSPORTATION. Emergent long-term trends in population and automobile ownership are examined, and some implications for urban transportation are drawn. Population trends include (a) a strong national trend toward zero population growth, at a pace well above demographers' expectations; (b) an inverse relation between growth and urban size, where the largest metropolitan areas exhibit little or even negative growth; and (c) a general shift in population from higher to lower density areas, with associated lower congestion, and some reversal of migration flows from nonmetropolitan to metropolitan places. Statistical analysis of growth rates shows two key relations: high rates of growth in three subregions (Pacific Southwest, Florida, and middle-sized Texas areas) and an inverse relation between size and growth for both the high-growth and low-growth areas of the country. Despite the continuing shift of population from central cities to suburbs, available evidence suggests some current diminution of suburban sprawl and a likely buildup of population densities in urban areas, a development that can be related to a corresponding movement toward saturation of automobile ownership. Data on intraurban density relations and rates of automobile ownership are presented in support of these predictions. The discerned trends in population and automobile ownership are likely to reduce traffic congestion and hence the needed highway investment and improve the viability of public transit in the large urban areas investing in such systems.

Hoch, I (Resources for the Future, Incorporated) *Transportation Research Board Special Reports* No. 153, 1975, pp 196-213, 3 Fig., 13 Tab., 24 Ref.; Presented at the 7th Summer Mtg. of TRB in cooperation with Florida DOT, Jacksonville, Fla., Aug. 5-7, 1974.; ORDER FROM: TRB Publications Off, Repr. PC

42 099672 ROLE OF WAITING TIME, COMFORT, AND CONVENIENCE IN MODAL CHOICE FOR WORK TRIP. This paper is concerned with the development and use of a policy-oriented, disaggregated behavioral choice model for transportation planning problems and emphasizes the impacts of changes in travel comfort, convenience, and waiting times. The econometric method chosen was logit analysis, and, in that the logit model can be derived from demand or choice, we can interpret logit coefficients as trade-off values. The model is based on survey data for commuters' work trips in the Stockholm metropolitan area in 1968 and 1971. It contains choice variables, socioeconomic variables, and transportation policy variables. The most important choice variable is "the use of car for work," which supposedly restricts the possibility for public transit use. The socioeconomic variable is income. The Transportation policy variables are travel time, travel cost, and the chance of getting a seat. A dummy variable technique is applied to the binary-choice approach so that stratification of the choice situation for different types of transit modes within the same model is possible. This allows for differences among the various transit modes in relation to comfort. The survey data are subdivided into two income groups to test the hypothesis that the value of time and comfort depends on the level of income. Results from our research are of particular interest when suggested changes in public transportation are compared with each other or with the do-nothing alternative.

Algers, S (Stockholm County Council, Sweden) Hansen, S (More og Romsdal Regional College, Norway) Tegner, G (Stockholm Joint Planning Board, Sweden) *Transportation Research Record* No. 534, 1975, pp 38-51; ORDER FROM: TRB Publications Off, Orig. PC

42 099673 APPLICATION OF DISAGGREGATE MODAL-CHOICE MODELS TO TRAVEL DEMAND FORECASTING FOR URBAN TRANSIT SYSTEMS. This paper describes the development and application of disaggregate models to travel demand forecasting for transit systems in the Niagra Frontier region in western New York State. In this study, the disaggregate modal-choice models are developed from trip information from standard home-interview surveys. The data set used is a 12 percent subsample of the home interview conducted in 1962. Binary logit models are calibrated for four types of trips, classified by trip purpose and automobile availability. For each model, the individual's probability of using transit is related to two system variables: the ratio of transit-to-automobile travel time and trip length. Aggregated transit-use proportions for the entire system are then obtained by combining the disaggregate probabilities with an approximation term, which reflects the within-zone variance of system characteristics. The prediction performance of the disaggregate modeling approach is compared to

that of the conventional modal-split model. Results suggest that, by using the same type of information but only 12 percent of the sample, the disaggregate modal-choice method can produce at least as accurate modal-split predictions as the conventional method. The paper also describes the procedures necessary to integrate the disaggregate modal-choice method into typical urban transportation planning modeling systems.

Liou, PS Cohen, GS Hartgen, DT (New York State Department of Transportation) *Transportation Research Record* No. 534, 1975, pp 52-62, 4 Fig., 4 Tab., 10 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 099701 FEDERAL TRANSIT POLICY: SPECULATIONS ON THE FUTURE. For the near future at least, it appears that no major new legislation in the mass transportation area is needed or foreseeable. Modest amendments to the law would be a big help. Some increase in funds may be in the cards, and some fleshing out of programs, such as extending the operating aid provisions to embrace urban places of less than 50,000 population, are justifiable for the sake of equity. The important thing to observe now is how well the new formula grant programs work and how effective some of the requirements are in making transit more efficient to operate and more attractive to the urban public.

Smerk, GM *Transit Journal* Vol. 1 No. 3, Aug. 1975, pp 5-20

42 099746 METHODS AND THEORETICAL BASES FOR THE TRAFFIC PLANNING OF RAPID TRANSIT LINES. This investigation which is confined to the sphere of general planning and is mainly concerned with traffic and traffic economic matters, indicates and compares the planning data and the methods applied to transit planning. The degree to which the different branches of the technical and economic sciences are able to supply decision aids in examined, and recommendations are derived for the further development of rapid transit planning methodology. This report, which is based on a European questionnaire survey and information supplied by Germany and the U.S., presents data on traffic structure, planning periods and planning authorities, and discusses transport policy objectives which are components of rapid transit planning. The methods of planning are based on traffic analyses, traffic forecasts, and network planning. Economic and socio-economic investigations are reviewed, and empiric traffic criteria related to rapid transit planning are outlined. Financing and the volume of investment for rapid transit construction are considered.

Robbins, RM (London Transport Executive) Pampel, F (Hamburger Verkehrsverbund, West Germany); International Union of Public Transport Conf Paper 3b, 1975, 35 pp, 1 Tab., 56 Ref., 7 App.; Presented at the 41st International Congress of the International Union of Public Transport, Nice, France, 1975.

42 099759 TRANSPORTATION AND URBAN AND REGIONAL DEVELOPMENT IMFACTS. In this paper, TOPAZ (Technique for the Optimum Placement of Activities in Zones) a mathematical programming technique is used to study long term effects of transportation systems on macro development patterns in urban and regional systems: for a Melbourne-Sydney re-

gional corridor; and for the small town of Blacksburg in the United States. The first case is an objective function representing total costs and benefits for several alternative decentralized layouts of land uses and public service facilities. A gravity model is used to predict daily travel between town zones, and an iterative procedure produces the cheapest solution within certain constraints. In the second application, sub-models representing fuel consumption and pollution levels are added to the objective function, to ensure that they are reduced to a minimum. From these two studies, it can be concluded that the transportation, land use development, energy and air pollution components of urban and regional systems are highly interconnected.

Dickey, JW Sharpe, R *High Speed Ground Transportation Journal* Vol. 8 No. 2, 1974, pp 71-80, 3 Fig., 2 Tab., 6 Ref.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: Planning[Transport Associates, Incorporated, P.O. Box 4824, Duke Station, Durham, North Carolina, 27706 Repr. PC

42 099776 SYNTHESIS OF A STUDY ON THE ANALYSIS, EVALUATION AND SELECTION OF URBAN PUBLIC TRANSPORT SYSTEMS. A summary of a study carried out in 1971 by the Battelle Research Center at the request of Fiat. This study is made up of 8 volumes: (1) Definition of transport demand; (2) Definition of Transport supply; (3) Analysis of linear transport (transport serving several stations along one line); (4) Physiological problems; (5) Proposals by the Battelle Research Center for 4 original linear systems; (6) System selection process based on the functional and operational qualities of the systems; (7) Economic and technical evaluation of the systems; and (8) Project development methods. This document contains 8 chapters, summarizing the contents of the original report.

Centro Studi Sui Sistemi di Trasporto Sept. 1974, 67 pp, 37 Fig.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: International Union of Railways, BD, 14-16 rue Jean Rey, 75015 Paris, France Repr. PC; UIC cat. No. 89N37

42 125057 TRANSPORT AND THE URBAN ENVIRONMENT. PROCEEDINGS OF A CONFERENCE HELD BY THE INTERNATIONAL ECONOMIC ASSOCIATION AT LYNGBY, DENMARK. The book contains some of the fifteen papers presented at the Conference on Urbanization and the Environment, which was held on 20-24 June 1972 near Copenhagen, Denmark. Titles and authors are as follows: 1-Urbanization and environment: An introduction to some theoretical issues, by Boevener, E von; 2-Central place theory and regional planning: West German experience, by Muenich, FE; 3-Inter-Urban differences in the quality of life, by Hoch, I; 4-Migration and urban change, by Lave, LB, Lave Jr and Seskin, EP; 5-A biologist's view of the consequences of urban change, by Bakacs, T; 6-An introduction to urban transportation problems, by Mosse, R; 7-Transport and the urban environment, by Foster, CD; 8-Sensitivity analysis of congestion and structure in an efficient urban area, by Mills, ES; 9-A town planner's view of urban structure as an object of physical planning, by Albers, G; 10- Cost-Benefit

analysis of urban traffic congestion: the example of Paris, by Levy-Lambert, H; and 11-Urbanization and environment: retrospective and prospective views, by Heggie, IG, Tulkens, H, Thoss, R, Maeler, KG and Mills, ES. /TRRL/

Macmillian Press, Limited Textbook 1974, 294 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 212260)

42 125536 A METHOD FOR EVALUATING URBAN TRANSPORTATION PLANNING IN TERMS OF USER BENEFIT. The optimum distribution of origins and destinations which minimizes the sum of the costs of travel between origins and destinations and the cost of location of those origins and destinations is derived for a linear city. It is assumed that the cost of travel is directly proportional to, or proportional to the square of, the distance between origin and destination. It is also assumed that the rent per unit area is proportional to a power of the total number of origins and destinations per unit area. The model is calibrated to data for London and Sydney and Comparisons made to the actual population distributions for these cities. /A/

Vaughan, RJ *Transportation Research* Vol. 9 No. 1, Feb. 1975, pp 25-29, 4 Fig., 1 Tab., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-213120)

42 125539 GREATER LONDON TRANSPORTATION SURVEY: INITIAL RESULTS. This report presents the initial findings of the greater London transportation survey undertaken in 1971 to provide A well-informed background to policy for all the authorities concerned with transport planning in London. The basic information on travel behaviour was collected by interviewing people at home, in hotels, in freight depots, and when travelling, and by counting traffic flows at various points in London. Detailed analyses are not yet complete and the full results will be published as they become available. /TRRL/

Prestwood, JEW Smith, JER ; Greater London Council R&D Rpt. No. 18, 1974, 24 pp, 10 Fig., 14 Tab., 26 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213037)

42 125567 CONDITIONS AND FINANCING REQUIREMENTS FOR PUBLIC TRANSPORT [Condizioni e fabbisogno finanziario delle aziende di trasporto pubblico]. Urban living trends in Italy indicate that in the next 25 years, 45% of the population of the country will be living in the 4% of its area made up by metropolitan Milan, Naples, Rome, Turin, Genoa, Florence, Palermo and Bologna. This article discusses the planning, financing and economics of public transport to meet future urban mobility requirements. /TRRL/ [Italian]

Pinto, G (Universita Degli Studi di Perugia, Italy) *Automobilismo E Automobilismo Industriale* No. 5-6, May 1974, pp 71-139, 22 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 212620)

42 125569 PUBLIC TRANSPORT POLICY AND ITS EFFECT ON METROPOLITAN AREAS [Politica dei trasporti pubblici ed effetti sull'assetto territoriale]. An analysis of the regional, social, economic and administrative conditions which determine traffic flows, begins with a study of the four basic community sectors which generate and require transport: residence,

commerce, industry and services. The importance of accessibility is emphasised and various fare and pricing policies favouring public transport are discussed. Planning policies which restrict the car from town centres, and some bus priority measures are outlined, and a discussion of financing policies covers state, private, and public investment. Finally, it is stressed that transport planning must be an integral part of the medium and long term urban planning program. /TRRL/ [Italian]

Stefani, G (Ferrara University, Italy) *Automobilismo E Automobilismo Industriale* No. 7-8, July 1974, pp 11-72; ACKNOWLEDGMENT: TRRL (IRRD-212621)

42 125588 URBAN TRAFFIC MODELS: POSSIBILITIES FOR SIMPLIFICATION. Urban traffic is one of the crucial problems of governmental transport policies. In order to make urban transport investments and policies more effective, it is necessary to analyse and evaluate a wide range of alternative transport solutions before selecting those most adequate for detailed study. The aim of this report is therefore to appraise and improve existing decision making tools available in the form of "strategic" transport computer models and to study the degree of simplification which is compatible with meaningful results. The report reviews the current state of the art in urban traffic models, i.e. The four-step models (generation, distribution, modal split, assignment) conventionally used in urban transportation and the new single-step "explicit" demand/supply equilibrium models; the concept of the general share model is introduced and the various modelling approaches are discussed. The implications for simplified traffic models and current research in this field are described. The report also contains an evaluation of the main issues involved in modern urban transport planning and of the major model components such as changes in land use, public transport, new modes, traffic restraint, parking and pedestrians. A short chapter on accuracy considerations is included and presents some practical results of past transportation studies. Finally data requirements, availability and simplification are examined. The report concludes with a series of recommendations for transport planners and proposals for further research in this area. /TRRL/

Organization for Economic Cooperation and Devel R&D Rept. Aug. 1974, 127 pp, 21 Fig., 6 Tab., 92 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212858)

42 125595 TRANSPORT AS AN INDUCER OF URBAN CHANGE. Four factors are discussed as having led to an increase of traffic in cities. They are: 1) the increased number of people in cities, 2) the changing distribution of population within cities, itself influenced by developments in transport, 3) the growth in car ownership, 4) cars are used in the peak period rather than public transport. Town size is shown to be related to mode of travel to the central areas of cities during the morning peak. It is concluded that there is a strong interaction between urban development and transport. The last part of the paper briefly discusses intercity and leisure travel. The number of the covering abstract of the textbook is IRRD Abstract No. 212297. /TRRL/

Mitchell, CGB (Transport and Road Research Laboratory); David and Charles (Holdings) Limited Textbook 1974, pp 49-61, 7 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-212300)

42 125600 URBAN PUBLIC TRANSPORT POLICY IN A FULLY MOTORISED SOCIETY. Two essentials are stressed at the beginning of this paper: the increasing importance of the motor car and the need for transport policy. The creation of passenger transport authorities and executives has attacked the latter problem. Urban transport policy must be based on trade-offs: decisions on the balance of facilities for cars and public transport, in the light of land use policies and traffic congestion. Social welfare issues must be the financial responsibility of the community as a whole, especially as the executives must pay their way. Policy on fares and services is even more important to financial success than efficient management and relates also to the balance between public transport and the car. It is concluded that the arguments for a total transport budget apply equally well to a total urban budget. The number of the covering abstract of the textbook is IRRD Abstract No. 212297. /TRRL/

Ridley, TM (Tyneside Passenger Transport Executive, England); David and Charles (Holdings) Limited Textbook 1974, pp 125-128; ACKNOWLEDGMENT: TRRL (IRRD-212310)

42 125607 SPATIAL DISTRIBUTIONS OF HOMES FOR JOURNEYS TO WORK BY DIFFERENT MODES OF TRANSPORT. Home density data from London and Bristol are examined for different transport modes to work. The data can be fitted to functions that generalize those proposed by Clark (1951) and Sherratt (1960) for the same purpose. Our generalized model assumes circular symmetry, but takes into account the smaller density of homes in the central area. Comparison between the different modes of transport in London show that the homes of car commuters are the most spread out, followed by train and then bus. The homes of tube commuters are the least spread out across the city. Further studies of the data on journeys to work show that the positions of the homes and workplaces are correlated. The correlation is especially apparent for car journeys and bus journeys in London. Direct distances between home and workplace are examined and comparisons made between the different modes of transport. /Author/TRRL/

Blumenfeld, DE (University College, London) Shragar, R Weiss, GH (National Institutes of Health) *Transportation Research* Vol. 9 No. 1, Feb. 1975, pp 19-23, 2 Fig., 4 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213121); ORDER FROM: ESL, Repr. PC, Microfilm

42 125610 TECHNIQUES FOR TRIP MODELING. This paper describes the methods used by the London Borough of Islington in trip modelling during their transportation study. Since matrices for the base year 1971, were not available from the greater London transportation study until late 1974, base data were synthesized from the 1962 London traffic survey data. In order to determine how trips are generated, each household is allocated to one of 180 categories which depend on household structure, income group and car ownership. For each zone a small survey

was performed and probability functions used to find the distribution of categories. To find the distribution of trips between zones a gravity-type model was assumed. The flows on the road network were simulated using standard transportation modelling techniques. The models may then be used to estimate future trip generation and patterns of journeys. It is hoped to develop the distribution model to include trips made by public transport. /TRRL/

Blythe, KG; London Borough of Islington, England R&D Rept. Tech. Note 7, Mar. 1974, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 213152)

42 125631 THE IMPROVEMENT OF PUBLIC TRANSPORT. The author reviews the roles of public and private transport: it is noted that few people now believe the car is the solution to all transport problems. This is due to American experience and the warnings of documents such as the Buchanan report. A description of the general decline in public transport is followed by an analysis of the relative investment in the two types of transport, indicating a far greater emphasis on private transport. The financing system is discussed and it is concluded that the separate financing of individual projects favours road transport and considerably distorts real costs and benefits. It is argued that effective control of all parking is needed to limit car usage. The construction of trans-shipment centres and the provision of good rail access are examined as means of alleviating freight transport problems. The author presents a number of policy conclusions which include the need for overall planning of the transport system, an integrated financing system, parking controls and more encouragement for rail freight. /TRRL/

Millar, J (Greater Manchester Council, England) *Planner* Vol. 60 July 1974, pp 809-811; ACKNOWLEDGMENT: TRRL (IRRD 213155); ORDER FROM: Royal Town Planning Institute, 26 Portland Place, London W1N 4BE, England Repr. PC

42 125645 PAPERS FROM THE URBAN ECONOMICS CONFERENCE 10-13 JULY, 1973. VOLUME 1. Some of the papers contained in volume 1 are as follows: urban externalities, leve, j; exclusion facilities and the valuation of environmental goods, starkie, dnm and johnson, am; a theoretical analysis of the quit rate of London transport drivers, robinson, c; some thoughts on the economics of intra-urban spatial location of homes, worker residences and workplaces, mogridge, mjh. For abstract of Volume 2, see IRRD Abstract No. 213147. /TRRL/

Centre for Environmental Studies Conf Paper CES CP9, Volume 1, Feb. 1974, 301 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-213146)

42 125646 PAPERS FROM THE URBAN ECONOMICS CONFERENCE, 10-13 JULY, 1973. VOLUME 2. Some of the papers contained in volume 2 are as follows: an economic appraisal of transport projects and urban planning objectives, harrison, aj and holtermann, de; an econometric analysis of residential amenity, davis, gj; land prices and the urban market policy, neutze, m; employment growth and decentralisation of manufacturing industry: some in-

triguing paradoxes, firm, jr and hughes, jt; urban expansion: A theoretical explanation of some statistical paradoxes in professor mills recent book, couch, jd. For abstract of Volume 1, see IRRD Abstract No. 213146. /TRRL/

Centre for Environmental Studies Conf Paper CES CP9, Volume 2, Feb. 1974, 287 pp, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-213147)

42 125771 AGGREGATE TIME-SERIES ANALYSIS OF URBAN TRANSIT DEMAND: THE MONTREAL CASE. This paper shows how readily available monthly time-series data may be used to explain the aggregate demand for public transit in particular urban areas in terms of the prices of public and private transportation, the price of non-transportation goods, service characteristics of the competing modes, comfort levels, income and socioeconomic variables, etc. Parameter values pertain to the adult market of the Montreal Urban Community Transit Commission over the period December 1956 to December 1971. Estimates are obtained by using linear regression techniques in conjunction with the Box-Jenkins procedures for the specification of the Rth-order autoregressive process of the error terms. /Author/

Gaudry, M *Transportation Research* Vol. 9 No. 4, Aug. 1975, pp 249-258; ORDER FROM: ESL, Repr. PC, Microfilm

42 125796 COMMUNITY ROLE IN MODAL CHOICE FOR TRANSIT SYSTEM PLANNING. The Buffalo, N.Y., SMSA is currently anticipating the construction of a rail rapid transit system. This rail rapid transit system is to be contained in a central corridor going from the existing CBD in Buffalo to the rapidly developing new State University campus and planned new community in the suburban areas. Current travel patterns and their changes in the past decade have been examined together with changes in population, employment, and shopping characteristics. As the proposed rapid transit is the culmination of a long transportation planning process begun in the early 1960's, the history of this process is reviewed. Issues that have arisen by community groups in the impact area are traced. It is noted that the diversity of the issues and current concerns regarding planning have arisen from previous transportation actions, job availability, and dependence upon the car. The paper concludes with an assessment of current actions in the corridor area.

Paaswell, RE (State University of New York, Buffalo) Pafka-Gerbig, J *ASCE Journal of the Urban Plan and Develop Div* Vol. 101 No. 1, May 1975, pp 35-47, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

42 125797 RAIL TRANSIT OPERATING COST GUIDELINES. Operating costs may be estimated at several levels of detail, ranging from the simple application of unit costs per car-mile or car-hour, to the preparation of a complete manning table and other refinements, depending on the level of accuracy required for the individual application. The need for this type of estimate prompted the development of the set of guidelines that forms the subject of this paper. The so-called "yardstick concept" that evolves utilizes unit measures of work and cost derived from actual operating systems to estimate generalized man-

power requirements and operating costs for planned urban rail systems. Following an analysis of present transit accounting practices, factors affecting operating costs, and the development of the yardstick concept, an estimate prepared for Atlanta with the aid of the guidelines is presented.

Gilcrease, EE, Jr (Metropolitan Atlanta Rapid Transit Authority) Kudlick, W Padron, M *ASCE Journal of Transportation Engineering* Vol. 101 No. 2, May 1975, pp 365-381, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

42 125833 MASS TRANSPORTATION: A NATIONAL COMMITMENT. This paper emphasized the need for a national commitment to public transportation and the need for legislative action to provide stable long-term funding. It is estimated that a \$77 billion commitment could provide the systems and rolling stock for public transit to attract upwards of 38 billion trips by 1990. The three basic modes of ground transportation--rail transit, bus, and automated personal rapid transit--are discussed and their relative role and funding needs advanced.

Lancaster, TA (Rohr Industries, Incorporated) Hearn, DL ; Society of Automotive Engineers Preprint 750443, Feb. 1975, 6 pp; Prepared for meeting 24-28 February 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

42 126077 NATIONAL ECONOMIC ANALYSIS OF TRAFFIC SYSTEMS-A CAB TRACK SYSTEM IN VAESTERAAS [Sambhaell-sekonomisk Analys av Trafiksystem-Spaartaxi I Vaesteraas]. A method for the analysis of traffic systems from a national economic viewpoint is described; it involves taking whole traffic system into consideration and investigating alternative traffic solutions with different public transport systems. In the evaluation all factors that are affected should be accounted for. The proposed methodology is applied to a case study for a Swedish town, Vaesteraas, involving a new means of public transport, a cab track system, which the authors find technically possible and fully realizable in this town in 1990. Three alternatives, reflecting different courses of development have been analyzed in the report, for the year 1990; the first is an extension of the present trend, that is car traffic dominating, the second includes the introduction of a cab track system as a public means of transport, the third furthermore includes a forced limitation of private car traffic. Economic and other consequences are discussed. /TRRL/ [Swedish]

Kreitz, PA Nelldal, BL ; Royal Institute of Technology, Sweden R&D Rept. No. 4, 1974, 71 pp, Figs., 12 Tab., 1 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-213455); ORDER FROM: Royal Institute of Technology, Sweden, Fack S-10044, Stockholm 70, Sweden Repr. PC

42 126122 POLITICS, REGULATION AND URBAN TRANSPORTATION PRIORITIES: THE TRIUMPH OF THE AUTO SOCIETY. In the United States, urban transportation is in serious difficulty. The emphasis is on the automobile highway transportation system not mass transit. A network of auto related industries keep policy orientation on highways. They wield economic and political power that burdens urban

areas. Cities are not only choked with auto pollution and congestion but about one half of the center cities land is devoted to accommodating the auto. People have no viable alternative to the auto. The Highway Trust Fund indirectly regulates the automobile industry by creating the demand for automotive transportation. The revenue generated by the fund leads government to heavily subsidize highways. This makes mass transit look even less attractive. The auto-highway aggregation is deeply entrenched in our society from government officials to auto dealers, and parking lot and gasoline service station owners. The automobile problem is an economic and political problem. It will have to be solved by political means.

Cornelius, JV *Antitrust Law and Economics Review* Vol. 7 No. 3, 1975, pp 69-88

42 126203 MAN AND CAR SOCIETY [Maenniskan och bilsamhaellet]. This book deals with the priorities of various modes of transport in Sweden. It is shown how car-oriented traffic planning has developed up to today. The changes in traffic environment during the latest 5 decades are analyzed and the effects on different road user categories are discussed. A main idea is that if a more reasonable payment responsibility is laid on car traffic a substantial increase in public transport will be the effect. Many concrete suggestions are made in order to favor public transport and pedestrians. /TRRL/ [Swedish]

Hultgren, K ; Bokfoerlaget Pan/Norstedts Textbook 1974, 227 pp, 10 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-213465)

42 126265 EFFECTS OF CHANGES IN PARKING PRICES AND PARKING RESTRICTIONS ON URBAN TRANSPORT DEMANDS AND CONGESTION LEVELS. The research reported investigates the influence of parking prices, fees, and time costs, on urban modal choice and parking location decisions. A disaggregate approach is used to test a behavioral two-stage model in which the use of the car is followed by a selection among alternative parking locations. Parking was shown to be treated as a separate variable in the modal choice decision, and not simply aggregated with running costs as previous modal split studies suggested. Work trip data, based upon the Toronto and region transportation study of 1964, was used for testing modal choice and parking location equations, and the effects of changes in parking prices, fee structures and time costs are evaluated. The main conclusions are: (1) The estimated elasticity of choice of mode with respect to changes in parking fee is -0.44. This is lower than previously believed. Also, the impact of any changes in parking prices are dependent on the current auto/transit split. (2) The parking location models indicate that a rise in parking prices over the central business district (CBD) will result in both a relocation and modal switching effect. (3) Congestion in aggregate is influenced very little, if at all. There is, however, a redistribution of parkers towards the periphery of the CBD. The redistributive impact depends on the current distribution of parkers within the CBD, their socio-economic characteristics, such as income level, and the particular parking policy chosen. /TRRL/

Gillen, GW ; Toronto-York University Joint Program in Transp R&D Rept. No. 25, Feb. 1975, 51 pp, 2 Fig., 9 Tab., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-213719)

42 126311 PRELIMINARY TRANSIT PATRONAGE ESTIMATION FOR SMALL URBAN AREAS VIA TRANSIT SERVICE FACTOR. Transit service-factor (annual revenue miles of bus service per capita) offers a conveniently applied parameter for preliminary estimation of system-wide patronage for the small urban area contemplating establishment or substantial expansion of public transit service. Its use is particularly suited to preliminary transit feasibility studies using sketch-planning techniques for rapidly generating and appraising alternative system concepts and general levels of service. Careful judgment should be exercised in application of the service factor/ridership relationships presented here to any particular urban area, however. Adjustments for local conditions--community factors and transit system parameters--and consistency checks with other patronage estimation criteria are essential in applications beyond gross preliminary patronage estimation.

Neuzil, D *Traffic Engineering* Vol. 45 No. 8, Aug. 1975, pp 32-35

42 126408 PLANNING, IMPLEMENTATION AND OPERATION OF THE PHILADELPHIA-LINDENWOLD LINE. The one to six car trains are operated by a one man train crew who is, in fact, part of the automated or computerized process. He notifies the computer as to the length of the train; opens and closes doors; determines the length in time of each stop; initiates acceleration; and can eliminate station stops. The computer prevailing determines train speed for each track section and right of way conditions; causes the train to decelerate at the optimum rate; and stops at the station with the center of the train at the center of the platform. The Lindenwold Line has demonstrated that motorists will leave their cars if superior transportation is provided; quality transit service can reduce air and noise pollution and conserve energy; traffic congestion can be reduced; technology is now available to create desirable rapid transit service, and that rail rapid transit can be planned, constructed, and efficiently managed to meet operating and maintenance costs out of the fare box.

Johnston, RB (Port Authority Transit Corporation of Penn and NJ) ; Society of Automotive Engineers Preprint #750623, May 1975, 5 pp; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

42 126412 QUESTIONNAIRE SURVEYS OF PASSENGER COMFORT. Some of the techniques involved in the quantitative treatment of data obtained in the 'field' situation are discussed. The examples provided concern attempts to quantify passenger reaction to the noise and vibration experienced in public transport, since it is the assessment of these two factors, and their effects on passenger comfort, which is being investigated at Swansea. After discussing the validity of information derived in this way, general methods of assessment are described. The paper continues with a detailed examination of questionnaire methods of the subjective assessment of environmental stimuli, and concludes with examples of the pitfalls which may be inherent in such assessment.

Osborne, DJ (University College of Swansea, Wales) *Applied Ergonomics* Vol. 6 No. 2, June 1975, pp 73-103, 9 Ref.; ACKNOWLEDGMENT: EI;

ORDER FROM: ESL, Repr. PC, Microfilm

42 126428 ANALYSIS OF URBAN TRANSPORTATION CRITERIA. The criteria should accurately account for the quality of the transportation service, accessibility to various land-use opportunities, economic efficiency, system and traffic characteristics, community disruption, pollution of the environmental, adaptability to changes in technology and travel behavior, and esthetic quality of transportation facilities. The results of an attitudinal survey conducted by the Delaware Valley Regional Planning Commission (DVRPC) indicate that individuals can adequately rank well-defined criteria. The examination of the criteria ranks by population groups of different socioeconomic characteristics shows no larger variations from the ranking by the total population in the sample. The DVRPC survey indicates that safety and security is the most important criterion in transportation, followed by reliability, air pollution, travel time, preservation of neighborhood, comfort, noise pollution, esthetics, job opportunities, transfers, duration of service, construction cost, and shopping opportunities.

Zakaria, T *ASCE Journal of Transportation Engineering* Proc Paper Vol. 101 No. TE3, 11496, Aug. 1975, pp 521-536; ACKNOWLEDGMENT: *ASCE Journal of Transportation Engineering*; ORDER FROM: ESL, Repr. PC, Microfilm

42 126858 NATIONAL TRANSPORTATION POLICY-A PROPOSAL. This six-part paper reviews the central transportation issues, and drafts (for public comment) a statement of goals, aspirations and programs for public transport in America. The first part which discusses the national problem, is designed to furnish an historical reference point and perspective on area of principal concern to those of 1,000 private and public agencies which are engaged in the task of daily moving persons within urban and rural areas. Part II, which considers the place for public transport in a national transportation policy, establishes relationships primarily among urban and rural ground transportation forms. This section is an attempt to crystallize those elements of an overall policy which would advance the role and possible contributions of public transport in restoring balance to the efforts which must be expended in assuring future mobility for citizens. Part III focuses on specific objectives and requirements of the public transport industry within the framework of general goals. The two immediate public transport markets are brought into play in Part IV and several approaches to potential markets are examined. Part V analyses the National Mass Transportation Act of 1974 insofar as it meets the specified requirements of the transit industry. In the final section (Part VI), the future of the provisions of the '74 act are considered and a number of major concerns that have arisen are addressed.

Transit Journal Vol. 1 No. 1, Feb. 1975, pp 3-22, 1 Tab., 15 Ref.

42 127010 PREPARATION OF STRATEGIC CHOICES IN INTER-REGIONAL URBAN OR SUBURBAN PUBLIC TRANSPORT SERVICES [Preparation des choix strategiques en matiere de transports interregionaux de personnes (TR.I.P.)]. The French Minister of Transport and the Minister for Urban and Regional Development have set up an interministerial Steering Committee to study possible strategies for inter-regional passenger transport. The author, who is chairman of the working party known as TR.I.P., which is the committee's executive body, explains the progress made by his group in its work. He describes the organization and scope of the study, the supply-demand simulation model, the envisaged financing plan, and the strategic formulations they make possible. It is planned to apply them in the preparation of the VIIth economic plan. [French]

Metzinger, G ; International Conference on Transport Research Proceeding June 1973, pp 246-252; Proceedings of the International Conference on Transportation Research, Bruges, Belgium, June 1973.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: OECD Publications Center, 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006 Repr. PC

42 127487 PROGRAMMING IN PERSPECTIVE. The role of programming is defined and the historical aspects, current features and future trends of the concept are examined. The programming role is that of marshalling all the options, weighing them against one another, deciding the order of effectiveness among means, and the order of relative efficiencies for each level of effectiveness of means. The programming role is an intermediate role which must continually interact with the initiatives that arise at the planning level and with the consequences reported at the budgetary level. The transportation picture in the 19th century is described; the needs at this time were met by a mixture of public and private programming. Before the advent of the automobile, the only programming required of public authorities had to do with the level and structure of franchise payments they could exact. Programming soon came to assume the intermediary function if not holds. At this time the special programming problem became the establishment that the use of vehicles confers net benefits at least equivalent to the costs. The need for intermodal programming (most needed in connection with terminals and terminal areas) now arose. The main needs in this area are likely to relate to the hearts of metropolitan areas. Comments are made on the traditional impact study and the programming based on the benefits it indicates. The implications held by the private passenger vehicle and public transportation is examined. Complex problems for programming are also presented by the Highway Trust Fund and Transportation Trust Fund. The programming road ahead for freight is seen in the railroad; in intercity transport, programming must demonstrate sensitivity to more parameters and different points of view; within cities, the development of "discontinuous or disjunctive" programming is suggested. There will be a need in the future for more extensive and imaginative programming and a better grasp of far-out options.

Nelson, JR (Amherst College) *Transportation Research Board Special Reports* No. 157, 1975, pp 14-24; Proceedings of a conference held March

23-26, 1975 at Orlando, Florida. See individual sections, HRIS #127487-#127495.; ORDER FROM: TRB Publications Off, Orig. PC

42 127488 FEDERAL ROLE IN PROGRAMMING. Although federal programs, policy and regulations have distorted the competitive balance among modes, changes are foreseen. Regulatory reform will allow inherent competitive advantage to operate more fully and to allow intelligent trade-offs in the economic sphere. Another major federal policy change focuses on user-charge policy. Woven with the user-charge issue and an important part of programming are trust funds, earmarked financing, and long-term financing. The Department of Transportation has several basic premises that will serve to strengthen local transportation planning and programming. These include more flexibility in the use of funds, a broader range of modal choices with federal transportation assistance, and the use of multiyear contract authority. The need is expressed for the analysis of transportation investment in a way that openly recognizes the community development impact. Comment is made on the argument concerning the need to cross subsidize the unprofitable low-density lines with high-density lines. Without effective legislative cooperation, the new budget control act could restrict long-term programming to transit funds. To resolve this problem, either the act must be amended or an alternate system must be developed that allows for budget review and yet facilitates needed 2-or 3-year delivery systems. Transportation policy must not be dictated by a provision that hinders long-term programming authority unless there is a trust fund. With reference to the provisions of the 1973 highway act (especially the transfer of Interstate Highway funds), there must be some recognition of the special programming, timing and execution problems of the transfer provisions because conventional programming processes for the Interstate Highway System program does not accommodate the needs.

Lutz, TC (Department of Transportation) *Transportation Research Board Special Reports* No. 157, 1975, pp 25-27; Proceedings of a conference held March 23-26, 1975 at Orlando, Florida. See individual sections, HRIS #127487-#127495.; ORDER FROM: TRB Publications Off, Orig. PC

42 127495 EVALUATION. The failure of the transportation process or program is traced to lack of management. The basic cause of this failure is human, not technical. In evaluating the transportation programming process, reference is made to a linear alignment (from planning to programming to right-of-way acquisition to construction) and to factors of time, funds, and manpower generally for individual projects and possibly grouped. The evaluation of success must seriously consider the role of transportation in meeting the needs and the desires of society, the role of each level and unit of government, the role of private enterprise in establishing and accomplishing reasonable objectives, the balance of resources among all functions of publicly funded programs, and the performance of individual agencies and units in their assigned roles with available resources. In the discussion which follows, the Federal Highway Administration's viewpoint is put forward: programming is neces-

sary; and the Administration is committed to restoring it with a minimum requirement of federal presence in an evaluation process. The Urban Mass Transportation Administration has statutory objectives against which to measure progress, and certain national objectives of air quality and energy conservation. However, these are not operational objectives. Such objectives, it is suggested could be the improvement of the quality of service for the "transit independents"; improvement of mobility of the transit dependents; and the reduction of automobile usage because such usage serves as a surrogate for certain more basic goals such as improved environmental quality and energy conservation.

Revell, WL (Post, Buckley, Schuh and Jernigan, Incorporated) Lamm, LP, Discussor (Federal Highway Administration) Orski, CK, Discussor (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* No. 157, 1975, pp 67-72; Proceedings of a conference held March 23-26, 1975 at Orlando, Florida. See individual sections, HRIS #127487-#127495.; ORDER FROM: TRB Publications Off

42 127574 EVALUATING TRANSIT SERVICE TO MINORITIES. This report describes a computerized evaluation methodology for analyzing the fair distribution of transit services. The report is of specific interest to the Office of Civil Rights, Urban Mass Transportation Administration, which is charged with evaluating compliance with Civil Rights standards during a review prior to the awarding of a capital grant in Urban Mass Transportation. It may be used to analyze the fairness of transit services provided to the elderly, to females, or to any desired interest group. The report is also of interest to transit planning agencies, and is useful in analyzing the geographic and socio-economic distributing of transit services in a metropolitan area. A model is formulated upon the concept of accessibility to opportunities, and produces accessibility indices of transit service for small geographic zones. The indices measure the percentage of opportunities available to residents of each zone via the transit system. A computer model is produced that is compatible with current U.T.P.S. programs and it uses these programs to develop input data. Capabilities of the model to analyze accessibility conditions and produce output reports are illustrated by data from the City of Richmond, Virginia. The computer program is included in the appendix and it is thoroughly described in the User's Manual. /Author/

Popper, RJ Connelly, MD ; Virginia Polytechnic Institute & State University Final Rpt. UMTA-VA-09-0013, Sept. 1975, 102 pp, Figs., Tabs., 17 Ref., 2 App.; Available from NTIS, PB-253041/8ST. Transportation Administration Office of Civil Rights.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-253041/8ST

42 127667 MAJOR SHIFT IN TRANSPORTATION MODES FORESEEN OVER NEXT 25 YEARS. The trend toward more energy-efficient forms of transportation is discussed in this summary of the market research study "Transportation Markets" published by Frost & Sullivan, Inc. Statistics are given for future car populations, engine modifications, auto usage, freight transportation and mass transit by both rail and bus.

Some specific features of each of these areas are mentioned.

American Highways and Transportation Vol. 54 No. 2, July 1975, p 29

42 127684 TELECOMMUNICATIONS: THE STATE OF THE ART AND PLANNING IMPLICATIONS. This overview of the science of telecommunications and some of its possible implications, focuses on the possibility of using telecommunication as a substitute for travel. Various combinations of four sub-systems (2-way audio, 2-way audio visual facsimile transmission, and remote computer services) are currently used in diverse fields through the country. Although many operational systems are limited geographically, they are already substituting for travel. The development of telecommunication science has been directed toward the improvement of communications and the bringing of social services within reach of the disadvantaged. Studies indicate that about 24 percent of all work trips and about 50 percent of all shopping trips could be replaced by telecom methods. There is a real possibility that substitution of telecommunications for travel will lead to changes in urban form and to decentralization. A possible consequence of such decentralization is the decline of CBD office growth, and the concomitant impacts on mass-transit-especially rapid rail. The social and psychological implications are also considered. The acceptability of a mechanical form of communication and a possible "information overkill" are discussed.

Oregon Department of Transportation Jan. 1975, 56 pp, 6 Fig., 5 Tab., 48 Ref.

42 127773 GREATER LONDON TRANSPORTATION SURVEY. 1. ORGANISATION AND MANAGEMENT OF THE SURVEYS. The greater London transportation survey undertaken during 1971-72 was, in technical content, a conventional transportation survey, but differed from other surveys in that it was the first major update in the U.S. Of a transportation data base: 1962 was the year of the London traffic survey. The main differences were in terms of planning, implementation, processing and procedure. During the planning stage a number of pilot surveys were commissioned to find ways of avoiding mass data collection, hitherto an inherent part of the process. The study also provided the opportunity to introduce subjective data into a field previously guarded by opinion and precedent. The underlying approach was to establish a total data system in which fieldwork methods were not regarded in isolation, but rather as an integral part of the overall process. (A). /TRRL/

Weald, DE (National Water Council, England) *Traffic Engineering and Control* Vol. 16 No. 5, May 1975, 4 pp, 5 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 214449)

42 127860 THE MATTER OF BALANCED TRANSPORTATION. Balanced transportation has been used to describe a mixture of transport services involving desirable or optimum combination of two or more modes. This article concludes that a balanced transport system has not yet been achieved in any urban area. The author urges that there be better understanding of the nature of problems such as relation between land use and transportation. Decision making processes must

be clarified and there should be continued advancement in the processes of planning. More adequate concepts of organization are needed to perform transport-related functions. Broader bases are needed for public financing of urban transport. A greater range of alternatives are available for meeting special requirements of a complex regional transport system.

Davis, HE *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 515-530; ACKNOWLEDGMENT: Traffic Quarterly; ORDER FROM: ESL, Repr. PC, Microfilm

42 127879 TRANSPORTATION IN FOCUS. These proceedings, composed of papers presented at the Transportation Research Forum, reflect the broad spectrum of transportation problems that now exist and the wide range of approaches that have been taken to solve them. The following topics are covered: national transportation policy; determining the optimal railroad route structure; air service to small communities; financing urban transit systems; port planning and operation; the Canadian deregulation experience; issues in trucking and urban goods movement; urban transportation systems; transportation of solids by pipeline: economic issues; safety and security in public transportation; should railroad accounting be revised; the national transportation study; air transportation systems analysis; developments in travel demand analysis; transportation of solids by pipeline: technological issues; urban transportation system evaluation; transportation cost measurement for decision making; marketing public transport services; and interactive graphic tools for transportation planning. Papers from the Canadian Transportation Research Forum which was held prior to the U.S. Forum are also included. Reports of the discussions and debates appear in a companion volume.

Transportation Research Forum, Proceedings Vol. 15 No. 1, 1974, 623 pp, Figs., Tabs., Refs. ORDER FROM: Vietsch (Grant C), 181 East Lake Shore Drive, Chicago, Illinois, 60611 Orig. PC

42 127970 BALANCED TRANSPORTATION. An investigation of practices and problems of urban areas in Canada, Australia and eight European countries covered 5 specific areas: the coordination of the technical aspects of land use and transportation planning; the coordination in timing and financing of improvements; the sources of funds for planning and development; the legal requirements and administrative practices that require or encourage coordination in development; and the extent and form of citizen participation in the planning process. The most significant of these, and one common to all countries was that covering legal requirements and administrative practices. Forming and financing of improvements was also found to be of vital importance. Growing public participation was noted, and common features in the preparation and approval of the first-level plan are set forth. The question is considered why planning is more effective in other countries than in the U.S. The concept of "quality of transportation" is discussed, and the role of the transportation official is examined.

Holmes, EH (International Road Federation) *American Assn of State Hwy & Transp Office Proc* Vol. 16 1974, pp 64-75; Proceedings of the 1974 Sixtieth Annual Meeting, Detroit, Michigan, November 18-20, 1974.

42 128895 DEMAND FUNCTIONS, BEHAVIORAL ANALYSIS, AND COST EFFECTIVENESS IN URBAN TRANSPORTATION. The sensitivity of cost-benefit assessments to variations in demand for public transportation systems, indicates some major changes in costs and benefits for different demand conditions. However, the relative standing of new systems of urban transportation were not significantly affected. Also discussed are requirements for improved modeling of demand. Diagram and table illustrate analysis.

Dodson, EN (General Research Corporation) *Transportation Science* Vol. 9 No. 2, May 1975, pp 139-148, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

42 129419 MARTA GETS MOVING, AT LAST. Construction has started on the Metropolitan Atlanta Rapid Transit system. This article describes the long planning and political processes which preceded the building of the system that is eventually to extend 60.9 miles, cost \$2.1 billion and require more than 330 cars.

Asher, J *Railway Age* Vol. 176 No. 23, Dec. 1975, pp 20-24; ORDER FROM: ESL, Repr. PC, Microfilm

42 129478 INVESTMENT EVALUATION MODEL FOR MULTIMODAL TRANSPORT CORRIDORS. A method of economic evaluation of centrally focused multimodal urban transport corridors is presented that is based on certain production theory principles. Production functions are developed in terms of average door-to-door travel velocity in a corridor as a function of commuter-rail and expressway-facility inputs. Cost data are used to establish the optimum combinations of transport mode inputs for various travel speeds. The information used to develop the relationships was obtained in the Toronto region. The use of the techniques described in the paper allows the technical and economic characteristics of the modes to be examined in a quasi-continuous way, which allows a broad range of potential modal combinations to be evaluated. This is in contrast to the normal economic evaluation approach, which chooses from among a set of mutually exclusive, mode-specific alternatives that may not include the optimal alternative. The framework allows the examination of a range of policy variables such as parking charge changes in the central business district and the effect of dial-a-bus as a residential feeder mode.

Freeman, J (Ontario Ministry of Transportation & Communic, Can) Hutchinson, BG (Waterloo University, Canada) *Transportation Research Record* No. 550, 1975, pp 26-34, 10 Fig., 4 Tab., 5 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

42 129528 DESIGN CHARTS FOR ESTIMATING TRANSPORTATION PLANNING STATISTICS FROM AREA POPULATION. Utilizing data collected for urban transportation studies in Ontario, regression analysis has been used to establish relationships between the daily number of person trips in an urban area and the area population. In particular the number of trips by auto drivers, auto passengers and mass transit riders have been investigated. Further, auto driver trips have been stratified into the following destination trip purposes: return home, work and

related business, shopping, social-recreational and miscellaneous. The results of this analysis have been used to prepare a set of design charts. These charts are presented graphically and in the form of a nomogram. The accuracy of these charts has been investigated and found satisfactory for most planning purposes. (A) /TRRL/

Rose, K (Queen's University, Canada) *Transportation (Netherlands)* Vol. 4 No. 1, Mar. 1975, pp 55-66, 4 Fig., 3 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213515)

42 129612 TRANSIT ASSISTANCE PROGRAM FOR IOWA. This inventory of transit services in Iowa covers urban transit, intercity passenger bus carriers and charter operators, taxicab operations, rural transit services and special services, and includes the results of questionnaire and interview surveys, and the resulting recommendations. The recommendations urge a centralized source of data and expertise, a public information program, the utilization of federal aid, the continuance of existing transit services with no diminution of service level, the establishment of new services in communities of over 20,000 population, the sponsorship of demonstrations in communities with populations of 10,000 to 20,000, and the development and improvement of rural transit service. Based on state and local community experience, recommendations are made concerning revenue sources to support transit in Iowa, and four alternative state transit assistance programs are presented.

Carstens, RL Mercier, CR Kannel, EJ Ring, SL Butler, DL ; Engineering Research Institute, (ERI 75128) Final Rpt. June 1975, 229 pp, 5 Fig., 24 Tab., 6 App.; Sponsored by the Iowa Department of Transportation.; Contract UMTA-IA-09-9001 A

42 129630 TOWARD MORE BALANCED TRANSPORTATION: NEW INTERGOVERNMENTAL PROPOSALS. This report focuses on the "regional" transportation systems (Metropolitan as well as non-metropolitan areas) encompassing all modes, operating characteristics and considers the challenge of finding a means of linking the planning for one mode with the planning for another. To meet this challenge, the Commission recommends a nine point program relating to the merging of the federal urban system and secondary highway system into a unified block grant program, the utilization of this block grant, the channeling of funds, the regional bodies designated for federal and roles, state and local financing policies, and the consolidation by Congress and State legislators of established regulatory bodies. Precedents upon which these recommendations are made are stated, and the importance of cooperative intergovernmental relations in the implementation of the recommendations is underscored.

Advisory Commission on Intergovernmental Relations 1975, 307 pp, 14 Fig., 115 Tab.; ORDER FROM: GPO, Repr. PC; 052-003-00106-3

42 129682 A MODAL SPLIT MODEL [Een Model Voor de Voertuigkeuze]. A modal split model developed by the national physical planning agency for a study of the relations between the physical structure of towns and the transport system is described. The model divides a given total origin-destination matrix into trips by mode:

car, public transport, motorcycle, bicycle. The basic idea of the model is that every traveller makes his choice from the various modes in a given choice situation. This situation is defined by the trip purpose and the modes available to the trip maker. The choice from these modes is determined by the travel times, costs and distances and in some cases by the parking situation at the place of destination. On the one hand, these variables constitute the choice determining factors, on the other hand they are policy related. The basic idea is worked out into an operational model concept. The calibration of the model is described. The appendices deal with the theoretical and operational model put into a scheme, the formulae of the modal split model, the parameter values used in the model and the results obtained. The covering abstract for the conference is IRRD no. 213390. /TRRL/ [Dutch]

Colloquium Verkeersplanologisch Spuurwerk Conf Paper 1974, 11 pp, 2 Fig., 3 Tab., 3 Tab., 8 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 213397)

42 129683 A FLEXIBLE TRAVEL DEMAND MODEL SYSTEM FOR REGIONAL APPLICATIONS [Een Provinciaal-Regionaal Rekenmedel: Toepasbaar en Aanpasbaar]. The regional model system presented here has the following characteristics: applicability to work days for the period 0-24 hour, three trip purposes and three modes. Furthermore, it is possible to apply it to particular periods of the day, e.g. the peak hour, and to make calculations for selected areas at a much higher level of detail. The following five submodels are dealt with: 1) trip production and attraction, and intrazonal trips 2) trip distribution 3) modal split 4) time split 5) road and public transport network assignment. Apart from the usual explanatory variables use is made of two zone typologies: a classification of zones according to service level and employment, and one with respect to urban and non-urban areas. (a) the covering abstract for the conference is IRRD no. 213390. /TRRL/ [Dutch]

Batenburg, K Thompson, AC ; Colloquium Verkeersplanologisch Spuurwerk Conf Paper 1974, 16 pp, 4 Fig., 1 Tab., 6 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 213396)

42 129973 PROGRESS IN PLANNING URBAN PASSENGER TRANSIT IN AUSTRALASIA AND JAPAN. The authors present a state of the art report of research being carried out a Australasia and Japan in mid 1974 into innovation in public transport systems and coordination of urban public transport planning. The huge differences in scale, resource availability and tradition that separate Australasia and Japan were found to be reflected mainly in the progress made towards the development of public transit systems, rather than in the overall aims of the policies being adopted to combat urban transport problems. /TRRL/

Woodling, G Marshall, R (Transport Planning Limited) *Traffic Engineering and Control* Vol. 16 No. 4, Apr. 1975, pp 178-180, 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 215210); ORDER FROM: Printerhall Limited, 29 Newman Street, London W1P 3PE, England Repr. PC

42 129976 THE BASIC-NETWORK: A FLEXIBLE SYSTEM FOR THE CALCULATION OF TRAVEL TIMES AND DISTANCES [Het Basis Netwerk: Een Flexibel Systeem voor het Berekenen van Reistijden en Reisafstanden].

The need for traffic and transport planners to have quickly available the values of explanatory factors influencing transport demand led, among other things, to the development of a so called basic network with corresponding software. The paper gives a systematic description of the infrastructure, analysed in all its essential components, for all modes of transport, such as walking, bicycle, moped, car, railway, bus etc. After dealing with the inventory of the infrastructure, the author focuses attention on the programs which produce a transport network model. Data checking is performed in order to guarantee an expeditious application. The output, such as travel time-matrices, distance-matrices and "round trips", is also discussed. Finally, brief attention is paid to the setting-up of a databank, to its use, and to the further development of the system and programs. For covering abstract for the conference see IRRD no. 215277. /TRRL/ [Dutch]

Batenburg, K Thompson, AC Quack, RFB ; Colloquium Vervoersplanologisch Speurwerk Conf Paper 1975, pp 529-544; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 215300)

42 130767 SENSITIVITY ANALYSIS OF COMMUNITY SAVINGS DUE TO CHANGE-OF-MODE OPERATIONS.

This study is concerned with a sensitivity analysis of the community savings provided by successful change-of-mode (park-and-ride) facilities in medium to large U.S. cities. The research was an early attempt to generalize the locational aspects of change-of-mode facilities and their benefits to the community. The determination of the community savings due to the diversion of trips from highway to change-of-mode facilities is a prerequisite in assessing the feasibility (success of park-and-ride facilities). Community savings (the summation of both user and nonuser benefits) are computed as the difference in travel costs by highway alone and or by change-of-mode facilities. Travel costs are simulated in a deterministic fashion and by using average unit costs for cities of different sizes and for different locations within a given city. The simulated community savings data are then used to develop a linear multiple regression equation to predict the savings.

Abdus-Samad, UR (National Council for Scientific Research, Lebanon) Grecco, WL (Tennessee University, Knoxville) *Transportation Research Record* No. 557, 1975, pp 1-11, 8 fig., 4 Tab., 25 Ref.; ORDER FROM: TRB Publications Off

42 130768 INFLUENCE OF PARK-AND-RIDE FACTORS IN MODAL SHIFT PLANNING.

The purpose of this paper is to investigate the use of park-and-ride facilities and municipal parking policies as a means of controlling the modal split in urban areas. A discriminant model was used to examine the reasons why park-and-ride patrons shifted to that mode from a former automobile mode. An attitudinal survey was also used to substantiate the model results. The reduction in travel cost appears to be the main reason for the modal shift. The primary conclusion is that a park-and-ride facility can be used as a planning tool to adjust the modal split if the service is properly designed.

Brown, GR (British Columbia University, Canada) *Transportation Research Record* No. 557, 1975, pp 12-20, 4 Fig., 3 Tab., 5 Ref.; ORDER FROM: TRB Publications Off

42 130770 COMPUTER-ANIMATED SIMULATION MODELS: A TOOL FOR TRANSPORTATION PLANNING.

The role of computer animation in visualizing the behavior of simulation models of complex processes and systems is described. The results of a demonstration project applying this technique to transportation planning are reported and analyzed. The study involved the modeling and display of passenger flow in a subway station. It was carried out by using SIMULOGO, a new discrete-event simulation language, and ZAPP, a new computer animation system, which are discussed in the paper. Planned extensions and elaborations of these facilities to provide a comprehensive and responsive environment for transportation systems modeling are outlined.

Baecker, RM Horsley, TR (Toronto University, Canada) *Transportation Research Record* No. 557, 1975, pp 33-44, 4 Fig., 19 Ref.; ORDER FROM: TRB Publications Off

42 131011 COMPARATIVE TRAVEL PATTERNS FROM FOUR WORK TRIP DATA SOURCES.

This research investigated the feasibility of using work trip data as the primary source of information to obtain travel patterns for urban transportation planning in small urban areas. Data was collected from four sources in Lafayette-West Lafayette (Indiana) SMSA: (1) the Greater Lafayette Area Transportation and Development Study's home-interview origin-destination survey; (2) an employee survey; (3) the Lafayette city directory; and (4) Bureau of the Census 1970 Urban Transportation Planning Package. Chi-square test and simple analysis of variance techniques were used in comparing the resultant trip tables from the latter three sources against those from the home-interview. In addition to traffic zone to traffic zone trip tables, traffic zone to census tract tables were also compared. It was found that there were significant statistical differences in all comparisons. However, the differences did not appear to be of practical importance between the census and the home-interview patterns. It was also concluded that the directory pattern showed significant statistical and practical differences from the home-interview pattern. Although the employee survey pattern showed statistical differences, it was not clear that these differences would be truly practical differences in transportation planning for small cities. Further research is recommended in the form of another comparative survey with more comprehensive sampling and data collection techniques.

Law, WK ; Purdue and Indiana State Highway Commission JHRP, (C-36-69B) Final Rpt. JHRP-75-23, Dec. 1975, 249 pp, 3 Phot., 12 Tab., 12 App.; Conducted in cooperation with the Department of Transportation, Federal Highway Administration.; HP&R 1-(12 Part 1)

42 131316 RAPID TRANSIT PLANNING: A TALE OF THREE CITIES.

Three articles explore the complex nature of rapid transit planning and reflect the experiences of three municipalities in their efforts to plan rail transit systems,

providing insight into the mechanisms, concepts and difficulties inherent in such undertakings. Dyer analyzes the events that have taken place in the Miami area. Looking at rapid transit planning in the context of public policy, four major issues are related to the Dade County project and recommendations are offered to sooth the planning process and make it more responsive. Alegria focuses on the physical aspects of planning and specifically on technical barriers that the designers of Mexico City's Metro had to overcome. The system is now in operation and the municipal government is looking to its expansion. Simpson of Denver's Regional Transportation District asks at what point planning should stop and commitment be made. Denver's slow progress is discussed.

Dyer, JA Alegria, A Simpson, JD *Transit Journal* pp 33-52; ORDER FROM: American Public Transit Association, 1100 17th Street, NW, Washington, D.C., 20036 Repr. PC

42 131357 MAN MOVEMENT AND TOMORROW'S CITIES: THE EFFECTS OF MOTORIZATION ON URBAN GROWTH.

The question of what the future holds for the automobile and for the city is considered, and the effect of motorization in limiting urban growth is examined. The situation in Japan is considered where bold plans for road construction were implemented in the 1960's. Rapid motorization soon met with opposition from elements which favor modes of transportation other than the automobile, and those who downgrade the importance of transportation altogether. It is recognized that the urge to move is deeply rooted, and it creates inevitable and never ending conflicts. The impact of these conflicts are described. The solution to automobile problems which has emerged, is that if a section of a city cannot handle automobiles, then the automobiles will go elsewhere. Restricting automobile use will stop urban population growth, but the reason for this will not be because the restriction will spur demand for mass transportation.

Kakumoto, R *Wheel Extended* Vol. 5 No. 2, 1975, pp 440, 3 Fig.

42 131442 URBAN AND REGIONAL MODELS. PROCEEDINGS OF SEMINAR K. SUMMER ANNUAL MEETING, UNIVERSITY OF WARWICK, JULY 1974.

The following papers were presented at the meeting: The Application of Urban Models in South America: A Case for Santiago and Caracas, Echenique,M; The Design of Urban Growth Model for Strategic Land-Use Transportation Studies, Turner,CG; Models and Theories in Planning, Massey,D; Some Dynamic Models for Spatial Interactions, Blokland,J and Nijkamp,P; Dynamic Spatial Models of Urban Systems, Sayer,R; A Dynamic Simulation Model for Regional Economic Planning, Burdekin,R, Telford,K and Yule,A; Disaggregated Residential Location Models, Housing Market Models and Duality, Senior,M; The Influence of Accessibility on the Spatial Distribution of Activities in an Urban System, Langen,M DE, Leeuwen,IL Van and Verster,ACP; An appraisal of Shopping Models, Roe,PE; Calibration and Behavior of Some shopping Models, Openshaw,S; Hierarchical Aggregation Procedures for Interaction Data, Masser,I and Brawn,PJB; Aggregation Problems; the Question of Scale-Micro/Macro, Urban/Regional, Dre-

we,P; A Regional Location Model Using a Measurement of the Valuations of Households, Veldhuisen,KJ; The Use of Models in Structure Planning: Applications in Teeside, Barras,R and England,J; The Area 8 Pilot Model: Experiments in Urban Modelling for Sub-regional Planning, Batty,M, Bourke,R, and Cormode,P; Hierarchical Model for Urban and Regional Planning, Brotchie,JE and Sharge,R./TRRL/

Planning and Transport Res and Computation Co Ltd Conf Paper PTRC/P/98, No Date, 441 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 216424)

42 131596 TRANSPORTATION SYSTEM MANAGEMENT AS AN ELEMENT OF FEDERAL POLICY. Some of the commonly asked questions about the Transportation System Management (TSM), plan are clarified, and the rationale behind TSM is examined. TSM which is the short range element of the transportation plan (covering both highway and transit improvements) for each urban area, is designed to address needs through more efficient use of existing transportation resources. Development of the plan requires consideration of a wide range of actions of operational, pricing and regulatory nature. Typical examples of TSM are traffic operations improvements, provision of preferential treatment for transit, graduating parking fees and peak hour tolls, reducing transit fares, provision of incentives for ride sharing, provision of better local collection, distribution and circulation services, and the provision of coordination between feeder and line-haul services. Fiscal economy, better balance between transportation system elements, and the achievement of a better balance between intended future benefits and immediate benefits are the objectives of TSM. The question is asked, if TSM represents federal meddling in local affairs. The importance of action categories is stressed, and the question of assistance to localities, a single TSM/Transportation Control Plan (EPA requirement) and phased programming are considered.

Orski, CK (Urban Mass Transportation Administration) *Traffic Engineering* Vol. 46 No. 4, Apr. 1976, pp 36-39, 1 Phot.

42 131700 THE TRANSIT OPERATOR'S ROLE IN FEDERALLY FUNDED PLANNING AND PROGRAMMING. A plan for the allocation of resources by planning work area is presented which may be utilized by transit system operations and metropolitan planning organizations (MPO) to allocate responsibility and necessary funds to carry out planning and programming functions. Comments are made on the division of areas of planning responsibility, and the lack of guidance from the Urban Mass Transportation Administration is noted. The identification of the lead agency and manpower splits are seen to be the major problems. The long-range transportation plan;system plan covers six areas: identification of the long-range transportation needs of the urbanized area (MPO, 80-90 percent; operating agencies 10-20 percent); analysis of existing conditions (MPO, 80-90 percent; operating agencies 10-20 percent); projection of urban area economic, demographic and land use activities (MPO, 90-95 percent; operating agencies 5-10 percent); analysis of alternative transportation investments (MPO

40-50 percent; operating agencies 50-60 percent); monitoring and reporting urban development and transportation indicators (MPO, 60-80 percent; operating agencies, 20-40 percent), and identification of new transportation policies or facilities (MPO, 30-50 percent; operating agencies, 50-70 percent). Details are also outlined of long-range plan;plan refinement, short-range plan;transportation system management element, the transportation improvement program and implementation. Although the exact nature of the divisions will vary from one urbanized area to another, formalizing the allocation along the lines suggested here will make more explicit the relationship of transit operators and MPOs through the nation.

Burke, FB Jamieson, JR (Twin Cities Area Metropolitan Transit Commission) *Transit Journal* Vol. 2 No. 1, Feb. 1976, pp 3-9, 4 Ref.

42 131742 1973-74 TRANSIT FACT BOOK. This is the fifth edition of a Transit Fact Book prepared by the Canadian Urban Transit Association giving statistical information for the year ending December 31, 1973. The information shown in this publication has been obtained mainly from statistical and other records of the Association and, in some cases, Statistics Canada. Such information pertains to member transit systems, both publicly and privately owned, operating in urban areas. It does not include interurban or school bus services. Membership represents approximately 90% of the urban transit systems in Canada. Statistical tables showing population groups are based on the 1971 Government of Canada census, and reports of member systems showing the size of areas served. Also included are the Officers and Board of Directors, Chairmen and Executive of Standing Committees, together with the lists of Operating, Associate Members and Associates of 1974. /RTAC/ Canadian Urban Transit Association No Date, 23 pp, 14 Tab.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

42 131797 ESTIMATING THE DEMAND FOR URBAN BUS TRAVEL. The disadvantages of conventional transportation study models, in particular their large data requirements and their weaknesses in dealing with changes in trip generation rates have led to a need for a simple model that can quickly and at low cost examine alternative public transport strategies. This paper investigates simple economic models of bus demand, examines alternative variables that can be used and discusses some alternative model forms. It demonstrates the results of a model using data from twelve urban bus operators in Britain and compares the results with those from other types of study. The model utilizes fare and service quality elasticities to explain the decline in passengers on urban bus services, and derives an average elasticity with respect to fare changes of -0.31 and with respect to service quality changes of 0.62. It is estimated that fare rises accounted for 13% of the 43% decline in passengers over the last fifteen years, vehicle mileage reductions for 14.3% and that only 15.7% was due to such factors as rising car ownership which are often given as the cause of declining bus patronage. The results, by showing that passengers are

far more sensitive to changes in service than they are to fare rises, are a useful guide to the broader public transport policy issues, and the paper concludes that the model does provide a useful method of forecasting public transport demand at a strategic level. Further work is needed, however, to establish more accurate forecasts for different types of passenger and studies are now being undertaken to establish these and to construct an operational forecasting model that can be applied with only limited data requirements. (A) /TRRL/

Mullen, P (Colin Buchanan & Partners, London) *Transportation (Netherlands)* Vol. 4 No. 3, Sept. 1975, pp 231-252, 2 Fig., 2 Tab., 15 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216082)

42 131800 MODELING THE MODAL CHOICE DECISION PROCESS. Most models of modal choice are macroanalytic in nature-focusing on the behavior of large groups of travelers-and have limited explanatory power. Transportation managers need to know more about the decision processes of individual travelers in selecting a mode for a particular trip, if they are to be able to develop strategies for influencing these decisions. A microanalytic model of modal choice is therefore developed in flow-chart form, clarifying the stages in the modal choice decision process for any given trip. Individual consumers are seen as trying to satisfy a particular travel need by first specifying the characteristics of the trip itself and then specifying the "ideal" modal attributes required for this trip. Next, the perceived characteristics of a limited number of modes are evaluated against this "ideal" solution and the consumer is assumed to select that mode which provides the best match. The model explicitly recognizes the impact of psychological variables on modal choice as well as the consumer's need for information if he or she is to evaluate realistically all alternatives. (A) /TRRL/

Lovelock, CH (Harvard University) *Transportation (Netherlands)* Vol. 4 No. 3, Sept. 1975, pp 253-65, 1 Fig., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216081)

42 132276 TOWARDS THE ANALYSIS OF ATTITUDINAL AND BEHAVIORAL RESPONSES TO TRANSPORTATION SYSTEM CHARACTERISTICS. This report treats the requirements of planning methods for short-range and low-capital transportation options within the context of two primary objectives. The objectives are (1) the presentation of a fundamental set of behavioral principles which are relevant to the planning process and (2) the discussion of alternative methods for assessing the behavioral consequences of transportation changes. The presentation of fundamental behavioral principles relies substantially on classical behavioral reinforcement theory, but reference is also made to attitude theory, econometrics, marketing, and psychometrics. The discussion of data collection procedures presents information on sample specification, and it illustrates a variety of questionnaire formats for the collection of perceptions and preferences from respondents. Advantages and disadvantages of the formats are mentioned. Based on the discussion of behavioral principles and methods, general guidelines are offered for the modeling and data collection requirements of planning methods for short-range

and low-capital transportation options. (A) /TRRL/

Dobson, R (Department of Transportation) *Transportation (Netherlands)* Vol. 4 No. 3, Sept. 1975, pp 267-290, 7 Fig., 4 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-216080)

42 132281 PLANNING OF TRANSPORT OPERATIONS. This report is prepared as the background to a lecture to be delivered to Scottish local authorities as part of the introduction of the transport policies and programmes system. The emphasis is on that part of the process which is concerned with making the best use of existing infrastructure and capital equipment. A general account is given of research results and recent relevant experience and an attempt is made to make a coherent picture of the present state of knowledge arising from operational studies of transport and transport policies. In a final section the plan-making process itself is discussed; it is suggested that the annually cyclic nature of the tpp process leads naturally to an annual cycle of plan revision in the light of measures which monitor the objectives. This has implications for the manner in which objectives are formulated. (A) /TRRL/

Hitchcock, ATM; Transport and Road Research Laboratory R&D Rpt. Lab Rpt. 671, 1975, 28 pp, 62 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216168); ORDER FROM: TRRL, Orig. PC

42 132353 TRAVEL DEMAND FORECASTING MODELS [Vervoersprognose Modellen]. A survey is presented of (a) the structure of travel demand forecasting models, and (b) the state of affairs regarding the application of such models. The survey is based on special report no. 143 by the Highway Research Board, entitled "Urban Travel Demand Forecasting". See also IRRD 211416. The covering abstract for the conference is IRRD no. 215277. /TRRL/ [Dutch]

Heere, E ; Colloquium Verkeersplanologisch Speurwerk Conf Paper 1975, pp 1-18, 36 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV44002E), TRRL (IRRD-215278)

42 132885 PUBLIC EXPENDITURE AND URBAN AND INTER-URBAN TRANSPORT. The author summarizes three recently published papers which add support to the opinion that the solution to urban traffic congestion lies in improving public transport rather than in building more roads. The first paper also calls for the coordination of public expenditure on the different modes of interurban transport, including rail and water, as well as roads. The papers are: 1. "Public Expenditure on Transport", the first report of the Expenditure Committee, Environment Sub-committee, of the House of Commons for session 1974; 2. A summary report on the Stevenage Superbus Experiment; 3. A discussion paper by Tyson, WJ on the "Economic Implications for Transport Planning of the New Grant System and Transport Policies and Programmes". /TRRL/

Jenkins, GC *Housing and Planning Review* Vol. 31 Jan. 1975, p 15; ACKNOWLEDGMENT: TRRL (IRRD 215978); ORDER FROM: National Housing and Town Planning Council, 34 Junction Road, London N19, England; 7510180

42 132891 THE COST STRUCTURE OF TUBE VEHICLE SYSTEM FOR HIGH SPEED GROUND TRANSPORTATION. This report examines the estimation of capital and operating costs for a range of general assumptions concerning the physical and cost features of tube vehicle systems. Costs are broken down as follows: costs of land acquisition (right of way, land prices, the cost of land), tunnels, at-grade construction, overhead construction, track and control (investment and maintenance), station, terminal and yard, vehicle and crew, vehicle power and evacuation systems, (electricity, aerodynamic drag, magnetic suspension drag, evacuation systems); total and unit costs are quoted together with vehicle capacity and headways. The costs of the above parameters are incorporated in the economic case study of a hypothetical tube vehicle system for which total annual and unit costs are compared /TRRL/

Bunting, PM Gralewskik ZA Hawkins, NM (LOUGHBOROUGH UNIV. OF TECHNOLOGY) ; Loughborough University of Technology, England R&D Rpt. July 1975, 80 pp, 2 Fig., 20 Tab., 39 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 400173); ORDER FROM: Loughborough University of Technology, England, Loughborough LE113TU, Leicestershire, England

42 132894 A GLOBAL MODEL FOR THE EVALUATION OF EXTENSION PROJECTS FOR PUBLIC TRANSPORT IN THE PARIS REGIONAL NETWORK [Un modele global pour l'evaluation des projets d'extension des reseaux de transport public en region parisienne]. In order to dispose of tools which could cope with the evaluation of a specific project and with the comparison of several transport policies, the RATP has at its disposal a global model for traffic forecasts which is applicable to the whole Paris regional network and which operates in two stages: 1-the estimate of demand (generation and distribution) broken down into 302 independent zones for each socio-professional category comprising-the definition of basic planning data (active residents and employment by zone and by socio-professional category) using an original typological approach,-the generation of intra-zonal flows based upon average levels of service and accessibility, upon the type of zone and its area,-the distribution of inter-zonal flows using a normative model with probability justification. 2-the estimate of traffic (modal split and assignment) broken down by modal category into 600 zones and comprising:-assignment for each network of the "shortest" trips by reference to generalised cost,-modal split using assignment curves with variables based on the relative difference of generalised costs. The outputs of this model are exploited as the basis for comparative studies using the economics of multi-criteria analytical methods. These studies concern the development plan of the RATP, the preparation of the five year regional plan, and the interconnection of the RATP and SNCF rail networks. /TRRL/ [French]

Labbe, B Scherrer, C (Direction des Etudes Generales de la RATP) ; North-Holland Publishing Company Conf Paper 1974, pp 677-688, 1 Fig., 8 Ref.; Presented at a conference on Traffic Control and Transportation Systems; ACKNOWLEDGMENT: Institute of Transport (IRRD 215943), TRRL;

ORDER FROM: North-Holland Publishing Company, 335 Jan Van Galenstraat, P.O. Box 103, Amsterdam, Netherlands

42 132996 SERVICE AND METHODS DEMONSTRATION--ANNUAL REPORT. This report contains a description of the Service and Methods Demonstration Program. Transit demonstration projects undertaken in previous years are reviewed. Recently completed and current demonstration projects are described and project results from similar demonstrations are compared. The comparisons are made by grouping projects according to the program objectives addressed: (1) decrease transit travel time, (2) increase transit reliability, (3) increase transit coverage, (4) increase transit vehicle productivity, and (5) improve the mobility of transit dependents. Demonstrations are categorized as either experimental, i.e. those intended to develop and test concepts to the point where they merit widespread use, or exemplary, i.e. those conducted to achieve more widespread diffusion of proven concepts and techniques. Independent activities carried out in support of the demonstrations are described, such as the development of evaluation guidelines and improved methodologies for demonstration evaluation, analytical studies in support of the development of experimental demonstrations, and case studies of independent local innovations. Information dissemination mechanisms and activities intended to facilitate more widespread knowledge of effective approaches to improving transit are discussed. The Appendix contains a detailed description of each demonstration project including the objectives, history, status, results, evaluation and conclusions. /UMTA/

Benjamin, P Casey, R Cofield, C Heaton, C Kendal, D Misner, J Simkowitz, H ; Transportation Systems Center, (DOT-TSC-UMTA-76-1) Ann Rpt. UMTA-MA-06-0049-75-2, Nov. 1975, 252 pp; Contract MA-06-0049; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-251325

42 133112 A STRATEGY FOR THE EVALUATION OF ALTERNATIVE URBAN TRANSPORTATION SYSTEMS WITH MULTIDIMENSIONAL CONSEQUENCES. This report undertakes two interrelated efforts: (1) the examination of the validity of existing evaluation techniques potentially suitable for dealing with the problems involving multidimensional consequences of urban transportation systems; and (2) the development of an evaluation model in the context of additive utilities for unifying value judgements in search of the best alternative transportation plan. Four basic evaluation models are identified for comparative analysis. The focus of the analysis is on the theoretical soundness of the models and on the sensitivities of the models with respect to the number of alternatives encountered, to the distribution of outcome states, and to the addition or the reduction of the number of alternatives from the original set.

Lin, FB ; Carnegie-Mellon University, Urban Mass Transportation Administration, (UMTA-PA-11-0007) CMUTRI-TP-74-21, UMTA-PA-11-0007-74-4, Sept. 1974, 174 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251179/8ST

42 133286 NEW YORK CITY TRANSIT AUTHORITY DESIGN GUIDELINES. TRANSPORTATION PLANNING AND ENVIRONMENTAL. The project was designed to develop a revised and updated series of handbooks covering various aspects of the design, construction, and equipment of a modern rail rapid transit system.

New York City Transit Authority, Urban Mass Transportation Administration, Tri-State Transportation Commission, (UMTA-IT-09-0014-TS-C) Final Rpt. UMTA-IT-09-0014-75-1, Mar. 1975, 196 pp; Prepared in cooperation with Tri-State Regional Planning Commission, New York. Paper copy also available in set of 12 reports as PB-251 641-SET, PC\$70.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251642/5ST, DOTL NTIS

42 133321 OPERATING COSTS OF RAIL RAPID TRANSIT. The report examines the cost of operation of rail rapid transit systems, and the prediction of such costs for future systems, based on data obtained from the urban rail rapid transit operators in the United States and Canada. Existing cost-prediction models, based on the division of operating costs into maintenance of way and structures, maintenance of equipment, power, conducting transportation, administrative expenses, and miscellaneous expenses, are updated according to the most recent data available. In addition, those transit systems for which information is available are examined for division of costs into non-labor, direct labor and indirect labor categories; for the degree of utilization of personnel and facilities; for the relation of unit costs in the six categories to system characteristics; and for their relative scales of wages and benefits.

Kwickliss, CS Roess, RP ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0009) Proj. Rpt. UMTA-NY-11-0009-74-2, May 1974, 64 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251970/OST, DOTL NTIS

42 133421 SUMMARY STATEMENT OF THE 1990 TRANSPORTATION PLAN FOR THE SOUTHEAST MICHIGAN REGION. The document presents the 1990 Transportation Plan. It includes a summary of planning work in the Southeast Michigan region throughout the past 10 years, an explanation of SEMCOG forecasting and planning work, a description of the changes to the Plan that took place through public hearings and committee structure processes, and copies of the Plan maps-Highway and Transit Elements. In addition, the document contains a status report on the work in progress in the three sub-study areas of Port Huron, Ann Arbor-Ypsilanti, and the lower tier of the three townships of Whiteford, Bedford, and Erie in Monroe County, and explanation of how the plan serves as a basis for the implementation of transportation improvements, and a preview of annual review and update and the 2000 plan.

Southeast Michigan Council of Governments, Urban Mass Transportation Administration, Michigan Department of State Highways & Transport, (UMTA-MI-09-0016) Final Rpt. P7502, June 1975, 78 pp; Prepared in cooperation with Michigan Dept. of State Highways, Lansing, and Urban Mass Transportation Administration, Washington, D.C.; Contract MDSHT-74-0613; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-252119/3ST

42 133628 LONDON'S RAILWAYS IN THE FUTURE. This report summarises some of the main findings of the 1974 London rail study. The changing levels of demand, organisation, staffing, and the availability of finance are discussed. Brief outlines are given of the major schemes to extend the rail network which were subject to detailed evaluation. /TRRL/

Bayliss, D *Greater London Council Intelligence Unit Quart Btn* No. 31, June 1975, pp 31-39, 5 Fig., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 400182); ORDER FROM: Greater London Council, County Hall, London SE1 7PB, England

42 133674 THE NIMS SYSTEM AND ITS USE IN PUBLIC TRANSPORT PLANNING [Nims-systemet och Naagot om Dess Anvaendning i Kollektivtrafikplanering]. The nims system is a computerised planning system, adaptable to conditions in individual municipalities, comprising methods and programs whereby data bases can be constructed and maintained, analyses performed and information presented statistically or graphically. Geographical location of reference objects is an essential element of the system; this is related to population, business data, etc. The system can be used for public transport planning. Data concerning population and employment on a zonal basis are fed into traffic models. These are used for analyses of bus service availability, accessibility of service facilities, the standard of service, etc. The system has also been used for simulation of the taxi-bus system. /TRRL/ [Swedish]

Salomonsson, O ; Swedish Transport Ministry 1975, 54 pp, 14 Fig., 1 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-216971)

42 134234 SPATIAL VARIATIONS IN TRANSPORT CHARACTER. The aim of this paper is to show, by means of cluster and principal component analysis of sub-regional data, common patterns of spatial variation among transport and other social economic and demographic characteristics. By creating synthetic proxies for affluence and urban density from the principal components, density is shown significantly to affect both the intensity of car and public transport use and the proportion of work trips dependent upon neither mechanical mode. This, together with the independent effects of population change on ownership and transport use, has two implications for transport forecasting: that at this level of spatial aggregation the relative attractiveness of public transport to choice riders is only a marginal determinant of total modal split and that the assumed correspondence between the travel behaviour of existing and new populations may persistently underestimate levels of car ownership and usage. (A) /TRRL/

Webber, R (Planning Research Applications Group, London) *Transportation Planning and Technology* Vol. 3 No. 1, 1975, pp 1-12, 8 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 217378)

42 134264 DISAGGREGATED PERCEPTIONS AND PREFERENCES IN TRANSPORTATION PLANNING. This paper uses preferences and similarity judgments with respect to system characteristics of an integrated innova-

tive urban transport system to better understand the demand for public transportation. This transport system concept embraces dual mode transit, personal rapid transit, and people mover vehicles. A major goal of this study is to identify if insights could be uncovered by segmenting a sample of respondents into homogeneous perceptual groups. Three psychometric models are applied to a set of judgments from a set of respondents. The results from these models are used to cluster individuals into homogeneous population segments on the basis of common pattern of preferences. The patterns of preferences for the various groups are then linked to their socio-economic characteristics. The analysis provides some useful insights as to the socio-economic profiles of groups preferring automatic vehicle control, basic transport service and personal luxury service. These results make it possible to better understand the benefits derived by these user groups from different system alternatives. (A) /TRRL/ Nicolaidis, GC Dobson, P (General Motors Research Laboratories) *Transportation Research* Vol. 9 No. 5, Oct. 1975, pp 279-295, 21 Fig., 4 Tab., 28 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-217346)

42 134297 HOW RAPID TRANSIT GOT LOST IN THE CLOUDS. In the mid-1960's the U.S. government supported a resurgence of public transportation, but simultaneously denigrated the existing practitioners. Now the 10-year-old dream shared among federal government, academics, politicians and some aerospace companies has turned into a financial, technical and political nightmare which has also set back mass transit in many cities by a decade. The American government and aerospace industry have pursued the wrong products, and in consequence harmed established manufacturers, given confidence to the anti-rapid-transit lobby and disillusioned transit's well wishers. The lesson is that money can only be made on standard performance products with cost escalation clauses.

Bond, W *New Scientist* Apr. 1976, pp 175-177; ORDER FROM: IPC Magazines Limited, 66-69 Great Queen Street, London WC2E 4DD, England

42 134313 PLANNING AND DESIGN OF THE HONG KONG MASS TRANSIT RAILWAY. The article describes the planning and design features of the Hong Kong mass transit underground railway system from the initial mass transport study planning stages in 1965 to the invitation of tenders for construction and equipment in 1975. Brief details are included of train design and operation, layout and services, station and tunnel ventilation, harbour crossing, and construction methods. /TRRL/

Edwards, JT (Freeman, Fox and Partners) *Institution of Civil Engineers, Proceedings* Vol. 60 Feb. 1976, pp 9-26, 8 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 214306); ORDER FROM: ESL

42 134405 SOME IMPLICATIONS OF ALTERING THE BALANCE BETWEEN PUBLIC TRANSIT AND HIGHWAY CAPACITIES IN URBAN AREAS. Current policies on urban transport directed towards increasing the use of public transport are discussed. The private and public aspects of urban transport systems are examined, and the con-

straints which must be observed in attempting to get more people to travel by public transport, without reducing the overall supply of transport services presently existing, are delineated. / TRRL/

Roer, PO *Logistics and Transportation Review* Vol. 11 N 1975, pp 283-296, 3 Fig., 3 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218195)

42 134513 A MONEY VALUE OF TRAVEL TIME SAVINGS-FACT OR FICTION? With the increasing use of cost-benefit analyses to estimate the relative values of different transport proposals- either public transport or roads improvement schemes numerous efforts have been made to estimate a money value of the benefit of the reductions in travel times likely to be obtained through the implementation of alternative schemes. Several philosophies of how reductions in travel time derive their money values have been advanced as the basis of these estimations. Typical of these methods are those described by M.E. Beesley, H. Mohring, I.N. Moses and H.F. Williamson, T. C. Thomas and G.I. Thompson, and the Melbourne Metropolitan Transportation Committee (MTC). However, the widely differing estimates of money values of time savings (from 9 to 155 per cent of average income) raise the question that these travel time savings (though at first sight one of the main benefits of a transport improvement scheme) may have actually been used instead of other benefits such as increased travel comfort and convenience, or extended travel horizon, which are rather more difficult to measure and quantify. The estimated money values are best described as a price which people are prepared to pay for improved transport, and which will vary with time and with the amounts people are prepared to pay for these benefits. Urban transport improvements which benefit the whole community are most likely to be achieved through increasing the operating efficiency of commercial vehicles and public transport services. (a). For the covering abstract of parts 2 and 3 of the conference, see IRRD abstract no. 218019. /TRRL/

Fouvy, CL (Victoria Ministry of Transport, Australia) *Australian Road Research Board Conference Proc* Vol. 7 No. 2, 1975, pp 34-60, 2 Fig., 2 Tab., 37 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218022)

42 134514 THE CALIBRATION OF THE NORMAL MARGINAL DISUTILITY MODAL SPLIT MODEL. With the present interest being shown by government in public transport, demands are being made on the transport planners for improved choice of travel mode modelling techniques. Many models in the past have merely "explained" a high proportion of the variance in the data and consequently their explanatory power is only a causal illusion. To use such models predictively, one must be confident that the invisible relationships underlying the data will continue unchanged through time; this is at best a dubious assumption. The model tested is based on utilitarian theory and can therefore be examined from both theoretical and empirical viewpoints. Until now only hand methods of calibration have been used. A statistical method of calibration using data from Australian cities as input has been developed. (A) /TRRL/ Davis, BC (Queensland Main Roads Department, Australia) *Australian Road Research Board Con-*

ference Proc Vol. 7 No. 2, 1975, pp 61-78, 6 Fig., 1 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218023)

42 134648 NATIONAL TRANSPORTATION POLICY. The need for comprehensive planning, for definition of decision-making responsibility and for adequate transportation funding are discussed in a preamble, concerns relative to the various modes (aviation, highways, transit, railroads, pipelines, transmission lines, specialized transportation) are addressed, the governments role in transportation is examined, and transportation funding alternatives are considered. Some of the principal factors common to various modes of transportation programs are: research and technological achievements, mobility, multiple use and joint development, design, productivity, competition, and safety. Provisions which a national transportation policy should make with regard to the various modes of transportation are listed, and the role played by local, state, federal and special purpose authority are outlined. Transportation funding at two levels (establishment, continuance, and rehabilitation of national networks; and supplementary federal support of state and local transportation systems) is discussed.

American Assn of State Hwy and Transp Officials Nov. 1975, 23 pp

42 134679 CRITICAL DECISIONS IN THE RAPID TRANSIT PLANNING PROCESS. This paper shows how financial, attitudinal, and physical factors influence decisions on whether to build a rapid transit facility and how much to build. The authors discuss the need for a more rigorous planning process that will discriminate among projects considered for financial assistance. They note the inadequacies of aggregate criteria and suggest that cost per passenger mile (kilometer) is a useful but incomplete measure. Results of benefit-cost analysis for major systems are compared, and specifications are suggested to increase the usefulness of such an analysis. Standardized estimates of benefits and costs, although inadequate in insulation, can make a useful contribution to the analysis process.

Deen, TB Kulash, WM Baker, SE (Voorhees (Alan M) and Associates, Incorporated) *Transportation Research Record* No. 559, 1976, pp 33-43, 4 Fig., 6 Tab., 12 Ref.; ORDER FROM: TRB Publications Off

42 134680 EVALUATION OF RAIL RAPID TRANSIT AND EXPRESS BUS SERVICE IN THE URBAN COMMUTER MARKET (ABRIDGEMENT). The basic alternative transportation modes in the urban commuter market, which are bus and rail transit, are covered in this paper. Comparing these alternatives on the basis of full cost, which includes supplier cost (costs for vehicle, way, and structure) and user-time cost (costs for access, waiting, in-vehicle transfer, and egress time), is dealt with. A modern rail rapid transit line has about the same passenger-carrying capacity as a bus system has if the bus system uses an exclusive busway for line-haul and surface streets for downtown distribution. The levels of user-time cost for a modern rail rapid transit line are equivalent to those for a bus system, but the supplier costs are much higher for rail rapid transit. Lower full cost can be achieved for

low-density, short-haul residential collection if 8-passenger bus-wagon jitneys are used instead of 50-passenger buses.

Boyd, JH, Discussor (Motor Vehicle Manufacturers Association) Asher, NJ (Institute for Defense Analyses) Wetzler, ES (Econ, Incorporated) Vuchic, VR *Transportation Research Record* No. 559, 1976, p 44-50, 9 Ref.; ORDER FROM: TRB Publications Off

42 134681 COMPARATIVE ANALYSIS AND SELECTION OF TRANSIT MODES. Current planning of transit systems in many cities requires comprehensive comparisons of alternative transit modes. This paper reviews the state of the art. Important conceptual studies and successful, practical mode comparisons for several cities are pointed out. Serious deficiencies of studies using hypothetical situations and comparing modes through costs only are shown on a diagram typically used in these studies. Methodology for mode evaluation consisting of several steps is presented. Requirements of passengers, operator, and community are defined; then candidate modes are selected through type of right-of-way, technology, and operation. Each mode then is evaluated in terms of monetary costs, other quantitative units, and qualitative values. A summary of the procedure also is presented.

Vuchic, VR (Pennsylvania University, Philadelphia) *Transportation Research Record* No. 559, 1976, pp 51-62, 3 Fig., 4 Tab., 13 Ref.; ORDER FROM: TRB Publications Off

42 134685 COMPARATIVE ANALYSIS OF URBAN TRANSPORTATION COSTS. This paper develops the methodology and compares door-to-door trip characteristics of some urban transportation modal combinations that are currently in use, are being considered, or appear to hold near-term promise for corridor travel in large U.S. cities oriented to the central business district. The cost and travel time of various options are developed separately for residential line-haul, and downtown trip components. Then they are combined selectively to explore relative merits of door-to-door alternatives. The analysis addresses the many possible variations in corridor length, central business district size, daily volume level, and temporal flow pattern. Furthermore, the sensitivity of costs with respect to changes in design specifications, operating policy, automation, and nature of construction is explored. A case study compares various options for Metro in the Washington, D.C., metropolitan area. The marginal costs of busway-based systems are lower than those of systems based on rail rapid transit. Automation is not likely to lower rail rapid transit operating costs dramatically. High-performance, exclusive busways require substantial initial investment but are less costly and faster than rail rapid transit in almost all environments and volume levels. Residential collection with jitneys costs only a little more than residential collection with buses and provides much better service. Car pools provide the least expensive service and attractive door-to-door time.

Bhatt, K, Discussor (Urban Institute) Tennyson, EL *Transportation Research Record* No. 559, 1976, pp 101-125, 9 Fig., 10 Tab., 13 Ref.; ORDER FROM: TRB Publications Off

42 135031 INDIVIDUAL PASSENGER TRANSPORT AND THE PUBLIC TRANSPORT SERVICES. An investigation is reported of the cross-elasticity or elasticity of substitution of the demand for individual transport with regard to the characteristics of the collective transport offered by public services. Details are given of the variables and the data, and the multiple regression equations which were computed. The results obtained lead to several conclusions. The increasing demand for individual transport measured by the volume of road transport expressed in passenger-kilometers, has been explained almost exclusively by the increasing level of the real GNP per capita. The increase of real level fares for railway commuters and for passengers using urban collective transport seem to have fostered the demand for individual transport, all other conditions being equal. The level of ordinary fares for the collective transport seems to have had no influence on the demand for individual transport. The quality of collective transport service has no influence on the demand for individual transport. Further conclusions are listed regarding the relationship between the demand for individual and collective transport, and the choice of transport.

Baumgartner, JP (University of Geneva) *Rivista Internazionale di Economia dei Trasporti* Vol. 2 N Aug. 1975, pp 161-165, 1 Tab.

42 135929 DETERMINING PRIORITY AREAS FOR TRANSIT SERVICE. Using a suburban Philadelphia county as a case study, an ordinal ranking procedure is proposed as one method of defining primary and secondary priority areas for transit service. Bucks County, a fast-growing auto-oriented society is considered with particular consideration being given to the spatial distribution of 3 special groups: school age children, senior citizens, and low income families. The ordinal ranking technique was employed to determine which of the 23 boroughs and 31 townships in the County should be considered as primary and secondary priority areas for new or expanded public transportation service. Each borough and township was ranked in terms of the density measures recorded for each 6 socio-economic indicators (the 3 special groups, population, zero car households and employment) and a composite score was obtained by summing individual values. The applicability of the ordinal ranking technique was initially determined by correlating the amount of new service proposed in the subsequent transit development program with the location of first and secondary areas in Bucks County. It was noted that the productivity of service expressed in passengers per mile or passenger miles per seat miles should vary along a route or among routes serving areas with different socioeconomic characteristics.

Polin, L (Simpson and Curtin Incorporated) Caruolo, JR (Bucks County Planning Commission, Pennsylvania) *Transit Journal* Vol. 2 No. 2, May 1976, pp 27-34, 1 Tab., 2 Phot.

42 135930 DEMAND THEORY: ITS APPLICATION TO TRANSIT. The concept of elasticity of demand is discussed and a methodology that would facilitate its practical usage by transit planners is presented. The discussion focuses on fare elasticity which is defined as the proportionate (percentage) change in the demand for transit resulting from a proportionate change in the fare

charged by transit. As much, this elasticity indicates the sensitivity of demand to alternative fare levels. The practical solution to estimating fare demand elasticities is illustrated with reference to the bus transit in the San Diego Area. It was noted that as the fare increased, demand falls off more than proportionately, and revenues fall despite higher prices. It was also found, in general, that the total revenue is maximum at that point where elasticity equals one; this therefore, sets the lower bound on the fare that should be charged.

Vanier, DJ Trippi, RD (San Diego State University) *Transit Journal* Vol. 2 No. 2, May 1976, pp 35-40, 1 Fig., 2 Phot.

42 136313 AN APPROACH TO TRANSPORTATION SYSTEMS MANAGEMENT IMPROVED USER-ORIENTED TRANSIT TO A MAJOR TRIP GENERATOR. The metropolitan Planning Organization in Cooperation with the State and publicly owned operators of mass transportation services are required to develop (Transportation Systems Management-TSM (as a part of the urban transportation planning process) which integrates traffic operations programs with transit development study results as a means of improving the movement of people and goods. TSM which is designed to maximize the use of existing road space, reduce vehicle use, improve transit service and increase transit management efficiency, involves 4 primary tasks. The initial step involves inventorying current state, local and regional programs and developing a tabulation by project type. The second step is that of selecting and defining eligible projects. This is followed by evaluation of the projects and by the development of TSM based on the prioritized list of projects.

JHK and Associates Oct. 1975, 12 pp, 1 Fig.

42 136917 ESTIMATING THE EFFECTS OF URBAN TRAVEL POLICIES. The report presents models and procedures for quick evaluation of transportation policy options on urban travel behavior. The methods described in this report can be used to estimate the travel demand effects of a wide variety of transportation policy instruments with currently available data in a matter of hours, or minutes, with the aid of a calculator. To evaluate the effects of a transportation policy, travel is separated into work and nonwork purposes. The work travel section of the report describes procedures for applying disaggregate logic models to generally available grouped data. To analyze the effects of policies on nonwork travel, a disaggregate travel demand model is estimated which is designed to be broadly applicable to a variety of planning and data contexts. Both the work and nonwork trip demand models and procedures are exercised on sets of policy issues which are of current interest, including gasoline taxes, parking restrictions, transit service improvements and the introduction of new modes. Where appropriate, travel demand elasticities with respect to level of service changes are computed.

Dunbar, FC ; Charles River Associates, Incorporated, Transportation Systems Center, Department of Transportation Final Rpt. DOT-TSC-OST-76-10, Apr. 1976, 196 pp; Sponsored in part by Office of the Assistant Secretary for Policy, Plans and International Affairs (DOT), Washington, D.C.; Contract DOT-TSC-964; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-253208/3ST

42 137314 OBTAINING TRANSPORTATION MODE UTILITIES USING THE ELIMINATION BY ASPECTS MODEL. Estimates for the utility parameters of the Elimination By Aspects (EBA) probabilistic model of human choice are obtained using a least squares fit to the observed probabilities. These heuristic estimators are considerably easier to obtain than the usual maximum likelihood estimators of the EBA parameters. The estimators and their usefulness to transportation planners are presented via a survey of transportation preferences conducted in the Milwaukee County.

Makowski, GG Bakr, MM Sinha, KC ; Marquette University, Urban Mass Transportation Administration, Purdue University, (UMTA-WI-11-0002) UMTA-WI-11-0002-75-2, Oct. 1975, 32 pp; Prepared in cooperation with Purdue Univ., Lafayette, Ind.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254638/OST

42 137360 MACROANALYSIS OF THE IMPLICATIONS OF MAJOR MODAL SHIFTS IN INTEGRATED REGIONAL TRANSPORTATION NETWORKS. The report describes a macroanalytic approach to the problem of analyzing changing travel patterns in an integrated regionwide transportation network. Separate models of residential areas, transportation corridors, and central business districts are combined in a modular representation of urban structure suitable for use in policy analysis and transportation planning. This analytic approach treats demand parametrically, has minimal data requirements, and provides rapid insights into the impacts of alternative patterns of transit and automobile usage. Such impacts as travel time, user costs, congestion, and energy consumption are examined explicitly. Application examples discuss the potential economies of scale available from major shifts in current transit usage patterns, tradeoffs between flexible-route and fixed-route systems, and the potential benefits available from policies to reduce the effects of demand peaking.

Billheimer, JW Bullemer, R Holoszyc, M ; Systan, Incorporated, Department of Transportation Summ. Rpt. System-D147, DOT/TST-76-64, Apr. 1976, 42 pp; Contract DOT-OS-50265; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254923/6ST, DOTL NTIS

42 137364 INTEGRATED ANALYSIS OF SMALL CITIES' INTERCITY TRANSPORTATION TO FACILITATE THE ACHIEVEMENT OF REGIONAL URBAN GOALS. INTERCITY TRANSPORTATION IN RURAL REGIONS: VOLUME 2. REGIONAL FACTORS AND ANALYSES. The volume includes analyses of the structure and development of economic planning regions as typified by the nine rural regions which constitute the study area for this research. Other research topics include studies of the feasibility of a demand-responsive air taxi system and air ambulance service. Mailed survey instruments were utilized to define patterns and characteristics of travel in rural regions and to afford information concerning behavior in response to shortages of transportation energy and attitudes toward such shortages. Recommen-

dations are formulated to address typical transportation problems in rural regions and to enhance their potential for growth.

Richards, RO Brewer, KA Prescott, JR Millett, ML Carstens, RL; Iowa State University, Ames, Department of Transportation Final Rpt. ISU-ERI-AMES-76190, DOT/TST-76/43-Vol-2, May 1976, 379 pp; See also Volume 1, PB-254930; Contract DOT-OS-30106; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254931/9ST, DOTL NTIS

42 137418 FUTURE SCENARIOS FOR URBAN TRANSPORTATION. The author finds that, between 1972 and 1990, urban passenger miles will greatly increase. This increased demand will be met by a particular modal split. Presently, these modes have certain characteristics. Unless the internal combustion auto meets the statutory emission standards, it will cause more air pollution harm than the diesel bus and electrified modes. Using total energy consumption comparisons, the internal combustion auto that meets DOT suggested fuel economy standards for 1980 (19.6 mpg) is twice as energy intensive as the diesel bus, three times as energy intensive as rapid rail and the electric bus, and five times as energy intensive as the electric car and the advanced GRT. If 47% of all urban travel is made on electrified modes in 1990, 1.6 billion barrels of petroleum can be saved, at a cost of 1.7% increase in anticipated electricity demand. The author concludes that to decrease energy consumption, improve urban air quality, and improve urban transportation, strategies should be aimed at achieving a transit and electric intensive modal split. Opportunities for action include (1) strongly supporting HR 8800, which, if passed, will appropriate \$160 million for 5 years to the Energy Research and Development Administration (ERDA) for Electric Vehicle R and D; (2) working in cooperation with ERDA to develop an urban private passenger electric vehicle and improved battery powered electric bus.

Leahy, MP; Urban Mass Transportation Administration Final Rpt. UMTA-RDD-9-75-1, Aug. 1975, 120 pp; Contract RDD-9; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-255349/3ST, DOTL NTIS

42 137436 PROCEEDINGS OF THE URBAN MASS TRANSPORTATION ADMINISTRATION/AMERICAN PUBLIC TRANSIT ASSOCIATION RESEARCH AND DEVELOPMENT PRIORITIES CONFERENCE HELD AT ARLINGTON, VA. ON FEBRUARY 19-20, 1976. The document contains the material that was presented at the Urban Mass Transportation Administration/American Public Transit Association Research and Development Priorities Conference. The papers specifically address the following aspects of urban transportation research and development: bus and paratransit technology; rail transit technology; new systems and automation; socioeconomic research and special projects; service and methods demonstrations; priorities and balance in UMTA research and development; delivery systems for putting results of research and development into service; transit management; and planning methodology.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0136) UMTA-DC-06-0136-76-1, May 1976, 131 pp; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-255898/9ST, DOTL NTIS

42 137479 REPORT OF THE TWENTY-SEVENTH ROUND TABLE ON TRANSPORT ECONOMICS, HELD IN PARIS ON 10TH AND 11TH OCTOBER, 1974, ON: GENERAL TRANSPORT PLANS: METHODS, GAPS AND PROSPECTS. Transport planning, whether horizontally integrated with the overall plan for the structure of society or vertically integrated with different levels of transport planning, is stated to have two basic problems. These are determining the optimum infrastructure and transport system for a given economic development and physical distribution of population and industries, and estimating the effect of a given transport system on the population distribution and economic activities. An example from the rimcity is described, and the Dutch integrated transport study for the Netherlands transport plan is summarised. The conclusions drawn from the study were that the real problems of transport lay in the built-in inadequacy of physical planning. For the future, attention is drawn to the need for better methods for integrating various transport models and for explaining the impact of infrastructure and transport systems on land use. Discussions arising from the paper are also reported; they include a survey of planning experiments over the previous fifteen years. The shortcomings of such experiments are highlighted and indicate the need for a reappraisal of the concept of transport plans. /TRRL/

Bourdrez, JA (Nederlands Economisch Instituut) European Conference of Ministers of Transport 1975, 62 pp, 2 Fig., 2 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 218729)

42 137570 EVALUATING PUBLIC TRANSPORT [Att Vaerdera Kollektivtrafik]. The basis of a national economic analysis for public transport is the endeavour to achieve effective utilisation of resources. Costs must be weighed against benefits. Resources are valued according to their alternative use value; only resources with an alternative use are considered. Taxes are regarded as merely a transfer from one sector to another. Road maintenance costs, travellers' time, accidents and environmental effects are also considered, although evaluation of the last two in monetary terms is very difficult. Travellers' time is valued on the basis of how much extra they would pay to travel faster; this, however, gives only average figures since the value placed on time varies greatly in different circumstances. As regards benefits, these are estimated by finding how much extra travellers would pay in fares to retain a route threatened with closure, and thus obtaining a demand curve. Examples are given of applying this method. It is considered that development of models which give a better representation of demand and thus traffic benefit, is most urgent. /TRRL/ [Swedish]

Westerberg, B *Svensk Lokaltrafik* No. 6, 1975, 4 pp, 5 Fig., 1 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-218404); ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

42 137572 THE DEVELOPMENT OF PUBLIC TRANSPORT MODES [Utvecklingen av Kollektivtrafikneden]. In choosing a traffic system for a certain district, all relevant factors must be considered, such as journey patterns, available resources, and objectives regarding walking distances, journey times, comfort etc. It is difficult to quote general cost levels for different modes; the energy requirement varies considerably. Tests by Swedish rail to introduce 200 km/h trains offer large savings in time, but problems connected with unmanned crossings must be solved. The chief improvements needed for railbound transport concern station comfort. The needs of the handicapped will be catered for, and automatic ticket systems will free staff from routine tasks. Express traffic can be designed to miss a number of stops or to use every other stop. Investment costs for auto-minibuses are very high. Design speed and choice of braking system are critical. Buses are the most versatile mode. To make getting on and off easier, introduction of several smaller wheels may be necessary to lower the floor level. Reserved lanes are useful but bottlenecks occur at end points, and kerbside parking creates obstacles. Bus stops are usually of low standard. Speeds can be increased by using the skip-stop system. Taxibus costs are very high and must be subsidised. /TRRL/ [Swedish]

Sillen, P *Vag-Och Vattenbyggaren* Vol. 21 No. 12, 1975, pp 49-52, 2 Phot.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-218408); ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

42 137574 ROAD USERS CHOICES OF TRAFFIC MODES [Trafikanterns Val av Färdmedel]. Both in planning roads and traffic installations and in controlling traffic, it is essential to know the distribution of traffic over different modes. Over the past 10 years, logit models have been found to have properties which make them very well suited for traffic planning. They have better statistical precision than conventional choice of mode models, and the explanatory factors are also the instruments at the planning authority's disposal. Logit models can be used for: 1. Traditional forecasting, 2. Analyses of the effect of traffic policy changes, 3. Comparisons of standards, 4. National economic cost-benefit analyses. The results of analyses in greater stockholm show that increased service frequency, direct connections without the need to change, and maximum comfort are the measures most urgently needed to increase travel on public transport. Very good agreement is found between forecasts with logit models and actual data. /TRRL/ [Swedish]

Tegner, G *Vag-Och Vattenbyggaren* Vol. 21 No. 12, 1975, pp 29-31, 3 Fig., 2 Tab., 3 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-218410); ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

42 137724 THE DECLINE AND FALL OF URBAN PUBLIC TRANSPORT. The author criticises the present urban public transport policies which attempt to provide a realistic alternative to the private car restraining their use at commuter peaks. He suggests that restraint of car use does not lead to simple substitution of public

transport journeys; fewer car journeys are used to accomplish the same activities. Although the flow of car traffic has been reduced in city centres, this may have an undesirable long term effect on its level of commercial activity and foster the development of out of town shopping centres. Many commuters now leave their car at home where it can be used by the rest of the family, thus diverting possible off-peak bus users. A revised policy is suggested where peak hour car restraint is removed and urban public transport services are reduced annually by five per cent. Pedestrians should have priority during a designated off-peak when all cars are excluded. Park and ride facilities from peripheral car parks should only operate at off-peak periods. /TRRL/

Heggie, I *Surveyor - Public Authority Technology* Vol. 147 No. 4370, Mar. 1976, pp 9-10, 1 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 219366)

42 138145 URBAN PUBLIC TRANSPORTATION GOAL DETERMINATION: A RESEARCH APPROACH. Urban problems such as energy shortages, congestion, and increasing highway costs are prompting communities to reassess the need for public transportation. A solution can be achieved if citizens are encouraged to rely less on the automobile and more on public modes for intracommunity travel. However, achieving user shifts in mode preferences is not easy because of the automobile's popularity. Consequently, if public transportation is to realize its potential, effective planning is essential, and it must begin with the setting of appropriate goals for community transportation services. Among the complexities that add to the difficulty of setting goals are the differing needs of existing and potential user groups, the variety of transportation service alternatives, community role structure, environmental constraints, and limited resources. A promising approach to setting community transportation goals is the policy Delphi method. Through this technique information is collected independently from various individuals and groups concerning future events and policy issues. Opinions and information are gathered without the participants' having to interact. Moreover, feedback of information from other participants is provided to each Delphi panel member. The paper examines the community transportation goal-setting task in the context of a complete transportation planning process. Major attention is given to applying the policy Delphi method to generating community transportation goal information and assessing the extent of agreement among policy makers.

Cravens, DW Woodruff, RB Harper, JF (Tennessee University, Knoxville) *Transportation Research Record* No. 563, 1976, pp 1-12, 6 Fig., 12 Ref.; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

42 138294 A PRICE RESISTANCE MODEL FOR PERSONAL TRAVEL. This paper describes the development of a price resistance model for personal travel. The model provides a comprehensive and flexible mechanism for assessing the effect on the demand for travel for any particular mode or modes of cost changes, such as changes in bus fares, petrol prices, parking charges, etc. Both the absolute change in the

overall demand for travel associated with any change in cost (considered in terms of both time and money) for a specific mode, and the competitive adjustments in demand between modes as a result of the change are taken into account in the model. The results of a case study on the effect of bus fare increases shows that the models predictive ability is good and that it is a realistic and robust tool. /Author/

Metcalf, AE Markham, J Fenney, BP *Regional Studies* Vol. 10 No. 1, 1976, pp 79-88, 5 Fig., 5 Tab., 10 Ref., 1 App.

42 138587 TRANSPORTATION PLANNING FOR SMALL URBAN AREAS. The initial focus of this research was to develop a simplified transportation planning process for small urban areas of less than 250,000 population that is sufficiently flexible so that travel forecasts can be based on a small sample home-interview survey or simulation. It was found that the existing standardized procedures were incompatible with the possible variations in the nature of the problems, available resources and expectations of the participants. The need for a customization of planning procedures was established and the current organizational framework and technical practices in both land use and transportation planning were evaluated from that standpoint. Land use planning in small communities was found to be highly standardized in format and content, but not in procedures, which varied significantly in terms of sophistication. The transportation planning procedures appeared to be relatively more standardized. The research identified and presented four types of transportation planning techniques for application in small urban areas: (a) network simulation based on synthetic models and a small sample household survey, (b) consumer-oriented transit planning procedure, (c) simple techniques for corridor analysis, and (d) hand-computation oriented procedure for estimating localized impacts of major traffic generators. Under each category existing techniques were reviewed and tested (to varying levels).

Grecco, WL Wegmann, FJ Spencer, JA Chatterjee, A (Tennessee University, Knoxville) *NCHRP Report No.* 167, ISBN-0-309-0250-0, June 1976, 71 pp, 17 Fig., Tabs., 84 Ref., 7 App.; Prepared in cooperation with American Association of State Highway and Transportation Officials, Washington, D.C.; ACKNOWLEDGMENT: ORDER FROM: TRB Publications Off, NTIS

42 138589 DISAGGREGATE TRAVEL DEMAND MODELS: PHASE 1 REPORT. This report presents the results of Phase I of a study to develop improved disaggregate models of urban travel demand. Such models will form the basis for improved travel demand estimation procedures for application to specific urban transportation system planning alternatives and public policy issues. Policy-sensitive travel demand forecasting models are developed and calibrated with data from individual travelers' choices, using data from two urban areas. The resulting models are evaluated and recommendations for their implementation are discussed. Several application scenarios are presented to illustrate how the models may be applied. An extensive analysis of the Independence of Irrelevant Alternatives property of the multinomial logit model is reported. Issues in model specification and calibration and collection of data for disaggregate models are consid-

ered. The findings of the study are that disaggregate demand techniques are workable and versatile, and properly applied, can be used to analyze transportation planning issues not presently addressed by conventional approaches and deserve wider application.

Chatham County-Savannah Metropolitan Plan Comm Intrim Rpt. Feb. 1976, 468 pp, 24 Fig., 65 Tab., 32 Ref., 4 App.; Publication of Project 8-13 in 2 volumes.; ORDER FROM: TRB Publications Off

42 138869 ROAD PASSENGER TRANSPORT: POLICIES PROBLEMS AND PROSPECTS. The article discusses the problem of framing road public transport policies, which, it is claimed, should be based on the operating experience of the industry. Although policies designed to develop public transport services while reducing dependence on private transport have been outlined in the past, further action in the form of producing a fully integrated plan has not been taken. In considering the objectives of a transport policy in all its aspects, it is thought important that local authorities should receive guidance while retaining the power to suit transport policy to local conditions. Current government policy at a time of short-term financial restriction is causing operators to impose service reductions to prevent financial collapse, so preventing long-term planning for the better use of national resources. While in forming any transport policy it is politically unrealistic to deny ownership of a car to any section of society, the use of private transport must be controlled to provide greater access and mobility to all sections of society. It is suggested that bus operators should pay greater attention to market research to improve the image of their 'product' by better public relations. The introduction of transport policies and programmes (tpps) for 1975-76 is seen as an advance in attitude towards policy making, allowing a greater co-ordination of public transport to meet the needs of different areas. /TRRL/

Irwin, IS *Chartered Institute of Transport Journal* Vol. 37 No. 3, Mar. 1976, pp 74-80; ACKNOWLEDGMENT: TRRL (IRRD 20093)

42 138948 LOW-BUDGET MODAL SPLIT ANALYSIS. The paper describes the data collection and calibration of A generalised cost modal-split model carried out at very low cost. The model was based upon assumptions about the value of time and relative disutilities of time components derived from other work. Both a straight line and logistic curve model formulations were fitted to the data and, over the range of values considered in the analysis, both gave very similar results. The use of the model to assess alternative pricing policies for car parking and bus fares, and the resulting recommendations on the relative price and supply of central and fringe public car parking space, are also described. (A). /TRRL/

Mullen, P Lawson, GP *Traffic Engineering and Control* Vol. 17 No. 5, May 1976, pp 188-191, 3 Fig., 3 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220285)

42 138953 NEEDED: A MORE PROGRESSIVE, LESS DEFEATIST ATTITUDE TO PUBLIC PASSENGER TRANSPORT. The author suggests that the recent failings of public

transport policy have been due to particular factors which will not necessarily persist. Factors considered include the slow delivery of buses, cheap petrol, a poor image and slow progress in urban rail programmes which have proved important in Europe. The author attacks proposals suggested in a previous article and puts forward his own ideas on how a smaller and more efficient bus fleet should be managed to stay within the government's reduced subsidy limits. /TRRL/

White, P (Polytechnic of Central London) *Surveyor - Public Authority Technology* Vol. 147 No. 4378, May 1976, pp 13-14, 1 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-220291)

42 139028 RUCI: A ROAD USER COST PROGRAM FOR LONDON. RUCI is a computer program to determine the present worth of road user costs for roads and road schemes in London. It is similar in purpose to the Department of the Environment's program COBA, the use of which is now mandatory in the evaluation of major non-urban road schemes, but rucI is designed specifically for urban roads and urban traffic conditions, for which COBA is unsuitable. RUCI will assist the technician to (I) identify roads for improvement, (II) select the best design from among a number of alternative proposals for one project, and (III) to determine priorities. At a higher level the rucI program will provide a basis for determining the road budget and/or the successful road projects. Because the program values occupants' costs it will be useful in studies involving public transport, and improve the technician's contribution to community decision making on road projects. /TRRL/

Tindall, JI ; Greater London Council Research Memo 475, 46 pp, 5 Fig., 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220334)

42 139209 TRANSPORTATION PLANNING IN NAGOYA METROPOLITAN AREA-USING PERSON-TRIP SURVEY. The Nagoya Metropolitan Area has an extent of 40 kilometer radius with Nagoya city as its center, and is the third largest metropolitan area in Japan. Its population is about 6-million 110-thousand as of 1970. Nagoya city surpasses other large cities in Japan in the road improvement situation owing to the land readjustment work such as rehabilitation from the ruins of World War II, and its completed road system with enough width has received wide publicity as a successful case of city planning in this country. It has, however, become apparent that many problems have cropped up as in other metropolitan areas of Japan, such as chronic traffic congestion, lack of parking spaces in CBD, waste gas and traffic accidents caused by the rapid increase of population and more excessive increase in the number of motor vehicles. To cope with these problems, it is not sufficient only to improve road networks. It is also necessary to carry out a comprehensive urban transportation planning as a total system, with the optimum assignment of modal functions to motor vehicle, railway transport, two-wheeler, etc. Now, one of the merits of person-trip survey is the grasping of a passenger's preference of transportation by modes, because the survey may get directly the information regarding the movement of people generating a traffic, different from an origin-destination survey of motor vehicle or a survey for railroad users, in trying to get the movement of

vehicles. From such a point of view, we carried out a person-trip survey in the Nagoya Metropolitan Area, and have made an analysis for the present pattern, estimation of future traffic demand, and planning of transportation facilities, using the findings of the survey. /Author/

Hayshi, K (Ministry of Construction, Japan) *Japan Road Association Annual Report of Roads* No. 75, 1975, pp 35-43, 4 Fig., 7 Tab.

42 139536 EDMONTON AT THE HALF-WAY STAGE. While the discussion and planning for proposed light rapid transit networks continues in many North American cities, Edmonton has gone ahead with construction and its initial 7 km route is due to open in early-1978. The simplicity of the line with its eight grade crossings and use of CN rights-of-way is noted and a brief description of rolling stock is included.

MacDonald, DL *Railway Gazette International* Vol. 132 No. 7, July 1976, p 253, 1 Fig., 4 Phot.; ACKNOWLEDGMENT: UIC; ORDER FROM: ESL

42 139557 PROGRAMMING TRANSPORT INVESTMENT: A PRIORITY-PLANNING PROCEDURE. A priority-programming procedure was developed and is being implemented by the Ontario Ministry of Transportation and Communications. The procedure initially will deal with rural highway investment but can be extended to transit and urban areas. An earlier paper has given a general background of the procedure. This paper shows how the linear-programming formulation is a valuable extension of current methods of cost-benefit analysis. The basis of the extension is the explicit consideration of trade-offs concerning the time of investment for improvements. The method also provides for different interest rates for discounting benefits and costs. The paper describes the linear-programming formulation including the treatment of alternatives, regional budgets, and commitments. The paper also discusses the treatment of interrelated or joint benefits of improvements. Finally, the paper presents the calculation procedure for the key benefits-user time and vehicle operating cost. This procedure accounts for variations in hourly volumes over the year and uses existing information as input. /Author/

Shortreed, JH (Waterloo University, Canada) Crowther, RF (Ontario Ministry of Transportation & Communc, Can) *Transportation Research Record* No. 574, 1976, pp 48-57, 4 Fig., 1 Tab., 8 Ref.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

42 139611 ASSESSING NATIONAL URBAN TRANSPORTATION POLICY ALTERNATIVES. This paper describes a model for assessing national urban transportation policy alternatives and its application in the 1974 National Transportation Study in the U.S. This multimodal version of the trans urban model system employs an aggregate modelling technique which treats each urban area as a single analysis unit. Given a level and mix of funds, the model calculates the amount of highway and transit facilities, travel demand by mode, system performance, and external impacts such as fatalities, land consumed, air pollution, dislocations and energy consumed. The model was applied to assess the effects of alternative funding and pricing policies for the 64 largest urbanized areas. /Author/

Weiner, E (Department of Transportation) *Transportation Research* Vol. 10 No. 3, Apr. 1976, pp 159-177, 26 Fig., 1 Tab., Refs.

42 139718 TRAVEL ESTIMATION PROCEDURES FOR QUICK RESPONSE TO URBAN POLICY ISSUES. This report presents the findings of an investigation of the ability of travel estimation procedures to provide information which can respond quickly to urban policy issues. Perhaps the most significant material in the report are descriptions and evaluations of 34 models and procedures which should prove useful to transportation planners in selecting available techniques appropriate for quick response to policy issues. This project identified urban transportation planning issues requiring a quick response on the part of responsible agencies. Questionnaires, on-site visits, as well as a review of pertinent reports, were used to determine current needs. In addition, the project reviewed and evaluated current and emerging techniques as to their ability to respond rapidly to the issues identified. It was found that an effective and responsive transportation planning process must be capable of rapidly providing estimates of the values of criteria used in the evaluation of multi-modal facility and service alternatives. These evaluation criteria include service, impacts and costs at less than the regional scale. It was found that emphasis has shifted away from long-range regional capital facility planning to providing short-range highway and transit improvements at sub-regional scales. Land use is a major issue and no longer can be treated as a fixed input to the transportation planning process. No one existing travel estimating technique was found to be completely adequate in responding to all of the many questions being asked. A quick, efficient four-step transportation planning computer process to provide for improved response to some of the current issues was recommended. Additionally, a policy oriented non-network specific procedure is needed to evaluate system changes and policy changes from a nominal condition. Development of manual methods are recommended to support project level and service changes in meeting quick response needs. The need for new disaggregate techniques which can deal with the non-work travel market was also emphasized.

Wickstrom, GV Sosslau, AB (COMSIS Corporation) ; Metropolitan Washington Council of Governments Intrm Rpt. NCHRP Proj 8-12, Apr. 1976, 167 pp, 11 Tab., 34 Ref.; Prepared for the National Cooperative Highway Research Program, Transportation Research Board.; ORDER FROM: TRB Publications Off

42 139838 STATUS OF TRANSIT IN OHIO. An overview is presented of public transportation in Ohio, an inventory is made of transit systems in Ohio, and statistics are included which support and summarize the above data. The overview examines the changing role of public transportation, discusses energy issues, expresses concern for elderly and handicapped citizens, are reviews rural public transit, pupil transportation, public transportation planning, federal programs, transit authorities, and revenue sources. The inventory of transit systems describes each system and includes a 1973 transit profile. Twelve districts are reviewed, and the details are outlined of

intercity bus service, limousine service, pupil transportation, intercity rail passenger transportation, water related transportation, and discontinued operations. Statistical figures and tables are presented which show present and past trends in the transit industry and identify the extent of government involvement in urban public transportation.

Rhodes, JA Jackson, RD ; Ohio Department of Transportation Jan. 1975, 123 pp, 6 Fig., 13 Tab.

42 139947 BOSTON: A SYSTEMS SOLUTION TO URBAN MASS TRANSPORTATION PROBLEMS. This paper examines public mass transit solutions to increasing auto congestion and pollution in the Boston area. It attempts to measure the effectiveness of this solution and prescribe a modified course of action to deal with Boston's urban transportation problem. The commitment to transit is called a disappointing failure, but transit is seen as the key ingredient to regional transportation problems.

Stephenson, FJ (Northeastern University) *ICC Practitioners' Journal* Vol. 43 No. 5, July 1976, pp 625-645, 2 Fig., 11 Tab.; ORDER FROM: Association of Interstate Commerce Comm Pract, 1112 ICC Building, Washington, D.C., 20423

42 141153 TRANSPORTATION PROGRAM.

The Office of Technology Assessment made several reports to Congress in 1975 concerning the safety, economic, and energy aspects of the nation's transportation systems. An assessment of automated guideway transit defined three classes of these systems and examined their economic and social impacts. The process by which communities plan for and implement rail rapid transit systems was assessed, based on area case studies. A short term study was made of the relationship between cost and availability and transit patronage, between transit incentives and automobile use, and the effect on unemployment of increased expenditures for transit. Another assessment analyzed the testing and operation of automatic train control systems in respect to safety, economics, and performance. In regard to the rehabilitation of the nation's railroads, a group of three related assessments was made on a broad range of railroad issues. The assessment on automobile collision data evaluated methods of data collection on collision forces resulting in occupant injuries. The assessment on changes in the use and characteristics of automobiles was begun late in the year, and will examine such issues as future availability of fuels, shifts in public attitudes, and public policy alternatives.

Office of Technology Assessment Annual Rpt Mar. 1976, 4 pp; In Annual Report to Congress, pp 37-40.; ORDER FROM: GPO; 052-003-00152-7

42 141270 A SHORT RANGE TRANSPORTATION PLAN OF THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS. The Short Range Transportation Plan of the Southern California Association of Governments (SCAG) is designed to address near term transportation problems and solutions by detailing in terms of time, cost and effectiveness all transportation planning activities for the next five years. The proposed short range transportation improvements for the SCAG region include preferential treatment on freeways and major arterials for high occupancy vehicles, carpool action programs, transit development

strategies, bicycle related programs and commuter rail service. A monitoring and evaluation process is included in the Short Range Plan so that individual improvements can be assessed and the cumulative effects of these improvements on air quality can be determined.

Southern California Association of Governments Final Rpt. 740411, 98 pp, Figs.; Sponsored in part by the Urban Mass Transportation Administration, Washington, D.C.; ORDER FROM: Federal Highway Administration, Urban Planning Division, 400 7th Street, SW, 400 7th Street, SW

42 141281 METROPOLITAN TRANSPORTATION PLANNING: PROCESS REFORM. Shifting public values, increasing competition for public resources, and improved technical capabilities have rendered obsolete certain aspects of the conventional regional transportation planning process. Several recent regional planning reviews and restudies have surfaced a new approach. This paper suggests how philosophy, organization, staffing, and technical approach can be balanced in a new process to incorporate the concern for long-range regional issues with short-range localized issues. The implications of such a restructuring of the planning process will be most dramatically felt in the redefinition of a plan as an open-ended document in response to the current status and future options for a continuing improvement program. /Author/

Hansen, WG (Voorhees (Alan M) and Associates, Incorporated) Lockwood, SC *Transportation Research Record* Conf Paper No. 582, 1976, pp 1-13, 4 Fig., 12 Ref.; Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

42 141288 TRANSIT SKETCH PLANNING PROCEDURES. The current urban transportation planning process is highly dependent on a complex set of travel demand models that operate at a relatively fine level of detail. These models ultimately produce travel assignments on alternative modes of travel. Unfortunately, these travel demand estimates are often insensitive to policy variables, and the process is often too cumbersome and time consuming to be used to test a wide range of transportation policy alternatives. This paper describes a complementary analytical method called the transit sketch planning process. Its purpose is not to supplant traditional, more detailed urban transportation planning but to extend the range of existing procedures. The transit sketch planning process uses a much more aggregated data base. A logit modal-choice model is adapted to operate at such a level of aggregation while producing transit-demand estimates that are consistent with detailed estimates. Policy alternatives can be evaluated with respect to their overall impact on central business district, city center, and suburban transit demand. With a complementary cost analysis, the degree of subsidy required for each policy alternative is estimated. Those policies that appear to be most promising can be further tested in the traditional urban transportation planning system to evaluate the detailed impacts at a zone-to-zone and facility level. The procedures do not attempt to advance the state of the art of transportation demand forecasting. Rather they attempt to use the best of existing procedures in a framework that can provide quick responses to transit policy questions that local planners must answer.

Difiglio, C Reed, MF, Jr (Highway Users Federation for Safety and Mobility) *Transportation Research Record* No. 569, 1976, pp 1-11, 4 Fig., 4 Tab., 27 Ref.; ORDER FROM: TRB Publications Off

42 141410 ECONOMICS OF CAR OWNERSHIP AND USE BY TEENAGERS (ABRIDGMENT). Disaggregate income and expenditure data were produced as part of a comprehensive, exploratory study of subgroup travel behavior and mobility barriers. Information from small panels of 50 white male high school studies from 3 working-class Boston suburbs generated insights that could help refine the analysis of metropolitan transportation planning and programs. Traveler benefits and costs used to investigate and forecast trip and modal-choice decisions must consider perceived costs and anticipated incomes of relatively homogeneous population segments, such as older teenagers, rather than average costs and past incomes for heterogeneous population groups or households. Travel cost estimates of engineers and economists seem to be higher than those of teenagers. Incomes for teenagers and their desire to work to pay for high-quality private transportation seem to be underestimated by planners. The study discussed in this paper suggests that teenagers want jobs and cars as means to other objectives such as avoiding boredom, socializing, and obtaining goods and services. Active teenagers appear willing to spend as much as 50 percent of their budgets on transportation that satisfies their complex requirements for off-peak, unchaperoned dating and social and part-time employment trips. Policymakers should consider that many teenagers' perceptions of car ownership and use benefits far outweigh their perceptions of car costs; no evidence suggests that increased public education programs dealing with true car costs or the provision of inexpensive transit service are likely to significantly affect the modal preferences and travel behavior of older, working-class male teenagers. Public policies that reflect the economic behavioral preferences of these teenagers (and probably many other transit-dependent travel subgroups as well) would promote job-development activities and programs to reduce costs of car ownership and use.

Gurin, DB (Urban Mass Transportation Administration) *Transportation Research Record* Conf Paper No. 583, 1976, pp 78-83, 16 Ref.; Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

42 141508 MAJOR URBAN TRANSPORTATION INVESTMENTS. A statement is made on the Federal Policy (1975) with respect to decisions on major urban mass transportation investments assisted under the Urban Mass Transportation Act of 1964. This statement has been developed in concrete with Federal, State and local transportation and planning officials, transit operators, public interest groups and other parties potentially affected by the Policy. Comments are made on policy areas which require clarification: namely, the measure of transportation cost-effectiveness; the long range plan; incremental development; short term analysis; Transportation System Management improvements; major urban mass transportation invest-

ment; and the relation between environmental impact statement and the analysis of alternatives. Procedures are outlined which will be followed in reviewing alternative analysis, implementing the environmental impact statement, and in making funding commitments.

Federal Register Vol. 41 No. 185, Sept. 1976, 3 pp

42 141682 URBAN TRANSPORTATION STUDY PROCEDURES. Study Number 2-10-74-17, "Urban Transportation Study Procedures," was originally a three-year planning study. Condensed to a two-year study effort, the technical support and research effort will continue under an interagency agreement contract. Study 17 was directed toward providing continuing technical support for the Texas State Department of Highways and Public Transportation in the conduct of urban transportation studies throughout the State. Under this study, assistance was provided in the analysis and forecasting techniques relative to urban transportation studies. The maintenance and modification of computer programs previously developed was performed under this study. The determination of the feasibility and means of theoretically estimating the trip length frequency distribution for "synthetic" urban transportation studies was investigated. The development of a procedure by which the trip length frequency distribution is theoretically estimated resulted. The procedure was tested and compared with the observed trip length frequency distributions from 18 transportation studies conducted in Texas for home-based and nonwork trip purposes, nonhome based, and truck and taxi trip purposes; this procedure was found to yield acceptable results. The sensitivity of traffic assignment to input from the preceding modeling phases was evaluated. Different random trip matrices were assigned to a network and the resulting assignments were compared to the fully modeled assignment and ground counts. Based on the results of these analyses, a sketch planning approach is proposed which would be expected to produce assignment results of sufficient accuracy for preliminary system evaluation and comparison with other alternatives similarly modeled.

Benson, JD Stover, VG Teniente, MF ; Texas Transportation Institute, (No. 17-3F) al Rpt.730 TII-2-10-74-17-3FFin, Aug. 1975, 36 pp, 4 Fig., 3 Tab., 8 Ref.; Research was sponsored by the Texas State Department of Highways and Public Transportation, Planning Division, in cooperation with the FHWA, DOT.; Contract 2-10-74-17; ORDER FROM: NTIS

42 141930 BART'S OUTCOMES: AN EARLY APPRAISAL. After costing \$1.6 billion, BART is now serving only 2% of all trips made in its 3-county district. The overall effect has been to leave highway congestion levels just about where they would have been anyway. Half the expected riders have chosen the convenience of private cars or buses that bring them close to their jobs over the luxurious but relatively inaccessible train. Fares are paying for only about a third of the annual operating costs, and even if ridership reaches the projected levels in another five years, increasing labor and other costs will continue to produce annual deficits. The initial decision to build BART was unfortunately not substantiated by accurate forecasts of patronage or revenues, and planners were convinced it could compete with

the auto-dominated society and come out on top. Hopefully, other urban planning officials will learn from the lessons of BART, and not continue to make the same costly mistakes in providing the best in transit systems that technology has to offer.

Webber, MM ; California University, Berkeley July 1976, 58 pp, 7 Fig., 7 Tab.

42 141938 APPLICATIONS OF VALUE OF TRAVEL TIME TO TRAVEL DEMAND ESTIMATION. Potential areas of application of the value of time within all the predictive models in the transportation planning process are identified, and basic problems associated with such application and the urban transportation planning package are discussed. Three alternatives are described for determining the function of value of time in predictive models. The major applications of values of travel time are in the conventional travel demand models: trip generation, distribution, mode choice, and route assignment. A formulation that would involve the use of costs and times as major explanatory variables in the various decision processes is discussed. Broad areas in which the generalized cost concept in urban transportation models may be applied are indicated (for possible exploration), and gains that it may provide in terms of realism and accuracy of existing models are considered. The need for considerable research in modeling of trip generation before operational models are produced, incorporation of generalized cost in models of trip distribution and mode choice, use of an algorithm in trip assignment procedures, and model interaction are discussed. The reasons for the lack of a set of modeling tools for interurban travel are noted, and choice situations that should be differentiated are indicated. The value of time should be used specifically in predicting the market for possible new modes of intercity travel.

Reichman, S (Hebrew University, Israel) Stopher, PR (Computer Identities Corporation) *Transportation Research Record* No. 587, 1976, pp 6-11, 27 Ref.; ORDER FROM: TRB Publications Off

42 142075 A PLANNING MODEL FOR MULTIPLE-MODE TRANSPORTATION SYSTEM OPERATIONS. The problem of generating a set of "good" transportation alternatives during the early and intermediate stages of transportation planning is addressed in this paper. A linear programming model of a multi-modal transportation system is developed. The model is run interactively to determine optimal operating levels for all modes for various transport policy decisions. The model described is a component of a composite network generation model incorporating dynamic changes. The linear programming component determines optimal operating policies for given points in time. The composite model incorporates these in a dynamic programming framework to determine optimal staged investment policies over several time periods. /Author/TRRL/

Nihan, NL (Washington University, Seattle) Morlok, EK (Pennsylvania University, Philadelphia) *Transportation Planning and Technology* Vol. 3 No. 2, 1976, pp 59-73, 4 Fig., 1 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220954), EI; ORDER FROM: ESL

42 142157 THE ROLE OF ACCESSIBILITY IN BASIC TRANSPORTATION CHOICE BEHAVIOR. Accessibility measures reflect the level of service provided by transportation systems to various locations. Basic transportation choice behavior is defined to include those decisions of how many automobiles to own and how many trips to make by automobile and by public transit. Here, these decisions are assumed to be made jointly by urban households and are conditional upon residential location decisions. It is the purpose of this paper to explore the role of accessibility as a causal factor in such basic transportation choice behavior. An economic utility theory model of choice behavior is postulated in which the benefits from making trips to specific destinations are reflected by measures of destination attraction. Through determination of utility-maximizing trip frequencies, indirect utility functions are developed which include accessibility concepts. Behavioral implications of these concepts are proposed and contrasts are drawn to accessibility measures used in conventional segregated models of trip distribution, modal choice, and automobile ownership. Sensitivity analyses of alternative empirical definitions of accessibility in the choice model are conducted using data from the Detroit regional transportation and land use study-covering counties in southeastern Michigan. These analyses employ a multinomial logit estimation technique and focus on definitions of trip attraction. Results of these analyses indicate that more complicated attraction measures can be replaced by measures involving the proportion of either urban area population or urban area employment within a traffic analysis zone. Also, evidence is found that decision-makers in the case study area consider trips of up to 60 or even 90 minutes duration when evaluating accessibilities offered by alternative public and private transportation systems.(a) /TRRL/

Burns, LD Golob, TF (General Motors Corporation) *Transportation (Netherlands)* Analytic Vol. 5 No. 2, June 1976, pp 175-198, 2 Fig., 7 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220921)

42 142158 APPROACHES TO THE FUTURE IN U.S. URBAN TRANSPORTATION PLANNING. In appreciation of the fact that longer-run considerations are particularly important in the development of urban transportation, during the past three decades American transportation planning has been employing increasingly sophisticated approaches to the future. This article discusses four phases in this evolution, with a given focus dominant in each period. During the first period, following on the initial provision of federal government funds for the construction of highways in and around cities, major reliance was based on simple projections of travel demand in metropolitan regions, based mainly on current patterns. This was followed by an approach which focused on an analysis of impacts on transportation systems of projected land uses, based on forecasts of population and economic growth for a target year, on the assumption that facilities were to be provided to move all vehicles that wanted to move from here to there at least possible cost. The third period was characterized by an increasing consciousness of the value of articulating national and local goals in making transportation decisions, going beyond narrow economic and mobility objectives, and including

the notion of trade-offs among goals. The most recent period discussed is one characterized by rising interest in futures studies, using methods such as "delphi" and cross-impact analysis and approaches such as "alternative futures," as well as a search for achieving flexibility in transportation development and for means of limiting resource commitment in the face of the uncertainties of the future ("keeping options open"). /TRRL/

Perloff, HS Flaming, DJ (California University, Los Angeles) *Transportation (Netherlands) Analytic* Vol. 5 N June 1976, pp 153-173, 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220922)

42 142193 URBAN TRANSPORTATION MODELING AND PLANNING. This book examines in detail the available techniques and current research in travel-forecasting procedures. In an effort to maintain some perspective on the primary uses, the techniques are examined within the broader construct of the transportation planning process. The evolution of the transportation planning process is outlined and some of the fundamental processes associated with forecasting procedures are highlighted. System analysis and economic aspects are covered as well as fundamental concerns related to model building. The relative importance and interactions of the forecasting or modeling procedures are discussed, and the individual steps involved in the procedures are detailed. The theory, and concepts are described of 4 recent approaches to replacing the conventional travel forecasting process. The direct traffic-estimation method, the spatial-distribution model theory, the theory of econometric models, and behavioral travel-demand models are detailed.

Stopher, PR (Northwestern University, Evanston) Meyburg, AH (Cornell University); Heath Lexington Books 1975, 345 pp

42 142201 TRANSIT RIDERSHIP AND DEFICITS: 1980 PROJECTIONS FOR NEW YORK STATE. This report develops alternative forecasts of transit ridership and deficits for 13 New York State transit operations, relating trends in usage to changes in fares, service levels, and auto registrations. It is prepared as part of NYSDOT's Section 9 Study, mandating an evaluation of the 1975-76 state Transit Operating Assistance program, and is basically an extension of similar forecasts made in 1974, assuming various fare and service policies. Forecasts are made and compared for several different assumptions about fares, service, and auto registration trends. Results show that (1) 1980 deficits will be in the range of \$1.2 billion under all fare policies studied; (2) higher fares will significantly reduce ridership without materially improving the deficit picture.

Cohen, GS Howe, SM Knighton, RG; New York State Department of Transportation Prelim. Res. Rpt. 92, Dec. 1975, 57 pp, 9 Tab., 2 App.

42 142241 URBAN TRANSPORTATION DECISION-MAKING: 10. MANCHESTER AND LEEDS: A CASE STUDY. The salient features of the Manchester and Leeds metropolitan areas are briefly reviewed and their socio-economic characteristics are discussed. The political structures and process, transportation programs and needs, the institutions involved in the transporta-

tion process in Manchester are described, and corresponding features in Leeds are noted. Manchester is noted as slow to develop participation by the private sector in the transportation decision-making process. Recent efforts by citizens groups are noted. The Picc-Vic tunnel scheme (part of the SELNEC Transportation Plan for the Manchester metropolitan area) controversy is discussed. Transportation planning, programs and institutions in Leeds are examined and ways in which they differ from those of Manchester are noted.

Colcord, FC, Jr Lewis, RS; Tufts University Final Rpt. OST-TPI-76-02,VIII, Jan. 1974, 147 pp, Figs., Refs., 2 App.; Contract DOT-OS-30036; ACKNOWLEDGMENT; ORDER FROM: NTIS

42 142242 URBAN TRANSPORTATION DECISION MAKING: 12. HAMBURG: A CASE STUDY. The historical background and socio-economic characteristics of the city of Hamburg, West Germany are discussed as well as its political features, transportation characteristics, and its institutional structures for transportation planning and programs. The extent, quality and innovative administrative arrangements are noted of Hamburg's transit system. The success of the Hamburg Transport Community (HVV) led to the creation of similar organizations in Munich, Frankfurt and the Ruhr region. The cost of HVV is minimal. The joint tariff and coordination of services undertaken under HVV has led to many beneficial results. Two basic factors are identified as underlying Hamburg's successful public transport: a city requires either a substantial tax base of its own or a large amount of revenue assistance from some higher government; coordination of individual agencies involved in public transport is crucial for efficient operation both from the operators standpoint and that of the passengers.

Colcord, FC, Jr Lewis, RS; Tufts University Final Rpt. OST-TPI-76-02,X, Jan. 1974, 98 pp, Figs., Refs., 2 App.; Contract DOT-OS-30036; ORDER FROM: NTIS

42 142243 URBAN TRANSPORTATION DECISION MAKING: 13. AMSTERDAM: A CASE STUDY. The history, socioeconomic characteristics, transportation aspects, political features, and the institutions for transportation planning and decision-making are reviewed. Transportation has for many years been planned in a coordinated fashion and has been closely related to physical planning. Details are given of Amsterdam's automobiles, roads, and public transport system (trams and metro). Eight new towns have been planned in coordination with transportation. An excellent example of such planning is that of Bijlmermeer around an elevated metro-line and carefully separated highways. Controversies and questions related to transportation are listed. These relate traffic management in the city, the long range plan for metro, the question of traffic arteries through the 19th century city center, and the extent of national government authority in transportation decision-making.

Colcord, FC, Jr Lewis, RS; Tufts University Final Rpt. OST-TPI-76-02,XI, Feb. 1974, 119 pp, Figs., Refs., 2 App.; Contract DOT-OS-30036; ORDER FROM: NTIS

42 142314 STAGING LONG-RANGE TRANSIT PLANS. The article examines the staging strategies that are based on a rationale that is applicable to the individual metropolitan area and involves complex, interwoven considerations of demonstrated transit usage, highway congestion, financial resources, institutional climates, technical justification, and the area's commitment to the goals and objectives of public transportation services.

Evoy, HD (Parsons, Brinckerhoff, Quade and Douglas, Inc) *Traffic Quarterly* Vol. 30 No. 3, July 1976, pp 413-429; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 142374 TRI-STATE REGIONAL CONFERENCE-PROCEEDINGS. The Conference incorporated an overall review of regional policy as well as intensive examination of specific topics. Panels were convened which focused on major regional issues. Preference was expressed for a denser, compact urban development which would conserve energy, protect the environment, reduce costs of utility systems, preserve agricultural land, make mass transit economically feasible and end waste of public funds. The need was expressed for subregional committees not only in transportation programs but also in housing, health and other social services, land use planning, cultural affairs, and law enforcement. The 6 panels covered the following subjects: Environmental Quality-Who should bear the costs? Transportation goals-Can obstacles be overcome? Land Use-Where and Where not to Build, the Economy-Is the Decline Reversible? Housing: How Much, Where, and How? Energy-What the Region can do. State planning responsibilities and interstate cooperation were covered in further presentations. Participation and exchange sessions, while providing a recapitulation of the discussions, also covered the OMB Circular A-95-local government participation; Human Resource Planning-functional and intergovernmental; Economic Development Planning in a Metropolitan Region; and Water Resources, Coastal Zoning and Offshore Development.

Tri-State Regional Planning Commission Proceeding May 1976, 232 pp, Photos.

42 142480 MODAL CHOICE AND THE VALUE OF TRAVEL TIME. This book brings together a number of recent research studies dealing with both modal choice and value of savings in travel time. The titles of the individual studies are as follows:-A diagnostic survey of urban journey-to-work behaviour-Heggie,IG; Modal choice behaviour and the value of travel time: Recent empirical evidence-Earp,JH, Hall,RD and McDonald,M; The skyport special: An experimental personalized bus service-Heraty,MJ; Valuation of commuter travel time savings: An alternative procedure-Hensher,DA; The value of travel time savings and transport investment appraisal-Jennings,A and Sharp,C; Resource value of business air travel time-Carruthers, RC and Hensher,DA. /TRRL/Oxford University Press 1976, 190 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 221939)

42 142483 INTERACTION BETWEEN PUBLIC TRANSPORT AND URBAN PLANNING. In this paper separate chapters deal with (1) the urban phenomenon and the industrial

revolution; (2) the growth of towns and development and land use patterns; (3) mobility, traffic flows, public and private transport; and (4) costs and fares. The conclusions contained in chapter 5 emphasise the need to coordinate urban and regional planning and to consider transport (public and private) as an integral part of such planning. /TRRL/

Paschetto, A (Torino Azienda Tranvie Municipali, (Italy)) ; International Union of Public Transport Monograph 1976, 57 pp, Figs., Tabs., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 221816)

42 142733 TRAVEL TIME AS TRAFFIC ASSIGNMENT INPUT: SOME DIFFICULTIES EXPLORED [Reistijden als assignmentinput; een discussie over enkele problemen]. The main theme of this paper is the hypothesis that it is, in the current situation, probably more fruitful to concentrate efforts on improving assignment input quality, rather than only on developing more and more sophisticated assignment models, in order to increase the precision of assignment results. In particular, emphasis should be placed on travel times or travel time functions. After pointing out in a general fashion the relationship between specification errors and data errors, the ways in which inaccuracies of the travel times affect the outcomes of the travel prediction are indicated. A discussion of potential explanatory factors of travel time is followed by a recommendation to establish a travel time model. Special attention is paid to the amount of travel time intersections account for. Then some drawbacks of current assignment models are discussed. Finally, some problems are outlined concerning travel times, which are related to our experiments on the effect of zone size and network detail on assignment results. /Author/TRRL/ [Dutch]

Jansen, GRM (Delft Inst Voor Stedebouwkundig Onderzoek, Holland) ; Collogium Verkeersplanologisch Spuurwerk Analytic 1976, pp 569-598, 7 Fig., 29 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV55025E), TRRL (IRRD 221577)

42 142802 THE DEMAND FOR URBAN BUS TRAVEL. This paper discusses the various factors affecting demand for urban bus travel and considers the strengths, weaknesses and problems of alternative models of bus demand. From this work a simple aggregate model of bus demand was derived which was used to estimate fare and service quality elasticities for 12 municipal bus operators. The study estimated the overall fare elasticity to be 0.31 and the overall service elasticity to be 0.63. These findings are compared with the results of other studies and their implications for future public transport policy discussed. /Author/TRRL/

Mullen, P Lewis, KJ ; Colin Buchanan and Partners Monograph Dec. 1974, 29 pp, 1 Fig., 2 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-221243)

42 142924 THE BART EXPERIENCE--WHAT HAVE WE LEARNED? This monograph spells out misjudgements of designers of the Bay Area Rapid Transit System which the author defines as a lack of appreciation of the San Francisco region's highway accessibility, the significance of supplemental accessibility afforded by BART and

the traveler's appreciation of time spent getting to moving vehicles as compared to time spent inside them. BART's suburban riders have switched from lower cost buses, have adopted travel patterns which do not relieve highway congestion and BART has not altered automobile use significantly. High capital and operating costs are being compounded by low patronage. It is concluded that high-speed, high-comfort travel on exclusive rights-of-way, features that require mainline rail technology, has insured high costs while a more automobile-like technology would have attracted more riders.

Webber, MM ; California University, Berkeley Monograph No. 26, Oct. 1976, 40 pp; ORDER FROM: Institute of Transportation Research, 416 McLaughlin Hall, University of California, Berkeley, California, 94720

42 142925 AN ASSESSMENT OF COMMUNITY PLANNING FOR MASS TRANSIT. Contents: v.1. Summary.--v.2. Atlanta case study.--v.3. Boston case study.--v.4. Chicago case study.--v.5. Denver case study.--v.6. Los Angeles case study.--v.7. Minneapolis-St. Paul case study.--v.8. San Francisco case study.--v.9. Seattle case study.--v.10. Washington, D.C. case study. Skidmore, Owings and Merrill, System Design Concepts, Incorporated OTA-T-16--T-25, 1976, Figs., Photos., Refs.; 12 volumes prepared for the Senate Committee on Appropriations Transportation Subcommittee. Volume 11, Technical Report (OTA-26), and Volume 12, Bibliography (OTA-T-27), are available from NTIS.; Contract; ACKNOWLEDGMENT: Office of Technology Assessment, U.S. Congress; ORDER FROM: GPO, NTIS; GPO Item 1070

42 142929 URBAN TRAVEL DEMAND MODELS WITH COMPETITIVE MODES. The principle of microeconomics and consumer demand theory are utilized to form the mathematical structure of urban travel demand models. Competition between the automobile and four different public transportation mode options is considered. The automobile, which competes with one of the public transport options in a transit corridor, is assumed to make up a competitive mode model system. A stepwise linear regression procedure has been used to calibrate and test statistical significance of each competitive mode model system. A sensitivity analysis has been performed to evaluate the effect of multicollinearity upon model parameter estimates. A calibration procedure that insures the model estimates are statistically valid and consistent is presented. An investigation of the Boston metropolitan area is used in a case study.

Ossenbrugger, PJ Li, A *ASCE Journal of Transportation Engineering* Proceeding Vol. 102 No. TE3, Paper 12314, Aug. 1976, pp 585-598; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL

42 142938 A TIME-SERIES ANALYSIS OF THE IMPACT OF MASS COMPETITION ON COMMUTER RAIL RIDERSHIP. Extension of the Chicago Transit Authority Kennedy rapid transit line into the close-in suburban territory served by the Chicago and North Western's Northwest commuter line has been studied. There was an assessment of effects on ridership, an evaluation of the effect of rail fare increases in the presence of a competing mass transit mode, a study of the time interval of the impact and its

geographic range, and an assessment of the impact of the energy crisis on commuter rail usage. This paper gives the background, the methods of study and analysis, and the results with their policy and planning significance.

Johnson, C Burrows, B Heramb, C Kunze, RC (Illinois University, Chicago) Sen, AK ; Cross (Richard B) Company Proceeding 1976, pp 211-20, Figs.; Seventeenth Annual Meeting of the Transportation Research Forum, Beyond the Bicentennial: The Transportation Challenge, held in Boston, Massachusetts, October 28-30, 1976.; ORDER FROM: Vietsch (Grant C), P.O. Box 405, Oxford, Indiana, 47971

42 143047 MACROANALYSIS OF THE IMPLICATIONS OF MAJOR MODAL SHIFTS IN INTEGRATED REGIONAL TRANSPORTATION NETWORKS. PHASE I. The report describes a macroanalytic approach to the problem of analyzing changing travel patterns in an integrated regionwide transportation network. Separate models of residential areas, transportation corridors, and central business districts are combined in a modular representation of urban structure suitable for use in policy analysis and transportation planning. This analytic approach treats demand parametrically, has minimal data requirements, and provides rapid insights into the impacts of alternative patterns of transit and automobile usage. Such impacts as travel time, user costs, congestion, and energy consumption are examined explicitly. Application examples discuss the potential economies of scale available from major shifts in current transit usage patterns, tradeoffs between flexible-route and fixed-route systems, and the potential benefits available from policies to reduce the effects of demand peaking.

Billheimer, JW Bullemer, R Holoszy, M ; Systan, Incorporated, Department of Transportation Final Rpt. Systan-D147, DOT/TST-76-65, Apr. 1976, 225 pp; See also PB-254923 and PB-256137.; Contract DOT-OS-50265; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256136/3ST, DOTL NTIS

42 143048 MACROANALYSIS OF THE IMPLICATIONS OF MAJOR MODAL SHIFTS IN INTEGRATED REGIONAL TRANSPORTATION NETWORKS. PHASE I: APPENDICES. Contents: Cost factors (Physical characteristics, capital costs, private auto operating and maintenance costs, private auto parking costs, public transit operating and maintenance costs, allocation of total daily transit system costs between peak and off-peak); Performance factors (Fuel consumption factors, air pollution factors).

Billheimer, JW Bullemer, R Holoszy, M ; Systan, Incorporated, Department of Transportation Final Rpt. Systan-D147-App, DOT/TST-76-66, Apr. 1976, 115 pp; See also PB-256136.; Contract DOT-OS-50265; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256137/1ST, DOTL NTIS

42 143216 URBAN DENSITIES FOR PUBLIC TRANSPORTATION. The report develops relationships to show the suitability of different urban density arrangements to eight modes of public transportation: the taxicab, dial-a-bus, local bus, express bus, light rail, light guideway transit, rapid transit and commuter rail. Differences in transit ridership among urban areas are largely

explained by areawide density, downtown size measured in nonresidential floorspace and the existence of rail transit. Operating and capital costs of the eight modes are examined. At any particular residential density, the demand level will vary depending on the area's distance from a non-resident concentration, and on the size and character of that concentration. For a minimum cost per passenger, downtowns of about 10, 15, and 35 million square feet of non-residential floorspace provide minimum, intermediate, and frequent service, respectively. Express buses to which passengers walk must be confined to large cities, and can only operate at very low frequencies. Park-and-ride express bus service can provide low and intermediate service frequencies to downtowns in the 20 to 50 million square foot range or larger. Light rail is promising for downtowns in the 35 to 50 million square foot range. The present generation of automated light guideway transit is limited to special applications, not to line haul use with its high peaks. Rapid transit to a downtown of 50 million square feet of total non-residential floor-space appears to be possible, if favorable construction conditions exist. Residential densities as low as 1 to 2 dwellings per acre can support commuter rail if the route connects to a very large downtown.

Pushkarev, BS Zupan, JM ; Tri-State Regional Planning Commission, Urban Mass Transportation Administration, (UMTA-IT-09-0023) Final Rpt. UMTA-IT-09-0023-76-1, May 1976, 318 pp; Contract IT-09-0023/31; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-256636/2ST, DOTL NTIS

42 143364 A PUBLIC TRANSPORTATION PLAN FOR COLORADO'S REGIONAL TRANSPORTATION DISTRICT. The report describes the recommended public transportation plan for a seven-county regional transportation district. It is a report of three years of activity which led to the recommendation of the public transportation system RTD believes will best meet the needs of the District. Within this time period studies were conducted on the region's specific transportation needs. RTD identified the transportation services which would satisfy those needs most efficiently. The proposed transit system was further tailored to the region as services were applied. Next, RTD examined what would be involved in implementing the system. Finally, RTD studied methods of financing a transportation system for the District.

McMahan, JW Roberts, WH Eager, WR ; DRA/WMRT, Colo.*DRA/WMRT, Denver, Colo. Summ Rpt. Mar. 1973, 79 pp; Prepared by DRA/WMRT, Denver, Colo. Errata sheet inserted.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255237/OST

42 143765 PLANNING AND PROGRAMMING FOR TRANSPORTATION. The papers in this Record include (a) an analysis of near-term transportation alternatives for the Los Angeles region that uses the policy-oriented urban transportation model developed by the Rand Corporation; (b) a presentation of some of the long-range transportation planning alternatives for Saigon and some of the problems associated with applying the U.S. Department of Transportation planning packages in a remote location; (c) a description of a new interactive programming system for transportation planning; (d) a discus-

sion of the development of a procedure for using the goal-programming technique, a modification and extension of linear programming, to evaluate urban transit systems for meeting the transportation-related goals of a community; and (e) a discussion of how the linear-programming formulation is a valuable extension of current methods of cost-benefit analysis for highway improvements.

Mikolowsky, WT ; Transportation Research Board, Washington, D.C. TRB/TRR-574, 1976, 62p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255637/1ST

42 143928 COMPREHENSIVE TRANSIT STUDY. THE UNIVERSITY OF SOUTH CAROLINA. The purpose of the study is to formulate and evaluate alternative transportation concepts which would provide internal circulation within the University of South Carolina (in Columbia) complex. Such a system would serve both university and non-university persons. The planning efforts made in the study relate to overall transportation system planning for the Columbia area. Demographic information, coupled with interviews of students, faculty, and staff, provided descriptive measures of the university population. A recommended plan was developed which encouraged a pedestrian environment for the campus area integrated with highway improvements and key fringe parking facilities. Access to parking areas and circulation within the campus is to be provided initially by mini-buses, eventually, as long-range demand criteria are satisfied, automated Personal Rapid Transit systems are recommended. Interface with the surrounding community and its transportation facilities, existing as well as planned, is accomplished at all levels of development.

Central Midlands Regional Planning Council, Urban Mass Transportation Administration, (UMTA-SC-09-0002) UMTA-SC-09-0002-74-1, 1974, 165 pp; Prepared by Smith (Wilbur) and Associates, Columbia, S.C.; Contract SC-09-0002; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-256833/5ST

42 144015 THEORY BACKGROUND FOR STUDY OF BART'S IMPACTS ON HUMAN PERCEPTION AND RESPONSE. This paper relating to BART impacts provides a review of behavioral science literature relevant to human perception and response. It outlines a possible strategy for the use of behavioral science theory: a conceptual model of the impact process is suggested which includes the element of human response and its determinants. An extensive bibliography is also included.

Carp, FM ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Gruen Associates, Incorporated, De Leuw, Cather and Company Work Paper DOT-BIP-WP-23-4-76, Mar. 1976, 62 pp; Prepared in cooperation with Gruen Associates, Los Angeles, Calif. and De Leuw, Cather and Co., San Francisco, Calif. Report on BART Impact Program.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258368/OST, DOTL NTIS

42 144021 BART IMPACT PROGRAM: ANALYSIS OF PRE-BART URBAN RESIDENTIAL ENVIRONMENT SURVEY. This report presents an analysis of a 1972 home

interview survey of 2,541 persons living near BART, after most of the system's construction but before its operation. Most of the survey dealt with anticipated rather than actual impacts, although perceived impacts of the system's construction were included. The analysis emphasized tests of the significance of relationships between perceived (or anticipated) BART environmental impacts and hypothesized determinants of those perceptions including specific characteristics of BART, its physical setting, and the respondents themselves. Results of the analysis included the finding that most residents had very favorable attitudes and expectations regarding BART's effects on them. Variations in these responses tended to be related mainly to the respondent's distance from BART and his or her plans to make use of the system.

Metropolitan Transportation Commission, De Leuw, Cather and Company, Department of Housing and Urban Development, Department of Transportation Work Paper DOT-BIP-WP-24-4-76, Mar. 1976, 63 pp; Prepared in cooperation with DeLeuw, Cather and Co. and Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258379/7ST, DOTL NTIS

42 144053 URBAN TRANSPORTATION PLANNING IN DEVELOPING COUNTRIES. A LIST OF SELECTED REFERENCES. This bibliography presents research citations in 3 major areas: transportation and development, urban transportation planning, and transportation information. The research references given here relate to work dealing with transport at national and regional scales, sometimes in relation to metropolitan planning and urbanization in a global sense. Urban and metropolitan transport studies are categorized under topical headings: transport problem perception; planning process; travel characteristics, analysis, model building; transport technologies (vehicles, energy, infrastructures); traffic engineering and management; transport economics; impact-social and environmental; evaluation-decision making process; transport institutions- national and international financing; and selected major urban transportation planning studies. References are also given which relate to periodical, bibliographic and statistical information sources.

Gakenheimer, RA (Massachusetts Institute of Technology) Bovy, PH (Swiss Federal Institute of Technology) ; California University, Berkeley Biblio. Lib. Ref. 41, June 1975, 24 pp

42 144136 TRANSPORTATION SYSTEMS MANAGEMENT: BIBLIOGRAPHY OF TECHNICAL REPORTS. This document is a bibliography of readily obtainable technical reports on operational transportation improvements. It was prepared to assist in the development of Transportation System Management (TSM) plans as required by the Urban Mass Transportation Administration/Federal Highway Administration urban transportation planning regulations that were issued in Fall 1975, and in the implementation of TSM improvements. (TSM plans are intended to document the local strategy for improving air quality, conserving energy, and improving transportation efficiency and mobility through management of the

existing transportation system.) Descriptions and availability information on over 150 reports dealing with low-capital, short-range, or policy oriented urban transportation improvements are included and classified into 9 sections. The first, General, includes transportation management overviews, survey reports on the various operational approaches and strategies for improved transportation efficiency, and demonstration program reports. The remaining sections contain more focused reports in the following areas: Preferential Treatment for High Occupancy Vehicles, Traffic Operations, Parking Management, Transit Improvements, Transit Management, Pooling and Paratransit, Pedestrians and Bicycles, and Transportation Demand Management.

Oram, RL ; Urban Mass Transportation Administration, (UPP-L) Final Rpt. UMTA-UPP-L-76-1, May 1976, 149 pp; Sponsored by Department of Transportation, Federal Highway Administration and Urban Mass Transportation Administration.; UPP-L; ACKNOWLEDGMENT: Federal Highway Administration; NTIS; ORDER FROM: NTIS; PB-257273/AS

42 144261 THE GENERATION ANALYSIS PROCEDURES. The primary objective of the study performed by the RTAC Trip Generation Project Committee was to provide a concise summary of the trip generation information developed during the course of the many urban transport planning studies completed in Canada during the past decade. The Committee has chosen to include in this report a review of multiple linear regression analysis techniques and their application in trip generation studies.

Roads and Transportation Association of Canada Apr. 1976, 76 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

42 144349 LIMITATIONS OF PUBLIC TRANSIT IN MEETING URBAN TRANSPORTATION NEEDS. This paper outlines the nature of public transit, the response of the demand for transit to operating policies and presents a set of policy guidelines of use with transit. The author presents the theory that transit should be designed to provide a basic level of mobility in a city and where economically viable, provide for the mass movement of people. The role of transit should not be to get the people out of their automobiles.

Shortreed, JH (Waterloo University, Canada) ; Roads and Transportation Association of Canada Proceeding 1976, pp 221-239, 6 Fig., 3 Tab., 10 Ref.; This paper was published as part of the Proceedings of the 1975 Annual Conference of the Roads and Transportation Association of Canada, held in Calgary.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

42 145326 ALTERNATIVE SAMPLING PROCEDURES FOR CALIBRATING DISAGGREGATE CHOICE MODELS. In this paper, three sampling techniques for calibrating disaggregate travel demand models are considered: random, stratified, and choice-based sampling. In a random sample, the probability of all members of the population being in the sample is equal; in a stratified sample, the population is divided into groups based on one or more characteristics and each group is sampled randomly but at different rates; and in a choice-based sample, the number

in the sample selecting each alternative is predetermined, i.e., the sample is based on the outcome of a behavioral choice process. Existing disaggregate choice calibration methods yield consistent parameter estimates for random and stratified sampling techniques. Although maximum likelihood estimation for the third technique is extremely complex, an alternative, tractable estimator whose estimates are both consistent and asymptotically normal exists. This new estimation technique can be applied by using existing capabilities in ULOGIT or other multinomial logit estimation programs with only minor revisions. This implies that choice-based samples such as on-board surveys and roadside interviews can now be used for disaggregate model calibration. This should substantially reduce the cost of data collection in disaggregate model development. In addition, it opens an entire range of questions regarding the most appropriate sample design for future data collection efforts oriented toward the development of disaggregate choice models for urban travel demand forecasting. /Author/

Lerman, SR (Massachusetts Institute of Technology) Manski, CF (Carnegie-Mellon University) *Transportation Research Record* No. 592, 1976, pp 24-28, 7 Ref.; ORDER FROM: TRB Publications Off

42 145531 URBAN TRANSPORTATION DECISION MAKING. SUMMARY. The report is one in a series encompassing ten monographs and a summary. Together they describe the transportation decision process in a number of major cities in the U.S., Canada and Western Europe, and interpret this information in such a way as to derive observations and conclusions useful in the identification of progressive transportation decision-making institutions. The monographs contain largely descriptive information and cover the following cities: United States: Atlanta, Minneapolis/St. Paul, Miami/Dade County, Seattle; Canada: Toronto, Montreal; Europe: Hamburg, Manchester and Leeds, Stockholm and Gothenburg, Amsterdam. Interpretive and analytical information is confined largely to the Summary and Conclusion volume.

Colcord, FC ; Tufts University, Office of Policy, Plans and International Affairs Final Rpt. OST-TPI-76-02-01, Sept. 1974, 187 pp; See also PB-257996.; Contract DOT-OS-30036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257995/1ST, DOTL NTIS

42 145532 URBAN TRANSPORTATION DECISION MAKING: 4. MIAMI-DADE COUNTY: A CASE STUDY. The report is one in a series encompassing ten monographs and a summary. Together they describe the transportation decision process in a number of major cities in the U.S., Canada and Western Europe, and interpret this information in such a way as to derive observations and conclusions useful in the identification of progressive transportation decision-making institutions. This monograph contains a transportation study of Miami, Florida.

Colcord, FC Polan, SM ; Tufts University, Office of Policy, Plans and International Affairs Final Rpt. OST-TPI-76-02-02, July 1973, 80 pp, 2 App.; See also PB-257997.; Contract DOT-OS-30036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257996/9ST, DOTL NTIS

42 145533 URBAN TRANSPORTATION DECISION MAKING: 5. ATLANTA. A CASE STUDY. The report is one in a series encompassing ten monographs and a summary. Together they describe the transportation decision process in a number of major cities in the U.S., Canada and Western Europe, and interpret this information in such a way as to derive observations and conclusions useful in the identification of progressive transportation decision-making institutions. This monograph contains a transportation study of Atlanta, Georgia.

Colcord, FC Polan, SM ; Tufts University, Office of Policy, Plans and International Affairs Final Rpt. OST-TPI-76-02-03, July 1973, 64 pp, Figs., 2 App.; See also PB-257998.; Contract DOT-OS-30036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257997.7ST, DOTL NTIS

42 145534 URBAN TRANSPORTATION DECISION MAKING: 6. MINNEAPOLIS, ST. PAUL. A CASE STUDY. The report is one in a series encompassing ten monographs and a summary. Together they describe the transportation decision process in a number of major cities in the U.S., Canada and Western Europe, and interpret this information in such a way as to derive observations and conclusions useful in the identification of progressive transportation decision-making institutions. This monograph contains a transportation study of the twin cities, Minneapolis-St. Paul.

Colcord, FC Polan, SM ; Tufts University, Office of Policy, Plans and International Affairs Final Rpt. OST-TPI-76-02-04, July 1973, 58 pp, Figs., 2 App.; See also PB-257999.; Contract DOT-OS-30036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257998/5ST, DOTL NTIS

42 145535 URBAN TRANSPORTATION DECISION MAKING: 9. TORONTO. A CASE STUDY. The report is one in a series encompassing ten monographs and a summary. Together they describe the transportation decision process in a number of major cities in the U.S., Canada and Western Europe, and interpret this information in such a way as to derive observations and conclusions useful in the identification of progressive transportation decision-making institutions. This monograph contains a transportation study of Toronto, Canada.

Colcord, FC Lewis, RS ; Tufts University, Office of Policy, Plans and International Affairs Final Rpt. OST-TPI-76-02-07, Mar. 1974, 122 pp; See also PB-258000.; Contract DOT-OS-30036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-257999/3ST, DOTL NTIS

42 145624 TRANSPORTATION NEEDS SUMMARY. A REPORT OF THE TRANSPORTATION TASK FORCE OF THE URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES. The report contains the results of the extensive needs identification and screening process conducted by the member cities and counties of the Urban Consortium for Technology Initiatives. Chapter I provides an overview of this unique needs identification process used by the Consortium. While the needs selection process provided the basis for forming the Task Forces for all nine need areas, this report focuses on the work of the Transportation Task Force. The process by which the Transportation Task Force screened the original 94 transportation

needs identified by the Consortium members to its top 10 priority needs is described. Chapter I also contains a status report on Consortium work in four of the top priority need areas.

Public Technology Incorporated, Department of Transportation DOT/TST-76T-15, Sept. 1976, 42 pp; (PC A03/MF A01); Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258872/1ST

42 146290 NEW APPROACHES TO TRAVEL FORECASTING [Transportation research record]. Contents: Transit sketch planning procedures; Approaches to travel behavior research; Disaggregate behavioral model of automobile ownership; Theory of urban-household automobile-ownership decisions; Time-stability analysis of trip-generation and predistribution modal-choice models; A synthesized trip-forecasting model for small-and medium-sized urban areas; Development of a simulation model for regional recreational travel; Disaggregate multimodal model for work trips in the Netherlands; Structural travel demand models—an intercity application; Joint-choice model for frequency, destination, and travel mode for shopping trips.

Difiglio, C Reed, MFJ; Transportation Research Board, Washington, D.C. TRB/TRR-569, 1976, 161p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256975/4ST

42 146291 INNOVATIONS IN TRANSPORTATION SYSTEM PLANNING. The seven papers focus on various aspects of transportation planning ranging from state and regional planning to metropolitan and subcommunity planning. They include (a) review of the metropolitan transportation planning process of the 1960s; (b) discussion of the community aggregate planning model; (c) discussion of circulation simulation model to be used in a heuristic method of evaluating and selecting from alternative transit designs; (d) presentation of a conceptual approach to formulate a more comprehensive program for studying and improving trails for park and recreational areas; (e) discussion of the purposes and objectives of the Regional Rail Reorganization Act of 1973; (f) a report on the progress being made in developing a regional simulation model that is interactive and linked with employment, population, land use, and transportation components; and (g) discussion of experience in Wisconsin as it relates to state-regional transportation planning.

Hansen, WG; Transportation Research Board, Washington, D.C. TRB/TRR-582, ISBN-0-309-02496-X, 1976, 94p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256972/1ST

42 146489 TRANSPORTATION TECHNICAL ASSISTANCE NEEDS AND REQUIREMENTS ANALYSIS. As part of the continuing reevaluation of the priorities of transportation decision-makers, the Office of R and D Policy (OST) has undertaken a study to determine the transportation technical assistance needs of the various user groups in the infrastructure. This determination was based on four independent studies: (1) TSC Technology Sharing surveys, (2) the report of the OMB Study Committee on Policy Management Assistance, (3) Urban Consortium for Technology Initiatives needs determination, and (4) the National Conference of State

Legislatures survey. The analysis of these needs determinations was stratified to identify those needs peculiar to each of three user groups: (1) policy, (2) planning and evaluation, and (3) operations. The relationship of the needs to both the public management processes and Federal transportation policy are presented.

Albin, PA DiLuzio, RG; Dynatrend, Incorporated, Department of Transportation Final rpt. DYN-UR-003, DOT/TST-76T-14, Sept. 1976, 37 pp; Contract DOT-OS-60500; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259680/7ST, DOTL NTIS

42 147504 THE INFORMATION NEEDS OF RESEARCH IN TRANSPORT PLANNING.

This review concentrates on passenger transport in urban areas. Systems described and illustrated include high speed (10 mph) pedestrian conveyors; automatic tracked vehicle systems, offering a local network service and a more extended corridor service; rapid transit systems; and finally inter-city traffic, including road, rail and air transport. Some guidelines are given regarding the overall assessment of transport systems in terms of their interaction with each other. Economic, social and environmental cost benefit considerations are also considered. /TRRL/

Fitchie, JW (Transport and Road Research Laboratory); Aslib Monograph 1975, pp 6-26, 9 Fig., 1 Tab., 15 Phot.; This article is from a book entitled "New Directions in Transport Sources Information"; ACKNOWLEDGMENT: TRRL (IRRD 221248)

42 148084 DECISION-MAKING WHEN WE CANNOT REDUCE EVERYTHING TO MONEY TERMS.

This paper addresses the problem of selection amongst alternative transportation actions. Typically, these involve planning and environmental side-effects. The consequences of each action have been assessed by evaluation of its effect on a standard list of factors (attribute list), the same for each action. The selection task consists of using the attribute list to determine a 'worth' of total worth obtained subject to the resource and other constraints which limit choice. This paper considers only the problem of worth. "Simple additive weighting" or "linear worth" is described; this consists of multiplying each attribute by a coefficient and adding up, basing preference decisions on the single number so obtained. This convenient method has definite implications for how each factor should be measured. The study finds that whenever cost is one of the factors, rational decision-making will assign a money value to each unit of each factor, through these money values need have little connection with market values.

Murchland, JD (London University, England); Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 371-373; This paper appears in "Urban Traffic Models," which is a publication containing the proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148089 A DISAGGREGATED MODAL CHOICE MODEL FOR THE COPENHAGEN AREA. A PRELIMINARY REPORT.

The development of the mode choice model is schematically illustrated, and the properties of disaggregate stochastic behavioral models are described. Survey data and samples are described

which were designed to obtain a firmer knowledge of the transportation system characteristics relevant to urban transport policies. The preliminary results of the study indicate that inclusion of the overall travel time by car (T_c) and by transit (T_t) in the model should be in the form: $\Delta T = T_c - T_t$. The same result was found concerning the overall travel cost difference $\Delta C = C_c - C_t$. These results lead to a value of time of 12.83 Danish Kroner/hour from 6 different models with a standard deviation of 1.80 D.Kr./h.

Schiotz, O (Denmark Technical University); Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 56-63, 2 Tab., 14 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148090 A MARKOVIAN APPROACH TO MODE AND ROUTE SPLIT.

Research is discussed which was designed to determine the size of the park and ride facility that should be constructed adjacent to the station of a new high speed mass transit, tracked air cushion vehicle (ATCV). It was found that binary modal-split procedures were inappropriate, as there were at least 3 competing modes: car, train, and TACV. Ten "channels" were considered, 4 of which were exclusively car-based, 4 of which involved the use of park and ride, and 3 were based upon bus and ride. A model of general formulation involving mode and route split was considered. Details are given of the Markovian process. The computations require information on the transition probabilities which are a result of the subjective estimation by individuals of the attributes of the different alternatives.

Roulet, J; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 64-75, 7 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148092 A THEORY OF URBAN ACCESSIBILITY: A NEW WORKING TOOL FOR THE URBAN PLANNER.

The opportunities opened up in the field of urban transport planning by research relating urban accessibility are analyzed and discussed. The estimation of the level of service provided by a urban system is discussed, and the problems associated with the use of conventional economic indicators to reflect transport conditions are noted. The microeconomic model of users' behavior in the theory of accessibility is described. Accessibility to employment opportunities and accessibility for non-work trips are detailed, and applications to planning criteria are reviewed. Applied to urban planning, the economic theory of accessibility enables an estimate to be made of the likely impact upon the service provided to the population by the various transportation networks. The theory provides a key to traffic predictive models, as well as paves the way for fundamental research into the analysis of urban development trends and the effects upon land use which may be induced by decisions taken within the field of transport. Figures are presented which illustrate the behavioral assumption concerning the choice of destination, and the probability distribution of gross utility.

Joening, JG (SETRA, France) ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 99-147, 8 Fig.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148093 ACCESSIBILITY: A MULTI-ROLE PARAMETER IN THE PLANNING PROCESS. Transportation quality describing the space-time system, is re-influenced by the space-time system itself. Its complex form may be explained by various closed loops. Indicators, such as accessibility, opportunity for communication at some location, availability of means of transport: all these are figures to describe the quality of transport as a space-time determinant, and they may be used as evaluation criteria in a decision process. The advantage of location (as a level of communication) influences degressively the socio-economic production (the standard of living) of regions. Besides, in regions with a socio-economic production above the average, already small steps in infrastructural programs let expect outstanding rates of growth in their socio-economic production. /Author/

Ruske, IW (Institut fur Stadtbauwesen) ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 148-170, 9 Fig., 8 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148100 CALIBRATION OF MODAL SPLIT MODELS. The details are given of the formulation and calibration of modal split models (which may be used to predict the proportions of travellers who will use each of a given set of modes for given journeys (in the urban transportation context) in an effort to set these models on a sound logical and statistical basis, so that the effect of any necessary assumptions can clearly be seen. The paper discusses the hypotheses of traveller behavior which enable the setting up of modal choice models, and describes the techniques for validating the hypotheses and estimating the parameters of the models. The application of these models to urban transportation planning is outlined. The paper also indicates how the modelling and calibration techniques can be extended to other aspects of the planning process such as trip distribution and route choice.

Daly, AJ Zachary, S ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 236-245, 4 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148103 COMMUTER MODE CHOICE IN DUBLIN. Socio-economic as well as journey characteristics were found to explain commuter mode choice behaviour in Dublin. City-wide choices were adequately modelled by the five variables: (a) excess time associated with the bus or train, (b) the walking time of the car mode, (c) the age of the choice commuter, (d) the demands of the home on the car and (e) whether the car is employer owned or not. The coefficients in this

model were shown to be reasonably stable over time. A number of important recommendations are made on the methodological approach to modal choice models and planning generally. /Author/

Markham, J (Coras Iompair Eireann, Dublin) ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 273-294, 6 Tab., 16 Ref., 4 App.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148105 PASSENGER DEMAND RESEARCH IN LONDON TRANSPORT. Areas demanding further research are considered, the results of partial statistical analysis are briefly reviewed, and the development of a model which incorporates the comprehensive transportation study approach and the results of statistical analysis is outlined. This model will contain behaviorally plausible relationships based on transportation planning theory; segment passenger journeys into a number of market categories; and be comprehensive i.e. include trips made by all modes. The basic data source being used to estimate trip patterns and model market shares is the Greater London Transportation Survey 1971/2.

Fairhurst, MH (London Transport Executive) ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 316-332, 3 Fig., 6 Ref., 1 App.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England During July, 1975.

42 148106 MODELING THE WALK MODE. This description of how the walk mode is incorporated in the LGORU public transport modelling suite TRANSEPT (a sequence of models designed for short and medium term bus planning), includes a discussion of the relationship between bus and walk modes and an outline of the problems of scale that make walk modelling difficult. Some methods of estimating walk times are sketched, and theoretical problems involved in the incorporation of the walk mode in the modal split model are explored. The formulation of TRANSEPT's bus network representation is outlined in order to demonstrate how the role of walking as a feeder to bus services can be modelled. TRANSEPT models its modal split model so that predicted traveller's behaviour takes account of the availability of the walk alternative. The basis of the formulation is the generalized cost function which weights together the diverse characteristics of travel alternatives particularly the component times and costs of different parts of the journey. With this measure a comparison of the relative attractiveness of the alternatives available can be carried out which ultimately leads to a prediction of the number of travellers using each.

Last, A Daly, AJ ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 333-340, 11 Ref.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148108 VARIATIONS IN TRAVEL BETWEEN INDIVIDUALS LIVING IN AREAS OF DIFFERENT POPULATION DENSITY. Analysis of data from the National Travel Survey 1972-3 indicates that as population density increases, (a) the total number of stages per person remains constant; (b) the average stage distance is less; (c) travel is slower; (d) the use of private transport decreases the effects combine in such a way that; (e) the average time taken per stage for each mode separately and in total is approximately constant; (f) the total amount of time spent on all travel per person is approximately constant. A mathematical model based on fairly simple economic principles is discussed, and although this is not yet fully compatible with the empirical findings, it seems to offer a possibly useful approach. /Author/

Goodwin, PB (Greater London Council) ; Planning and Transport Res and Computation Co Ltd P122, July 1975, pp 256-370, 10 Fig., 1 Tab., 5 Ref., 1 App.; This paper appears in "Urban Traffic Models", which is a publication containing the Proceedings of Seminar N of the Summer Annual Meeting at University of Warwick, England during July, 1975.

42 148129 THE POTENTIAL FOR PUBLIC TRANSIT IN THE COMMUTER-SHED AREAS OF EDMONTON AND CALGARY. This paper reports on the project for a commuter-shed for Edmonton and Calgary. It includes a discussion of the existing commuter system, commuter transit costs and revenues, and commuter services. This report emphasizes the need for a multi-modal approach to transportation planning in commuter-shed areas and lists 9 conclusions as a result of the project.

Brander, B (Stanley Associates Engineers, Limited) Morrall, J (Calgary University, Canada) ; Roads and Transportation Association of Canada Proceeding Report Number 7, Sept. 1975, pp 81-103, 6 Fig., 12 Tab., 10 Ref.; This paper was presented at the Annual Conference held in Calgary, 1975.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

42 148137 THE NORTH PICKERING PROJECT: TRANSIT STUDIES. This report documents the examination of the role for public transit services with in the North Pickering Project. A large part of the analysis has focused on the development of a transit system to serve 75,000 population. However, the review was expanded to consider guidelines for public transportation if at some future time the Community were to grow beyond that target. Guidelines are given for the initial implementation and staging of transit services in the Community. The analysis incorporates specific assumptions related to the type and location of the regional transit system. The report concludes by outlining the possible consequences of other regional transit scenarios on the internal community structure and the local transit system. /RTAC/

Ontario Ministry of Housing Sept. 1975, 31 pp, 7 Fig., 5 Tab.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

42 148221 MAINTAINING MOBILITY. This comprehensive updating of the "Tri-State Transportation 1985: an interim plan" published in 1966, incorporates some preliminary results of intercity rail freight and passenger planning. The

plan is the result of a unified work program dealing with the technical elements of transportation planning and supplemented by a transportation improvement program. The development of the plan and its elements is illustrated by tabulations, and the degree of attainment of the planning objectives is measured by certain criteria shown in the tables. The plan prescribes particular levels of achievement by specific target dates. The current status of the regional transportation components is described, and priority and future projects which achieve the desired objectives are listed. The capital investments are listed, and the operation and maintenance costs are summarized. The combined highway and transit plan yields financial requirements that are compared with available resources.

Tri-State Regional Planning Commission Sept. 1975, 47 pp, Figs.; Second printing in black and white only, March, 1976.

42 148238 TRANSPLAN 76: INITIAL IOWA TRANSPORTATION PLAN. This plan which stresses the roles played by the public and private sectors in providing transportation services is presented in seven sections which cover: statewide transportation planning, the Iowa Transportation Policy, modes, needs, resources and programming, critical issues, and public investment in transportation. Iowa has been using a needs study approach for more than 15 years as its basic highway planning tool. The Iowa Transportation Plan is concerned with the socio economic and environmental consequences of transportation investments as well as decisions on types and timing of investments and funding sources. Iowa's transportation policy supports the establishment of an adequate and safe multimodal transportation system. Air, waterway, rail, transit, road and pipe transit modes are considered, and financial needs and resources are discussed. Passenger and freight modes and planning values related to energy intensiveness are discussed, and freight and passenger cost characteristics are noted.

Iowa Department of Transportation Mar. 1976, 274 pp, 82 Fig., 67 Tab., 6 Ref.; ORDER FROM: Iowa Department of Transportation, Planning and Research Division, Des Moines, Iowa, 50319

42 148722 SHORT-RANGE TRANSIT DEVELOPMENT PROGRAM FOR THE WASHINGTON METROPOLITAN AREA. The Short Range Transit Development Program's purposes and objectives are detailed in this report. The recommendations include bus expansion and modernization, data collection, public information, bus priority lanes and streets, fringe parking facilities, dial-a-ride systems, commuter rail service, car and bus pool programs, bikeways, staggered work hours, and metro rapid rail construction. /GMRL/

Metropolitan Washington Council of Governments Mar. 1974, 75 pp; ACKNOWLEDGMENT:

42 148726 NEW DIRECTIONS IN URBAN TRANSPORTATION PLANNING. This report proposes some important changes in the way transportation planning takes place. It describes the sources of current concerns and pressures for reexamination and discusses the inadequacies of the present transportation planning system. From this assessment comes a wide-ranging set of

recommendations for rebuilding the structure of transportation planning and its techniques, methods, and relationships with other planning efforts, in order to achieve a transportation system in harmony with today's urban needs. /GMRL/

Engelen, RE Stuart, DG ; American Society of Planning Officials ASPO Rpt. No. 303, June 1974, 40 pp; ACKNOWLEDGMENT:

42 148876 AN ALTERNATIVES ANALYSIS OF THE ROCK ISLAND COMMUTER RAIL SERVICE. This case-study of a major alternative analysis evaluation presents, in a more general perspective, an empirical analysis of the trade-offs between commuter rail and bus service. A series of alternative services were developed, ranging from complete rehabilitation to partial rehabilitation to total replacement of the Commuter Railroad by bus service. The alternatives were evaluated in terms of capital cost, operating deficit, user cost, social impact, environmental impact and operational feasibility. Based on these criteria, the report recommends a complete rehabilitation of the railroad, and a changing of the railroads downtown terminal. The report shows that no type of bus service (feeder to rapid transit, feeder to other commuter rail lines or express to the downtown) in this corridor can achieve the efficiencies that are associated with a rebuilt Rock Island Railroad.

Permut, H ; Northeastern Illinois Regional Transportation Auth Tech. Rpt. Rpt. No TR-76-09, June 1976, 76 pp, Figs., 7 App.

42 148880 RESPONSES TO ALTERNATIVES ANALYSIS REQUIREMENTS. The federal policy for alternatives analysis of major public transportation investments sets forth five principles which, based on experiences in Buffalo and San Juan, are not easily fulfilled when the planning process is entered in midstream with stringent time requirement for completion. It is felt that until the UMTA guidelines for alternatives analysis are well defined, well understood and applied to planning projects from the outset, a difficult adjustment period must inevitably take place. The guidelines were developed, in part, to put rapid transit proposals from different urban areas in a more consistent analysis basis. However, Buffalo and San Juan studies suggest that, to do this on even a limited basis, extreme care will be required to ensure that qualitative factors which are not easily compared are not ignored or deemphasized; and with wholly consistent assumptions representing similar levels of uncertainty.

Deen, TB Skinner, RE, Jr (Voorhees (Alan M) and Associates, Incorporated) *Transit Journal* Vol. 2 No. 4, Nov. 1976, pp 53-71, 1 Fig., 4 Tab., 2 Phot.

42 149070 PLANNING FOR PUBLIC TRANSPORT. The book is intended to provide a basic textbook on the subject of public transport planning with the British system taken as the context. The subject is discussed in the following chapters:-(1) Organization and Control, (2) The Role of Public Transport, (3) Bus and Coach Systems, (4) Rail and Rapid Transit System Design, (5) Urban Network Planning, (6) Pricing and Costing, (7) Rural Transport Planning, (8) Intercity Public Transport, (9) Policy in the Short Run, and (10) Policy in the Long Run. /TRRL/ White, PR (Central London Polytechnic) ;

Hutchinson and Company, Limited, (009 126851 6) Monograph 1976, 224 pp, Figs., Tabs., 12 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRR 223104)

42 149135 PROCEEDINGS 1975-76: CANADIAN URBAN TRANSIT ASSOCIATION. This publication presents ten papers given at the seventy-first meeting of the Canadian Urban Transit Association. These papers concern themselves with urban centers and its many aspects particularly transit areas. The paper includes urban planning, public transit commissions, study on better urban transport modes, transit operations and the need for further innovation. /RTAC/

Canadian Urban Transit Association Proceeding June 1976, 62 pp; Proceedings, Western Association of Canadian Highway Officials.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

42 149143 THE CITY OF EDMONTON TRANSPORTATION PLAN. PART I. Part I of the transportation plan deals with the roadway system and is a general overview of the system including a plan of the entire transportation network. The basic principle behind this Plan is to make various additional improvements throughout the existing system, to accommodate immediate demands, and in the future to concentrate the emphasis on developing the public transit component to carry a substantially greater proportion of total personal trips throughout the city. /RTAC/

Edmonton, City of, Canada Feb. 1974, 64 pp, Figs., Tabs.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

42 149155 LEA TRANSIT COMPENDIUM (LTC). One comprehensive reference source has been compiled which reports the latest international developments in transit technology via a standard format, using consistent terminology and definitions. The LTC covers the entire spectrum of urban public transportation, including new technology and conventional proven systems and equipment. There are 9 issues per volume plus 2 special issues for 1976-77. No. 1, Reference Guide, gives a description of the Compendium service, short history of transit technology, a classification of transit systems and a guide to the use of the Compendium (definitions, terminology and reporting standards). The other 8 issues report on the following: Moving Way Transit-accelerating moving walkway systems and fixed-guideway systems where passive vehicles move continuously, propelled by mechanical means from the guideway; Group Rapid Transit-automated fixed-guideway systems designed to carry groups of passengers, generally in the intermediate capacity range; Personal Rapid Transit-automated fixed-guideway transit systems which offer on-demand personal (single-party) service; Light Rail Transit (LRT)-operational LRT systems and recent vehicle designs; Heavy Rail Transit-operational conventional urban heavy rail systems, one monorail system, two heavy monorail systems, and vehicles; Bus Transit-various bus system improvement projects, including exclusive bus lanes, express buses, contra-flow bus lanes, exclusive busways, exclusive bus streets, exclusive or bus

priority ramps and automatic vehicle monitoring systems; Para-Transit-various para-transit operations, including Dial-A-Bus, shared taxi, subscription service, jitneys and vanpooling; Roadway Transit Vehicles-small, medium, and large buses and chassis. One special issue will be on Passenger Admission Processing and will report on items of equipment and systems. The Compendium is periodically revised and updated, giving the latest changes and progress on previously reported subjects as well as new material and assessments of the state of the art. Reporting is unbiased and objective, with no preference expressed for particular systems or equipment.

Lea (ND) Transportation Research Corporation 1977

42 149169 EVOLUTION OF URBAN TRANSPORTATION PLANNING. This study traces the evolution of urban transportation planning from the early highway planning activities to the most recent guidelines issued by the Federal government for a joint highway-transit planning process. From this overview, the author concludes that early urban transportation planning processes were structured too rigidly with little flexibility to adapt to changing conditions. The author suggests that the planning processes be more open and receptive to new ideas and should evolve in a manner which would facilitate treating these issues. With the wider range of issues, impacts and alternatives and the greater diversity of participants, considerable effort in the future must be made to develop approaches for addressing these issues and for keeping urban transportation planning a manageable and relevant activity. Weiner, E; Department of Transportation Apr. 1976, 31 pp, 29 Ref.

42 149190 TRANSIT REQUIREMENTS FOR ACHIEVING LARGE REDUCTIONS IN LOS ANGELES AREA AUTOMOBILE TRAVEL. This paper describes the structure and application of a model for estimating aggregate supply characteristics of bus transit systems that are capable of carrying substantial fractions of the person trips in an urban area. Given the number and geographical distribution of trips that must be carried on transit, the model enables a range of transit options for carrying these trips to be developed. Each option is characterized by the number of buses it requires, the geographical area served by transit, the transit schedule frequency, the transit mode split that must be achieved in the transit service area, average transit travel time and cost per trip, and the average travel time and cost that would result if bus travelers used automobiles. The model is applied to Los Angeles, California. The results indicate that large fractions of current person trips in Los Angeles can be carried on bus transit at a cost that is comparable to the cost of automobile travel and with an average travel time that exceeds average automobile travel time by 15 to 20 minutes. However, this requires bus fleets and transit mode splits that are quite large by current standards. For example, to carry 20 percent of person trips at a cost equal to the cost of automobile travel and with an average travel time 17 minutes greater than average automobile travel time, the transit system must have 9500 buses and must achieve a 45 percent mode split in the areas it serves. /Author/

Horowitz, J ;

Environmental Protection Agency EPA/400-11/76-001, Nov. 1976, 71 pp, 19 Fig., 4 Tab., 13 Ref., 3 App.

42 149193 A STUDY OF ALTERNATIVE ORGANIZATIONAL PLANNING STRUCTURES FOR THE SYSTEMS PLANNING PROCESS. This report examines the new role and consequent alternative organizational responses the SDHPT may wish to take relative to the recently established multi-modal metropolitan planning organizations. The goals and objectives of federal, state, and local governments, especially Texas officials, relative to transportation planning organization matters are discussed. The findings of research which has been done on highway system planning are analyzed as they relate to SDHPT systems planning organization. State organization models that are designed to accommodate and facilitate multi-modal, urban transportation planning are also presented and evaluated. Four organizational typologies developed by Roland Warren that characterize ways organizations behave when interacting are used as a framework for identifying different possible interorganizational planning situations that the SDHPT may become involved in when dealing with non-SDHPT MPOs. Within each of the four possible contexts, alternative SDHPT organizational planning arrangements are suggested and shown in chart form. The emphasis is placed on organizational alternatives that can be adopted by the SDHPT, some alternatives, however, require the cooperation of MPOs or local governments. The intent of the suggested alternatives is to provide the SDHPT with maximum input into the MPO planning process within the parameters established by present legislation and regulations. /Author/

Weiss, ME Richardson, S; Texas Transportation Institute, (2-10-75-215-1F) Final Rpt. TTI-2-10-75-215-1F, Aug. 1976, 149 pp, 21 Fig., 1 Tab., Refs.; Sponsored by Texas State Department of Highways and Public Transportation, Transportation Planning Division; work done in cooperation with Department of Transportation, Federal Highway Administration.; Contract 2-10-75-215; ORDER FROM: NTIS

42 149244 INVESTIGATION OF MODAL CHOICE FOR DUAL-MODE TRANSIT. The attitudes of individuals regarding dual-mode transit, personal rapid transit, and people-mover forms of urban transportation were collected through a home-interview survey. It was hypothesized that a more thorough understanding of mode choice could be obtained by stratifying the sample into homogeneous groups rather than by considering the set of respondents collectively. Respondents were grouped according to two alternative criteria: socioeconomic characteristics and preference judgements. A multivariate clustering procedure was used to determine groups. Frequently used variables for defining socioeconomic groups were income, age, education, and race. Of the 12 system attributes, those selected most often to define preference groups were temperature control, automatic control, and vehicle privacy. However, socioeconomic groupings were stratified by a more consistent set of variables than the preference groups. Mode choice was examined through the use of linear additive models. The predictor set for socioeconomic and

preference groupings was composed of mode-dependent satisfaction judgements. These judgments were made with respect to system characteristics such as waiting time, comfort, and accessibility. The variability of mode-choice judgements was accounted for more accurately by models that stratified individuals into homogeneous population segments than by modes that totally disaggregated individuals; this confirms the main hypothesis. Also, it was possible to account for a greater percentage of the mode choices with stratification by socioeconomic characteristics than by preference judgements of respondents. In general, the socioeconomic and preference groups used alternative predictor sets to explain their mode choices. Dual-mode transit was preferred to either personal rapid transit or people movers. /Author/

Costantino, DP Dobson, R Canty, ET (General Motors Corporation) *Transportation Research Board Special Reports* No. 170, 1976, p 67; This paper appears in *Dual Mode Transportation*, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

42 149338 IMPLEMENTATION OF THE 1975 STATEMENT OF NATIONAL TRANSPORTATION POLICY-A PROGRESS REPORT. This report reviews the progress to date in implementing the courses of action recommended in the 1975 Statement of National Transportation Policy. Recommendations are divided into thirteen areas and progress in each area is discussed, including the following: The railroad industry is embarking on a major modernization program. The financial condition of the domestic and international aviation industry appear to be improving. Progress is being made in energy conservation in transportation and in bringing about transportation regulatory reform. Mass transit and highway programs are being streamlined. Consumer participation in the decision making process is being facilitated. Programs continue to be implemented across the various modes of transportation to meet safety and environmental goals.

Office of the Secretary of Transportation Sept. 1976, 23 pp; ACKNOWLEDGMENT: OST; ORDER FROM: GPO

42 149498 STUDY OF THE IMPACT OF STAGGERED WORK HOURS ON PUBLIC TRANSPORTATION COSTS AND SERVICE LEVELS: PHASE I, CHICAGO TRANSIT AUTHORITY. This report gives details of the loading standards, the percentage of passengers staggered, temporal parameters, cost criteria, the data collection and modification, and the calculations employed in this study. Three levels of loadings per vehicle were selected to represent the range of loading applicable to CTA during peak hours. Three staggering assumptions and 3 alternative staggering patterns were evaluated. The methodology involved 3 phases: data collection and modification, i.e., the translation of CTA scheduling data into the form necessary for use in this study; calculations, i.e. the application of percentages of passengers shifted under various loading standards in order to arrive at the difference in the number of vehicles needed; and analysis, the process of translating the differences in vehicles into operating and capital costs and

benefits. It is shown that in all uses of staggering under loading conditions of 70 passengers per bus and 90 passengers per transit car, there is a cost saving for CTA which increases with increased staggering. The 60 passengers per bus and 70 passengers per car are standards which best fulfill the joint objectives of staggered work hours, cost saving and improved level of service.

Zimring, M ; Northeastern Illinois Regional Transit Authority Rept. No. TR-75-05, Dec. 1975, 25 pp, 3 Fig., 7 Tab.

42 149666 METHOD FOR THE ANALYSIS AND APPRAISAL OF TRANSPORT SYSTEMS IN URBAN AREAS [Metod foer analys och bedoemning av transportsystem i taetorter]. Model studies will be made to provide data for the appraisal of future traffic solutions. The planning model should have the structure, problem analysis, goal formulation, proposal of solutions and evaluation of these. In all model towns, a study will be made of the present situation, three alternative long-term changes in the traffic situation, and short-term changes. Assessment of different traffic solutions is to be based on expected effects; many of these depend on expected traffic flows. These are dependent on the assumptions made concerning division into modes, traffic regulation measures, financial measures. Effects may be direct and indirect ones. The most important effects are accessibility, traffic safety, cost, and noise levels. Data for evaluation must be presented in a clear manner. The method recommended is graphical presentation in a factor profile. Some effects can probably be presented in combination which will make for clarity. The factor profiles must be seen from the standpoint of different population groups based on age, employment and health; assessment must also be made from the standpoint of the state, the municipality, public transport undertakings and the business sector. /TRRL/ [Swedish]

Holmberg, B Friberg, G ; Nordisk Ministerraad Sekretariatet Monograph No Date, 220 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (VTIN40001E), TRRL (IRRD-223964)

42 149732 OBJECTIVE OF REGIONAL TRANSPORT TODAY AND ITS NEAR FUTURE [Vocation des transports regionaux aujourd'hui et pour le proche avenir]. The author recalls that regional transport will have to take over parts of the individual transport and freight transport run by other operators if energy savings are to be made, and pollution and congestion are to be prevented. Should individual transport be restricted, regional transport will have to be used for transport of school children and other utilizations. It should therefore be made more attractive (for public transport: quicker and easier journeys, direct itineraries, simplified tariff system, increased service frequency; for freight transport: simplified routing, speeding up of vehicle movements, elasticity of demand, etc.). Emphasis is placed on a closer cooperation between regional and urban transport. To fulfil its aim, regional transport should have technological means at its disposal together with legal arrangements such as reserved corridors for buses, priority for buses leaving a bus stop, activation of traffic signals by buses, etc. The author stresses the importance of cost-effectiveness in public and freight transport,

which could be achieved by imposing tariffs adapted to the market and collective economy. /TRRL/ [French]

Schlagelbauer, V ; International Union of Public Transport Proceeding No. 2, May 1975, 28 pp, 15 Fig., 19 Ref.; 4le congres international de l'UITP, Nice, 1975; ACKNOWLEDGMENT: Road Safety Study and Research Fund, Belgium (IRRD 103559), Central Laboratory of Bridges & Highways, France, TRRL

42 149785 STAGGERED WORK HOURS: A REPORT ON UNITED STATES AND INTERNATIONAL PRACTICE. In 1974 and 1975 a survey was conducted of 131 U.S. cities and 84 cities abroad to determine the state-of-the-art of Staggered Work Hours Programs. Besides soliciting general information about employment and transportation, this international survey covered the techniques employed, achievements, costs, benefits, and other pertinent factors. The response rate was 66%, with a total of 142 cities returning the questionnaires. Analysis of the responses indicates that Staggered Work Hours Programs are in effect in many parts of the world, particularly in the U.S., Canada, and Europe. A total of 51 cities, the bulk of them foreign, indicated some form of the program in effect. Only 28 cities reported having conducted formal work schedule surveys; congestion in the Central Business District caused by work schedules had only been observed informally. Other work scheduling programs, such as the 4-day work week, had been implemented by 44 cities, 20 of them being foreign.

Port Authority of New York and New Jersey Intrm Rpt. TS No. A521, Nov. 1975, 30 pp, 4 Fig., 17 Tab., 2 App.; Preparation of this report has been financed in part by DOT, Urban Mass Transportation Administration.; Grant IT-09-0023-34

42 149862 WASHINGTON: DOT SEES HEALTHY FUTURE FOR AUTOS. An overview of the Department of Transportation's study "National Transportation; Trends and Choices" is presented. The study traces the form and function of the U.S. transportation system (moving goods and people as an integrated whole) through the year 2000. Also, the possible effects of such factors as population movements and economic growth factors in the system are included. The following conclusions relate to the automobile industry. The automobile will continue to dominate passenger travel as well as most shopping trips unless there is a tremendous shift in present traditional values. Should public passenger carriers double their share of presenger traffic over the next 25 years, the automobile would still account for 80% of all trips. Passenger-miles and freight-ton-miles are forecasted for a 50% and 70% increase respectively over the next 15 years. This increase in demand can be met without increasing our energy consumption. Most of the motor vehicle fuel efficiency will be precipitated by the advances in vehicle and engine design and increasing social responsibility in the use of automobiles. Lastly, an increase is projected in the number of licensed drivers and vehicles owned (automobiles, light-duty trucks, vans and recreational vehicles).

Bolton, EL *Chilton's Automotive Industries* Vol. 156 No. 4, Mar. 1977, p 11

42 149869 THE JOURNEY TO WORK. A BEHAVIOURAL ANALYSIS. The general objective of this study is to build behavioural models of the decision-making process of commuters in the Dublin conurbation. The models are intended to improve understanding of modal choice determinants, thus assisting urban transport authorities to influence modal split by altering pricing and investment policies in order to achieve the most efficient economic balance (in cost-benefit terms) between private and public transport. This volume contains 8 chapters as follows: 1, introduction; 2, models of modal split; 3, towards a theory of mode choice; 4, hypotheses formulation; 5, sample survey methodology; 6, hypotheses testing and model building; 7, modal split predictions and the value of time; and 8, discussion and conclusion. /TRRL/

O'Farrell, PN (Wales University) Markham, J (Coras, Tompair, and Eireann, Ireland) *Progress in Planning* Vol. 3 1975, pp 183-288, Tabs., 65 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 223105)

42 151607 PUBLIC TRANSPORTATION PLANNING [Transportation research record]. Contents: Urban public transportation goal determination--A research approach; Legislative perspectives on the state transportation planning process and transit planning in California; Consumer attitudes toward public transit; Characteristics, attitudes, and perceptions of transit nonusers in the Atlanta region; Travel patterns on a new regional rapid transit system--clues from the early stages of operations on BART; Forecasting dial-a-bus ridership in small urban areas; Forecasting demand for peripheral park-and-ride service; Public policy and transit services for handicapped persons; Evaluating the relevance of specialized university courses in public transportation; Operational planning of fixed-route and demand-responsive bus systems in the Greater Lafayette, Indiana, area.

Cravens, DW ; Transportation Research Board, Washington, D.C. TRB/TRR-563, ISBN-0-309-02473-0, 1976, 104p; Library of Congress catalog card no. 76-16549; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261223/2ST

42 151742 TRANSPORTATION PLANNING AND IMPACT FORECASTING TOOLS. This is one of eight information bulletins developed for the Urban Consortium for Technology Initiatives' Transportation Task Force. The Consortium is a coalition of 34 major urban governments, 28 cities and 6 counties, with populations over 500,000. This bulletin examines new tools, both automated and manual for transportation planning and analysis. Specific emphasis is given to the Urban Transportation Planning Systems (UTPS) package, its features and its application. An extensive list of contacts and an annotated bibliography are provided, including coverage of transportation planning models, land use models, and major impact assessments.

French, BI Casebeer, EMC ; Public Technology, Incorporated, Department of Transportation Final Rpt. DOT-TST-77-10, Oct. 1976, 40 pp; Prepared for Urban Consortium for Technology Initiatives. Transportation Task Force. See also PB-258 872; Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263963/1ST, DOTL NTIS

42 151809 DEVELOPMENT OF A TRANSPORTATION PLANNING SYSTEM. The study was designed to develop an integrated multi-modal transportation planning system that would offer guidelines to transportation management for facilitating planning. The major research included developing agency goals and functional objectives; identifying opportunities and constraints as mandated or restricted by existing legislation; defining procedures, organizational alternatives, a system concept, communications and information, a manpower management plan, and an implementation strategy.

Maggied, H Graziano, P Steeger, RS Weems, D Corrington, B ; Jorgensen (Roy) and Associates, Incorporated, Georgia Department of Transportation, Urban Mass Transportation Administration, (GDOT-7205) FHWA/GA/RD-76-7205, UMTA-LA-06-0001-76-1, Apr. 1976, 336 pp; Prepared in cooperation with Georgia Dept. of Transportation, Atlanta. Research and Development Bureau.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263747/8ST

42 152046 GOLDEN GATE CORRIDOR TRANSPORTATION FACILITIES PLAN, PHASE II. The development of the 1971 transportation plan for the Golden Gate Corridor is discussed, and the development of transit activities, improvement programs undertaken and committed on the Golden Gate Bridge, and the District's financial position and near-term outlook are reviewed. The studies undertaken at the legislature's request and the District's plan for future transit program implementation are also described. Studies of the bus and ferry system and the Golden Gate Bridge itself are outlined. Transportation studies relating to the legislative analyst's review of District activities, the pricing policy simulation model, the Golden Gate corridor long range transportation, planning, policies, transportation alternatives, and the public reaction to the alternatives are reviewed. The Board of control has accepted the incremental approach to transportation planning and implementation. The planning for transit development and the District's long-range plan for transit development are briefly outlined.

Golden Gate Bridge, Highway and Transport District 1975, 36 pp, Figs., 1 Tab., Phots., 1 App.; This report was presented to the California State Legislature, September 1, 1975.

42 152918 PROCEEDINGS OF SEMINAR N, ON URBAN TRAFFIC MODELS. The following papers were presented: A Statistical Explanation for Some of the Effects of Data Aggregation on Estimates of Transport Planning Model Parameters by Wright,CC; Zonal Regression-Can It Be Made Respectable? By Dale,HM; An Analysis Technique for Structuring a Trip Generation Model by Doar,E; Traffic impacts of Work Schedule Changes-A Redistribution Model; A Disaggregated Modal Choice Model for the Copenhagen Area: A Preliminary Report by Schiotz,O; A Markovian Approach to Mode and Route Split by Roulet,J; Public Transport Assignment Calculations with the Transcom Suite by Chapleau,R and Chriqui,C; Some Remarks on Probabilistic Route Choice Models by Le Clerq,F; A Theory of Urban Accessibility: A New Working Tool for the Urban Planner by Koenig,JG; Accessibility: A Multi-role Parameter in the Planning Process by Ruske,W; Cost

Benefit Analysis, Accessibility, Social Equity and Saturation Levels by Withrington,PF; Higher Fuel Prices and Car Traffic Levels- Recent Experience by Parish,DJ; An Econometric Model of the Influence of Petrol Price on Traffic Levels in Greater London by Atkinson,D and Lewis,D; The Estimation and Prediction of Multi-car Ownership by Cheung,YHF and Mogridge,MJH; Car ownership forecasting in Category Analysis -a Pitfall by Parish,DJ; Pooled Models of Car Ownership; Calibration of Modal Split Models by Daly,AJ and Zachary,S; An Application of Disaggregate Modelling Techniques to Transportation Planning Studies by Richards,MG; Comfort and Convenience in Travel Demand Models: Some Recent Advances by Stopher,PR; Commuter Mode Choice in Dublin by Markham,J; Recent Findings on the Value of Time by Metcalf,AE and Markham,J; Passenger Demand Research in London Transport by Fairhurst,MH; Modelling the Walk Mode by Last,A and Daly,AJ; The Generalized Costs Concept by Le Clerq,F; Variations in Travel Between Individuals Living in Areas of Different Population Density by Goodwin,P; Decision Making when we Cannot Reduce Everything to Money Terms by Murchland,JD.

Planning and Transport Res and Computation Co Ltd Proceeding No Date, 373 pp, Figs., Tabs., Refs.; This paper contains the Proceedings of Seminar N held on July 7-11, 1975 during the PTRC Summer Annual Meeting at Warwick University, England.; ACKNOWLEDGMENT: TRRL (IRRD 220827)

42 152983 THE PUBLIC TRANSPORT STUDY OF THE STOCKHOLM COUNTY COUNCIL. LAKU FINAL REPORT, CONDENSATION. This condensation of the final report discusses community development and public transport in Stockholm, the framework for the development of the region, the extent of commuting and the factors determining this, and the supply and demand of financial resources. The objectives in transportation planning (the optimal utilization of resources in a sense of welfare economics, improved environment and traffic safety, equitable distribution of wealth amongst the inhabitants of the region) are discussed, and comments are made on the demand for public transport journeys. The various aspects of the supply of public transport services covered here include: the production environment, the planning region, the present public transport system, transfer problems, technology, and costs. Studies which describe measures for more effective utilization of resources, measures for improved environment and traffic safety, and measures for more equitable distribution are discussed.

Stockholm County Coun Pub Transport Board, Sweden Final Rpt. Feb. 1976, 27 pp, 22 Fig.

42 153051 CONCEPT DEFINITION OF AN INTERMEDIATE CAPACITY TRANSIT SYSTEM. It is believed that the project of rail transit lines represents a significant federal initiative in the area of urban transportation research and development. The purpose of this paper is to describe in general terms the work which will be carried out, and the manner in which it will be administered.

Rudback, NE (Transportation Development Agency); Roads and Transportation Association of Canada Proceeding No. 7, Sept. 1975, pp

169-178; Proceedings of RTAC Annual Conference, Calgary, Alberta, 1975.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada; ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

42 153263 MASS TRANSIT FOR THE FEW. The issue with mass transit planning, as with most other public questions, is still "who benefits and who pays?" A mass transit system can be immediate bread-and-butter transportation for the masses, or it can be luxury transit for the few, paid for by the many. The latter is the way Los Angeles voters saw SCRTD's proposed system twice within the past two years. To prevent the Los Angeles fiasco from recurring, future studies of transportation alternatives--and indeed of any technological choices--must be explicit in addressing the question of benefit and payment. Political and social analysis should become as indispensable a part of transportation decision making as origin and destination studies or studies of technology are today. /GMRL/

Marcuse, P (Columbia University, New York) *Society* Vol. 13 No. 6, Sept. 1976, pp 43-50; ACKNOWLEDGMENT:

42 153266 PROJECT TRIP: A DESIGN FOR COUNTY-WIDE TRANSIT. The Montgomery County Council has approved funding for a plan devised by the County's Department of Transportation that will ultimately provide some sort of public transit in nearly every section of the county. What the transportation planners devised was a set of coordinated, short-range transit projects designed to improve feeder and intra-county movement, with service tailored to the varying character of the community. Two scheduled minibus systems operated by DOT in the urban lower county will link residential sections with commercial centers, educational and recreational facilities, inter-city and local Metrobus terminals and future Metrorail stations. These consist of various systems incorporating minibuses, dial-a-bus, additional bus routes, commuter rail renovations, peak hour bus additions, shelters, bicycle racks and development of fringe parking spaces. /GMRL/

Lynch, RJ (Montgomery County Dept of Transportation) *Public Works* Vol. 106 No. 1, Jan. 1975, pp 50-51; ACKNOWLEDGMENT:

42 153269 A TRANSIT DISTRIBUTION SYSTEM FOR DOWNTOWN ALEXANDRIA. The proposed regional Metro-rail system, currently under construction in the metropolitan Washington area, is planned through the City of Alexandria, with two stations located approximately one mile west of the downtown. This paper reports on the investigation of the real need for a transit distributor system, connecting the downtown with the two Metro-stations and an evaluation of the different available "genetic" types of transit systems in the context of the demand. The study shows that there is indeed a demand for such a distributor system that can be quantified using modeling techniques. /GMRL/ Khasnabis, S (Wayne State University) Picard, JG (Barton-Aschman Associates, Incorporated) Mann, WE (Washington Area Council of Governments) ; American Society of Mechanical Engineers ASME No. 75-ICT-10, July 1975, 11 pp; Presented at the Intersociety Conference on

Transportation, July 14-18, 1975.

42 153311 USE OF MODELS FOR ANALYSIS OF PUBLIC TRANSPORT SYSTEMS [ANVAENDNINGEN AV MODELLER FOER ANALYS AV KOLLEKTIVTRAFIK-SYSTEM]. Because of the rapid increase in wages over the past few years, rational operation of buses is essential. There is a greater need for planning aids. Computer models have been produced for traffic volume forecasts which take into account choice of mode. Questions of interest which must be answered by investigations of public transport are 1. Which proposed traffic system best meets the specified objectives, 2. What will be the distribution between private and public transport as a result of the proposed traffic system. Choice of mode is influenced by a great number of factors; apart from car ownership, the standard of car travel in relation to that of public transport is of great importance. Traffic volume forecasts therefore estimate journey times for both cars and public transport. Models have been used for analysis of public transport and for estimation of journey times. The models have been tested by comparing estimated times with actual ones, and good agreement has been obtained. Use of the models in choice of mode forecasts has also given good accuracy in estimating journey times, but estimation of the actual distribution of modes has been less satisfactory due to the complexity of determining factors. /TRRL/ [Swedish]

Karlsson, R. *Orrjekontakt* Analytic No. 36, 1976, pp 20-22, 2 Fig., 1 Phot.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (IRRD 224560), TRRL

42 153321 PASSENGER TRANSPORT DEMAND IN URBAN AREAS. METHODOLOGY FOR ANALYSING AND FORECASTING. This study relates to urban transport demand modelling. Approach methodologies are described and the scope of available procedures, particularly with regard to relevance and determining the conditions for better results, is discussed. The difficulties of measurability are briefly reviewed, and the stratification approach to their solution is outlined. The report finally raises the question of improved consistency in terms of the objectives of demand models and suggests an evaluation of strategy which is in closer alignment with the expectations of present-day cities. /TRRL/

Bonnafous, A Gerardin, B (Lyons University, France); European Conference of Ministers of Transport Monograph 1976, 82 pp, Figs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-224192)

42 153852 RETURNS TO SCALE AND TECHNOLOGICAL CHANGE IN URBAN MASS TRANSIT. The goals of this research were twofold: first, to estimate the nature & magnitude of technological returns to scale in urban mass transit and second, to identify the structure and growth of technological progress. The results are clear on both counts. The production of route miles of transit service demonstrates constant returns to small (large) scale. In contrast, it was found that increasing returns to small scale prevails in production of seat miles of transit service; and the latter measure seems to yield a

more accurate portrayal of full capacity output than does route miles.

McDevitt, PK (New Mexico State University, Las Cruces) *Logistics and Transportation Review* Vol. 12 No. 4, 1976, pp 233-249

42 153857 TRANSPORTATION SYSTEM MANAGEMENT: STATE OF THE ART. This report summarizes current information concerning the spectrum of actions that are relevant to Transportation System Management (TSM). Under Department of Transportation regulations, urban areas with population greater than 50,000 are required to develop TSM plans that document their strategy for improving air quality, conserving energy, and increasing transportation efficiency and mobility through coordinated operation and management of existing urban transportation facilities and services. TSM therefore includes actions to influence transportation demand as well as actions to manage the supply of service or its performance characteristics. The report presents state of the art information on 31 specific TSM actions within the following seven major categories: improving vehicular flow, preferential treatment of high-occupancy vehicles, reducing peak-period travel, parking management, promoting non-auto or high-occupancy auto use, transit and paratransit service improvements, and transit management efficiency measures. Each summary includes examples of successful experience, advantages and disadvantages, guideline conditions concerning implementation, the range of costs involved, and interrelationships with the other actions. /Author/SRIS/

Keyani, BI Putnam, ES Oshatz, HJ Ewing, AJ; Interplan Corporation Rept No 7504R, Sept. 1976, 107 pp, 11 Fig., 51 Tab., Refs.; Sponsored by the Urban Mass Transportation Administration, Office of Policy and Program Development, Washington, D.C.; Contract DOT-UMTA RI-06-0008; ACKNOWLEDGMENT: National Safety Council, Safety Research Info Serv (770338R)

42 153938 URBAN STRUCTURE AND MODAL SPLIT IN THE JOURNEY TO WORK. Relationships between modal split for the journey to work and patterns of social and economic activity in large urban areas are investigated in this paper. Small zone data from six major land-use transportation studies were used as a basis for a systematic comparative analysis of these relationships. Three of the studies were British (London, West Midlands and Selne) and three American (Tri-State, Penn-Jersey and Los Angeles). Standard correlation and regression programmes were employed on a wide range of data, using three different models. The results reveal the overriding influence of car ownership on modal split, but also demonstrate the limitations imposed by urban structure in the form of employment and population densities. (A) /TRRL/

Sammons, RR Hall, P (Reading University, England) *Urban Studies* Analytic Vol. 14 No. 1, Feb. 1977, pp 1-9, 3 Fig., 1 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 225083)

42 154056 INSTITUTIONAL FRAMEWORK FOR INTEGRATED TRANSPORTATION PLANNING. AN INFORMATION BULLETIN OF THE TRANSPORTATION TASK FORCE OF THE URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES. This is one of eight information bulletins developed for the Urban Consortium for Technology Initiatives' Transportation Task Force. The Consortium is a coalition of 34 major urban governments, 28 cities and 6 counties, with populations over 500,000. This bulletin covers mechanisms encouraging the consideration of highways and transit together in developing short and long range transportation plans and programs. Areas covered include regulatory issues associated with Unified Planning Work Programs, Transportation Plans, and Transportation Improvement Programs, as well as institutional issues associated with Metropolitan Planning Organizations. A extensive list of contacts, a description of ongoing research programs in this area and an annotated bibliography are also provided.

French, BI Casebeer, EMC; Public Technology, Incorporated, Department of Transportation Final Rpt. DOT/TST-77-4, Oct. 1976, 49 pp; See also PB-258 740.; Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-275450/8ST, DOTL NTIS

42 154771 DEVELOPMENT OF AN AGGREGATE MODEL OF URBANIZED AREA TRAVEL BEHAVIOR: PHASE 1. This is the final report of Phase I of a project to develop an aggregated travel demand model for use in urbanized area prediction. The model is designed to be applied in the context of the Department of Transportation TRANS model and is based on the aggregation to the urban area wide level of disaggregate travel demand models. Phase I of the project was concerned with the investigation of alternative aggregation procedures. The results of this theoretical and empirical investigation are summarized in this report. In Phase II of this project the results of Phase I will be used to develop an overall aggregation procedure operating on a full set of disaggregate travel demand models. This report describes the implications of the Phase I results and outlines the approach for the overall aggregate forecasting process to be developed in Phase II.

Koppelman, FS Ben-Akiva, M Watanatada, T; Massachusetts Institute of Technology, Department of Transportation DOT/TPI/10-77/10, Apr. 1976, 87 pp; Contract DOT-OS-50001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265324/4ST

42 154797 APPLICATIONS OF NEW TRAVEL DEMAND FORECASTING TECHNIQUES TO TRANSPORTATION PLANNING. A STUDY OF INDIVIDUAL CHOICE MODELS. The report documents the application of individual choice (disaggregate) travel demand models in urban transportation planning. Three general areas of application are covered: (1) The traditional travel demand forecasting process; (2) short range, transportation systems management evaluation; and (3) patronage and revenue forecasting for new transportation systems. For each application, the suitability of the model is discussed, recent applications are summarized, and two detailed case studies are presented to demon-

strate how the models were used. A short primer on individual choice models is included to provide the planner with enough information to understand how the models work and their differences from more conventional planning models. References are given for those who would like to know more about individual choice models.

Spear, BD ; Federal Highway Administration FHWA/PL-77012, Mar. 1977, 163 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265718/7ST

42 154816 TRAVELER RESPONSE TO TRANSPORTATION SYSTEM CHANGES-A HANDBOOK FOR TRANSPORTATION PLANNERS. Transportation planners and decisionmakers need an understanding of how travelers respond to changes in the urban transportation system if they are to correctly identify the most favorable opportunities to maximize beneficial use of highways and transit operations. Traveler response to the following 10 types of transportation change are investigated: pool/bus priority lanes, variable work hours, carpooling encouragement activities, buspools/vanpools, area auto restraints, auto facility pricing, transit scheduling/frequency, bus routing/coverage, transit fare changes, and transit marketing/amenities.

Pratt, RH Pedersen, NJ Mather, JJ ; Pratt (RH) Associates, Incorporated, Federal Highway Administration Final Rpt. FHWA/HHP-22-8479, Feb. 1977, 283 pp; Contract DOT-FH-11-8479; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265830/OST

42 155345 PROCEEDINGS OF THE URBAN MASS TRANSPORTATION ADMINISTRATION/AMERICAN PUBLIC TRANSIT ASSOCIATION RESEARCH AND DEVELOPMENT PRIORITIES CONFERENCE (2ND) HELD AT ARLINGTON, VIRGINIA ON NOVEMBER 30-DECEMBER 1, 1976. The report contains the papers, a summary, and recommendations for each of five workshop sessions held during the conference. The material specifically addresses the following aspects of urban transportation research and development: viewpoints on UMTA's R&D priorities from spokesmen for transit operators, state governments, and local governments; needs and priorities in policy-related research and development and deployment; implementation of nonhardware innovations; technology delivery systems; and information exchange.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) Proceeding UMTA-DC-06-0157-77-1, Mar. 1977, 103 pp; See also PB-255 898; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266158/5ST, DOTL NTIS

42 155406 TOWARD 2000: OPPORTUNITIES IN TRANSPORTATION EVOLUTION. This report describes possible directions for the Nation's transportation system evolution, and identifies research and development strategies to take advantage of the most promising opportunities. The document begins with a brief examination of population and demographic trends, and makes some conjectures about the future. The report then examines transportation opportunities in

five major areas: urban transportation, intercity transportation, the private automobile, freight-systems, and cross-cutting issues such as decision-making. The report also includes general discussions of the relationships among transportation changes in the spatial organization of the nation (land use), and the use of resources: energy, labor, and capital.

Ward, JD O'Leary, KL Bartholow, B Chu, SC Linhares, AB ; Office of the Secretary of Transportation Final Rpt. DOT-TST-77-19, Mar. 1977, 152 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-266763/2ST, DOTL NTIS

42 156106 TRANSIT PLANNING IN A SMALL COMMUNITY: A CASE STUDY. This paper describes strategies for estimating potential markets for transit or paratransit service, developing a potential set of transit system concepts, estimating demand for each of a selected subset of concepts, developing an evaluation process, and selecting an implementation strategy. The case study has shown that there is considerable value in conducting limited, small-scale surveys of specific market segments as well as in developing a wide variety of system concepts in order to permit an effective choice among possible systems. An extensive educational effort is needed for the community participants in the process as well as broadbased community representation throughout the process. /Author/

Pfefer, RC Stopher, PR (Northwestern University, Evanston) *Transportation Research Record* No. 608, 1976, pp 32-41, 6 Fig., 2 Tab., 11 Ref.; ORDER FROM: TRB Publications Off

42 156130 APPLICATION OF A UNIVARIATE LOGIT MODEL TO PEDESTRIAN/TRANSIT MODE CHOICE BEHAVIOR: A SURVEY OF CAMPUS TRAVEL AT THE UNIVERSITY OF IOWA. The principal purpose of this research is to evaluate the predictive power and utility of a stochastic, disaggregate pedestrian/transit mode choice model for campus planning and transit operations. A specific objective is to determine if a relatively simple survey procedure of collecting campus travel data from a small sample can be used to successfully fit a univariate logit mode choice model of pedestrian/CAMBUS travel at the university of Iowa. The first section of this paper provides a brief review of the application of stochastic, disaggregate analysis techniques to the mode choice problem in transportation research, and the use of logit model in special context planning in particular. The second part of this paper provides a description of the University of Iowa campus physical environment and transportation system attributes. This section of the paper also outlines the procedures and results of the April, 1975 survey of campus travel conducted at the University of Iowa. In the third section of the paper, the application of the results of logit analysis of this data set is reported. In the last section of this paper, the potential utility of the logit model formulated and fitted for pedestrian/COMBUS travel is discussed, and a method of evaluating its predictive power is illustrated. /Author/

Donnelly, RM ; Iowa University Technical Report 68, May 1976, 58 pp, 11 Fig., 34 Ref., 2 App.

42 156133 INFORMATION INTEGRATION MODELS OF TRANSPORTATION DECISIONS. This paper describes an ongoing research program in which behavioral analyses are being applied to transportation-related decisions and judgments. The analyses are being carried out within a theoretical framework for developing decision-making models in psychology. The studies described in the paper were designed to show that transportation consumer behavior can be analyzed in an experimental context which can provide some valuable insights into the processes underlying transportation-related decisions. In two of the studies, subjects indicated the relative likelihood of using an automobile or taking a bus in a series of hypothetical mode choice situations, described by variations in cost-differences and travel time differences. The subjects in these studies seemed to base their mode choice responses on a weighted average of these factors. There were, however, individual differences in weighting policies. A behavioral measure of each subject's response preference was useful in predicting his weighting policy, while his nominal group membership was not. Follow-up studies were designed to relate individual differences to antecedent conditions (e.g., the individual's previous experience and knowledge of local transit parameters) and to use this information to effect desired changes in behavior. /Author/

Levin, IP Corry, FA ; Iowa University Technical Report 61, Sept. 1975, 23 pp, 2 Fig., Refs.; This report was produced as part of a program of Research and Training in Urban Transportation sponsored by DOT, Urban Mass Transportation Administration for presentation at the 55th Annual Meeting of the Transportation Research Board, Washington, D.C., 1976.

42 156183 FRONTIERS IN TRANSPORTATION PLANNING. A compendium of papers on the future of the automobile, demand responsive transportation, energy consideration in transportation planning, planning in third world countries, and commuter transportation is presented. The paper on the future of the automobile focuses on current and future travel, employment, and population patterns. An outline of the Knoxville, Tennessee experience examines the process of establishing a city-wide express bus service. Demand responsive transportation and the role that it can play in serving the needs of the poor, elderly, and handicapped is discussed. A discussion of planning for community transit services examines metropolitan-wide planning policies for the transit dependent. Energy use, and consumption characteristics in urban transportation planning is discussed. The paper on BART/Trails focusses on the commuter and recreational trial potential as well as the possibility of interfacing the bicycle with other modes. A discussion on spatial integration and transportation in third world countries focusses on transportation planning in the context of national development planning. A survey is made of existing transportation planning courses in planning schools.

American Institute of Planners No Date, 84 pp, Figs., Tabs., Refs.; Selected papers from the 57th Annual Conference of the American Institute of Planner, Denver, Colorado.

42 157179 THE EFFECT OF ALTERNATIVE URBAN FORMS ON TWO-MODE TRANSPORTATION SYSTEMS REQUIREMENTS.

It is the objective of the research described in this report to determine the most effective combination of road and transit systems to serve a range of cities with differing density and spatial patterns, and thereby to assess the effects of varying urban form on transportation investment and service requirements. A two-mode network generation model is developed and applied to six hypothetical urban forms of two million population size. The comparative analysis of the transportation requirements for each city type indicates a wide range of mode usage, user travel requirements, and modal system investment requirements. While the evaluation of urban forms from a transportation perspective is dependent on the measure of effectiveness chosen, it is concluded that the transportation system requirements by mode are an important determinant in the choice of urban development patterns. /Author/

Rice, RG (Toronto University, Canada) ; Toronto-York University Joint Program in Transp Research Rpt. No. 38, Mar. 1977, 1 p

42 157198 IMPACT OF SUBURBAN RAPID TRANSIT STATION LOCATION, FARE AND PARKING AVAILABILITY ON USERS' STATION CHOICE BEHAVIOR: ANALYSIS OF THE PHILADELPHIA-LINDENWOLD HIGH-SPEED LINE.

In designing a park-n-ride rapid transit system, locating the stations and determining their parking capacities are among the most important decisions. A simple behavioral model useful for evaluating such plans is proposed, and estimated with survey data on the Philadelphia-Lindenwold High-Speed Line. Model variables include user's access cost and time to stations, and transit fares; a probabilistic version of the model is tested, and satisfactorily predicts the station choice of transit users, thereby determining each station's patronage. As prototypical applications of the model's use, predictions of diversion to a proposed new station on the existing Line, and to two proposed branch lines are developed. The report concludes with a case study of evaluating the addition of a station to an existing rapid transit line. The proposed station choice model states that transit users choose the station that minimizes their total journey cost including the value of travel time. In its deterministic form, the model depicts station market areas with hyperbolic boundaries. This model correctly classifies 60 to 65 percent of observed station choices of park-n-ride and kiss-n-ride commuters on the High-Speed Line. A probabilistic version of the model is formed by relating the proportion of users choosing their least total cost station to the difference in cost between the two least cost stations. Of all users choosing one of their two least cost stations, 87 to 92 percent are correctly assigned by this model. The report consists of nine chapters including a fifteen-page summary. Time series and cross-section analyses of travel patterns in the market area of the High-Speed Line provide a context for the more analytical research described above. /Author/

Boyce, DE Desfor, G ; Pennsylvania University Press Final Rpt. Dec. 1974, 329 pp, Figs., 99 Tab., Refs.; Sponsored by DOT, Office of the Secretary; Contract DOT-OS-10044

42 157235 COST-BENEFIT ANALYSIS, GOVERNMENT POLICY AND THE BRITISH RAILWAY NETWORK. In 1963 the Beeching Report on Britain's railways proposed the closure of a substantial part of the railway network (British Railways Board, 1963). Although many services were withdrawn, disquiet at the Report's failure to analyse the social benefits of rail passenger services eventually led to the application of the technique of cost-benefit analysis to the problem of unremunerative rail services. However, although such studies revealed that the retention of many rural rail services could not be justified on social grounds, these services were not withdrawn. This paper outlines briefly the history of attempts to deal with the question of the "optimal size" of the rail passenger network. Secondly, it considers the social cost-benefit case for reducing the present size of the network in Britain and the quantifiable benefits from such a reduction. The problem of joint costs is discussed. Finally, it attempts to explain the failure of successive Governments to apply the results of cost-benefit studies in practice, and suggests how the decision-making process might be altered to facilitate a more rational approach towards public transport problems in Britain.

Dodgson, JS (Liverpool University, England) *Transportation (Netherlands)* Vol. 6 No. 2, June 1977, pp 149-170, 2 Tab., Refs.; ACKNOWLEDGMENT: Transportation (Netherlands); ORDER FROM: ESL

42 157280 MANAGING THE TRANSPORTATION SYSTEM. The objective of the Baltimore Region Transportation Systems Management Plan (TSM) is to formulate a coordinated set of regional strategies to ensure that the utilization of existing highway and transit facilities is maximized, the use of low-occupancy vehicles is reduced and the bus transit system is strengthened. The regional transportation planning process has identified the following such strategies as alternatives that hold the greatest promise of achieving systems management objectives and transportation goals in the Baltimore Region: Provide preferential treatment for high-occupancy vehicles; encourage ride sharing; encourage transit ridership; establish alternative work schedule programs; improve parking management; improve traffic operations; and improve bicycle facilities. Tables are included which summarize the most promising strategies and techniques, and service as well, as an annual component of the recommended systems management plan.

Maryland Department of Transportation June 1976, 157 pp, 5 Fig., 7 Tab., Photos.

42 157435 CONCLUSIONS ADOPTED BY THE GENERAL ASSEMBLY-41ST INTERNATIONAL CONGRESS OF THE "UNION INTERNATIONALE DES TRANSPORTS PUBLICS" (INTERNATIONAL UNION OF PUBLIC TRANSPORT), NICE 1975, 25-31 MAY [Conclusions adoptees par l'assemblee generale-41E congres international de l'union internationale des transports publics, Nice 1975, 25-31 Mai]. Conclusions were reached on the following themes: interrelation of public transport and regional planning, regional transport today and in the future, economic and technical aspects of the automation of underground rail-

ways, effect of the energy crisis on the operation of underground railways, methods of and theoretical bases for the planning of rapid transit railway lines, use of buses, activities of the commission concerning the study of buses, maintenance and viability of buses, interdependence of investments and maintenance, economics of transport, location and layout of bus garages and depots, electronic data processing as an aid to viability studies and preventive maintenance of public transport vehicles, world energy crisis and its effects on the operation of public transport systems, urban transport in the Paris region and rise in the cost of oil. /TRRL/ [French]

UITP Revue Analytic Vol. 24 Mar. 1975, pp 183-212, 2 Fig. ACKNOWLEDGMENT: TRRL (IRRD-103846)

42 157671 IS THERE A CASE FOR RAIL TRANSIT? The pervasive effects of the automobile are usually underestimated and the costs of transit, easily identified, are a ready target for critics. The Bay Area Rapid Transit is used as the point of departure for a general discussion of the investments required in transportation and the role of regional and land-use planning in determining the shape of future urban regions.

Transportation Research News No. 70, May 1977, pp 2-5, 3 Phot. ORDER FROM: TRB Publications Off

42 157674 URBAN TRANSPORTATION PLANNING GUIDE. The new Canadian planning guide provides a summary of currently applied techniques and procedures for planning transportation facilities in urban areas in a North American context and presents an analytical structure for the planning process. The formulation of goals and objectives, the collection and analysis of data describing the operation of a system, policy formulation, current procedures in analyzing transportation systems, and the political process of implementation are all discussed. Reference is made to other more intensive material. The book is intended as an introductory treatise for engineers, planners, and other professionals working in the field as well as students and interested members of the public at large.

Roads and Transportation Association of Canada No Date, 167 pp; ORDER FROM: Toronto University Press, 33 East Tupper Street, Buffalo, New York, 14208

42 157777 FORECASTING PATRONAGE ON NEW TRANSIT ROUTES. A modeling effort is reported in which a logistic curve can accurately describe the relationship between route patronage and elapsed time, and a transit service trial period of only 30 days is necessary for model calibration. Such a model can predict a new transit route's ridership potential without an extended trial period, and could, therefore, lead to a more efficient allocation of available transit resources. For this model, it was assumed not only that a transit route will attract an ultimate patronage level but also that the change in ridership at any given time is directly proportional to the product of the current ridership and the difference between this patronage and the asymptotic value. The patronage variable was standardized relative to the first day's ridership performance. The mathematical relationships are set forth and comments are made on the model sensitivity and validation.

Cherwony, W Polin, L (Simpson and Curtain Consulting Firm) *Traffic Quarterly* Vol. 31 No. 2, Apr. 1977, pp 287-295, 3 Fig., 2 Tab.

42 157786 CRITERIA FOR PLANNING A HOME-TO-WORK PUBLIC TRANSPORTATION DEMONSTRATION PROJECT FOR LOW-INCOME WORKERS; A CASE STUDY. This paper discusses some basic criteria that should be considered when a home-to-work transportation demonstration project is planned. Particular attention is given to the concept of relating the level of investment that is required if the objectives of a demonstration project are to have at least a 0.5 probability of being detected. The results of a case study in a large urban areas are discussed in detail. /Author/

Falcocchio, JC Pignataro, LJ McShane, WR (Polytechnic Institute of Brooklyn) *Highway Research Record* No. 473, 1973, pp 1-15, 6 Fig., 13 Tab., 13 Ref.; This article appeared in *Highway Research Record* No. 473, Transportation for the Disadvantaged.; ORDER FROM: TRB Publications Off

42 157821 TESTS OF THE TEMPORAL STABILITY OF TRAVEL SIMULATION MODELS IN SOUTHEASTERN WISCONSIN. The assumption of the stability of travel simulation models over time is an essential element of the urban transportation planning process. This assumption was tested using travel simulation models developed with data from an origin and destination survey conducted in 1963 and travel inventory data from a similar study conducted in 1972. Both surveys were conducted by the Southeastern Wisconsin Regional Planning Commission; the travel models tested were those that had been used in the preparation of a regional land use and transportation plan for southeastern Wisconsin that was completed in 1966. The testing performed as a part of the reappraisal of the land use and transportation recommendations of 1966, which was of the temporal stability of the three major travel simulation models-trips generation, model split, and trip distribution-indicated that 1972 trip generation, transit use, and trip length characteristics within southeastern Wisconsin were predicted with adequate accuracy through the application of the original 1963 models. /Author/

Yunker, KR (Northwestern University, Evanston) *Transportation Research Record* No. 610, 1976, pp 1-5, 7 Fig., 1 Tab., 5 Ref.; This article appeared in *Transportation Research Record* No. 610, Passenger Travel Demand Forecasting.; ORDER FROM: TRB Publications Off

42 157823 TRANSFERABILITY AND UPDATING OF DISAGGREGATE TRAVEL DEMAND MODELS. In recent years much work has gone into the development of disaggregate travel demand models. However, little has been done to evaluate the ability of these models to predict travel behavior in locations other than the area for which the model was estimated. Unlike aggregate models, the parameters of disaggregate models are not dependent on a particular zonal system and therefore have the potential for transferability. The motivation behind transferring is clear-if a model estimated in one area can be transferred to another, the cost of conducting transportation studies could be greatly reduced. Several possible approaches for transferring are

developed and discussed from a theoretical perspective. For an empirical evaluation, a work-trip modal-split model estimated on Washington, D.C., data is transferred to New Bedford, Massachusetts, using each of the proposed approaches. The results of estimating the original model on Los Angeles data are also represented. The most significant result is the exceptional performance of the original Washington work mode choice model on both New Bedford and Los Angeles data. This is noteworthy in view of the extreme differences of the means for several variables between these cities. Of the several approaches for transferring that were developed, Bayesian updating based on combining the existing model coefficients with the estimation results from a new sample gave the best overall performance. The results of this study indicate that the potential transferability of disaggregate travel demand models can be realized. /Author/

Atherton, TJ (Cambridge Systematics, Incorporated) Ben-Akiva, ME (Massachusetts Institute of Technology) *Transportation Research Record* No. 610, 1976, pp 12-18, 2 Fig., 3 Tab., 13 Ref.

This article appeared in *Transportation Research Record* No. 610, Passenger Travel Demand Forecasting.

42 157826 AN APPLICATION OF MODE-CHOICE METHODOLOGIES TO INFREQUENT COMMUTER-RAIL SERVICE. The feasibility of commuter-rail transit in the southwest Baltimore corridor was studied by a variety of passenger estimation methodologies. The methodologies selected were required to be applicable to the corridor scale, to be run manually, and to be capable of quick response. They were also required to be responsive to the addition of one or two trains per peak period, changes in station location and accessibility, and changes in costs such as parking charges and gasoline costs associated with the automobile. No one methodology met all of the above requirements. However, two methodologies were adapted to consideration of infrequent rail service (one or two trains per peak period) and applied to the corridor. The first methodology involved the application of a simple graphical technique that related modes split to station distance from the CBD; the second involved the application of a marginal utility model to corridor census tracts. The infrequent service capability was added, in the case of the graphical approach, by applying experience factors, and in the computational approach by relating automobile captivity to the number of trains per peak period. Both methodologies were transferable, without reestimation of coefficients, to the southwest Baltimore corridor. Both approaches could be applied manually in a person-week or less; the need for any greater sophistication than the graphical methodology is seriously questioned. /Author/

Kingham, RI *Transportation Research Record* No. 610, 1976, pp 30-36, 5 Fig., 13 Ref.; This article appeared in *Transportation Research Record* No. 610, Passenger Travel Demand Forecasting.; ORDER FROM: TRB Publications Off

42 157827 THE SUBAREA FOCUSING CONCEPT FOR TRIP DISTRIBUTION IN THE PUGET SOUND AREA. This paper explores one method of reducing the computational costs associated with urban travel demand modeling.

The technique investigated is a data base approach called subarea focusing. The distinction between this technique and other data simplification methods is in the detailed analysis of only a portion of a study area and the simultaneous presence of several levels of areal detail in the data base. A computerized technique for subarea focusing was developed and used for a sample trip distribution application to data from the Puget Sound region. The procedure was not unduly expensive in either manpower or computer time. When aggregate data sets were used to obtain travel demand predictions, substantial savings in computer time were realized. The error analyses indicated some sacrifice in accuracy, but not a serious sacrifice. The results appear to justify continued refinement of the aggregation procedure and investigation of the effects of subarea focusing on other demand models. /Author/

Miller, DG (Peat, Marwick, Mitchell and Company) Nihan, NL (Washington University, Seattle) *Transportation Research Record* No. 610, 1976, pp 37-43, 6 Fig., 3 Tab., 13 Ref.; This article appeared in *Transportation Research Record* No. 610, Passenger Travel Demand Forecasting.; ORDER FROM: TRB Publications Off

42 157828 STATEWIDE DISAGGREGATE ATTITUDINAL MODELS FOR PRIMARY MODE CHOICE (ABRIDGEMENT). This effort which developed models using attitudinal and situational (demographic and trip-related) data collected in a home interview survey, had 2 objectives; to build mode choice models having both predictive and explanatory value, and to assess the relative significance of situational and attitudinal variables in regional or statewide models. Disaggregate binary logit models for the choice of bus as primary mode were constructed for 6 area-purpose cases. The results of the study suggest that attitudinal variables are less significant than situational variables in predicting primary mode choice. Data analysis showed that automobile users express more satisfaction with the attributes of transit than did those who actually used transit. The study concluded that small disaggregate data sets appear to be adequate for the development of useful mode choice models at the statewide level. Further conclusions regarding the independent variables best explaining mode choice, and the levels of influence of variables on mode choice are also presented.

Howe, SM Cohen, GS (New York State Department of Transportation) *Transportation Research Record* No. 610, 1976, pp 44-46, 4 Tab., 4 Ref.

This article appeared in *Transportation Research Record* No. 610, Passenger Travel Demand Forecasting.; ORDER FROM: TRB Publications Off

42 157880 SUMMARY OF NATIONAL TRANSPORTATION STATISTICS. These periodic reports are compendiums of selected national-level transportation statistics. Included are cost, inventory, and performance data describing the passenger and cargo operations of the following modes: air carrier, general aviation, automobile, bus, truck, local transit, rail, water, and oil pipeline. The report includes basic descriptors of U.S. transportation, such as operating revenues and expenses, number of vehicles and employees, vehicle-miles and passenger miles, etc. As the name implies, these reports are summaries of a larger data base, consisting of time-series col-

lected from a variety of government and private statistical handbooks. In the 1975 and 1976 editions, the selected data cover the periods 1963 through 1973 and 1964 through 1974, respectively.

Gay, WF ; Transportation Systems Center No Date, n.p.; Annual Report, Report No. PB-25410, DOT-TSC-OST-75-18, 160 pages for June 1975 report; Report No. DOT-TSC-OST-76-11, 120 pages for June 1976 report. Also available from NTIS.; ACKNOWLEDGMENT: Transportation Energy Conservation Data Book; ORDER FROM: GPO

42 158057 A COMPARATIVE ANALYSIS OF URBAN TRANSPORTATION REQUIREMENTS, VOLUME I. This report on urban transportation systems covers a study made in 31 urban areas located in 14 countries, including 9 cities in the U.S.A. Information is presented on the development and use of mass transit systems in each of these cities, the costs of providing and operating the systems, the sources of financing required, and the changing patterns of rider usage of transport modes, including the private motor vehicle.

Turner, FC Davis, HE ; International Road Federation, Federal Highway Administration Final Rpt. FHWA-PL-77013, Feb. 1977, 52 pp

Sponsored by DOT, Federal Highway Administration. See also Volume 2, PB-267789.; Contract DOT-FH-11-7970; ACKNOWLEDGMENT: Federal Highway Administration, NTIS; ORDER FROM: NTIS; PB-267788/AS

42 158082 PROCEEDINGS OF THE SECOND URBAN MASS TRANSPORTATION ADMINISTRATION/AMERICAN PUBLIC TRANSIT ASSOCIATION RESEARCH AND DEVELOPMENT PRIORITIES CONFERENCE, 1976. This report is a compilation of material that was presented at the Second Urban Mass Transportation Administration/American Public Transit Association Research and Development Priorities Conference. It contains one or more resource papers, additional papers, a summary and recommendations for each of five workshop sessions held during the conference. In addition, addresses at general, luncheon, and breakfast sessions are included. The material specifically addresses the following aspects of urban transportation research and development: viewpoints on UMTA's R&D priorities from spokesmen for transit operators, State governments, and local governments; needs and priorities in policy-related research and development and deployment; implementation of nonhardware innovations; technology delivery systems; and information exchange. Among the speakers whose remarks are included are APTA Executive Director, B.R. Stokes; Urban Mass Transportation Administrator, Robert E. Patricelli; Senator Birch Bayh; and Jordan D. Lewis, Director of the Experimental Technology Incentives Program of the National Bureau of Standards. A listing of conference participants is also included.

American Public Transit Association, (DC-06-0157) Proceeding UMTA-DC-06-0157-77-1, Mar. 1977, 103 pp; Sponsored by Urban Mass Transportation Administration.; Contract DOT-UT-70026; ACKNOWLEDGMENT: Federal Highway Administration, NTIS; ORDER FROM: NTIS; PB-266158

42 158147 ANALYSIS OF URBAN TRANSPORTATION NEEDS WITH IMPLICATIONS FOR AGT SYSTEMS. In this report the current and future development of urban form is illustrated and analyzed in terms of its specific implications for automated guideway systems (AGT). Five cities that are representative of the range of urban attributes in the nation are examined—Chicago, Baltimore, Kansas City, Phoenix, and Grand Rapids. To identify what transportation modes satisfy the transportation needs, seven broad modal categories, operating and economic characteristics, energy consumption and pollution levels are presented. These measures are presented in detail for seven generic modes—Rail Rapid Transit, Light Rail, Conventional Bus, Group Rapid Transit, Personal Rapid Transit, Dail-A-Ride, and Auto. Conclusions as to the ability of AGT, as well as various other possible systems of transportation, to satisfy the predicted future needs of multi-nucleated urban areas are reached through the use of models of applicable demand range, which present, at one end, capacity capability and, at the other, necessary patronage for viable fiscal operation of such systems. Performance measures are developed for line-haul and circulation systems. The line-haul measures are given in terms of the boarding per hour per mile as determined by the capacity of the system and by the fiscal and fare policies. These measures are used to illustrate an approach to developing circulation measures, which are given in terms of the demand density that can be accommodated by the systems, as a function of the system characteristics and the area covered.

Johns Hopkins University, Baltimore, (MD-11-001) Final Rpt. UMTA-MD-11-0001-77-1, July 1975, 436 pp; Sponsored by DOT, Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-267006/5ST, DOTL NTIS

42 158215 TRANSPORTATION SCIENCE, WHAT DOES IT MEAN? [Vervoer-en Verkeerskunde: Wat is dat]. This article gives a description of a systematic arrangement of concepts such as transport organization and transport systems. Harbours, stations and airports as links between water, road, rail and air transport systems. Relationships between activities such as technology, physical planning, transport management, estimating future transport patterns with planning on one side, and design, construction and traffic control on the other. Diagrammatic presentation of the interactions between these concepts. [Dutch]

Heere, E (Ingenieursbureau Dwars, Heederik en Verhey, Neth) *Verkeerskunde Analytic* Vol. 27 No. 12, Dec. 1976, pp 594-94, 4 Fig., 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 248849); ORDER FROM: Dutch Touring Club ANWB, Wasenaarseweg 220, Box 2200, The Hague, Netherland, s

42 158994 A COMPARATIVE ANALYSIS OF URBAN TRANSPORTATION REQUIREMENTS, VOLUME II. This volume contains a report on each of the 31 urban areas studied, as well as a description of the National Setting for each of the 14 countries in which the individual urban areas are located. Volume II contains detailed comments and statistics pertaining to the mass transit situation and experience in each urban area studied, which is the basis of the comments contained in Volume I.

Turner, FC Davis, HE ; International Road Federation, Federal Highway Administration Final Rpt. FHWA/PL-77-014, Feb. 1977, 434p

See also Volume 1, PB-267 788.; Contract DOT-FH-11-7970; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267789/6ST

42 159004 SOLVING PUBLIC PASSENGER TRANSPORTATION PROBLEMS: A NEED FOR POLICY REORIENTATION, VOLUME II. Public transportation has declined because policymakers and outdated regulations have restricted the evolution of transportation systems which more closely reflect the mobility and life-styles of today. Public policy needs to take a consumer-oriented approach to public transportation by recognizing that all consumers do not have the same transportation needs and that one or two modes of transportation cannot satisfy these needs. This report argues that if public transportation is to become an efficient method of satisfying the transportation needs of a community, a brokerage or consumer-oriented approach should be adopted. The transportation broker will match specific individual needs with a broad array of transportation services, and overcome institutional, legal, and operational barriers to the development of new forms of transportation service.

Davis, FW Oen, K ; Tennessee University, Knoxville, Department of Transportation Final Rpt. DOT/TST-77/35, Jan. 1977, 34p; See also report dated Nov 76, PB-267 546.; Contract DOT-OS-40096; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267912/4ST

42 159356 USER DOCUMENTATION FOR THE METROPOLITAN ACCESSIBILITY PROGRAM (MAP). The Metropolitan Accessibility Program (MAP) is a computerized tool that facilitates analyses of transportation access to employment, commercial activities, hospitals, and other desired destination opportunities. This program is capable of producing output records that are interpreted by a special plotting program, MAPLOT. MAPLOT is capable of producing graphic displays of spatial variations in accessibility levels throughout an urban area, sector, or corridor. The MAP program and all subsequent modifications, including the plotting features, is housed within the U.T.P.S. Program, UMODEL. In this report the computer program, MAP, is presented through various User's materials including program documentation and five illustrative case study applications. The five case studies have been developed to aid the programmer in applying MAP and MAPLOT. This report is designed specifically as a User's guide to MAP and should be read in conjunction with the companion report which explains and illustrates the theory and methodology of transportation accessibility studies: 'Accessibility Applications in Urban Transportation,' by Popper and Connelly (UMTA-VA-11-0002-77-2). The MAP Program is used to facilitate transportation accessibility analyses, and to produce graphic maps of the spatial distribution of accessibility to jobs, shopping activities, and other destination opportunities. The program is suggested for use in planning and evaluation studies.

Connelly, MD Popper, RJ ; Virginia Polytechnic Institute & State University, Urban Mass Transportation Administration, (UMTA-VA-11-0002) Final Rpt. UMTA-VA-11-0002-77-1, Jan. 1977,

113 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269239/OST

42 159357 ACCESSIBILITY APPLICATIONS IN URBAN TRANSPORTATION. The report outlines the theory and methodology for developing accessibility studies to evaluate transportation service impacts at the corridor, subarea or metropolitan levels. A computer program (Metropolitan Accessibility Program or MAP) is described that will facilitate such an analysis. In addition a typical case study application is presented illustrating how employment accessibility is modified in a corridor after the building of a high speed transit line. Data indicates the relative degree to which the Black population subgroup in the corridor benefits from the accessibility improvements. The program is suggested for use in planning and evaluation studies.

Popper, RJ Connelly, MD ; Virginia Polytechnic Institute & State University, Urban Mass Transportation Administration, (UMTA-VA-11-0002) Final Rpt. UMTA-VA-11-0002-77-2, Jan. 1977, 54 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269240/8ST

42 159478 ANALYSIS OF CHANGES IN RAIL COMMUTING TO CENTRAL LONDON, 1966-71. Using the population census data for 1966 and 1971 an analysis was made of the way in which rail commuting to central London from a number of local authority areas has changed between these two years. The results of the multiple regression suggest that changes in rail journey time are more important to passengers than changes in frequency. An overall elasticity with respect to journey time of -0.6 (-0.9 for long journeys and -0.5 for short journeys) was obtained, whereas that with respect to frequency was not significantly different from zero. It was not possible to estimate the way rail passengers respond to fare changes owing to insufficient variation in fare levels over the local authority areas during the period. The inclusion of socio-economic variables such as car-ownership, the size of the local labour force and the number of owner-occupied houses in each local authority area improved the fit of the equation but did not tend to affect the absolute or relative size of the rail service elasticities. /Author/TRRL/

Hepburn, DRC ; Transport and Road Research Laboratory Monog Rpt. TRRL-SR-268, 1977, 12 pp, 6 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225885), NTIS; ORDER FROM: TRRL, NTIS

42 159487 MULTINOMIAL LOGIT APPROACH FOR MULTIMODAL CHOICE OF WORK TRIPS. This paper reports the results of an explorative study on the possibility of using a multinomial logit model to replicate and predict multimodal choice for work trips in a Canadian urban context. Modal choice data from Toronto, where a multimodal choice situation exists in the line-haul portion of the work trip, are used to develop the model. The developed model is evaluated in terms of statistical criteria and reasonableness tests. It is further examined for its predictive ability by the results with the published ones in this area. The study shows that disaggregate models can provide reasonable results when used in forecasting the modal choice between various modes.

Cherian, V (Calgary University, Canada) Sar-gious, MA *Canadian Journal of Civil Engineering* Vol. 4 No. 1, Mar. 1977, pp 10-17, 17 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 159596 PLANNING AND DESIGN OF INTERMODAL TRANSIT FACILITIES. This paper presents an analysis of the present state of the art of transit station planning and design. It discusses the design process in terms of (a) design parameters and standards (e.g., stairways, ramps, and passageways; escalators; platforms; fare and exit control; moving walkways and ramps; bus facilities; and parking facilities); (b) design of the station environment (e.g., lighting, ventilation, acoustics, and fire control; passenger information and graphics; passenger security; commercial activities; and special provision for the handicapped); and (c) design methodology (e.g., deterministic, probabilistic, and impedance models; simulation; and validation problems). A classified bibliography is included.

Hoel, LA (Virginia University) Rozner, ES (GAI Consultants, Incorporated) *Transportation Research Record* No. 614, 1976, pp 1-5, 52 Ref.; This article appeared in TRB Research Record No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

42 159704 APPLICATION AND VALIDATION OF EQUILIBRIUM TRIP ASSIGNMENT METHODS. An application of an equilibrium trip assignment method to the 1970 road network of the City of Winnipeg, Manitoba, Canada is described. The validity of the method is discussed in detail. The results presented show that the differences between predicted and observed values of the relevant parameter are attributable in part to limitations of the model to explain all route choice behavior as a function of time alone and in part to the way in which observed temporal values relate to predictions made by a static model.

Florian, M (Montreal University, Canada) Nguyen, S *Transportation Science* Vol. 10 No. 4, Nov. 1976, pp 374-390, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 159716 URBAN TRANSPORT RESEARCH PRIORITIES. This year, Britain, as a nation, will spend ,15000 M or some 17 per cent of the gross domestic product on transportation. A greater understanding of the problems associated with transportation, and the identification of possible solutions and means of attaining them are considered by the author to be a necessary part of urban transport research. It is suggested that the character of transport planning and management over the past few years has changed markedly, and that the future shows signs of being different in some respects in kind and in others in degree from what has been familiar until recently. Some of the more significant changes are identified and discussed. In particular, increased professional involvement to include land use, social and environmental planners and economists; and the growing importance of political concern and general public involvement in transport issues. The relevance of ongoing research and its application and impact is considered in relation to technology, industry and government. It is suggested that interest in better transport operations should be centred around existing

technology, operations administration and institutions with emphasis on how to continue to provide some public transport service in those market areas where traditional heavyweight public transport has become too costly. Gradual but controlled de-centralisation is suggested as a means of increasing the diversity and effectiveness of transport research. /TRRL/

Bayliss, D *Transportation (Netherlands)* Analytic Vol. 6 No. 1, Mar. 1977, pp 4-17; ACKNOWLEDGMENT: TRRL (IRRD-225744)

42 159790 ON THE FORMATION OF TRAVEL DEMAND MODELS AND ECONOMIC EVALUATION MEASURES OF USER BENEFIT. This paper examines a variety of issues within the context of two main themes: the formation of travel demand models and economic evaluation measures which are mutually consistent within a theory of rational choice; and a consideration of the structure of models which are representations of the trip decision process over several dimensions: location, mode, and route. Random utility theory is invoked to explore both the role and properties of composite costs or index prices in the 'recursive' approach to the structuring of travel choice models, and their significance in the economic evaluation problem. It is shown that the specification of these costs must be made very precisely, with respect to the demand model form chosen, in order to retain the underlying assumption that the traveller is an optimal decisionmaker. It is argued that the structure of 'simultaneous' models currently in use is inconsistent with the form of utility function assumed to generate those models. Furthermore, it is shown that the "simultaneous" and "recursive" forms are special cases of a more general choice model structure which takes specific account of correlation or 'commonality' of trip attributes. A number of applications are discussed in which consistent demand models and perceived user benefit measures are constructed. These include the formation of strategic transport planning models and of models for mixed-mode, multimode, and multiroute systems. The formalism allows definitive answers to be given to a number of problems of current interest in transportation planning, which have been incorrectly or incompletely treated.(a) /TRRL/

Williams, HCWL (Leeds University, England) *Environment and Planning* Analytic Vol. 9 No. 3, 1977, pp 285-344, 13 Fig., 5 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-226039)

42 163057 TRANSPORTATION: MANAGEMENT--ECONOMICS--POLICY. This book is a synthesis drawing upon a number of underlying fields and disciplines, primarily economics, engineering, and legal and policy studies. The functional approach supplies the integrative thread that ties the work together. The objective is to provide enough conceptual and substantive information that the reader can systematically weigh the alternatives and reach his own solution. The scope of this work is relatively broad. All of the principal passenger and freight modes are covered: railroads, pipelines, waterborne (ocean, inland, Great Lakes and St. Lawrence), and highway (automobile, truck and bus). The carriers are brought together in issues concerning urban transportation and urban intermodal problems. Final chapters cover government plans and policies and the future outlook. While this book

was designed primarily to meet the needs of professional majors, it should be of use to others. Courses in transportation engineering, economics, geography, urban planning, and public administration should find it a useful supplement. There are sufficient issues in the book to be of interest to practicing professionals in the field. It is written with a view to being comprehensible to the informed layman, the non-specialized manager, and government policy officials.

Hazard, J (Michigan State University, East Lansing) ; Cornell Maritime Press, Incorporated Textbook Aug. 1977, 581 pp; Cost is \$16.00.; ACKNOWLEDGMENT: Cornell Maritime Press, Incorporated; ORDER FROM: Cornell Maritime Press, Incorporated, Box 109, Cambridge, Maryland, 21613

42 163174 OPERATING PUBLIC TRANSPORT. The following papers were presented at the conference on public transport systems operation in urban areas--Routing strategy for urban passenger transport services, Parker,GB; The feasibility of the interchange concept as a component of the urban passenger transport system, Coleman,AH; The role of the timetable in maintaining bus service reliability, Lesley,LJS; Scheduling for depleted services, Bly,PH and Jackson,RL; Experiments in bus service control using an interactive model of a typical urban bus route, Jackson,RL and Stone,D; Fare collection systems and their effect on the regularity of public transport services, Werz,H; and, Operating bus services in a British provincial city, Lutman, PMD. /TRRL/

Newcastle-Upon-Tyne University, England Monograph 1975, 119 pp, Figs., Tabs., Phots., Refs.; Proceedings of a symposium held April 15-17, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 225700)

42 163226 THE FEASIBILITY OF UPGRADING PENINSULA PASSENGER RAIL SERVICES. FINAL REPORT. The feasibility of increasing use of Southern Pacific commuter services over the 47 mile Peninsula line between San Jose and San Francisco, CA., was studied under a grant from UMTA. Among potential means for increasing usage would be improved access, all-day transit-type operation, better connection with transit, and extension to a new San Francisco terminal. The experience of a private operator could be combined with the resources of public agencies to produce a staged expansion of service in response to changes in demand. Such steps should be part of an overall transportation plan for the Westbay Corridor.

Metropolitan Transportation Commission Final Rpt. UMTA-CA-09-0025, 1975, 287 pp, Figs., Tabs., Phots., Refs.; This Final Report, financed in part by UMTA/U.S. DOT, contains 4 parts: Summary; Legal Considerations; Operations, Marketing and Costs; and Reference Supplement.; Grant; ORDER FROM: Metropolitan Transportation Commission, Hotel Claremont, Berkeley, California, 94705

42 163340 A DETERMINISTIC METHOD OF ASSIGNING TRAFFIC TO MULTIPLE ROUTES OF KNOWN COST. A method is proposed for assigning road traffic to a network of urban streets. The objective is to predict the flows along alternative routes with the accuracy

needed for the design of comprehensive urban traffic management schemes. The method assumes that drivers vary in their perception of costs and choose the route that is best for them. The distribution of perceived costs is, for each link in a network, assumed to have a known average value and variance. A simple set of the deterministic relationships is derived which can be solved efficiently in a digital computer. The proportion of traffic using one of two routes is derived as a quadratic function of the difference in average costs and the relative variance in perceived costs. A network is solved by successive combinations of pairs of routes. A simulation program has been written to check the theoretical predictions. There is, as yet, no evidence that these predictions fit reality. It is suggested that some aspects of trip generation and choice of mode in addition to choice of route, may be analysed by the proposed method.(a) /TRRL/

Robertson, DI ; Transport and Road Research Laboratory Monograph TRRL Lab Rept. 757, 1977, 29 pp, 10 Fig., 3 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-226547), NTIS; ORDER FROM: NTIS; PB-280511/7ST

42 163443 AN EMPIRICAL STUDY OF PARK-AND-RIDE MASS TRANSIT SYSTEMS IN THE U.S.. With increased congestion and pollution in urban streets, as well as the challenge to more effectively use scarce land resources in center city areas, transportation planners need to examine methods of converting commuters to less energy intensive modes. Through emphasizing the key level-of-service variables, i.e. implementing exclusive bus lanes wherever possible, and scheduling park-and-ride services to insure flexibility for commuting patrons, it is hoped that transit policy planners can make mass transit in general, and park-and-ride programs in particular, successful systems in reducing the automobile-dependence of urban areas. /GMRL/

Hsu, T (Flint Planning and Development Comm, Michigan) McDermott, DR (Syracuse University) *Transportation Journal* Vol. 16 No. 3, 1977, pp 37-45; ACKNOWLEDGMENT:

42 163584 RECOMMENDED STATEWIDE TRANSPORTATION GOALS POLICIES AND OBJECTIVES. This publication which represents the policy element of the California Transportation Plan, covers the basic principles and policies to be used in transportation decision-making, as well as the applications and implementations of the policies. The way in which California's transportation system interacts with the social, economic, and natural environment of the state is described, future alternative directions are discussed, and transportation problems and the effect on them of continuing current policies are explored. Eight policy principles to guide decision-making are established. These principles relate to: provision of transportation services by the private sector; efficient use of existing system; full analysis of alternatives; pavement for transportation by users; and regulations. Government (state, local and regional) responsibility in transportation is discussed, and policies are presented to minimize adverse effects of transportation decisions on energy, capital, safety, and labor resources. Environmental protection is considered in policies on land use, air quality, noise and community disruption. Principles relating to

transportation issues and problems are formulated and applied to specific transportation problems. Institutional, financial and regulatory changes resulting from these policies are discussed, and short and long range actions are recommended.

California State Transportation Board Mar. 1977, 243 pp; ORDER FROM: California State Transportation Board, 1120 N Street, P.O. Box 1139, Sacramento, California, 95085

42 163600 TRAVEL BEHAVIOR AND MOBILITY PATTERNS OF LOW-INCOME RESIDENTS OF SYRACUSE, NEW YORK (ABRIDGMENT). This research was designed to study the way in which a low-income population receiving subsidies through the Department of Social Services traveled. Their perceptions of trip modal choice and their satisfaction with the travel mode used were included in a travel diary. The findings indicate that the majority of the travel outings occurred between 10 a.m. and 5 p.m. The trip destinations were generally concentrated in the CBD, in outlying areas where services are concentrated, and in areas where a large number of medical services are located. The majority of the outings were single-purpose trips and could be classified as shopping, or social-recreational or both. The study population felt that they were at a disadvantage because they did not own automobiles. They did not have the freedom to travel, and, because of a heavy reliance on bus service, they were restricted due to the inflexibility of bus routes and schedules. The study concludes that mass transportation is an important entity to a majority of low income individuals. Because of the systems inflexibility, these who are mass transit dependant remain immobile.

Taylor, L (Syracuse University) Sen, L (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 618, 1976, pp 16-18, 1 Ref.; This article appeared in *Transportation Research Record* No. 618, *Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement*; ORDER FROM: TRB Publications Off

42 163604 CITIZEN PARTICIPATION IN RAPID TRANSIT PLANNING. This paper relates the experience of metropolitan Dade County, Florida, in implementing an extensive, bilingual citizen participation program for planning the county's proposed rapid transit system. The overall goals of the program are to ensure that local residents have the opportunity to contribute to the county's transit plans and that public understanding, acceptance, and support of the system are achieved. To accomplish these aims, 25 neighborhood forums and 7 district citizens panels were created and integrated into the county government's decision-making process. The formation of these groups was part of a totally open community involvement process in which any interested resident could take part in the formulation of transit plans for each of eight time-phased decision points. During a 12-month period over 14,000 residents participated through 470 public meetings and hearings. Some of the major results of the program were the resolution of major community transit issues, significant citizen modification to the design guidelines and criteria for the system, and the establishment of long-term citizen participation structure. The

success of the program has confirmed the value and feasibility of citizen participation in proceeding with the final detailed design and construction of the system. /Author/

Castle, LL (Lockheed-Georgia Company) *Transportation Research Record* No. 618, 1976, pp 34-40, 4 Fig.; This article appeared in *Transportation Research Record* No. 618, Transportation Issues: The Disadvantaged, the Elderly, and Citizen Involvement.; ORDER FROM: TRB Publications Off

42 163708 TRANSIT SERVICE STANDARDS FOR SMALL URBAN AREAS REVIEW AND PLANNING APPROACH. This final report documents the results of activities and requirements stipulated in the Development of Service Standards, Research Task 14, of the Small Urban Area Transit Study. The document has been prepared to facilitate an understanding of both the procedures and the data base employed in the development of service level guidelines. It also provides a full discussion of a recommended service evaluation and improvement program design; procedures for implementing this program are also included. The recommended program design was developed as an outgrowth of the research activity that was undertaken to identify and evaluate the underlying issues of service standards applications, and it also presents a practical procedure for evaluating service levels within an adaptive development program, facilitating service improvements.

Resource Planning Associates, Incorporated UMTA-NY-09-8001, Mar. 1976, 200 pp, Figs., Tabs., 64 Ref.; The preparation of this report has been financed in part through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration.

42 163735 RAILWAYS AND THE FUTURE OF LARGE CITIES. The author, who is Managing Director (Railways) on the London Transport Executive, refers to the predictable expansion of cities in the next half-century; the outstanding importance of a good transport network in support of this expansion; the immense advantages of the railway, which can ensure high capacity transport at relatively high speed, without unacceptable disfigurement of the environment, and with superior efficiency in the use of energy and space. He concludes that a common planning process is required for movement in an urban area, with rail-borne and road-borne transport each contributing in the areas where they are most efficient.

Robbins, RM (London Transport Executive) *Rail International* Vol. 8 No. 6, June 1977, pp 291-294; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

42 163812 CRITERIA FOR THE OPTIMIZATION OF URBAN PUBLIC TRANSPORT [Criteri di ottimizzazione del sistema di trasporto collettivo urbano]. The essential factors in the improvement of a public transport service are the reduction of total journey time, the regularity of the service, and the quality (comfort, convenience and reliability) of the service. The overall optimization of a transport system in these terms must be based on the minimization of the total cost to the public. This paper examines the following criteria for an improved public transport service: less use of private transport during peak hours;

better regularity of service; more efficient use of equipment and personnel during peak hours; the spreading of demand into off-peak hours; greater mobility for non-motorists; and a reduction of noise and exhaust pollution. /TRRL/ [Italian]

Amoroso, S Santoro, G (Palermo University, Italy) *Strade Analytic* No. 6, Nov. 1976, pp 425-433; ACKNOWLEDGMENT: TRRL (IRRD-227201)

42 163867 URBAN TRANSPORT APPRAISAL. The book examines the methods developed for evaluating urban transport projects and policies. The author discusses the characteristics of the demand for transport and the way in which they determine how travel behaviour is analysed. The object of the appraisal being to ensure that value for money is obtained either with respect to the development of transport systems or the use of existing capacity. The book emphasises the economic aspect of policies on which a monetary value can be placed. The subject is discussed in the following chapters: (1) An appraisal framework; (2) Introduction to the analysis and forecasting of travel demand; (3) Some alternative approaches to the analysis of travel demands; (4) The analysis and forecasting of trip generation and attraction. (5) A digression-the specification of travel costs in the analysis of travel demand; (6) Trip distribution; (7) Modal choice; (8) assignment; (9) Economic evaluation: the benefit algorithm; (10) Evaluation criteria and their implications for benefit estimation; (11) Some problems in economic evaluation and (12) Conclusion. /TRRL/

Jones, IS (Department of the Environment, England) ; MacMillan Press, Limited, (0 333 177835) Monograph 1977, 144 pp, 39 Fig., 3 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 226459); ORDER FROM: Macmillan Press Limited, 4 Little Essex Street, London WC2R 3LF, England

42 163875 THE ROLE OF BRITISH RAIL IN PUBLIC TRANSPORT. In the report the select committee seeks to provide information for the House of Commons to judge the government's policy on transport. Although the committee have concentrated on the role of British Rail, their findings are concerned with all forms of public transport. The findings are based on evidence submitted by government departments, nationalised industries, local authorities, private transport organisations, unions and consumer organisations, and are presented under the following headings: the present state of British Rail; likely pattern of future demand; the future form and size of the rail network; manpower; co-ordinated passenger transport; competition on trunk routes; co-ordination of other services outside major conurbations; the conurbations; freight; expenditure on railways and public transport by central and local government; allocation of benefits derived from public expenditure to users of transport services; pricing; fiscal policy; investment; consumer organisations; exports; property; railway unions; statistics; national transport planning. Conclusions compare BR with similar Western European systems and also makes recommendations concerning the correct use of railway investment, and also the co-operation between all forms of public transport. /TRRL/ Her Majesty's Stationery Office Monog Rpt. Apr. 1977, 136 pp; House of Commons Select

committee on Nationalised Industries, Report and Proceedings of the Committee, Volume 1.; ACKNOWLEDGMENT: TRRL (IRRD 226474); ORDER FROM: Pendragon House, Incorporated, P.O. Box 255, Old Mystic, Connecticut, 06372

42 163932 URBAN TRANSPORTATION PLANNING SYSTEM: PHILOSOPHY AND FUNCTION. This paper describes the philosophy behind and the functional requirements of a computer-based system for urban transportation planning. It begins with a view of the current transportation problem and the resulting new demands on the planner. After outlining a planning framework composed of three analytical activities, long-range planning, short-range planning, and system surveillance, it outlines the functions of a software system, the Urban Transportation Planning System, that would effectively support the transportation planner of today. Such a system is presently under development at the Urban Mass Transportation Administration. /Author/

Dial, RB (Urban Mass Transportation Administration) *Transportation Research Record* No. 619, 1976, pp 43-48, 4 Fig.; This article appeared in *Transportation Research Record* No. 619, Innovations in Transportation System Planning.; ORDER FROM: TRB Publications Off

42 163959 PSYCHOLOGICAL DETERMINANTS OF USER BEHAVIOUR. The purpose of this report is to bring together details of current problems, and the most recent research results in the field of transport users' behaviour, and to make a critical assessment of developments in research into modal split. Particular attention is given to the degree of credibility attributed to psychological approaches in investigation, and to the stage in the analytical process at which application of psychological methods is most beneficial. The research described leads up to an illustrative model of modal split, which in turn, presents possibilities of quantifying the effects of measures on modal choice. /TRRL/

Broeg, W Heuwinkel, D Neumann, KH ; Organization for Economic Cooperation and Development (92-821-1041-9) Monograph Report No. 34, 1977, 76 pp, 5 Fig., 1 Tab., 36 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-225695)

42 163974 URBAN PASSENGER TRANSPORT: SOME TRENDS AND PROSPECTS. The trends in patronage by the main modes of public transport over the past two decades are described, and quantitative explanations given, where possible, of the changes which have taken place in terms of the main service variables (frequency, accessibility, reliability), fare levels, and the socio-economic variables (income, car ownership, land-use etc) which are mainly responsible for the background trends. The social consequences of these trends, particularly the fall in demand for bus travel and the question of subsidising services for which the users themselves are not prepared to pay, are discussed. The results of various travel surveys are described in relation to the travel "needs" and "desires" of individuals and it appears that people's travel habits are conditioned by constraints on the total amount of time spent travelling, the numbers of trips per day and the cost and effort involved in making them. The benefits of transport improve-

ments can be seen not in terms of time or cost savings, but as an increase in choice of destination. Current work on the evaluation of the main factors affecting public transport patronage is described and the latest information on elasticities with respect to fares, service levels etc is summarised. Use is made of these and other results to indicate the likely effects of certain changes in operating policy and to discuss possible means of affecting rider-ship. A TRRL model is used to see how bus patronage is likely to be affected over the next ten years if a break-even policy is applied, and, alternatively, how the subsidy level will grow if attempts are made to hold on to the present levels of bus patronage. (a) /TRRL/

Webster, FV ; Transport and Road Research Laboratory Monograph NLR771, 1977, 49 pp, 16 Fig., 13 Tab., 74 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-226909), NTIS; ORDER FROM: NTIS; PB-280870/7ST

42 163978 TRANSPORT REALITIES AND PLANNING POLICY. Most attempts at striking a balance between private and public transport are based on the allocation of the resources of road space and finance. The book instead uses a "consumers" approach to focus on that component of policy which is concerned with providing all members of the community with the means of meeting their daily travel needs. This approach is discussed in the following chapters: (1) adults travel in five areas; (2) teenagers travel in five areas; (3) junior schoolchildrens travel in five areas; (4) mobility and accessibility in the outer metropolitan area; (5) personal mobility: young women with children and pensioners; (6) travel patterns of young women with children; (7) travel patterns of pensioners; (8) influence of area, and (9) summary and conclusions. /TRRL/

Hillman, M Henderson, I Whalley, A ; Political and Economic Planning, (085374 1549) Monograph Vol. 42 No. 567, Dec. 1976, 196 pp, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 225434)

42 163982 TRAFFIC CONTROL: THE LINK BETWEEN TRANSPORT POLICY AND TRAFFIC ENGINEERING [Verkeersregeltechniek: schakel tussen vervoersbeleid en verkeersbeheersing]. Traffic control will, in the future, comprise more than traffic signals on junctions alone; the big increase of motorised traffic, the more intensive use of car traffic inside built-up areas require a rigorous control of the traffic flow; priority requirements for public transport necessitate the application of the most advanced control equipment; recent developments in the area of micro-processors open up new possibilities. /TRRL/ [Dutch]

Hakkesteegt, P (Delft University of Technology) Genootschap voor Automatisering Monograph Part 5, 1976, pp 13-32, 23 Fig.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD-226888)

42 164152 INTERTOWN PUBLIC TRANSPORT. ALTERNATIVES FOR CANBERRA. Canberra's intertown public transport service is the central part of a previously agreed overall strategy of public transport services whereby feeder buses radiate from the independent town centres which, in turn, are linked by A high quality intertown service. Previous studies have

suggested busway, rail, or automated systems (if available) for operation on the metropolitan intertown service. This report describes a study which examined a large number of conventional and non-conventional alternative public transport systems for use on the express intertown service which at present is operated with buses running in mixed traffic. The study primarily evaluated the feasible alternatives on technical, economic and environmental grounds, although other considerations were also taken into account. No consideration was given to the feeder bus system which was assumed to provide the same service irrespective of the type of intertown system utilized. /TRRL/

National Capital Development Commission, Australia Monograph Oct. 1976, 122 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 227245); ORDER FROM: National Capital Development Commission, Australia, 220 Northbourne Avenue, Canberra, A.C.T., Australia

42 164235 TRANSPORT POLICIES AND PROGRAMMES: THE NEW PLANNING APPROACH. The report was prepared by a working party set up to give guidance on the new system of transport policies and programmes (tpp) which the county councils are required to submit to central government. A survey of 1975/76 tpp submissions was made, and the different weighting given to the main components by councils in urban and in rural areas is illustrated. The effects of public policy on individual transportation requirements are described. Against a historical background the objectives of the new approach are outlined and advice on the preparation of tpp submissions is given. A carefully arranged timetable, use of financial guidelines and monitoring of progress are recommended. The establishment of relationships between county councils and other bodies is discussed. Constructive criticisms of the tpp concept and the transport supplementary grant (tsg) system are made. The opinion of the working party is that the tpp concept is sound and contributes usefully to forward financial and policy planning but no conclusion can be reached as to whether tsg is an effective grant. /TRRL/

Charter Inst of Pub Finance & Accountancy, England Monograph Mar. 1976, 63 pp, 11 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227458)

42 164262 NEW WAYS FORWARD-PUBLIC TRANSPORT ALTERNATIVES IN CLWYD. The report reviews schemes for alternative forms of public transport in the rural area of Clwyd. As a result of increasing costs and declining services of orthodox bus operations, alternative minimum-cost transport has been introduced. These schemes include voluntary social car service, voluntary essential car scheme, community mini-bus, off-peak conventional bus services, and, reduced fare experiments. The report discusses the implementation of the individual schemes, the areas over which they were operated and analyses the results. /TRRL/

Phillips, MH ; Clwyd County Council, Wales Monograph Aug. 1976, 95 pp, 9 Fig., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD-225693)

42 164305 DISAGGREGATE AND SIMULTANEOUS TRAVEL DEMAND MODELS: A DUTCH CASE STUDY. The purpose of this study was to examine the viability in A Dutch context of disaggregate and simultaneous travel demand modelling. The general, and most important conclusion that can be drawn from the work undertaken in the course of the study is that disaggregate simultaneous models, estimated utilising the multinomial logit model, have considerable potential in the field of transportation, or travel demand, modelling. In addition to application in comprehensive planning studies, they are highly relevant to policy studies and both local and specific studies: indeed the shopping model described in this report clearly could be developed into a full shopping model for use in shopping centre location studies. They offer major advantages over conventional aggregate modelling techniques without, so far as is yet apparent, any significant disadvantages. /TRRL/ [Dutch]

Buro Goudappel en Coffeng BV Monograph 1974, 157 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 227382)

42 164343 TRANSPORT POLICY. This white paper sets out the government's approach to transport policy and some of the specific decisions it has made. The three principal objectives of transport policy are identified as:-(1) to contribute to economic growth and higher national prosperity. (2) to meet social needs by securing a reasonable level of personal mobility, particularly by maintaining public transport for those without the use of a car. (3) to minimise the harmful effects of transport (road accidents, damage to the environment etc.). The subject matter is treated under the following chapter headings:-(1) objectives, (2) the role of government, (3) local planning and choice, (4) transport in towns, (5) the rural areas, (6) inter-urban passenger transport, (7) freight, (8) the public sector, (9) roads, (10) implications for public expenditure, (11) consultation and policy-making, (12) summary of decisions. The white paper concludes with details of transport resources budget, the purpose of which is to show what users, including those providing their own transport spend on different forms of surface transport by road and rail, the value of resources that go into providing transport and how they are paid for- whether entirely by users, entirely from public expenditure or a mixture of the two. /TRRL/

Her Majesty's Stationery Office Monograph CMND 6836, June 1977, 76 pp, 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 226882); ORDER FROM: Pendragon House, Incorporated, P.O. Box 255, Old Mystic, Connecticut, 06372; 7707010

42 165040 "OPTIMIZATION" OF PUBLIC TRANSPORT NETWORKS [Zur "Optimalität" öffentlicher Verkehrsnetze]. The author explains the difference between the criteria of private and public enterprise, and concludes by criticizing the contradictory nature of a policy which views railways as an agent in the transport market, while denying them a social role, yet continuing to regard them as public enterprises. [German]

Oettle, K *Glaser's Annalen ZEV* Vol. 101 No. 6, June 1977, pp 174-178, 10 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD;

ORDER FROM: ESL

42 165132 Q. HOW CAN I STRETCH TRANSPORTATION DOLLARS? A. MAXIMIZE RESOURCES AND CAPTURE VALUE (EDITORIAL). Spiraling construction costs for both highways and rail transit, huge operating deficits, and limited financial resources are causing cities, states, and the federal government to reexamine the way in which they build, operate, and maintain urban transportation systems.

Nation's Cities Vol. 15 May 1977, 2 pp ACKNOWLEDGMENT:

42 165216 APPLICATIONS OF THE COMMUNITY AGGREGATE PLANNING MODEL. An urban transportation sketch planning procedure is described and three basic requirements of sketch planning techniques including ease of input preparation, efficient use of computers, for those techniques using computers, and relevant and easily understood outputs are discussed.

Linden, PJ *Public Roads* Vol. 41 No. 1, June 1977, pp 1-9, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 165217 CHICAGO URBAN TRANSPORTATION PLANNING. The Central Area of Chicago presents a unique opportunity to carry out a carefully planned rapid transit system. The Chicago Urban Transportation District--formed to design and construct the Central Area Transit Project--subscribes to sound land-use policies and is actively working with the City and the private sector to encourage development of land areas adjacent to the proposed transit facilities to their highest and best use. In 1975, partially in response to the need to update the original transit plan, especially in the areas of land use and travel behavior and patterns, the District began a project specific transit planning effort called the Transportation Engineering Program (TEP). The TEP provides assistance in staging and sequencing the Core System, planning, and close coordination with other transportation planning.

Nelson, HE (Chicago Urban Transportation District) Barnes, WL *ASCE Journal of the Urban Plan and Develop Div* Proceeding Vol. 103 No. UPI, ASCE 13075, July 1977, pp 53-67, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 165384 URBAN TRANSPORTATION ALTERNATIVES: EVOLUTION OF FEDERAL POLICY. The findings are presented of two successful conferences which formed the foundation of a unique process of federal rule-making, and the underlying process that culminated in the conferences is discussed. The availability of new funds for urban mass transportation in 1974 raised complex questions of equitable resource allocation. Reaching answers to these questions involved the developing of consensus on a series of compromise solutions that would best reconcile the competing demands of different claimants. The first conference in February 1975 reached agreement on five principles which dealt with regional multimodal strategy, incremental planning, managing of the existing system, framework for evaluation, and public involvement. Cost effectiveness and usable segments were other areas of Administration's (UMTA) description of the implementation of 1976 was to review the Urban Mass Transportation Administrations

(UMTA) description of the implementation of the proposed policy as well as to review on the revised policy on Urban Mass Transportation Investment. A number of related issues were discussed at both conferences. Documents prepared by UMTA as background to the conferences are discussed.

Transportation Research Board Special Report No. 177, 1977, 38 pp, 1 Fig., 2 Tab. Report of conferences held February 23-26, 1975 at Airlie House, Warrenton, Virginia, and March 29-April 1, 1976 Hunt Valley, Maryland, and sponsored by the Urban Mass Transportation Administration, U.S. Department of Transportation.; ORDER FROM: TRB Publications Off

42 165563 APPLICATION OF A LOCAL AREA TRAFFIC MODEL IN AN INNER SUBURB OF MELBOURNE. The structure and development of a new traffic assignment procedure for use in small, detailed urban street networks is described. The model couples a probabilistic path selection procedure with a dynamic feedback system for delays, congestion and queueing in a network. It is intended for use with period travel demand data in the evaluation of network traffic and/or environmental management schemes, and the possible traffic impacts of urban redevelopment schemes. To evaluate the model, data regarding peak period traffic movements through an inner suburban area were collected. Included in the data collection were street traffic volumes and speed distributions, and cordonline origin-destination data for the study area. The particular area (West Hawthorn) is subjected to large volumes of commuter traffic on its local street system during peak demand periods. /Author/TRRL/

Taylor, MAP (Commonwealth Scientific & Indus Res Org, Australia) ; Victoria Ministry of Transport, Australia *Proceeding* May 1977, 27 pp, 7 Fig., 5 Tab., Refs.; *Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum--"Getting the Best Use from the Transport Infrastructure"* Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227896), Australian Road Research Board

42 165582 PUBLIC AND PRIVATE TRANSPORT IN URBAN AREAS. The proportion of overall national energy consumed by public transport in urban areas is found to be insignificant, whereas private transport consumption is found to be significant. The paper therefore focuses attention on the direct energy consumption characteristics of motor vehicles, identifying aspects where potential savings could be made. Consideration is given to the range of measures which could reduce energy consumption levels by private transport. These measures are seen as falling into two basic groups: those which reduce the fuel consumption rates for private transport; and those which reduce the travel demands for private transport. These measures would have identifiable implications on the mobility levels of public and private transport users, taking into account the higher mobility potential of private transport in Australian cities. The time scale over which the various measures could be effective is discussed. It is concluded that significant savings in energy use in urban transport could be made and that initiatives being undertaken now, such as in vehicle design and public transport improvements

should recognise these potential savings. / TRRL/

Ryan, M (Department of Transport, Australia) ; Society of Automotive Engineers (Australasia) *Analytic No.* 7710, May 1977, n.p., 2 Fig., 7 Tab., 14 Ref.; Paper from the Jubilee Conference of the Society of Automotive Engineers--Australasia, Melbourne, Australia, May 2-6, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227877), Australian Road Research Board

42 165676 TRAFFIC, FUNCTION, FORM AND DEVELOPMENT OF URBAN CENTRES [Vplivi sodobnega prometa na funkcionalnost in oblikovanje mestnega sredista]. Transport, urban development and development of urban centres is viewed in terms of spatial organization of activities and the form which urban accessibility networks and urban development take in the space. Transportation problems in urban centres are analysed and then formalized into three basic but interrelated topics: analysis of prototype patterns of development (future planned development), (patterns of possible development); environmental capacity of urban centres (present situation), (problem situations, trends); strategy for centres and transportation structure development (development potentials of selected patterns). In transportation planning theory it is the view that cities traffic and urban development planning should be coordinated. This study explores the possibilities of relating these two in practice rather unrelated aspects of urban planning at least conceptually, explaining them as parts of the same process of urban structure development in space. /TRRL/ [Slovenian]

Lenarcic, L ; Urbanisticni Institut sr Slovenije *Monograph* 1977, 128 pp, 25 Fig., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227774)

42 165746 ERIE: SHORT-RANGE TRANSIT TECHNICAL STUDY. Since the Erie Metropolitan Transit Authority (EMTA) acquired the bus system from the Erie Coach Company in 1967, it has implemented a comprehensive program of transit improvements that has turned-around the ridership decline that was apparent up to 1967 with the result that annually over 5.5 million passengers are now carried on EMTA bus compared to the 3 million in 1967. The purpose of this study is to update EMTA's 1969 Transit Development Program, that is, to maintain planning and capital certification and therefore remain eligible for State and Federal funds. This document contains the Transit Element of Erie's Transportation System Management Program. The program's findings and recommendations serve as the plan (six-year) for maintaining and improving mass transit in Erie. Improvements to transit in Erie have been identified in five major areas: management, marketing, fare structure, service, and capital. This report presents the results of the transit update study: 1) Background information includes a description of existing services and an evaluation on how well services correlate with specific community characteristics; 2) Community attitudes toward transit are examined; 3) An evaluation is made of the adequacy of existing service in terms of PennDOT standards and service; and 4) Capital, management, and marketing improvements are examined. The Appendix (A) contains a synopsis of interviews with social service agency representatives. This report

suggests that the future for mass transit in Erie will continue to be one where buses, rather than more elaborate modes, will provide the basic intracommunity public transportation service. /UMTA/

Simpson and Curtin Incorporated, (PA-09-0028) UMTA-PA-09-0028-77-1, Jan. 1977, 175 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract PA-09-0028; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-270214

42 165759 IMPLEMENTATION PROGRAM, URBAN CORRIDOR DEMONSTRATION PROGRAM FOR THE DISTRICT OF COLUMBIA AND MARYLAND. The Washington Urban Corridor Demonstration Program sought to improve peak period travel conditions through improving transportation system efficiency by the implementation of coordinated, complementary low capital projects. This report is the last in a series of three; the first report in the series was the Planning Study; the second report was on an Immediate Action Program. Projects in this implementation Program Final Report include a bus lane, express bus service, a transfer terminal, fringe parking, carpooling, and Dial-A-Ride. Monitoring and public information activities are also included. The Program demonstrated that coordinated transportation projects improve peak period transportation. /FHWA/

Moreland, PB ; Metropolitan Washington Council of Governments Final Rpt. DOT-FH-11-7973, Nov. 1976, 200 pp; Sponsored by the Federal Highway Administration, DOT.; Contract DOT-FH-11-7933; ACKNOWLEDGMENT: Federal Highway Administration, NTIS; ORDER FROM: NTIS; PB-272517/4ST

42 165762 INCREASING TRANSIT RIDERSHIP: THE EXPERIENCE OF SEVEN CITIES. During the last five years several transit systems have experienced large and sustained increases in ridership. The objectives of this study were to identify and analyze the factors to which the ridership increases are attributed and the techniques used to gain ridership that are transferable to other systems. The seven systems chosen for evaluation and the percentages of change in ridership between 1971 and 1975 were: Eugene, Oregon, 411%; Madison, Wisconsin, 49%; Minneapolis-St. Paul, Minnesota, 40%; Portland, Oregon, 57%; Salt Lake City, Utah, 118%; San Diego, California, 114%; and Vancouver, British Columbia, 57%. All of these cities possessed a common set of ingredients essential to their successes in increasing ridership--strong public and political support which resulted in the availability of substantial financial resources. It was found that most ridership gains were in large part attributable to service expansion, especially the expansion and addition of routes in areas that previously had been poorly served. Fares remained constant or were reduced in all of the cities studied. Furthermore, the energy crisis was credited with having an immediate positive effect on transit use. The types of techniques used in increasing ridership, which are transferable to other systems, are in the areas of: (1) planning, scheduling, monitoring and evaluation; (2) marketing; (3) transportation system management; and (4) route structure. /FHWA/

Sale, J ; Urban Mass Transportation Administration, (UPP-S) UMTA-UPP-S-76-1, Nov. 1976,

28 pp; Contract UPP-S; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-271071

42 165769 METHODOLOGY FOR IDENTIFYING URBAN TRANSPORTATION TECHNOLOGY ALTERNATIVES. This report reflects the view that the existing urban transportation planning process tends to ignore new transportation technologies (PRT, AGT, accelerated moving walkways, shared taxi). The information system described in this report aims to remedy this deficiency by specifying all the alternative technologies, new or old, that can satisfy a need. This system fits into the planning process after distribution. The intent herein is that this system be useful to transport planners and agencies. This report describes an information system which accepts as input a set of characteristics describing a particular transportation need and yields as output a list of transportation technologies capable of satisfying that need. A broad range of transportation need situations can be fed into this system. The system, however, is concerned with people movement rather than goods movement. The user of the system specifies the nature and extent of demand, as well as certain service requirements. A transportation technology is identified as suited to a particular need situation when the technology meets the demand and the service requirements, and does so at reasonable costs. The technologies identified by the system as suitable to a need are examined to select the one best alternative. This final selection process is not part of the system. The system consists of two tables. Their use is described and examples are presented in this report. The procedure used to develop the tables is discussed. This report recommends that a more comprehensive version of this system be developed. /FHWA/

Walbridge, EW ; Illinois University, Chicago, Urban Mass Transportation Administration, (IL-11-0008) Final Rpt. UMTA-IL-11-0008-77-2, Mar. 1977, 29 pp; Sponsored by the Urban Mass Transportation Administration, DOT.; Contract IL-11-0008; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-271225/5ST, DOTL NTIS

42 165776 SERVICE AND METHODS DEMONSTRATION PROGRAM. This report contains a description of the Service and Methods Demonstration Program. Recently completed and current and future demonstration projects are described and project results from similar demonstrations are compared. The comparisons are made by grouping projects according to the program objectives addressed: 1) decrease transit travel time; 2) increase transit reliability; 3) increase transit coverage; 4) increase transit vehicle productivity; and 5) improve the mobility of transit dependents. Independent activities carried out in support of the demonstrations are described, such as the development of evaluation guidelines and improved methodologies for demonstration evaluation, analytical studies in support of the development of experimental demonstrations, studies of independent local innovations, and case studies of transit operations in small communities. Information dissemination mechanisms and activities intended to facilitate more widespread knowledge of effective approaches to improving transit are discussed. /UMTA/

Kendall, D Abkowitz, M Casey, R Heaton, C Simkowitz, H Slaviv, H Waksman, R ; Transportation Systems Center, (DOT-TSC-UMTA-77-20) Final Rpt. UMTA-MA-0049-77-2, Apr. 1977, 562 pp; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-270673

42 166324 TEXAS TRANSIT OPERATIONS (STATISTICS AND ANALYSIS) 1975. The document presents statistical data and examines public transportation activities for the year 1975.

Texas State Dept. of Highways and Public, Transportation, Austin. Transportation Planning, Div. Aug. 1976, 34p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267804/3ST

42 166501 BART IMPACT PROGRAM: TRENDS IN TRAFFIC PATTERNS AT THE BAY BRIDGE AND CALDECOTT TUNNEL. Utilizing multiple regression techniques, this paper presents an analysis of the effects of the opening of the Bay Area Rapid Transit (BART) System's transbay crossing on the traffic at two major highway facilities, the San Francisco-Oakland Bay Bridge and the Caldecott Tunnel. Looking at data collected semi-annually since 1965, it was found that there was a sudden shift in trend lines in 1974 after the BART transbay tube was opened. Vehicle volumes dropped, transit patronage jumped, but total person trips in the short run followed roughly the trends of the previous eight years. Transbay vehicle and transit traffic has increased at a more rapid rate since 1974, with mid-day off-peak transit patronage showing a large increase. While an important temporary phenomenon, the 1973-74 increase in gasoline prices was not found to contribute much to this sudden change in the long-term trends. BART also caused the removal of a substantial number of buses from the two facilities, effectively increasing their vehicle-handling capacity. This has resulted in higher traffic flow rates during the height of the peak periods. (Color illustrations reproduced in black and white.)

Homburger, WS Dock, FC ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, (HUD-CA-09-0042) DOT-BIP-WP-32-3-77, July 1977, 66 pp; Prepared in cooperation with Metropolitan Transportation Commission, Berkeley, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270370/0ST, DOTL NTIS

42 166510 TRANSPORTATION IN AMERICA'S FUTURE: POTENTIALS FOR THE NEXT HALF CENTURY. PART 1. SOCIETAL CONTEXT. The report describes four potential socioeconomic futures for the United States and their implications for transportation through 2025. The futures--designated Success, Foul Weather, Disciplined Society, and Transformation--vary particularly in economic performance, climate, institutional structure, and personal values. For each future, Part 1 provides a detailed narrative account or scenario, accompanied by separate analyses of the energy, demographic, economic, and urban implications of each scenario. Part 2 provides demand forecasts for most modes; technology forecasts for twelve transportation modes and seven specific systems or technologies; and analyses of six critical transportation problems.

Curry, D Carlson, R Henderson, C Mandel, T Mitchell, A ; Stanford Research Institute, Department of Transportation, (SRI-URU-5040) Final Rpt. DOT/TPI/20-77/21-1, June 1977, 131 pp; See also Part 2, PB-270 468.; Contract DOT-OS-60160; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270467/4ST

42 166511 TRANSPORTATION IN AMERICA'S FUTURE: POTENTIALS FOR THE NEXT HALF CENTURY. PART 2. TRANSPORTATION FORECASTS. Contents: Transportation demand and energy estimates; Transportation trends and issues under three futures for 1995; Prospects for new and improved transportation systems by 2025 (Air, Avionics, Shipping, Pipelines and tunnels, Railroads, Inter-city buses, Highways and streets, Trucking, Automobiles, Urban transit and rail, Paratransit, Pedestrian aids and bikeways, Elderly and handicapped services); Electric and hybrid automobiles; Innovative urban systems; Automated highway system; A generic approach to advanced freight systems; Tracked levitated vehicles, improved passenger trains and buses; The successful SST; Some transportation implications of future telecommunications technology; Transportation problems and opportunities.

Curry, D Carlson, R Henderson, C Mandel, T Mitchell, A ; Stanford Research Institute, Department of Transportation, (SRI-URU-5040) Final Rpt. DOT/TPI/20-77/21-2, June 1977, 343 pp; See also Part 1, PB-270467.; Contract DOT-OS-60160; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270468/2ST

42 166735 THE TRANSPORTATION SYSTEMS MANAGEMENT PROGRAM FOR NORTHEASTERN ILLINOIS [Staff technical rept]. The Chicago Area Transportation Study (CATS) as the designated Metropolitan Planning Organization (MPO) for the northeastern Illinois region, has the responsibility of developing a Transportation Systems Management (TSM) element as part of the urban transportation planning process. The document represents the initial actions towards the development of a short-range plan designed to implement the objectives of improving system efficiency and maximizing system productivity. The document is composed of three parts: a history of effort on past and ongoing TSM projects in the region, an interim TSM program delineating projects in the FY 77 Annual Element of the Transportation Improvement Program, and documentation of the TSM processes, methodologies and elements as proposed during the coming fiscal year.

Chicago Area Transportation Study, Ill. 0352-01, July 1976, 107p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-269325/7ST

42 167038 IMPACT EVALUATION OF MORGANTOWN PRT 1975-1976 RIDERSHIP: INTERIM ANALYSIS. The Morgantown Personal Rapid Transit System (PRT) is a new type of public transportation system which was built as a research development and demonstration project. The system began passenger service in October 1975, and consists of three stations, 2.1 miles of two-lane guideway, and a 45-vehicle fleet. This report describes the Morgantown PRT system ridership levels and trends during its initial period of operation, the 1975-76 academic

year. The analysis measures the impact on ridership of seven operating characteristics: fleet mileage, actual operating hours, system availability, trip reliability, vehicle availability, downtime frequency, and downtime duration. Data were obtained from West Virginia University Management reports on daily ridership, and system operation and analysis included statistical tests of significance and multivariate statistical procedures.

Stearns, MD Schaeffer, KH ; Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-77-14, UMTA-MA-06-0026-77-1, June 1977, 79 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270916/OST, DOTL NTIS

42 167089 URBAN TRANSPORTATION POLICY. REPORT OF THE WORKSHOP ON NATIONAL TRANSPORTATION PROBLEMS (2ND), NOVEMBER 7-8, 1974. PROGRAM OF UNIVERSITY RESEARCH. The workshop is one of a continuing series to develop information useful to the Department of Transportation policymakers through interaction of principal investigators in universities under contract to the Department and members of the Department responsible for programs of in urban transportation. Eight panels were chaired by university and DOT officials to examine the following topics: Suburbanization and its implications for urban transportation; The role of new systems in meeting urban transportation needs; Choosing among transportation alternatives--improving the decision-making process; Urban freight movement; Service standards; Communication systems and urban transportation; Incremental versus ultimate system transit; How can universities organize to be of service to their local communities.

Department of Transportation, Washington, D.C., Office of the Secretary. DOT-TST-75-137, Nov. 1974, 49p; ; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271448/3ST

42 167299 TRANSIT PATRON ORIGIN AND DESTINATION SURVEY. A METRO TRANSIT/CITY OF SEATTLE JOINT PROJECT (1973) [Final rept]. The purpose of this survey was to provide a current data base which would assist in the rational planning and marketing of public transportation in King County, Washington. The report presents the methods and preliminary results of the transit patron origin and destination survey conducted on May 23 and 24, 1973, on the Municipality of Metropolitan Seattle (Metro) Transit System. The survey consisted of two parts, including a one-way (inbound) questionnaire distributed to approximately 58,000 passengers who boarded buses outside the Seattle Central Business District (CBD), and a complementary survey questionnaire distributed to approximately 33,000 persons boarding inside the Seattle CBD. The results of the survey were processed and stored in machine-readable form on magnetic tape. Data were summarized on both a geographic and a demographic basis.

Puget Sound Governmental Conference, Seattle, Wash. *Urban Mass Transportation Administration., Washington, D.C., (UMTA-WA-09-0006) UMTA-WA-09-0006-77-3, Mar. 1975, 102p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272362/5ST

42 167320 VALUE CAPTURE AND JOINT DEVELOPMENT APPLICATIONS: CHICAGO/LOUISVILLE/LOS ANGELES. The study presents highlights of findings, defines how value capture can be implemented, describes important legal, financial and community design issues associated with the value capture concept and summarizes the conclusions reached and the methodology employed in this research. In recognition of the diversity of legal, political, economic and physical situations in which mass transit development has and will occur, Value Capture Policy has been studied and is presented as an array of options. Central to Value Capture is a set of techniques which can be applied by a transit or community development entity. Each technique is designed to enable the entity to enhance and capture financial and/or community design benefits related to transit system implementation.

Sharpe, CP ; Rice University, Department of Transportation Final Rpt. DOT/TST-77/72, Jan. 1977, 206 pp; See also report dated 1 Nov 74, PB-244 101.; Contract DOT-OS-40007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272512/5ST

42 167352 AN ANALYSIS OF TRANSPORTATION PLANNING EFFECTIVENESS [Final rept. Sep 76-Feb 77]. The report documents a novel methodology and analysis procedure for measuring a program's effect, and it is based on data from case studies of a representative group of twenty urban areas, conducted during 1976, which are reported in a companion report titled: Transportation Planning Effectiveness: Twenty Case Studies. The twenty urban areas represent all UMTA regions, a range of population sizes, residential densities, and demographic characteristics. The case studies are reported in a uniform format which focuses on transportation planning effectiveness but also includes the urban areas' socio-economic and travel characteristics, transit and transportation planning history. Specifically, the study reports the influence of Technical Study Grants on transportation planning effectiveness which is measured by the development of professional planning capability, acquisition of new capital equipment, introduction of new or improved services with existing facilities, and alterations in the local institutional climate.

Stearns, MD Cooper, E Schaeffer, KH ; Transportation Systems Center, Cambridge, Mass. *Urban Mass Transportation Administration., Washington, D.C. DOT-TSC-UMTA-77-4, UMTA-MA-09-9003-77-1, July 1977, 77p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272756/8ST

42 167353 PHYSICAL FOUNDATIONS FOR SOCIO-ECONOMIC MODELING FOR TRANSPORTATION PLANNING. PART I: INTERACTION BETWEEN URBAN CENTERS AS A POTENTIAL PROCESS [Final rept. Jan-May 76]. The objective of this research is to make use of a physically based social system model to study the determinants of city sizes and their interactions in a nation. In particular, it was required that attention be paid to how new transportation systems affect city sizes. In this first part of a final report, the character of the distribution function for settlements of man is investigated. The distribution for weakly interacting settlements (early man as hunter gatherer) is developed and experimentally tested against his-

torical data. The distribution function for interacting settlements (since agricultural settlements)-Zipf's law-is then treated, first as a pure information theoretic, namely as a communicational living language, and then as a communicational language for communities of man loosely bound to the earth. To keep the ensemble alive, the need for good cheap transportation among a significant mobile fraction of the population is discussed.

Iberall, AS Cardon, SZ ; General Technical Services, Inc., Upper Darby,, Pa.*Transportation Systems Center, Cambridge, Mass.* DOT-TSC-OST-77-37.1, Sept. 1977, 48p; Contract DOT-TSC-1157; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272795/6ST

42 167357 TRANSPORTATION SYSTEM MANAGEMENT: PROCEEDINGS OF A CONFERENCE HELD IN MINNEAPOLIS ON NOVEMBER 7-10, 1976. Partial Contents: Traffic operations improvements to manage and control the flow of vehicles; Preferential treatment for transit and other high-occupancy vehicles; Management and control of parking; Actions to reduce vehicle use; Actions to improve transit management efficiency; Transportation system management from the Federal Highway Administration perspective; State Highway Department view of TSM; Management by objectives applied to transportation system management; Packaging transportation elements to meet energy goals; Packaging transportation elements to meet environmental objectives.

Transportation Research Board, Washington,, D.C.*Urban Mass Transportation Administration,, Washington, D.C.*Federal Highway Administration,, Washington, D.C.*Institute of Transportation, Engineers, Arlington, Va. TRB/SR-172, 1977, 171p; Sponsored in part by Urban Mass Transportation Administration, Washington, D.C., Federal Highway Administration, Washington, D.C. and Institute of Transportation Engineers, Arlington, Va.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272846/7ST

42 167450 TRANSPORTATION SYSTEMS MANAGEMENT REPORT. The Federal Highway and Urban Mass Transportation Administrations have jointly issued a series of regulations designed to achieve maximum efficiency from the short-range use of existing resources. The Metropolitan Planning Organization (MPO) for the Dayton area, and the Montgomery-Greene County Transportation and Development Planning Program are both responsible for preparing the TSM element of the areawide transportation plan. The items discussed in the TSM Report include those sections which have already been accomplished, those which have been incorporated in TCC's Fiscal 1977 Overall Work Program or which will be incorporated in the work programs of future years; and those which have been forwarded for implementation by other appropriate agencies. The following major headings are discussed in this report: Efficient use of Existing Road Space. Reduction of vehicle use in congested areas. Improvement of Transit Service. And, increased management efficiency throughout the transportation system. As part of the existing long-range transportation plan, the transportation systems management element is

endorsed annually and updated as needed. Through this element, the Transportation and Development Planning Program will guide the Montgomery-Greene County region to more efficient and less expensive movement of people and goods.

Montgomery County Planning Commission
Mar. 1976, 132 pp, 14 Fig., 2 Tab.

42 167463 TSM-A FEDERAL VIEWPOINT.

The concept of Transportation Systems Management (TSM) is essentially that all elements of the urban transportation scene will be treated as members of a single transportation system and that emphasis will be put on maximizing the efficiency of existing transportation facilities and resources. The institutional framework for TSM is essentially coordinating traffic engineers, planners and transit operators. Traditionally, little thought had been given to broadening the scope of this mutual assistance to take in a large area or to attack a problem on a systems basis. The author believes that the Metropolitan Planning Organization (MPO) can play a critical role as conveyor and coordinator. Hopefully within the forum of the MPO, the various groups will sit down together and discuss their problems. Developing a constituency for TSM is essential for certain TSM strategies are likely to be controversial. Bringing these diverse groups together in the early phases of TSM planning can help identify and build rapport for further TSM actions. More cooperation must also be developed in the way projects are actually implemented. The author identifies two major areas of concern. The first is the relatively large unobligated balance of urban funds that is rapidly being built up. The second area of concern is the apparent lack of activity in exercising the funding flexibility that exists in the urban system program. The author concludes the paper with a discussion of the activities at the Federal level related to the urban system program. These include clarifying for State and local officials the options and flexibility available with respect to Federal-aid programs. Streamlining the planning and project development processes. Lastly, FHWA has developed in cooperation with the states an extensive and effective procedures for dealing with project development.

Morgan, RD (Federal Highway Administration)
AASHTO Quarterly Vol. 56 No. 3, July 1977, pp 27-28

42 167471 POWER FOR THE MTA: AN EXAMINATION OF FUTURE RIDERSHIP SERVICE, AND ELECTRIC POWER REQUIREMENTS FOR METROPLITAN TRANSPORTATION AUTHORITY FACILITIES. This study begins by documenting the strong relationship between employment in the Manhattan Central Business District (CBD) and the use of electric railtransit-the subways and commuter railroads. The study explores two possibilities: A moderate drop in Manhattan employment below 1975 levels by the year 2000, and a resurgence in CBD employment to 2.1 million. Other variables that strongly affect ridership are transit fares and auto ownership. One policy investigates a fare rise in step with inflation, the other a fare decline. Two features of the automobile are explored. The auto becomes more energy efficient and smaller and auto use remains the same, and increased auto efficiency and auto use decreases. The possibility of a "Second phase"

subway expansion program is explored, which would add another 46 miles of new routes to the 28 miles currently planned, but would also remove 30 miles of elevated lines. In January 1974 prices, the present New Routes program would cost about \$3.3 billion, and the second phase another \$3.0 billion. Another \$3.5 billion would be required over the next two decades for upgrading the existing subway system. Capital improvements considered for commuter railroads in this study are the Long Island Railroad access to the East Side in the first phase and electrification extensions in the second phase. Lastly, changes in transit equipment and their impact on power needs are explored. 128 separate estimates for different combinations of conditions are explored in this study.

Pushkarev, BS Zupan, JM ; Regional Planning Association Incorporated RPA Bulletin 126, June 1977, 80 pp, Figs., Tabs., 1 App.

42 167477 TRANSPORTATION SYSTEMS MANAGEMENT-LOW CAPITAL ACTIVITIES IN THE TRANSPORTATION SYSTEMS MANAGEMENT PROGRAM, FISCAL YEAR 1977. The purpose of these two technical papers is to document the status of TSM projects and concepts included in the FY 76 and FY 77 TSM Elements, and determine which ones have advanced to the programming and/or implementation stages. Those low-capital activities in the TSM program that were undertaken by the East-West Gateway Coordinating Council during FY77 are described. The objectives of these low-capital improvements were to decrease traffic congestion during peakhours, conserve fuel, and improve air quality. A number of work tasks, ranging from transit promotion and vanpooling to rescheduled work hours and traffic engineering assistance, were under taken to meet these objectives.

East-West Gateway Coordinating Council,
(EWG-TS-0331.10.0) Final Rpt. UM-TA-IT-09-0067, May 1977, 38 pp, 6 Fig., 4 Tab., 1 App.; This report was sponsored by the DOT, Urban Mass Transportation Administration and Federal Highway Administration.; ORDER FROM: East-West Gateway Coordinating Council, 112 North Fourth Street, Suite 1200, St. Louis, Missouri, 63102

42 167501 TRANSIT'S ROLE IN JAPAN'S MAJOR URBAN CENTERS. Three metropolitan centers in Japan occupying 7 percent of the land area contain 40 percent of the nation's population. This report describes current developments in urban transportation in Japan with particular emphasis on identifying problems of major urban areas. While congestion and pollution may be universal problems of urban areas, Japan has special problems such as a rapid increase in demand for transit over very short periods and a great dependence on public transportation for mobility.

Noguchi, T (Weidlinger Associates) *Transit Journal* Vol. 3 No. 3, June 1977, pp 43-58, Figs., Tabs., 8 Ref.; ACKNOWLEDGMENT: Transit Journal; ORDER FROM: American Public Transit Association, 1100 17th Street, NW, Washington, D.C., 20036

42 167533 TRANSPORTATION POLICY IN THE EIGHTIES. Urban transportation policy during the nineteen seventies has been character-

ized by attempts to deal with four major problems: the minimization of environmental impacts of transport investments, the alleviation of inequities in mobility, and financial burdens imposed upon some groups by earlier investments in capital intensive highway networks, the accommodation of demands for public participation in transport decision-making, and the precipitous rise of public transit operating costs. Examples are given of policies which have been pursued in attempting to solve each of these problems. It is shown that policies designed to solve one of them have often intensified others.

Wachs, M (California University, Los Angeles) *Transportation (Netherlands)* Vol. 6 No. 2, June 1977, pp 103-119, 14 Ref.; ACKNOWLEDGMENT: EI, TRRL (TRRL 78241E); ORDER FROM: ESL

42 167536 INTERNATIONAL CONGRESS-INTERNATIONAL UNION OF PUBLIC TRANSPORT, 42ND, 1977. Proceedings include 10 papers that deal with the priority for surface public transport, regional transport in the development of an integrated public transport system, information and orientation systems in metropolitan railroads, development of the motorbus and its integration in modern transport systems, costs of public transport, automation of the control of public transport operations, proposals for the public transport problems, and transport services in medium-sized urban regions.

International Union of Public Transport Proceeding 1977; The 42nd Intl Congress, Montreal, Quebec, May 22-27, 1977. Also available from International Union of Public Transportation, Brussels, Belgium. This consists of 10 papers and 8 Booklets.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 167590 AN AGGREGATE SUPPLY MODEL FOR URBAN BUS TRANSIT-ABRIDGMENT. This paper describes a model that was developed to estimate aggregate characteristics of bus systems capable of carrying substantial fractions of person trips and automobile trips in the Los Angeles area. The model can be applied to other cities, and is based on a generalization of techniques that have been used in corridor-level comparisons of modal options. The model provides a relatively quick and inexpensive means of generating estimates of transit supply characteristics that can be used in assessing the feasibility of proposals for reducing automobile travel in cities and in identifying other options. Specifically, the model gives estimates of fleet sizes and operating policies that would be needed to accommodate varying degrees of reduction in automobile travel.

Horowitz, J (Environmental Protection Agency) *Transportation Research Record* No. 626, 1977, pp 12-15, 1 Tab., 6 Ref.; From Transportation Research Record No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

42 167591 ORLANDO CHANGES DIRECTION: FROM BELTWAY TO BUSWAY. This paper reports on the long-range phase of an overall urban area transportation study in a three-county area centered on Orlando, Florida. The paper focuses on a major shift in perspective regarding solutions to future travel demand problems. Discussed are five transportation system alternatives with various combinations of auto-

mobile-oriented and transit-oriented systems and two major aspects of the study methodology: (a) the formulation of a land use sketch plan designed to be more compatible with a future transit system and (b) the development of a disutility modal-split model based on transit attitudes. Transportation system alternatives are defined and the evaluation and public involvement processes that led to the selection of a preferred alternative plan are described. The implementation of the plan through a short-range transition period is described, and eight major conclusions and observations are given. /Author/

Lee, JW Grovdahl, DL (East Central Florida Regional Planning Council) Gersten, MC Sucher, PO (Howard, Needles, Tammen and Bergendoff) *Transportation Research Record* No. 626, 1977, pp 15-21, 1 Fig., 1 Tab., 9 Ref.; From Transportation Research Record No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

42 167596 WHERE EXPRESS BUSES WORK. Densities of residential areas and sizes of central business districts necessary to generate sufficient demand to support express buses for given frequencies of service at a reasonable cost are estimated. Two types of express-bus operations are considered. In the first case, patrons are picked up by buses circulating in a residential area before the bus travels express to the central business district. In the second, commuters arrive by automobile at a park-and-ride lot before continuing their trips by express bus. We found that, for express-bus operations with pedestrian access, a cost of 6 cents/passenger km (10 cents/passenger-mile) is attainable for only a narrow range of residential densities and only to rather large central business districts. If 12 cents/passenger km (20 cents/passenger-mile) is an acceptable cost standard, a wider range of supporting conditions is possible. Express-bus operations that provide park-and-ride facilities are more broadly applicable at the 6 cents/passenger km (10 cents/passenger-mile) standard. Residential densities as low as 7 dwelling units/hsq m (3 dwelling units/acre) and central business districts of moderate size can in some cases support express-bus service. These findings match reasonably well with empirical data from 11 express-bus operations in two Connecticut cities. The achievement of more express-bus operations is possible by higher residential densities over a larger area and by growth of central business districts in medium-to large-sized cities. /Author/

Zupan, JM Pushkarev, B (Regional Planning Association) *Transportation Research Record* No. 626, 1977, pp 35-38, 3 Tab.; From Transportation Research Record No. 626, Bus Service Planning.; ORDER FROM: TRB Publications Off

42 167602 EVALUATION OF ALTERNATIVE STATION SPACINGS FOR RAPID TRANSIT LINES. ABRIDGMENT. This paper presents a case study in which two alternatives for station spacing for non-central business district (non-BCD) sections of rapid transit lines are evaluated in terms of capital and operating costs, demand, and user benefits. This study involves the use of either a long or a short station spacing for a proposed rapid transit line in Chicago. The two alternatives for station spacings were chosen because they represent realistic strategies for station location on the line. The basic trade-offs

between the two alternatives are shown in cost and demand and user savings. Compared with the long alternative, the short alternative cost more to construct and operate, increases the user's in-vehicle time, but decreases the user's access times to stations. A detailed evaluation was undertaken to provide a quantitative examination of the trade-offs between the two alternatives. This evaluation concluded an analysis of the costs, the ridership, and the user savings associated with the long and short alternatives. A quantitative comparison of the alternatives is given as well as a sensitivity analysis of the analytical results. The study concludes that in terms of cost and demand and user savings, the long alternative is superior to the short alternative for the non-CBD section of a rapid transit line in Chicago. The evaluation approach used in this paper can be applied to comparing alternative strategies for station locations as well as to individual station locations in various circumstances.

Permut, H (Chicago Regional Transportation Authority) Vuchic, VR, Discussor (Pennsylvania University, Philadelphia) *Transportation Research Record* No. 627, 1977, pp 13-17, 2 Tab., 13 Ref.; From TRB Record 627, Rail Transit.; ORDER FROM: TRB Publications Off

42 167619 AUTOS AND PUBLIC TRANSIT FRIENDS OR FOES? This article which maintains that a balanced transportation system would exploit the advantages of both private motor vehicles and public systems, centers on a report developed by the General Motors Corporation as well as on other sources. It is noted that except for the gasoline-nationed years of the second world war, the use of public transit has decreased since World War I. It is believed that increased use of public transit would bring secondary benefits such as energy conservation. A recent study indicates that the maximum energy savings accrue when 10-15 percent of all urban trips are attracted to public transit. Public transit can also play a role in reducing congestion in high-density corridors. It is believed that increases in public-transit ridership to 2 to 3 times the present level are attainable and should attract most of the urban trips. Faster transit systems, capital investments, and trained staff will be required. One study has shown that it might be possible to attract 10 percent of the urban trips by 1990 for an investment of \$65 to 70 billion with a combination of transit bus and rail. Brief comments are made on the funding of transit from tax revenues.

Kaplan, G *IEEE Spectrum* Vol. 14 No. 11, Nov. 1977, pp 89-91, 2 Tab.

42 167861 MASS TRANSIT DECISION-MAKING MARKET SEGMENTATION: A PILOT STUDY. This report describes and then applies what is considered to be a tenable alternative to existing methods of mass transit market segmentation. The approach capitalizes on a resource of findings which have emerged from the modeling of human decision making in psychology over the past fifteen years, which shows potential of being of considerable utility in understanding consumer choice behavior. The resource, known as the theory of information integration, represents the core of the methodological approach posited here. This approach represents a

new way of viewing transit market segments by providing both a theoretical basis for segmentation strategies, something to which existing approaches are insensitive, and a means for estimating the elasticities of the various segments with respect to changes in the transit system. An experiment is reported in which decision-making segments were derived from a population of 62 University of Iowa undergraduates. An attempt was then made to discriminate among these groups based on a set of socioeconomic and travel characteristics of the sample. The results of the experiment as well as implications of the research for mass transit planning and marketing are discussed. /Author/

Koutsopoulos, KC Meyer, R ; Iowa University Technical Report 69, June 1976, 24 pp. 4 Fig., 2 Tab., 15 Ref.

42 167956 TRANSPORT POLICY IN THE UNITED KINGDOM. The authors describe the recent White Paper as a "pretentious failure" to secure allocational efficiency between road and rail. It recognizes the need for "unorthodox" rural transport and for better subsidy management, but the problems of railway finance and local public transport are fundamentally untouched.

Beesley, ME Gwilliam, KM *Journal of Transport Economics and Policy* Vol. 11 No. 3, Sept. 1977, pp 209-223, 8 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England

42 168007 ALTERNATIVE ROLES OF TRANSPORTATION IN URBAN PLANNING. This paper explores the function of transportation in modern urban life, and suggests the more active use of transportation investment planning as a tool for advancing urban planning objectives other than the satisfaction of estimated travel demand. Since unrestrained supply of transportation facilities to meet projected desires appears to be likely to fail both in environmental preservation and the long-term satisfaction of travel demand, strategies for reduction and redirection of that demand are emphasized.

Knight, RL (De Leuw, Cather and Company) *Water, Air and Soil Pollution* Vol. 7 No. 2, Feb. 1977, pp 215-220, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 168066 STRATEGY FOR IMPLEMENTING INTEGRATED REGIONAL TRANSIT. The recent desire for expanded urban public transportation generated by increased environmental and energy awareness and by the negative impact of extensive freeway construction has increased interest in the more efficient use of existing transportation facilities and in finding more cost-effective means of improving and expanding public transit service. A promising solution to these problems is in restructured conventional and paratransit services that are operated as comprehensive regional transit systems integrated operationally, physically, and institutionally. This paper examines the implications of embarking on a 10-year strategy to implement such a system. Three levels of ridership response are assumed, and their effects on system scale and operating policy decisions at biennial intervals are studied. The operating cost

and deficit implications of these three response levels are then traced, yielding insight into the feasibility of an evaluatory strategy. It is concluded that, if a high ridership response results, the dual goals of expanded and improved transit service and reduced operation deficits can both be accomplished. /Author/

Sobel, KL Batchelder, JH (Multisystems, Incorporated) *Transportation Research Record* No. 625, 1977, pp 27-31, 8 Fig., 9 Ref.; This article appeared in *Transportation Research Report No. 625, Transit Planning and Operations*; ORDER FROM: TRB Publications Off

42 168068 MASS TRANSIT GUIDELINES VERSUS A CONSUMER ORIENTATION IN PUBLIC TRANSPORTATION SYSTEMS. This paper evaluates present and proposed mass transit guidelines that contain level-of-service criteria for public transportation. The limited scope of public transportation services that is typically contained within such guidelines is emphasized. The rationale presented supports the need for expansion of these guidelines to include the total range of public transportation alternatives and a consumer orientation. A review of the research concerning the attitudes of the ridership of transit systems illustrates the existing gap between the transit desired and that proposed in the guidelines. Areas for further research are also given, and a time frame for change in which public marketing of urban transportation systems is discussed and set in perspective is given. /Author/

Mundy, RA (Tennessee University, Knoxville) *Transportation Research Record* No. 625, 1977, pp 33-37, 1 Fig., 14 Ref.; This article appeared in *Transportation Research Report No. 625, Transit Planning and Operations*; ORDER FROM: TRB Publications Off

42 168089 DATA PROCESSING OF THE RAIL TRAVEL SURVEYS OF 1971-72. This memorandum describes the computer processing by the GLC of the whole of the British rail survey (1971-72) and part of the underground travel survey (1971-72). These surveys were done to supplement the greater London transportation survey. The resultant data files are used by interested organisations to evaluate transport policies and forecast rail travel demand.

Feltham, AM ; Greater London Council, (0306-7203) Monograph No. 513, 1977, 59 pp, Figs., Tabs., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-228679); ORDER FROM: Greater London Council, County Hall, London SE1 7PB, England

42 168091 URBAN ROAD AND RAIL POLICY. The expectations inherent in legislation concerned with urban transport policy since the 1968 Transport Act are reviewed, and the reasons why these objectives are considered not to have been achieved are discussed. It is suggested that the main reasons for this situation are: institutional flexibility has been more apparent than real, the dearth of really attractive urban public transport capital projects, the apparent irrelevance of public transport subsidy to the congestion issue, the weakness of parking restraint policy, and the inadequate arrangements for administration coordination. The degree of importance placed on urban transport policy in the

consultation document (no more than part of a chapter) is shown to indicate a reduction of emphasis on such problems, and the implications of such a philosophy are considered in relation to such topics as car-restraint policies, measures to reduce the public transport peak, taxation, business cars and problems of management. It is concluded that the change of emphasis-towards a concern for the transport provision for those without a car available-has implications for public transport policy differing from those appropriate to treating public transport as a way of combating congestion.

Gwilliam, K (Leeds University, England) *Chartered Institute of Transport Journal Analytic* Vol. 37 No. 11, July 1977, p 336; ACKNOWLEDGMENT: TRRL (IRRD-228895); ORDER FROM: Chartered Institute of Transport, 80 Portland Place, London W1N 4DP, England

42 168134 APPLICATION OF BEHAVIORAL DISAGGREGATED MULTI MODAL CHOICE MODELS. In the urban travel demand forecasting process, the modal share can be determined by using either aggregate or disaggregate models. Disaggregate models have two main advantages over aggregate models. The first advantage is that they can explain the individual's trip choices in terms of human travel behavior. The second advantage is that they can guide the decision maker in analyzing the effects of certain policy decisions on the travel demand by various modes. The successful use of disaggregate models, however, depends upon reaching minimal aggregation error during the process of transforming disaggregate choices to aggregate travel demand. The main emphasis of this paper is on the application of disaggregate modal choice models for aggregate demand prediction and for policy decisions and not on disaggregate model development. The latter has been discussed in a previous paper by the authors. Using the multimodal choice model developed for the city of Toronto, this paper shows that reasonable results can be obtained while aggregating the disaggregate models for prediction purposes. Minimal aggregation error is achieved using the technique of "segmentation of population into groups". The results are presented both for the observations used in developing the model and for observations outside the sample area, thus providing an insight into the accuracy of the aggregation procedure. The paper also demonstrates by examples how the disaggregate modal choice model can be used as a policy analysis tool. /Author/TRRL/

Cherian, V (Victoria Regional Planning Division, Canada) Sargious, M Morrall, J (Calgary University, Canada) *Logistics and Transportation Review* Vol. 13 No. 2, 77, pp 123-35, 2 Fig., 4 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 229051)

42 168149 TRIP GENERATION AND DISTRIBUTION: THE INCONSISTENCY PROBLEM AND A POSSIBLE REMEDY. There are many shortcomings commonly associated with the conventional urban transportation modeling process. This paper focuses on one of the more important problems-the inconsistency between trip generation and distribution components-and suggests a possible way of alleviating it. The suggested approach involves sorting out the independent effects on tripmaking of origin, destination and travel cost characteristics, and

introducing accessibility measures explicitly into the modeling process. The resulting modeling framework can be used to obtain consistent estimates of trip generation and distribution quantities which are responsive to changes in the transportation and spatial systems. (a) /TRRL/ Cesario, FJ (Cornell University) *Transportation Planning and Technology Analytic* Vol. 4 No. 1, 1977, pp 47-62, 1 Fig., 15 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 229045)

42 168735 URBAN TRAVEL DEMAND FORECASTING PROJECT PHASE I FINAL REPORT SERIES, VOLUME III. DISAGGREGATED SUPPLY DATA COMPUTATION PROCEDURES. The document presents the methods and conventions used by the Urban Travel Demand Forecasting Project to prepare disaggregated urban trip time and cost data for use in the development of behavioral travel demand models. Temporally, spatially, and functionally disaggregated times and costs are calculated for individual work trips taken by surveyed samples of employed persons. The surveys were conducted before and after the introduction of the Bay Area Rapid Transit (BART) service in the San Francisco Bay Area. Together with the socioeconomic data derived from these surveys, the work trip data provide the basis for developing and validating the behavioral models. Chapter 3 describes the development of the temporal disaggregation methods used in the calculation of highway and transit trip attributes. Chapter 4 details the procedures and states the many conventions and assumptions necessary to complete the before-BART data set. It also describes some peripheral procedures used in the preparation of cost and reliability data. Chapter 5 details the preparation of the after-BART data.

Reid, FA ; California University, Berkeley, e for Applied Science & Research Applications UCB-ITS-SR-77-8, NSF/RA-770142, June 1977, 72 pp; Grant NSF-GI-43740; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270930/1ST

42 168736 THE URBAN TRAVEL DEMAND FORECASTING PROJECT PHASE I FINAL REPORT SERIES, VOLUME VIII. DEMOGRAPHIC DATA FOR POLICY ANALYSIS [Special rept]. A forecasting method used to obtain the effects of urban transportation policy is presented. SYNSAM is a methodology for generating a synthetic representative sample of households for an urban area for any specified date. The authors describe the implementation of this procedure for the San Francisco Bay Area, involving the construction of a sample of 12,000 households for the year 1976. In addition to residence and work locations, data for each household comprises a subset of the socioeconomic variables tabulated in the Public Use Sample (PUS) of the 1970 Census. The implementation utilizes 1960 and 1970 Census data plus external projections of population and economic conditions.

McFadden, D Cosslett, S Duguay, G Jung, WS ; California Univ., Berkeley. Inst. of Transportation Studies.*National Science, Foundation, Washington, D.C. Research Applied to, National Needs.*Alfred P. Sloan Foundation, New, York. UCB-ITS-SR-77-10, NSF/RA-770143, June 1977, 94p; Sponsored in part by Alfred P. Sloan Foundation, New York.; Grant NSF-GI-43740;

ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-270931/9ST

42 168783 TIMED DEVELOPMENT STUDY [Final rept]. The study evaluates current development trends in the city of Fremont and remaining development potential, and contains growth policy recommendations. A proposed Timed Development System (TDS) includes three elements: (1) establishment of an annual residential 'growth target' based on employment growth and a desired household/job ratio; (2) designation of residential 'priority growth' areas; and (3) a competitive project review system for the allocation of building permits. In addition, this study recommends that an 'Interim Development Policy for Minimum Density Development on Multi-Family Lands' should be continued. The purposes of the proposed TDS/Minimum Density policies are: (1) reduction of vehicle miles traveled and associated air pollution by expanding local job opportunities and developing multi-family housing in areas accessible to public transit and close to commercial areas; (2) improving the fiscal capacity of the city to provide services; (3) achievement of local and regional housing objectives, including a mix of housing types; (4) promoting urban design and economic development objectives of the city by creating an identifiable and multi-functional urban center; (5) promoting optimum site and project design; and (6) conserving sewage treatment capacity for economic development by phasing residential development. The study includes an analysis of the fiscal impact on the city of projected growth under current development trends.

Fremont Community and Economic Development Dept., Calif.*Department of Housing and Urban, Development, San Francisco, Calif. San Francisco, Area Office. CF-RR-77-1, Aug. 1977, 113p; Grant HUD-CPA-CA-1024; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271521/7ST

42 168791 BUSINESS INDUCEMENT AND ECONOMIC DEVELOPMENT IN THE DOWNTOWN LAKE CHARLES AREA [Final rept]. The city of Lake Charles undertook this study in an attempt to evaluate several problems confronting the downtown area. These include the farmers market, a mass transit terminal, an intermodal transit terminal, and the downtown mall. A detailed study of those major assets or problem areas facing downtown led to a listing of suggested improvement alternatives, accompanied by design sketches and architectural plan illustrations. Consideration is given to razing vacant structures, new office developments, governmental offices for parish and city, hotel/tourist attractions, housing, and traffic signalization. The report concludes with a description of organizational mechanisms and an analysis of tax incremental financing possibilities.

Champeaux, JJ ; Lake Charles-McNeese Urban Observatory,, La.**League of Cities-Conference of Mayors, Inc., Washington, D.C.*Department of Housing and Urban, Development, Washington, D.C. Assistant Secretary, for Policy Development and Research. UO-LCCM-LAC-77-010, HUD/RES-1129, Apr. 1977, 89p; Prepared in cooperation with League of Cities-Conference of Mayors, Inc., Washington, D.C. Contract HUD-H-2196R.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-271650/4ST

42 169202 FEASIBILITY ANALYSIS OF URBAN TRANSPORTATION SYSTEMS WITH SPECIAL REFERENCE TO TUNNELS. Performance-equivalent bus and rail systems were considered under various guideway choices such as dedicated lanes, medians, aerial structures, new rights-of-way, and tunnels. Average per passenger costs were determined for each alternative mode and guideway option. Peak-hour demand was projected for each of the 35 largest metropolitan areas based on analysis of 1970 journey-to-work tables and assumptions on future growth and distribution of population and employment. The decision to prefer tunnels over other choices is highly sensitive to right-of-way costs (property values) and the relative cost of tunnel excavation. If existing property values and construction costs prevail to 1990, 139 miles of tunnels nationwide are projected, while under more favorable conditions, nearly 400 miles of tunnels were found to be justified. The likelihood of fulfilling the optimistic condition is discussed.

Myers, MG Wood, RK Lago, AM Blattenberger, LB ; Systan, Incorporated, Ecosometrics, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-OST-77-47, SYSTAN-D146.1, Oct. 1977, 460 pp; Prepared in cooperation with Ecosometrics, Inc., Bethesda, Md.; Contract DOT-TSC-1075; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274372/2ST, DOTL NTIS

42 169258 THE SAN DIEGO TRANSIT STUDY DATA BASE: REFERENCE MANUAL. The manual presents descriptions of the sources and procedures used in compiling a data set for analyzing the impacts of changes in the service and fare policies of the San Diego Transit Corporation (SDTC) bus system over a 40-month period between 1972-1975. The manual describes the data items, the sources of data, the coding procedures, and the creation of computer files. It provides a glossary of terms and concepts adopted in creating and using the data set. The intent of the manual is twofold: (1) to serve as a supplementary reference document to other reports of the Urban Institute's San Diego transit study, and (2) to be a source for those who wish to familiarize themselves with the nature and structure of the computer files.

Green, MA ; Urban Institute, Urban Mass Transportation Administration, (UMTA-DC-52-0002) UMTA-DC-52-0002-77-3, Working Pap 5066-5-2, June 1977, 83 pp; See also report dated May 77, PB-275 009.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-275010/7ST

42 169706 THE URBAN TRAVEL DEMAND FORECASTING PROJECT, PHASE I FINAL REPORT SERIES, VOLUME XI. FORECASTING TRAVEL DEMAND IN SMALL AREAS USING DISAGGREGATE BEHAVIORAL MODELS: A CASE STUDY. The patronage of a new transit system proposed for a suburban city in the San Francisco Bay area is predicted using disaggregate behavioral models of transportation choice. Features of the study include: (1) detailed transportation alternatives (the models that were used estimated the probabilities of choices among seven different travel modes); (2) calculation of time and cost data

needed as inputs to the forecasting models with hand measurements of walk distances for each person in the sample, and descriptions of trips both inside and outside the local area; (3) a method based on iterative proportional fitting used to correct for unrepresentative sampling of the population of potential bus users; and (4) analyses conducted to test and compare the accuracy of the probabilities estimated by different behavioral models, using data available before the bus system was running. Results suggested that the behavioral models used can be feasibly applied to travel demand forecasting in small urban areas, but that additional development and testing of the models should be done before they are used as a basis for policy decisions.

Johnson, MA Adir, A ; California University, Berkeley, National Science Foundation Final Rpt. UCB-ITS-RR-77-13, NSF-RA-770282, Aug. 1977, 63 pp; See also Volume 6 dated Aug 77, PB-274317. Performed under Grants NSF-GI-43740 and NSF-APR74-20392.; Grant NSF-GI-43740; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274318/5ST

42 169972 SOCIAL "BALANCE SHEET" FOR SHORT-DISTANCE PUBLIC TRANSPORT [Sozialbilanz im öffentlichen Personennahverkehr]. The traditional presentation of company accounts, with their exclusively profit-oriented character, is not a true reflection of the company's activities, in that they tend to overlook the main objectives of a short-distance public transport company. Hence the presentation, for this particular business, of results based on its social aspect, in the form of a "social balance sheet". Alongside general considerations and possible premises for this particular sector of activity, the author identifies the social profit and cost elements, and gives an assessment based on turnover. [German]

Wassmuth, H Ohlms, N *Internationales Verkehrswesen* Vol. 29 No. 4, July 1977, pp 217-223; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Dr Arthur Tetzlaff-Verlag, Niddastrasse 64, Frankfurt am Main, West Germany

42 169985 ANALYSIS OF PREFERENCE FOR MIXED-MODE TRANSIT. The general concept and service characteristics of mixed-mode transit (MMT) are discussed. The interface between a rail system and a variety of access modes has been examined in the context of introducing an innovative transportation mode. Preference models for MMT systems were developed to assess the percentage of users who might prefer an MMT configuration to conventional transit alternatives.

Nicolaidis, GC (General Motors Corporation) Murawski, CA *Traffic Quarterly* Vol. 31 No. 3, July 1977, pp 471-496; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 169986 TRANSIT ALTERNATIVES ANALYSIS FOR LOS ANGELES. An interdisciplinary team of public agency personnel and consultants has recently performed a transit alternatives analysis subject to guidelines promulgated by UMTA mandating a comprehensive assessment of the social, economic, environmental, and urban development goals of an area as an integral part of the transportation planning process. The alternative analysis, the first to be

completed subsequent to the new UMTA directives, utilizes an iterative and hierarchical approach to transit planning proceeding from system level evaluation, followed by a selection of high-priority areas or corridors for further analysis, which is in turn, followed by the selection of the highest priority subareas for extremely detailed analysis and evaluation. Major categories of investigation included an analysis of many quantifiable measures leading toward cost-effective transit solutions (e.g., capital and operating costs) as well as a qualitative comparative assessment of such factors as visual impacts and direct impacts on land-use goals and objectives.

Taylor, P (Southern California Rapid Transit District) Howell, L *ASCE Journal of Transportation Engineering* Vol. 103 No. 6, Nov. 1977, pp 665-684, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 169987 TRANSPORTATION SYSTEMS FOR AMERICA'S FUTURE-A MANAGEMENT OVERVIEW. This special publication is based on presentations from the keynote session at the 1976 SAE National West Coast Meeting. Its purpose was to provide an overall view of America's transportation needs for the future and how they can best be met. Because of the outstanding success of the session, SAE decided to publish the keynote presentations so that the viewpoints expressed could reach a broader audience. Specifically, the publication contains an overview of transportation system requirements nationally and panel discussions of this overview from the viewpoints of the automobile industry, the railways, rapid transit equipment manufacturers and railway equipment manufacturers.

Society of Automotive Engineers SAE Spec Publ N420, Nov. 1976, 58 pp; Presented from Keynote Session at SAE National West Coast Meeting, San Francisco, August 9-12, 1976.; ACKNOWLEDGMENT: EI; ORDER FROM: SAE

42 170566 QUICK-RESPONSE URBAN TRAVEL ESTIMATION MANUAL TECHNIQUES AND TRANSFERABLE PARAMETERS. This Users Guide provides methods, transferable parameters, tables, nomographs, etc., for use with manual and computer techniques for urban travel estimation. A companion report, "Travel Estimation Procedures for Quick Response to Urban Policy Issues" was also prepared. The two documents are the results of an investigation of the ability of travel estimation procedures to provide information which can be used to respond quickly to urban policy issues. This document provides manual techniques and appropriate tables and graphs in the areas of: trip generation, trip distribution, mode choice, auto occupancy, time-of-day distribution, traffic assignment, capacity analysis and development density/highway spacing relationships. Application of the material to three scenarios (site impact, corridor analysis and density/highway spacing) is also included. There are numerous problem areas where application of the manual methods provided will prove advantageous as compared to the application of computer procedures. The transferable parameters allow quick response compared to the time required to collect local information, and may be used by computer methods as "default" values where more appropriate local information may not be available. The parameters

are also used in the manual methods described. /Author/

Comsis Corporation Final Rpt. NCHRP Project 8-12A, Nov. 1977, 604 pp, 169 Fig., 72 Tab., 73 Ref.; Prepared for Transportation Research Board, National Cooperative Highway Research Program. This work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration.

42 170929 AN ANALYSIS OF THE ROLE OF SUB-REGIONAL TRANSIT STUDIES--A REGIONAL PERSPECTIVE. An analysis is presented of the sub-regional Transit Development Programs (TDP's) for the Regional Transit Authority (RTA), and based on this, a proposal is made to describe the form of transit study most appropriate for the needs of each level of geographical aggregation: local, regional and federal. Such a study will address the transit needs of local areas, will provide the most valuable input into regional plans and programs, and will be translated into specific grant applications. Comparison of the 6 TDP's showed that all programs identified alternative transit concepts, and defined goals and objectives. The full marketing approach was followed in 2 studies. The modeling strategies for ridership estimation varied widely. The important features of each of the six studies are tabulated. It is recommended that the RTA should be involved in the study which will be performed at the local level. RTA support from the Marketing and Service Planning Department is required to lend expertise and to detail routes and schedules. Active RTA input is also required in "selling" the new service. Part of the study involves setting up a structure of responsibilities and communications (monitoring) to assure that the study is kept up to date.

Bowman, LA Bernard, MJ, III ; Northeastern Illinois Regional Transportation Auth TR-76-07, June 1976, 39 pp, 3 Fig., 4 Tab., 2 App.; The preparation of this report has been financed in part through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration.

42 170944 PRIVATE TRANSPORT. PUBLIC TRANSPORT [Individualverkehr. Öffentlicher Verkehr]. The author, by means of in-depth analysis of transport development in Austria, concludes that private car transport has reached a saturation point, so that more rational organization of public transport is required, bearing in mind the particular characteristics of each mode of transport. Area transport should be restricted to buses, and "linear" transport, with a properly adapted rail network, to the railways.

Krawina, J *Verkehrsannalen* Vol. 24 No. 3-4, Oct. 1977, pp 117-149, 9 Tab., 87 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Verkehrsannalen, Gauerannegasse 4, Vienna 100, Austria

42 172092 TRANSIT DATA FOR 173 URBANIZED AREAS BETWEEN 50,000 AND 200,000 POPULATION. This Urban Mass Transportation Administration (UMTA) listing of the 173 urbanized areas between 50,000 and 200,000 population identifies all transit operations (184) serving within those areas. /GMRL/

Urban Mass Transportation Administration
Tech Notice 6-77, Aug. 1977, 5 pp; ACKNOWLEDGMENT:

42 172143 OBSERVATIONS ON TRANSPORTATION SYSTEM MANAGEMENT (TSM) AND SUGGESTED CRITERIA FOR A WORKABLE TSM PROGRAM. In this paper, general observations are made and developmental efforts for improving TSM are suggested. Seven criteria must be met for a workable TSM process: a workable structure to bring together the various elements of the urban transportation scene; an initial classification system for TSM actions by which feasibility studies can be conducted by the most appropriate participants in the process; a second classification system to group TSM actions assigned to the MPO for study, according to their compatibility in achieving TSM objectives; technical process for evaluating arewide TSM actions or groups of actions which is compatible with the evaluation technology for long-range transportation alternatives; coordinated effort between TSM evaluations and the development of transportation control strategies required under the Clean Air Act; a monitoring process to validate results of TSM actions after implementation; an issue format on alternative combinations of TSM actions for discussion and debate by the policy group and funding incentives must be developed to encourage TSM consideration. Topics for priority consideration is developmental work for improving the planning and implementation are also suggested.

Roark, JJ ; North Central Texas Council of Governments Nov. 1977, 19 pp; Presented at the Federally-Coordinated Program Conference, Columbus, Ohio.

42 172364 AN EVALUATION OF PROMOTIONAL TACTICS AND UTILITY MEASUREMENT METHODS FOR PUBLIC TRANSPORTATION SYSTEMS: EXECUTIVE SUMMARY. The first part of the report focuses on the promotion of public transportation. It includes a survey of relevant communications and marketing literature, the research hypotheses that were deemed relevant, the methodology used to test alternative promotional tactics, and results of interpretation of the findings for promotion for public transportation. The second part focuses on recent advances in methods for quantifying preference levels for various products and service features of transportation modes. Similarly, it reviews the relevant literature, presents the methodology whereby alternative measurement methods may be applied to evaluate the attributes of transportation systems in the study area, and reports the findings concerning the usefulness of the methods tried as well as recommendations for transit planning and future research in the problem area. From these results, several suggestions for future research appear to be germane. First, longitudinal studies of the effects of multi-exposure promotional campaigns on attitudes and behavioral intentions toward public transportation need to be undertaken. Second, incremental changes in the attributes having the greatest potential for altering utilities should be implemented and monitored. Third, analytical models for evaluating the political and economic viability of alternative attribute combinations for transportation systems need to be developed. Fourth, further developments

should be undertaken to develop a more parsimonious instrumentation for eliciting trade-off data for potential users of transportation services. Finally, work should be undertaken to reduce the computational costs of analyzing trade-off data. The results of the study indicate that unless there are substantial improvements in the product (public transportation) promotion will not be effective in obtaining attitudinal and behavioral changes. The trade-off analyses developed in this study provide indications of the areas where policy may be most effective in increasing the utility of public transportation services. These findings provide, at least, a first handle on some of the policy levers that may be available to decision makers confronted with choosing alternative strategies for the provision of public transportation in their communities.

Alpert, M Golden, L Betak, J Story, J Davies, CS
Texas University, Austin Research Report 39, Mar. 1977, 3 pp; Sponsored by the Department of Transportation, Office of University Research.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274135/3ST

42 172543 NORTHERN CORRIDOR BUS-RAIL STUDY. The immediate purpose of this project was to study Adelaide's northern corridor, as a pilot for other investigations elsewhere, "to determine the optimum location and size of interchanges, to develop a preliminary design for bus/rail co-ordinated services and to assess the economic viability of the proposals". The primary output of the study was seen as: (I) identification of stations suitable for development as mode transfer locations; (II) route, frequency and fare policies; (III) projected access mode usage levels; (IV) preliminary layout plans for the recommended interchanges; and (V) examination of the economic and environmental justification of the proposals. This report was prepared for the Director-General of Transport, South Australia. /TRRL/

Loder and Bayly Monograph July 1977, n.p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD-229981); ORDER FROM: Loder and Bayly, 79 Power Street, Hawthorn, Victoria, Australia

42 172561 SOME DEVELOPMENTS IN TRANSPORT DEMAND MODELLING. This paper discusses some of the results obtained from the micro-economic interpretation of travel behaviour as it relates to the structuring of transport demand models. Emphasis is on evaluations using consumer surplus measures, and work done in Great Britain is mainly reported. The effects of variations in personal choice on the structure of demand models is analyzed, and the theory of personal difference models is developed. Some examples are given of a type of demand model (referred to as a "structured logit model") which is consistent with personal difference utility variation. /TRRL/

Daly, A ; Local Government Research Unit Monograph Apr. 1977, 17 pp, 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-229546)

42 172828 GOLDEN GATE RECREATIONAL TRAVEL STUDY. This study investigated the impact of the development of certain lands in the San Francisco Bay Area as a national parkland, and planned methods of carrying visitors to and

within the park areas. The plans attempted to resolve problems related to: the accelerated weekend travel demands in already traffic-congested areas; and access for the general populace to this major new Bay Area recreational source. Funding policies, general policies concerning transit operators, field data for future recreational travel plans, and policies relating to non-monitored access are considered. The Study Plan recommends two basic additions to the existing transportation system--Transit/Information Junctions and Park Shuttles. Specific recommendations for changes in current transit routes are also made. The mathematical model for predicting the amount of travel between the park and populated areas, transportation alternatives, and information systems which would stimulate travel are discussed. The major study findings regarding transit use, auto use, and informational needs are presented.

Metropolitan Transportation Commission Sumry Rpt. UMTA-CA-09-0025, July 1977, 82 pp, Figs.; The preparation of this report has been financed in part through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964, as amended. Additional funding has been provided by the National Park Service, the County of Marin, Caltrans and the Federal Highway Administration.

42 172866 FUNCTIONAL FORMS OF THE UTILITY INTEGRATION RULE IN TRADE-OFF ANALYSIS. This paper investigates the sensitivity of the N.Y. State Department of Transportation's trade-off model (an attitude scaling procedure) to the utility integration rule incorporated in the model. Three utility integration rules are tested: a multiplicative model, an additive model, and an exponential additive model. The sensitivity of the procedure is evaluated at two points: first using the utilities estimated by the different forms, then by means of a market simulation. Utilities were estimated for the multiplicative and additive models only. Systematic differences were found but they are very small. The market simulation was done using all three models in conjunction with either a voting share or a Luce preference share model. Expectedly, no differences were found under the voting share model, while again systematic though small differences were found under the preference share model. Overall, there are no significant empirical differences between the results arrived at under the three utility integration rules. Nevertheless, the exponential additive model is the preferred model, in the context of this procedure, because it requires only interval-scale data. /Author/

Koepfel, KWP ; New York State Department of Transportation Research Rpt. 122, Aug. 1977, 69 pp, 4 Tab., 85 Ref.; This report was prepared in part with the financial assistance of the U.S. Department of Transportation.

42 172885 THE TRADE-OFF MODEL: EMPIRICAL AND STRUCTURAL FINDINGS. This paper reports on a number of investigations done by N.Y.S.D.O.T. to investigate empirical and theoretical aspects of trade-off analysis, a multidimensional attitude scaling procedure. Using a split half sample of 110 N.Y.S.D.O.T. employees, and a questionnaire on staggered work hours, the trade-off procedure was com-

pared to categorical judgement. It was found that the methods are not equivalent: the trade-off procedure is preferential for the analysis of incremental changes in policy. Another analysis was conducted to investigate possible respondent fatigue effects due to the lengthy questionnaire: the effect was found to be significant. Further investigation was conducted to investigate the effect of a reduction in the questionnaire length. In general, a reduction of at least 50% in the number of required data matrices can be achieved without a significant loss in the quality of the results. Finally, the sensitivity of the procedure to a number of utility integration rules was investigated. While small differences in the results were found, they are small enough to be of little concern to the practitioner using the procedure. The research concluded that the trade-off procedure is a powerful robust approach that can be used with confidence. /Author/

Eberts, PM Koeppe, KWP ; New York State Department of Transportation Res. Rpt. 123, July 1977, 29 pp, 11 Tab., 10 Ref.; This report was prepared in part with the financial assistance of the U.S. Department of Transportation.

42 173185 PREDICTING THE IMPACTS OF TRANSPORTATION ON THE SPREAD OF URBAN BLIGHT. Large-scale, urban transportation developments can affect the spread of urban blight through residential areas both directly and indirectly. Sources of blight and their specifications in filtering models are reviewed. Relations between transportation developments and sources of blight are considered to determine whether filtering models can be used to predict the impacts of a development. While none of the models are adequate for this purpose, they provide the basis for a procedure to consider a proposed development's impacts.

Schmitt, RR (Johns Hopkins University, Baltimore) *Transportation Research Record* No. 634, 1977, pp 27-32, 58 Ref.; This article appeared in *Transportation Research Record* No. 634, Predicting and Measuring Impacts of Transportation Systems.; ORDER FROM: TRB Publications Off

42 173193 SOME SOCIAL, ECONOMIC, AND ENVIRONMENTAL RESEARCH NEEDS. Four major shifts that will shape research and policy agendas through the 1980's are enumerated and discussed. It is noted that the highway development backlog has now been completed and ways are being sought for improving the performance of the transportation network. Economists, lawyers, environmentalists and sociologists are entering the field of transportation planning and management. The concern for equity has supplanted that for efficiency in the above field. It is also noted that the hitherto powerful role of transport in shaping land use may now be ending. Another major shift is the decline in public transit and the absence of an obvious successor. Concern about highway accidents, energy, and the environment has generated engineering changes that will improve the auto highway system. However, other problems remain, the most serious is that the accessibility afforded by the automobile is not available to everyone. The more effective use of transit services, small vehicle transit service, and paratransit using automobiles as the public transit vehicle are

likely prospects for the future. Studies of new organizational forms for redistributing services is recommended. Comments are made on the influence of the automobile on land use patterns.

Webber, M (California University, Berkeley) *Transportation Research Circular* No. 187, Dec. 1977, pp 32-34; This article appeared in *Transportation Research Circular* No. 187, Transportation Research Needs Related to Social, Economic, and Environmental Issues.; ORDER FROM: TRB Publications Off

42 173299 BUS NETWORKS AND BUILDING AREAS IN MIDDLE-SIZED TOWNS. PARTS 1-3 [Busslinjenæet och bebyggelse i medelstora stæder. Del 1-3]. The aim of this project was to improve the basis of knowledge for bus network and building area planning concerning priority between travel-flows, adjustment of public transport planning to physical planning and adjustment between walking distance and bus frequency. In the network evaluation journey time and time value were considered. The priority between travel flows was studied by comparison of radial networks with tangential networks. The lowest average journey time value was obtained for networks with small tangential line deviations. It is essential for network selection to consider distribution effects between areas and between groups of individuals. Important improvements of travel standards can be obtained by the planning of continuous building areas and central line routeing, co-ordinated location of links and nodes in public transport systems within important destination areas, co-ordination of residential and other building areas with work/service areas. No evident results were obtained from the studies of adjustment between walking distance and bus frequency. This was because of a lack of empirical knowledge of waiting time related to tour interval and of the way in which waiting time and walking time are valued by different groups. The analysis of time value was carried out to compare real time with experienced time value. Both methods of analysis gave analogue results. /TRRL/ [Swedish]

Lundberg, S ; Swedish Council for Building Research, (91-540-2674-1) Monograph T15: 1977, 1977, 326 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 230506), National Swedish Road & Traffic Research Institute

42 173559 MASS TRANSPORTATION ALTERNATIVES: AIR, HIGHWAY, BUS AND RAIL. This article explains where we are today concerning mass transportation. It takes an in-depth look at the past, present and future projections of passenger traffic by discussing the interstate highway, rail, air, and bus systems. It outlines transportation needs in both urban and rural areas, as well as discussing problems which will need to be solved in order to make mass transportation a viable alternative to the private automobile.

Smith, PA ; Society of Automotive Engineers Preprint SAE 770679, Aug. 1977, 8 pp; Preprint for meeting held August 8-11, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 174014 COMPREHENSIVE IMPACTS OF URBAN TRANSPORTATION SYSTEMS. Solutions to urban transportation problems are twofold: First, alternative transportation systems must become available as a reasonable substitute

for the private automobile. Second, the spatial orientation of urban areas must be planned so as to prevent the inefficient cross-hauling requirements of the populace. As the inefficiencies and dis-economics of private auto transportation increase, users will equitably share a larger proportion of the social and actual costs of the mode. The entire urban planning process should become more oriented towards land-use planning with regard to more efficient accessibility. Because of the increasing diversity of origins and destinations other than the central urban core, there will always be a need for some type of private transportation. The concept should be one of an interfacing of the two modes rather than a reliance on one or the other. The present quality of service offered by mass transit is inferior in terms of convenience, comfort and speed, as well as the low availability of service. In order to offer effective competition with the private automobile, any form of mass transit must offer comparable amenities at reasonable costs. The massive resources required to initiate the development of new systems should be a joint effort of the government and private industry.

Smith, JR (Portland, Oregon International Airport) *Airport Management Journal* Vol. 2 No. 1, Jan. 1977, pp 8-12; ACKNOWLEDGMENT: American Association of Airport Executives; ORDER FROM: American Association of Airport Executives, 2029 K Street, NW, Washington, D.C., 20006

42 174024 TRANSPORTATION MODELING IN A CHANGING WORLD: A MIAMI CASE STUDY. Cities throughout the United States are placing increasing demands on the Urban Mass Transportation Administration for funding of improved transit systems. Approximately 40 of these communities are serious about developing rapid transit in one form or another. However, as a class, these proposals are extremely expensive and could utilize the entire Urban Mass Transportation Administration funding as established under the National Mass Transportation Administration Act of 1974 (\$11 billion over six years). To assure fair, systematic evaluation of these requests, the Urban Mass Transportation Administration has developed a series of policy guidelines that emphasize local decision-makers in creating a sound approach to alternative systems evaluation so that the technical results of all "lead-in" studies to rapid transit funding requests can be factually supported. Traditional technical approaches to transportation models are not tailored to the needs of planners and decision-makers. Using the Miami setting as a basis, a modeling approach is discussed that is directed toward: providing local officials and planners with policy options that will allow them to achieve stated goals with regard to the role of the transportation system in the urban environment; and evaluating quantitatively and analytically the effects of various uncertainties on the capital-intensive system investments. This approach uses a mathematically based risk analysis model together with sensitivity analysis and policy modal split techniques. The first model evaluates the degree of uncertainty involved in patronage and revenue projections and thus provides measures of the risk involved in investment alternatives. The latter set of models is capable of developing system characteristics and policy

combinations that will achieve modal split objectives for the region and for certain predefined trip and tripmaker strata. In addition to discussing these approaches and their application in Dade County, Miami, the role of calibration in the behavioral modeling package is described and illustrated.

Hinds, DH Roark, AL Schimpeler, CC Corradino, JC *Transportation Planning and Technology Analytic* Vol. 4 No. 2, Jan. 1978, pp 125-135, 5 Fig., 2 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230949); ORDER FROM: ESL

42 174047 CONSIDERATIONS INFLUENCING THE FEASIBILITY OF COMMUTER RAIL SERVICE. PASSENGER SERVICE EVALUATION. TECHNICAL REPORT 6. This report addresses the feasibility of commuter rail operations designed to serve workday urban travel demands. This report does not provide a detailed evaluation of the potential for commuter rail service in any specific corridor; rather, it provides an overview of issues and problems that should be realized in evaluating the desirability of a commuter rail operation in any corridor. This report is divided into five sections. The first section describes the travel problems that exist which create an interest in the commuter rail alternative. The second section presents operating considerations that would be associated with a commuter rail system in Texas. Following this, a preliminary estimate of the market for commuter service in illustrative travel corridors is provided. The fourth section identifies the general magnitude of revenue and cost that might be generated by a commuter rail system. Finally, a synopsis of the major findings is presented.

Christiansen, DL Grady, DS ; Texas A&M University Jan. 1977, 36 pp, 7 Fig., 8 Tab., 6 Ref.; ACKNOWLEDGMENT: Texas A&M University; ORDER FROM: Texas A&M University, Texas Transportation Institute, College Station, Texas, 77843

42 174168 TRAFFIC FORECASTING. PART 1. The author considers that the central fact of the work on traffic forecasting is the technique used to forecast the growth of car ownership, but that the conversion of this forecast into traffic growth, especially into trunk road traffic, raises a whole series of problems. It is suggested that there are a considerable number of techniques available for car ownership forecasting, depending on the data available for calibration. The Department of Transport's method of forecasting is described as that technique known as time series analysis, initially calibrated on licensing data, but now increasingly being used on census data at a local level. The use of this technique is discussed and compared with other techniques used by the Department of Transport, such as the cross-section technique used for car ownership forecasting in its national traffic model (NTM), and those used by British Rail and by the Greater London Council. The interaction between car purchase and car use in relation to land use and travel is examined, and the traffic implications of petrol prices and prices of public transport, and service levels, both in the short and long term are discussed. The basic assumption in a cross-section technique as compared with a time series analysis technique is that there is a stable relationship between car ownership, or some level of car ownership and income. Such differences are dis-

cussed, and emphasis is placed on the need to calibrate the model used, and to consider the validity of the data used for calibration, and its extent, and the specification of the actual indices used. /TRRL/

Mogridge, MJH (Greater London Council) *Highways and Road Construction International* Vol. 45 No. 1811, Aug. 1977, pp 5-10, 1 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230957)

42 174169 TRAFFIC FORECASTING. PART 2. Part 2 of this two-part commentary on the department of transport's method of traffic forecasting is mainly concerned with car purchase and car use. The author suggests that whilst the growth of car ownership appears likely to continue, indeed to levels substantially in excess of the department's estimates, the level of car traffic arising therefrom is much more sensitive to policy on taxation and service levels, whether on trunk roads or generally, and that much more work needs to be done to evaluate what the best policies are for the community as a whole. The author states that the only source of data which simultaneously gives the expenditure on car purchase and car use for each household income level is the family expenditure survey. These data are discussed, and it is suggested that since the car owning sample is only about 4000 households per year, any conclusions must be considered as tentative. The proportion of disposable income allocated to car purchase and use is given as about 15 1/2 per cent, and this finding is discussed in relation to movements in the prices of fuel and the growing demand for increases in car size. The relationship between public and private transport is discussed, together with policy implications concerned with petrol taxation; bearing in mind that the major determinants of car ownership are considered to be incomes and car prices, but not fuel prices. /TRRL/

Mogridge, MJH *Highways and Road Construction International* Vol. 45 No. 1812, Oct. 1977, pp 5-9, 2 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 230958)

42 174635 TRANSIT PLANNING AND OPERATIONS [Transportation research record]. Contents: Attitude surveys, transit planning, and automobile-use constraints; Marketing approach using product diffusion knowledge to measure consumer transit attitudes; Consumer reaction to transit marketing in Boulder, Colorado; Analysis of user response to the 1975 New York City transit-fare increase; Cost increases, cost differences, and productivity of transit operations in New York State; Transit costs during peak and off-peak hours; Strategy for implementing integrated regional transit; Bus transit route demand model; Mass transit guidelines versus a consumer orientation in public transportation systems; Bus passenger service-time distributions; Differential time-of-day transit-fare policies: revenue, ridership, and equity; Approach to the planning and design of transit shelters; Role of simulation models in the transit-station design process; Rehabilitation of suburban rail stations.

Hoey, WF Levinson, HS Schwartz, ML Obinani, FC Holthoff, WC ; Transportation Research Board, Washington, D.C. TRB/TRR-625, 1977, 70p; Library of Congress catalog card no. 77-20041.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274535/45T

42 174682 PROGRAM OF STATEWIDE TRANSIT ANALYSIS AND TECHNICAL ASSISTANCE. Contents: Coordination of data concerning capital and operating programming; statewide coordination of service effectiveness and subsidization projections; transit analysis in support of environmental and energy conservation responsibilities; development of statewide transportation services for the elderly and handicapped; marketing public transit; summary of transportation technologies-- applicability and cost-effectiveness; summary of transportation services for the elderly and handicapped; recommendations for transportation of special needs children; evaluation criteria for elderly and handicapped transportation services. (Portions of this document are not fully legible)

Massachusetts Executive Office of Transp & Constr, Urban Mass Transportation Administration, (UMTA-MA-09-8001) Final Rpt. PUB9224-86-85-1076CR, June 1976, 94 p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274957/05T

42 174729 BALTIMORE REGION RAPID TRANSIT SYSTEM. PHASE I [Rept. for Sep 71-Dec 73]. Significant transportation planning for Baltimore was begun in the early 1960's with an analysis of the long-range and specific urban transportation requirements for the region. The T9-6 (September 1971-December 1973) is one more step in the continuing planning and design process leading to the construction and operation of a public rapid transit system in the Baltimore region; it is administered and supervised by the Mass Transit Administration. This report presents a review of the work completed and the results achieved by the T9-6 Baltimore Rapid Transit project, and summarizes the rapid transit development program to date, as well as the current and future program leading to Phase I implementation. The basic purpose of the T9-6 project was to provide preliminary engineering designs, design criteria and guide specifications for the Phase I system; and to develop additional studies and analyses relative to cost, schedule, and other technical aspects to serve as a basis for the current Phase I Capital Grant Project. The Phase I system includes the Northwest and South lines (about 28 miles of line structure and 20 stations). The two Phase I lines are completely grade separated along routes extending northwest and south from Charles Center, and will provide frequent, high-speed, automated rapid transit service utilizing modern steel wheel vehicles traveling on steel rails. The two Phase I lines and corresponding stations are illustrated herein.

Daniel, Mann, Johnson and Mendenhall/Kaiser, Engineers, Baltimore, Md.*Urban Mass, Transportation Administration, Washington, D.C.*Maryland Dept. of Transportation, Baltimore., (UMTA-MD-09-0006) UMTA-MD-09-0006-78-1, Jan. 1974, 131p; Sponsored in part by Maryland Dept. of Transportation, Baltimore. See also report dated Jun 71, PB-212 815.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-276588/15T

42 174951 TRAVEL HABITS AND PATTERNS. VOLUME 2. 1974-JAN 78 (A BIBLIOGRAPHY WITH ABSTRACTS). This two-volume work is devoted to U.S. travel patterns and habits primarily in urban areas. Pres-

ented are discussions on mass transit, modal choices and split, parking, park and ride, and commuting. Disadvantaged, disabled, student, and various age groups are studied along with recreational data. References are made to dial-a-ride, dual mode, car pooling, taxicab, railroad, rapid transit railways, and aircraft. (This updated bibliography contains 179 abstracts, 25 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Jan. 1978, 184 pp; Supersedes NTIS/PS-77/0033, and NTIS/PS-76/0026. See also Volume 1, 1964-73, NTIS/PS-76/0025.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0020/4ST

42 175939 TRANSPORTATION PLANNING: NETWORK MODELS AND THEIR IMPLEMENTATION. Transportation planning plays an essential role in shaping regional and urban lifestyle. Complex decisions regarding policy alternatives for railroads, shipping, airline, and roadway traffic can often be, and often have been, analyzed using network optimization techniques. In this paper, the authors survey applications of network algorithms to transportation planning, stressing networks models and their efficient computer implementation. They discuss recent contributions concerning shortest paths, minimum cost network flows, traffic equilibrium, vehicle routing, and network design, and they enumerate several open research problems. Much of the discussion reflects an emerging theme in the analysis of transportation problems, the blending of ideas from transportation science, computer science, and operations research. (Author)

Magnanti, TL Golden, BL ; Massachusetts Institute of Technology Tech Rpt. TR-143, Jan. 1978, 59 pp; Contract N00014-75-C-0556, DOT-TSC-1058.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A050652/7ST

42 176160 MAKING FUTURE TRANSPORTATION DECISIONS: INTERMODAL PLANNING NEEDED. Intermodal planning is an examination of interactions and relative costs and benefits between competing and complementary transportation modes. Through intermodal planning, significant savings can be realized in the areas of freight movements and urban passenger travel. To promote intermodal planning by State and local transportation agencies, the Secretary of Transportation should seek (1) congressional legislation to consolidate Federal airport, highway, railroad, and transit planning grants into a block grant for all transportation planning and (2) merge the Department of Transportation's modal planning staffs into a single, all-mode unit.

General Accounting Office Cong Rpt. CED-78-74, Mar. 1978, 26 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278526/9ST

42 176167 PASSENGER TRAVEL DEMAND FORECASTING [Transportation research record]. Contents: Tests of the temporal stability of travel simulation models in southeastern Wisconsin; Location, housing, automobile ownership, and mode to work—a joint choice model; Transferability and updating of disaggregate travel demand models; Guidelines for aggregate travel prediction using disaggregate choice models; A disaggregate modal-split model for work trips involving three mode choices; An application of

mode-choice methodologies to infrequent commuter-rail service; The subarea focusing concept for trip distribution in the Puget Sound area; Statewide disaggregate attitudinal models for primary mode choice; Quick policy evaluation with behavioral demand models; A sensitivity evaluation of the traffic assignment process.

Transportation Research Board, Washington, D.C. TRB/TRR-610, ISBN-0-309-02585-0, 1976, 57p; Library of Congress Catalog Card no. 77-23421.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278617/6ST

42 176290 GOOD TRANSPORTATION IN URBAN AREAS. PROCEEDINGS OF THE ENGINEERING FOUNDATION CONFERENCE HELD AT SANTA BARBARA, CALIFORNIA, ON SEPTEMBER 7-12, 1975 [Final rept.]. Six specific subject areas were studied and reported upon by Probe Groups, namely (1) intermodal freight facilities and coordination, (2) assessment of planning and modeling methodologies, (3) improving UGM through operations management, (4) economic issues, (5) impact of reconstructed rail services, and (6) opportunities for capital and institutional improvements. In addition to reports and recommendations of Probe Groups, 25 keynote, summary, and resource papers are presented covering such topics as regulation; commercial zones; freight security; intermodal terminals; documentation; energy conservation; freight movement planning and modeling; truck priorities; and Federal, State and local programs.

Fisher, GP ; Engineering Foundation, New York.*Office of the, Secretary of Transportation, Washington, D.C. May 1976, 432p; nSee also report dated Feb 74, PB-267 738. n; Contract DOT-OS-60099; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281334/3ST

42 176292 NETWORK AGGREGATION IN TRANSPORTATION PLANNING. VOLUME I: SUMMARY AND SURVEY. Volume 1 summarizes research on network aggregation in transportation models. It includes a survey of network aggregation practices, definition of an extraction aggregation model, computational results on a heuristic implementation of the model, and related mathematical results.

Hearn, DW ; Mathtech, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-RSPD-78-8.1, Apr. 1978, 100 pp; See also Volume 2, PB-281 385.; Contract DOT-TSC-1232; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281384/8ST

42 176293 NETWORK AGGREGATION IN TRANSPORTATION PLANNING. VOLUME II: A FIXED POINT METHOD FOR TREATING TRAFFIC EQUILIBRIA. Volume 2 defines a new algorithm for the network equilibrium model that works in the space of path flows and is based on the theory of fixed point method. The goals of the study were broadly defined as the identification of aggregation practices and the development of a framework for studying these practices. These goals have been accomplished by, (a) conducting a survey of aggregation practices, (b) formulating an aggregation model, (c) conducting a computational study, (d) deriving mathematical programming formulations aimed at making steps of the model

precise, and (e) programming and testing a particular algorithm.

Kuhn, HW ; Mathtech, Incorporated, Transportation Systems Center Final Rpt. DOT-TSC-RSPD-78-8.2, Apr. 1978, 75 pp; See also Volume 1, PB-281 384.; Contract DOT-TSC-1232; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281385/5ST

42 176455 POLICY-CONTINGENT TRAVEL FORECASTING WITH MARKET SEGMENTATION. Market segmentation of travel data gives a data base that is easy to use and interpret. This paper develops methods for tabulating travel data so that disaggregate travel-demand models can be applied to market segments. These methods result in improved accuracy of travel forecasts because appreciation bias is reduced. The approach also allows nearly immediate computation of demand elasticities. These procedures can be applied to most urban travel-data files by using cross-tabulation software. To demonstrate the methods and their accuracy, the work-trip modal split is simulated on Nationwide Personal Transportation Survey data by using a disaggregate logit model. Travel demand is forecast under a variety of transportation policies that involve automobile controls and transit level-of-service improvements. /Author/

Dunbar, FC (Charles River Associates, Incorporated) *Transportation Research Record* No. 637, 1977, pp 27-32, 2 Tab., 9 Ref.; This article appeared in the *Transportation Research Record* No. 637, Forecasting Passenger and Freight Travel.; ORDER FROM: TRB Publications Off

42 176456 EFFECTS OF SMALL SAMPLE ORIGIN-DESTINATION DATA ON TRANSPORTATION STUDY RESULTS. This paper discusses the effects of using small-sample origin-destination survey data as the basis for urban transportation planning models. The study was based primarily on home-interview survey data collected in the 1969 San Antonio-Bexar County Urban Transportation Study. The analysis demonstrates the ability of small sample origin-destination data to produce travel estimates that are in close agreement with model results obtained by using traditional large-sample survey data. The survey data for 12,477 dwelling units (i.e., a 5 percent sample) were used as a data base from which repeated geographically stratified random samples of 6400, 3200, 1600, 800, 400, and 200 observations were drawn. Two samples for each sample size, representing the 10th and 90th percentiles of distributions of sample estimates of total automobile-driver travel, were selected for evaluation. This procedure provided a 0.8 probability that samples of similar size will produce travel estimates as good as or better than those obtained here. The selected samples were used to develop inputs to trip-generation, trip-distribution (gravity), and traffic-assignment models. Samples of 400 or more dwelling units were found to produce acceptable results. /Author/

Foster, RE (Northeastern Oklahoma State University, Tahlequah) Stover, VG Benson, JD (Texas Transportation Institute) *Transportation Research Record* No. 637, 1977, pp 33-39, 3 Fig., 5 Tab., 7 Ref.; This article appeared in the *Transportation Research Record* No. 637, Forecasting Passenger and Freight Travel.; ORDER FROM: TRB Publications Off

42 176490 TRANSPORTATION PLANNING IN LOS ANGELES. One of the primary transportation efforts in Los Angeles is the development of a starter-line rapid transit system for consideration by UMTA for funding from its capital grant program. Along with this long-term project is a focus on short term transportation improvements, including better management of existing transportation facilities. Results of early pilot and demonstration measures introduced in Los Angeles indicate that they do not yet represent sufficiently attractive alternatives to citizens to compete effectively with accustomed travel habits. Experience with proposals for the use of various disincentives revealed patterns of common characteristics. A fundamental characteristic of incentive-disincentive planning is that they carry a disproportionate number of negative impacts. It is much more difficult to anticipate the degree of antagonism that will be generated, for instance, by reserved lanes than it is for the construction of new transportation facilities. The potential for generation of public antagonism by unfamiliar new measures is so great that as much attention must be given to this negative aspect during preimplementation planning as is given to the planning of other more familiar project elements. Negative impacts must not only be identified but also dealt with. Great care, then, must be taken to prepare high-quality information materials and disseminate them carefully. A planning team must ultimately be representative of both the public and private sectors.

Emerson, NH Smith, GO Stern, WP (Los Angeles Office of the Mayor) *Transportation Research Board Special Report No. 181, 1978, pp 54-57, 1 Ref.*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

42 176517 THE DECISION-MAKING ENVIRONMENT OF URBAN TRANSPORTATION. The government's influences on the size and shape of the transportation equipment market and the unpredictability of that influence are discussed, as well as the operators' influence on the market. The uncertainty that characterizes government funding of transit is also present in the supply of private capital. Ways in which such uncertainties could be mitigated are considered. The constraint that labor imposes on transit operations is also considered. The ways in which the organizational and institutional environment could be reshaped to encourage better performance are listed: in certain contexts free transit could provide universal mobility while meeting specific social goals; competition in the supply of transit equipment and infrastructure would be stimulated more by subsidizing capital availability through low interest, proprietary interest. Other ways mentioned here include the conversion of some transit systems into employee-owned cooperatives; research into the demand aspects of transit; consumer education; and the examination

of fundamental concepts such as capacity on urban transportation etc.

Gellman, AJ (Gellman Research Associates) *Transportation Research Board Special Report No. 181, 1978, pp 199-201*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

42 176521 CASE STUDY OF NEW YORK CITY TRANSIT SYSTEM: PART 1. Transportation within the Metropolitan Transit Authority (MTA) is provided by 11 constructed agencies, 4 million private automobiles, 12,000 taxis 40,000 gypsy cabs, and by at least 120 private bus companies. A table is provided which illustrates commuter travel to work. The Consolidated MTA deficit is increasing in absolute size and in relation to the financial operation. The actual and projected deficit figures are illustrated in a table. Employee wages and fringe benefits have risen to the extent that savings gained through reductions in the work force have become insignificant. Also, staff reductions have not kept pace with the decline in ridership. Tables are provided which show ratios of the work force to passenger and the amount of service provided, employment data for MTA affiliates, the sources of deficit financing for the MTA affiliates, and the categories of the sources of financing. An attempt is being made to move to a service plan which is discussed at public hearings of riders and others affected by the operations of MTA so that they have greater control over the services.

Legg, ES (New York State Department of Transportation) *Transportation Research Board Special Report No. 181, 1978, pp 210-214, 8 Tab.*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

42 176698 EXAMINATION OF SIMPLIFIED TRAVEL DEMAND MODEL. A simplified travel demand model, the Internal Volume Forecasting (IVF) model, proposed by Low in 1972 is evaluated as an alternative to the conventional urban travel demand modeling process. The calibration of the IVF model for a county-level study area in central Wisconsin results in what appears to be a reasonable model; however, analysis of the structure of the model reveals two primary mis-specifications. Correction of the mis-specifications leads to a simplified gravity model version of the conventional urban travel demand models. Application of the original IVF

model to "forecast" 1960 traffic volumes based on the model calibrated for 1970 produces accurate estimates. Shortcut and ad hoc models may appear to provide reasonable results in both the base and horizon years; however, as shown by the IVF model, such models will not always provide a reliable basis for transportation planning and investment decisions.

Smith, RL, Jr (Wisconsin University, Madison) McFarlane, WJ *ASCE Journal of Transportation Engineering Proceeding Vol. 104 No. TE1, ASCE 13483, Jan. 1978, pp 31-41*; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 176910 INTEGRATED LONG TERM PROGNOSIS FOR TRANSPORT DEMAND IN FREIGHT AND PASSENGER TRANSPORT IN THE FEDERAL GERMAN REPUBLIC UP TO THE YEAR 1990. SECTIONAL STUDY: PASSENGER TRANSPORT-GLOBAL DEVELOPMENT UP TO 1990 AND REGIONAL STRUCTURE IN THE YEAR 1990 [Integrierte Langfristprognose fuer die Verkehrsnachfrage im Gueter-und Personenverkehr in der Bundesrepublik Deutschland bis zum Jahre 1990. Teilstudie: Personenverkehr-Globale Entwicklung bis 1990 und Regionale Struktur im Jahre 1990]. The long term forecasts for passenger transport in the federal German republic should be a particularly useful decision aid for the planning of traffic routes. For this reason, with the aid of many methodological assumptions, the global development of passenger transport up to 1980 is estimated, divided in accordance with the reason for the journey and the type of transport (modal). A special prognosis is required for air transport. In addition to the global forecasts, the 79 districts in the federal republic are checked for expected special developments in individual journey purposes and types of traffic and estimates are made up to the year 1990. The study also demonstrates the movement in passenger traffic between the 79 districts, also taking into account the modal split in this case. [German]

Internationales Verkehrswesen Vol. 28 No. 1-2, Jan. 1977, pp 3-8, 3 Tab. ACKNOWLEDGMENT: TRRL (IRRD-306613), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

42 176913 ESTIMATES OF FUTURE TRAFFIC VOLUME [Schaetzungen des Kuenftigen Verkehrsumfanges]. Market research is just as important in traffic engineering as it is for a company. Traffic estimates should take into account the sociological, economical and technical aspects simultaneously. This important exercise can only be properly conducted by a comprehensive study of the problem. In many respects the climax of development has passed. Population is on the decrease, an increase in maximum speed has no further advantages, the railway network is more or less complete apart from a few express-and urban routes and the extension of the highway network will probably be complete within a few years. As opposed to the constructive aspects of traffic engineering, the operational aspects are gaining importance. The transition between different modes of transport, and journey speeds, especially in town traffic conditions, has to be improved. A careful watch

on the situation will enable reliable estimates for the future to be possible and will assist in avoiding incorrect investments. [German]

Leibbrand, K. *Internationales Verkehrswesen Analytic* Vol. 29 No. 2, Mar. 1977, pp 100-103; ACKNOWLEDGMENT: TRRL (IRRD-306521), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

42 177121 DESIGN-SYNTHESIS APPROACH TO TRANSIT PLANNING. Transportation system design should be oriented toward meeting specific local and regional objectives. In most current planning, objectives are used only to evaluate selected alternatives. This paper presents a design-synthesis approach to transit planning, which allows objectives to be input directly to the process and generates a transit system incorporating characteristics that are selected to optimize the attainment of specific service and cost objectives. The design-synthesis technique specifies transit service in the abstract so that characteristics of service such as frequency, headway, travel speed, and fare can be examined individually without being constrained to a specific system alternative. The paper reports successful applications of the approach in (a) identifying short-range transit improvements for San Diego and Denver and (b) designing long-range transit alternatives for Denver.

Scheibe, MHJ (Puget Sound Council of Governments) Schultz, GW (Pratt (RH) Associates, Incorporated) *Transportation Research Record* No. 639, 1977, pp 1-7, 2 Fig., 10 Ref.; This article appeared in *Transportation Research Record* No. 639, Transportation System Evaluation Techniques.; ORDER FROM: TRB Publications Off

42 177124 COMPARING MODES IN URBAN TRANSPORTATION. Modal comparisons are defined as those studies in which an analyst compares urban transport modes with each other in a generalized framework, attempting to assess relative advantages and disadvantages of modes under a variety of conditions. This paper establishes a link between comparative analyses of transport modes and urban planning processes and generates a basis both for a normative theory of modal comparisons and for a critique of existing works in this field.

Mitric, S (Ohio State University) *Transportation Research Record* No. 639, 1977, pp 19-24, 15 Ref.

This article appeared in *Transportation Research Record* No. 639, Transportation System Evaluation Techniques.; ORDER FROM: TRB Publications Off

42 177129 DETERMINING THE NEED FOR UPDATING TRANSPORTATION STUDIES IN SMALLER URBAN AREAS. The available literature describing the transportation planning process, the applicability of the process to urban areas of under 50,000 population, and the techniques used to update transportation studies from a base year to the current year were investigated. Major factors influencing the need for updating were studied and their impact on the transport plan discussed. For small urban areas, a checklist of changes in community attitudes, goals, and objectives; federal regulations regarding service to impacted age groups and other requirements;

changes in population; socioeconomic considerations; land use; alternative models; funding; traffic; and transportation facilities provides an objective measure of the need to update the original study. The various levels of updating and the technical procedures are briefly described.

Lagomarsino, LC Matthias, JS (Arizona State University, Tempe) *Transportation Research Record* No. 638, 1977, pp 7-12, 11 Ref.; This article appeared in *Transportation Research Record* No. 638, Transportation Planning Techniques for Small Communities.; ORDER FROM: TRB Publications Off

42 177130 CROSS-CLASSIFICATION: AN APPROACH TO PASSENGER ESTIMATION IN SHORT-RANGE TRANSIT PLANNING. A transit-demand estimation model using cross classification is proposed for transit-system planning in small to medium-sized urban areas. The procedures are particularly applicable for communities that cannot afford to collect the household and transit-use data necessary for sophisticated modeling. The data requirements are limited to available census information, area-wide transit-demand estimates, and transit-system operational characteristics. The recommended synthetic model and its simplified versions have been tested as short-range transit planning tools in several cities. The procedures have been successful in describing the actual demand for existing transit systems and have been used in estimating future transit demands that reflect different policy decisions. The model can be adjusted to reflect local conditions and to incorporate the results of special studies and surveys.

Colangelo, DA Glaze, RS (Bartholomew (Harland) and Associates) *Transportation Research Record* No. 638, 1977, pp 12-17, 6 Fig., 1 Tab., 7 Ref.; This article appeared in *Transportation Research Record* No. 638, Transportation Planning Techniques for Small Communities.; ORDER FROM: TRB Publications Off

42 177131 TRIP-GENERATION SYNTHESIS FOR SMALL AND MEDIUM-SIZED CITIES. A generalized-synthesis approach for planning transportation facilities in small and medium-sized cities is presented in this paper. The object of this synthesis approach was to determine whether major travel parameters are independent of city size. Trip purpose distribution was found to be independent of city size. Distributions of 22.3 percent home-based work, 48.3 percent home-based other, and 29.4 percent non-home-based trips were used for synthesis application. Total trip-generation equations were developed by using both dwelling units and motor vehicles, and then a step-down procedure was applied. These generalized generation study-area equations were then evaluated against specific study-area equations and other generalized equations.

Kristoffersen, S (Norway Highway Department) Wilson, EM (Wyoming University) *Transportation Research Record* No. 638, 1977, pp 18-21, 1 Fig., 2 Tab., 2 Ref.; This article appeared in *Transportation Research Record* No. 638, Transportation Planning Techniques for Small Communities.; ORDER FROM: TRB Publications Off

42 177135 DEVELOPMENT OF TRANSIT PLANNING GUIDELINES FOR SMALL URBAN AREAS IN PENNSYLVANIA. Guidelines for short-range transit-planning studies for small urban areas are proposed in this paper. These guidelines are based on experience gained during the conduct of four studies in Pennsylvania. Three were undertaken in areas with existing transit service. The fourth was a transit-feasibility study for an area without transit service. The cities ranged in population from 16,000 to approximately 55,000. Specific guidelines are proposed for study initiation, data collection, demand forecasting, and local participation. The major conclusion is that studies in small urban areas need not be expensive or time-consuming. The major emphasis should be on the interaction of the planning team with local transit officials, planners, elected officials, and community groups. The technical aspects of the study play only a supportive role in the dialog among them.

Miller, JH (Pennsylvania Transportation Institute) Millar, W (Pennsylvania Department of Transportation) *Transportation Research Record* No. 638, 1977, pp 39-44, 2 Tab., 1 Ref.; This article appeared in *Transportation Research Record* No. 638, Transportation Planning Techniques for Small Communities.; ORDER FROM: TRB Publications Off

42 177137 ASSESSING TRANSIT NEEDS IN SMALL COMMUNITIES (ABRIDGMENT). In order to develop a methodology useful in determining the location and magnitude of public transportation needs, in rural and small urban areas in California, 10 sites, called representative sites, were selected and studied in detail by household surveys for each. Then, by the use of a site-pairing technique, over 200 sites, called candidate sites, were matched with the 19 representative sites through similar relevant characteristics such as land form, land use, area population, population of largest town, distance to nearest urban area, climate, and existing transportation facilities. Analysis of the data caused rejection of the original model and the use of classical regression approaches. A refined model was developed by using several variables chosen from the literature and the survey results, which suggested relative mobility needs. The values from the uncalibrated model were then presented to the local planning agencies. Their policy judgments were solicited as to the number of transit trips they were able or desired to satisfy. It was found that, while traditional regression approaches are inappropriate in these areas, travel needs in rural and small urban areas can be quantified to suggest relative transit deficiencies in such a way as to be useful for indicating legislative funding priorities.

Millikin, NH (California Department of Transportation) *Transportation Research Record* No. 638, 1977, pp 47-48, 1 Fig., 2 Ref.; This article appeared in *Transportation Research Record* No. 638, Transportation Planning Techniques for Small Communities.; ORDER FROM: TRB Publications Off

42 177138 EVALUATION OF RURAL PUBLIC TRANSPORTATION DEMAND MODELS THAT INCLUDE LEVEL-OF-SERVICE MEASURES (ABRIDGMENT). Two rural public transportation (RPT) demand models, one with level of service measures (developed by

Burkhardt and Lago) and one without (Pennsylvania trip-rate model), were evaluated by direct application to estimate the demand for two existing RPT systems in Northern Wisconsin, Ashland and Ladysmith. While no final conclusions as to the relative accuracy of the two models can be reached on the basis of a sample of only two rural transit systems, the application of the models to two systems with markedly different levels of service has demonstrated the importance of including level of service as an independent variable. On balance, the level-of-service model provided more accurate estimates of demand.

Smith, RL, Jr (Wisconsin University, Madison) *Transportation Research Record* No. 638, 1977, pp 49-51, 2 Tab., 4 Ref.; This article appeared in *Transportation Research Record* No. 638, *Transportation Planning Techniques for Small Communities.*; ORDER FROM: TRB Publications Off

42 177139 TRANSPORTATION PLANNING IN RURAL REGIONS OF IOWA (ABRIDGMENT). Changes in population, population density, and travel patterns, as well as economic changes, in the state-designated transportation planning regions of Iowa from 1950 to 1970 were analyzed in order to determine the validity of the present planning region boundaries. It was found that, as a result of the substitution of manufacturing for farm employment, the rural regions have become less self-contained with inter-regional commuting, and shopping trips more the norm than intra-regional travel for such purposes. It is suggested that rural transportation planning regional boundaries may have to be redrawn in order to avoid the interjurisdictional problems that would arise with the present boundaries.

Prescott, JR (Harvard Institute of Internatl Development, Iran) Lorber, WG (Iowa State Office for Planning and Programming) *Transportation Research Record* No. 638, 1977, pp 51-54, 1 Tab., 5 Ref.; This article appeared in *Transportation Research Record* No. 638, *Transportation Planning Techniques for Small Communities.*; ORDER FROM: TRB Publications Off

42 177215 USE OF VALUE OF TIME IN PROJECT EVALUATION. A method of combining the technique of equilibrium traffic assignment and the analysis of value of time is proposed. The method is used to determine cost-effectiveness functions for proposed transportation facilities. The implications of different values of time on the levels of investment in transportation facilities are examined. The case of a two facility urban transportation corridor is presented as a case study. The implications of different values of time on the resulting cost-benefit ratios for a proposed transportation facility are shown graphically.

Mobarak, H (Riyadh University, Saudi Arabia) Kanifani, A *ASCE Journal of Transportation Engineering* Vol. 104 No. 2, Mar. 1978, pp 123-130; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 177217 MONITORING THE EFFECTIVENESS OF STATE TRANSPORTATION SERVICES. This report discusses procedures that state governments might use to monitor the effectiveness of state transportation services on a regular (preferably annual) basis. Measurements procedures are discussed for assessing the out-

comes of a variety of state transportation services, including highway planning, maintenance, mass transit, the division of motor vehicles, and highway emergency services. Measures of effectiveness and data collection procedures addressing the following state transportation concerns are described: rapid movement; access to important destinations; safety; travel convenience and comfort (including road rideability); environmental and aesthetic impacts; and provision of quality services to citizens in terms of courtesy, fairness, responsiveness, and equitability. The problems and limitations of the measurements are also discussed. A special section on measuring the effectiveness of local and intercity mass transit services is included. An illustrative citizen survey for obtaining information on a variety of state transportation effectiveness concerns is provided as an appendix. It is based on the results of statewide citizen surveys tested in North Carolina and Wisconsin as part of the project. Experiences regarding tests of a number of other measures by these and other states--including cost information--are also reported. /Author/

Greiner, JM Hall, JR, Jr Hatry, HP Schaezman, PS ; Urban Institute DOT-TPI-10-77-23, July 1977, 164 pp; ORDER FROM: OST

42 177274 FORMULATING AN URBAN PASSENGER TRANSPORT POLICY: A RE-APPRAISAL OF SOME ELEMENTS--ACCESSIBILITY, ENERGY AND URBAN FORM. This paper re-evaluates the appropriateness of the dominant role of speed improvement and congestion reduction, by looking at the ramification of such objectives for the entire urban system. The appraisal leads to a proposal for alternative objectives thought to be more consistent with the achievement of efficiency in resource allocation. There is a need to re-appraise the approach to transportation planning, rather than concentrate on more refinement to models and politics within the present planning framework. Topics include a discussion of downtown commuter mode travel, speed, accessibility to opportunities, energy, and transport. This paper raises a number of important issues in order to provide more information for the debate on transportation policy in the future. It is noted that the two dominant mobility objectives (speed and reduction in congestion) should be replaced with the more appropriate urban areawide objectives of accessibility to opportunities and energy consideration.

Hensher, DA ; Macquarie University, Australia Report No. 151, Nov. 1977, 344 pp, 2 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 234083), Australian Road Research Board

42 177308 EVALUATION OF ALTERNATIVE MARKET SEGMENTATIONS FOR TRANSPORTATION PLANNING. Market segmentation in transportation planning is a division of a total population of travelers into groups (segments) which are relatively homogeneous with respect to certain personal characteristics (the segmentation base). It is desirable that the segments be distinct in terms of travel behavior and their reactions to changes in the travel environment such as the introduction of new transportation services. This report documents a comparison of market segmentation using six different bases. The first two segmentations represent alternative ways of dividing the

population into groups which had homogeneous demographic characteristics; the second two segmentations divided the population into groups based upon such travel choice constraints as auto availability and transit service; the last two segmentations divided the population into groups based upon their responses to attitude surveys. Among these pairs of segmentations, some were multivariate, while others involved only a single variable. The six segmentations were compared with respect to five criteria judged to be important considerations in transportation planning: measurability (data availability), statistical robustness, substantiality (size and importance of resulting segments), relationship with travel behavior, and relationship with planning of service options. The comparisons showed that no single segmentation base was superior according to all criteria. On balance, however, multivariate segmentations. In addition, the segmentation based upon multivariate choice constraints satisfied more of the criteria than other segmentation bases. Segmentations of the traveling population based upon attitudes were found to have certain specific uses but to be inferior to choice constraints segmentation for most planning purpose. /Author/

Nicolaidis, GC Wachs, M (California University, Los Angeles) Golob, TF ; General Motors Research Laboratories GMR-2289, Nov. 1976, 33 pp, 17 Ref., 20 Tab.; This paper was prepared for the 56th Annual Meeting of the Transportation Research Board, January 25, 1977, Washington, D.C.

42 177333 PREDICTING DEMAND FOR RURAL TRANSIT SYSTEMS. The object of this research report is to present a simpler method of predicting the patronage of rural public transportation systems. Previous methods of estimating the need or demand for rural public transportation are discussed. These methods include subjective, gap analysis, surveys, per capita aggregate estimates, and simulation of demand functions. Using data from approximately 100 existing rural transport systems, simulation models of factors influencing the number of riders were developed. It was found that reliable estimates of demand could be produced by using a small number of variables that described characteristics of the area and people served, and attributes of the transportation system. The elements affecting the ridership of rural demand-responsive transit systems are similar to those affecting the demand for rural fixed-route transit systems, but there are significant differences in the definition of area served, trip generation, and measurement of service responsiveness. The following factors were identified as having a major influence on the number of persons that can be expected to ride a given rural transit system: Monthly bus miles; availability of service; population served; other public transportation systems; distance; and fares. The greatest benefit of the demand equations is that they provide a rough estimate of how many people might use a system according to specific rural area and transit system conditions.

Burkhardt, JE Lago, AM (Ecosometrics, Incorporated) *Traffic Quarterly* Vol. 32 No. 1, Jan. 1978, pp 105-129, 1 Fig., 5 Tab.

42 178330 AN INVESTIGATION OF MACROSCOPIC MODELS OF URBAN TRAFFIC. A model of urban automobile traffic which does not rely on a link-by-link network description would be useful in analyzing impacts of policies intended to improve various measures of urban traffic efficiency. Here a steady-state macroscopic traffic flow model is extended to accommodate heterogeneous road types. A comparison to an equilibrium traffic assignment on a test network specifies errors due to spatial aggregation in the macroscopic model. Potential errors due to the assumption of steady state are indicated and a time-dependent macroscopic model is developed to study road system response to time-varying demand. /Author/

Carnahan, JV Tobin, RL ; General Motors Research Laboratories GMR-2420, Apr. 1977, 32 pp, 9 Fig., 6 Tab., 5 Ref., 2 App.; Presented at the TMS/ORSA Joint National Meeting, San Francisco, California, May 9-11, 1977.

42 178456 THE PROBLEMS OF TRANSPORTATION PLANNING AND AREA PLANNING IN URBAN CONURBATIONS [Probleme von Verkehrsplanung und Raumplanung in Ballungsgebieten]. The origins of transportation problems are examined with reference to the following aspects: (1) the present situation regarding lack of training (of architects and civil engineers); (2) the lack of understanding of transportation planning (the conflicts that exist between politicians and planners); (3) insufficient data; (4) the legal situation (unclear regulations, the division of legal rights); (5) the chronological transference of resolutions (keeping proposed routes free of development, urban structure comes before infrastructure); (6) the lack of compatibility between transportation planning decisions and changes in structure. In actual cases the known deficiencies are discussed relating to private and public transport and public action groups and the lack of information the population has. Prerequisites to the success of a transportation planning analysis are comprehensive data and qualitatively proportionate analyses of parallel transportation plans. As a step in the planning stage of a prognosis it is shown that a present possible practiced method of approach for transportation planning is the processing of variants which serve as a basis for establishing a range of decision areas. /TRRL/ [German]

Knoflachner, H (Technical University of Vienna, Austria) *SIR-Mitteilungen und Berichte* No. 1, 1977, pp 29-41; ACKNOWLEDGMENT: TRRL (IRRD-306489); ORDER FROM: Salzburger Institut fuer Raumforschung, Postfach 2, Salzburg, Austria

42 178495 COST-EFFECTIVENESS GUIDELINES FOR TRANSIT PLANNING. Cost-effectiveness has increasingly become a required feature of rapid transit planning for Federal approval. Uncertainty still exists with regard to what specifically constitutes cost-effectiveness analysis. With respect to measures of "transport" cost-effectiveness, a framework is proposed as a guide to which measures should be incorporated into an alternatives analysis involving rail transit proposals. Consideration should be given to the use of "marginal" measures that reflect the marginal costs, marginal usage, or marginal capacity provided by one alternative over another and to sensitivity analyses that indicate the

impact of variations in required input forecasts. For rail systems it is important to provide measures at the corridor or subarea level since systemwide measures, although valuable, can mask variations in performance by line or line segment. Because of their high capital cost, it is also important to calculate measures that reflect total costs of rail systems, not just operating costs.

Skinner, RE, Jr (Voorhees (Alan M) and Associates, Incorporated) Deen, TB *ASCE Journal of Transportation Engineering* Vol. 104 No. 3, May 1978, pp 335-348, 12 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 178611 HIGHWAY PLANNING: PROCEEDINGS OF THE SEMINAR ON HIGHWAY PLANNING HELD FROM TUESDAY 13 JULY-THURSDAY 15 JULY 1976 DURING THE PTRC SUMMER ANNUAL MEETING AT THE UNIVERSITY OF WARWICK, ENGLAND. The papers presented at the Seminar on Highway Planning were grouped under three sessions as follows: Session 1--Highway planning trends and policy: New German standards for network planning, Ruske, W; Transport planning in the Netherlands, Ruhl, A; Community involvement in transportation studies, Wicks, J. Session 2--Planning for the cyclist: Planning for the cyclist--The Bedford study, Brown, GJ and McCallum, DG; Planning of cycle routes in Sweden, Axelsson, K; Cycle routes in urban situations, Percival, RJ; Junction design of cycleways with main roads, Jenkins, RP. Session 3--Route choice: generated traffic in inter-urban highway investment appraisals: Some evidence, Judge, EJ; The interaction between assignment, benefit and environmental gains in the planning of major highway schemes, Brooks, JA and White, JE; The crawler lane study, a basis for economic evaluation, Bates, JM and McCallum, DG. /TRRL/

Planning and Transport Res and Computation Co Ltd raph Report No. 143 Monog, 114 pp, 22 Fig., 14 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 228115)

42 178649 PROCEEDINGS OF SEMINAR H ON PUBLIC TRANSPORT HELD FROM MONDAY 27-TUESDAY 28 JUNE 1977 DURING THE PTRC SUMMER ANNUAL MEETING AT THE UNIVERSITY OF WARWICK, ENGLAND. The following papers were presented at the Seminar: A review of solutions to the problems of urban bus operation, Chapman, RA and Jenkins, IA; Passenger evaluation of underground improvements, Maw, J and Bradley, J; Public transport--how can the consumer make his voice heard?, Sturch, FW; Bus use in newly designed housing areas, Bruce, DN; Public transport in small towns, Cox, BJ; Leeds bus routing studies, Harris, IDH; Management objectives and the financing of public transport in urban areas, Nash, CA; Operating objectives and pricing policy, Parker, GB; "Carte orange" experiment in the Greater Paris area, Mouzet, J; Minitram in Croydon and some comments on the role of automatic transport systems elsewhere, Hewing, RB and Willis, JG. /TRRL/

Planning and Transport Res and Computation Co Ltd Monograph Rpt. 154, June 1977, 106 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-232234)

42 178659 ROAD PRICING-EXPERIMENT WITH PUBLIC ROAD PRICING [Le prix de la route. Essai sur la tarification publique]. The author recalls the various aspects of transport: commodity for the community (road network), commercial service (heavy vehicle transport), private use (private vehicle ownership), and public service (public transport). Taking into account external effects and environmental problems increases the difficulty of transport pricing, e.g. The allocation to each service of the fairest price for the individual or the community. This book represents an attempt at finding an overall answer to the problem of road pricing. /TRRL/ [French]

Economica Monograph 1976, 152 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-105172), Central Laboratory of Bridges & Highways, France, Institute of Transport Research; ORDER FROM: OT236

42 178666 STUDIES OF THE VALUATION OF COMMUTER TRAVEL TIME SAVINGS. A COMMENT. The author considers that in the literature on the value of travel time, a good deal of interest has been focused on the question of whether, and how, the value of time varies with income, trip length, and "amount of time" saved. This interest is felt to relate to an underlying doubt as to the appropriateness of microeconomic theory, which predicts a close dependence of value of time on income but not on account of time saved, since value of time is defined with respect to marginal changes in travel time, the rejected alternatives being irrelevant. Thus, strong evidence that value of time does vary with the time difference between the chosen and the next best alternative, or that it does not vary with income, would cast doubt on the microeconomic approach. Empirical work by Hensher is reported which indicates such evidence, and which also argues for an alternative method of consumer behaviour which forms the basis of the quoted empirical results. The author considers that the purpose of this comment is first, to demonstrate that Hensher's conclusion, if valid, would indeed contradict the "revealed preference" or utilisation approach to consumer theory usually favoured by economists; and secondly, to argue that Hensher's statistical work and theoretical arguments are faulty, and cannot be said to add any evidence regarding the questions at issue. A rejoinder by Hensher follows this comment. /TRRL/

Small, KA *Journal of Transport Economics and Policy* Vol. 12 No. 1, Jan. 1978, pp 86-89; ACKNOWLEDGMENT: TRRL (IRRD-232817)

42 178713 EQUITY: TESTING AND ACHIEVING IT IN MASS TRANSIT. A prototypical study was made of public transportation services within the greater St. Louis, Mo., area from standpoints of adequacy and equity. At issue was whether the transit-dependent minority residents of the area were served adequately and as well as the remainder of the population. This paper describes the criteria and analyses employed in the Bi-state study. The criteria investigated are those which are primarily design-related (financial assistance, transit coverage, transferring, duration, frequency, fare, trip time, trip speed, accessibility), and those which are supply related (accident exposure, crime exposure, vehicle loading, waiting facilities, predictability, bus age, equipment, bus cleanliness, public information). The analysis also investigated other factors,

including ambient conditions they may contribute or directly cause inequities or inadequacies, eg. traffic conditions, crime, operating and maintenance facility limitations, physical location of facilities and effects of ridership patterns.

McBrayer, DB Howard, DM (Cutler-Williams, Incorporated) *Transit Journal* Vol. 4 No. 2, Apr. 1978, pp 63-72, 2 Tab.

42 178735 INNOVATIVE APPROACHES TO RURAL TRANSPORTATION. This paper identifies innovative approaches to rural public transportation at federal, regional, state and local levels. There is no attempt to evaluate them. Examples include federal and regional task forces; a state assistance with planning, management, funding and cash-flow, coordination, and insurance; and local level approaches to service provision, cost savings, revenue sources, coordination, user-side subsidies, maintenance, and promotion. /Author/

McKelvey, DJ Watt, RS (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 661, 1978, pp 1-6, 1 Fig., 45 Ref.; This article appeared in the Transportation Research Record N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

42 178737 RURAL TRANSPORTATION COSTS. This paper presents a rural transportation costs model which was developed while determining potential future demand for UMTA capital and operating assistance in rural areas. The model is designed to account for all costs incurred in the operation of a rural transit system, with considerations given to regional location, firm size and public/private ownership characteristics. The bulk of the data used to develop this model came from the Section 147 Demonstration funded by FHWA and UMTA. By combining the cost information and the information available on operating characteristics, a standardized cost per vehicle mile can be calculated for a given vehicle type. Several conclusions regarding costs are noteworthy: 1) Total operation costs per vehicle mile are highest in the Northeast and Pacific coast states. 2) In rural transit operations, the bulk of the total system costs are directly attributable to drivers' wages, overhead costs, and vehicle capital costs. 3) Economics of scale are not obvious in rural transportation operations. /Author/

Cegłowski, KP Lago, AM Burkhardt, JE *Transportation Research Record* No. 661, 1978, pp 15-20, 5 Tab., 3 Ref.; This article appeared in the Transportation Research Record N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

42 178738 A POISSON MODEL OF RURAL TRANSIT RIDERSHIP. A Poisson Model for ridership on rural public transportation routes is developed. Models are tested on data collected previously in the research, and some modifications made. Illustrated is a technique of using analysis of variance on ridership rates to determine those which are significantly different, so as to form categories for cross-classifications which are not arbitrary. /Author/

Neumann, ES Byrne, BF (West Virginia University) *Transportation Research Record* No. 661, 1978, pp 21-27, 7 Tab., 6 Ref.; This article appeared in the Transportation Research Record

N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

42 178741 PUBLIC TRANSPORTATION PLANNING FOR THE SUBURBS (ABRIDGMENT). Due to the demographic characteristics of suburban areas and the unusual transportation problems they present, effective public transportation planning demands flexible and innovative approaches. This paper describes a unique procedure used in a recent planning assignment for Camden and Burlington Counties, the New Jersey suburbs of Philadelphia. They typify the diversified geographic, socio-economic and population attributes and limited planning resources of such areas across the country. The essence of the planning methodology was a "prototype" approach which entailed: Formulating a list of the bi-county transportation problems which was then condensed to a shorter list of "model problems," selecting a "prototype" for each particular problem within the general categories of: transit user groups, geographic areas and major trip attractors/generators, developing a unique solution for each problem, analyzing each prototype solution for adaptability to other similar problems within the same group. Using this mechanism as the primary tool for public transportation planning for suburban areas maximizes the impact of available resources by concentrating upon solving specific problems while concurrently establishing the basis for wide application of results and recommendations. /Author/

Mauro, GT (United States Railway Association) *Transportation Research Record* No. 661, 1978, pp 37-39, 2 Tab.; This article appeared in the Transportation Research Record N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

42 178742 GEORGIA'S CRITICAL PUBLIC TRANSPORTATION NEEDS (ABRIDGMENT). This analysis is designed to identify public transportation needs of Georgia's rural transportation disadvantaged including elderly Georgians 60 years of age and older, and the handicapped under Section 16(b)(2) and Section 147. Approximately 12 percent or a half million of Georgia's population are over 60 years of age. One fourth of this group is handicapped numbering around 130 thousand. It is estimated that 1.5 percent of Georgia's under 60 population, or 60 thousand, are handicapped. Georgia's rural population approximates two million people. The rural target population, this study's focus, slightly exceeds 400 thousand of which 34 percent are transportation deficient. Subsequently, rural Georgians require 611.3 thousand trips to satisfy 135.4 thousand rural transportation deficient citizens. This analysis provides a cursory view by use of a broad-brush sketch plan. Many data gaps exist; the estimates are crude! Therefore, reliance on a professional "best-judgment" to identify Georgia's transport needy predominates. /Author/

Maggied, HS (Envirosphere Company) *Transportation Research Record* No. 661, 1978, pp 40-42, 1 Fig., 5 Tab., 7 Ref.; This article appeared in the Transportation Research Record N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

42 178862 TRANSPORT REQUIREMENTS FOR URBAN COMMUNITIES: PLANNING FOR PERSONAL TRAVEL. An OECD Working Group has considered some of the problems involved in the methodology of transport planning as applied to personal travel requirements. The Group's report is concerned chiefly with the framework in which recent planning exercises have been carried out, and it examines a number of ways in which these can be improved in the future. The report starts by reviewing the issues currently facing transport planners, and looks at the way in which the transport planning process has evolved to deal with issues. It then considers in detail three areas in which present approaches can be improved. Firstly, the objectives of transport planning require clearer definition in order to make explicit the relationship between technical decisions and policy issues. Secondly, new methods should be used to incorporate the study of needs, (as expressed in terms of travel requirements) into a planning process that concentrates on demand modelling. Thirdly, evaluation methodologies can be improved by recognising that no single criterion is sufficient for making a comprehensive assessment of the impact of proposed measures. It is intended that the report should be a background document for practitioners. /Author/

Organization for Economic Cooperation and Devel 1977, 91 pp, 6 Fig., 3 Tab., 52 Ref., 4 App.; ACKNOWLEDGMENT: TRRL (IRRD 232220)

42 178871 BETTER INTEGRATION OF TRANSPORTATION MODES. This study is made up of four interrelated components. The general intent of the project was to evaluate the deficiencies of selective elements of the New York City public transportation system and to formulate strategies that would result in improved service for the travelling public. Part I, the express bus policy study, seeks to formulate policy guidelines and implementable projects for the operation and improvement of express bus service in the city of New York, fully integrated with all other modes of public transportation. Part II, the park and ride study, seeks to develop a comprehensive Park and Ride system fully integrating the highway and arterial network of New York City with the public transportation system. Part III seeks to create improved graphics and information layouts at points of modal interchange which will facilitate user understanding of transit services and travel alternatives. Part IV seeks to ascertain the potential for modal switch from automobiles to transit (primarily to reduce auto works trips and promote transit patronage) through the utilization of marketing research techniques. The project results are designed to improve the efficiency of existing services and infrastructures by operational changes and low capital intensive investments. They are consistent with federal and local emphasis on TSM policies, and result from cooperative planning between a multitude of different government agencies.

New York City Department of Transportation Final Rpt. UMTA-IT-09-0023, Sept. 1977, 280 pp, Figs., Tabs., 3 App.; Sponsored by Tri-State Regional Planning Commission and by DOT, Urban Mass Transportation Administration.

42 179019 DISAGGREGATE TRAVEL DEMAND MODELS. Disaggregate models are policy-sensitive travel demand forecasting models that are consistent with travel choice theory using data at the level of individual travelers. Such models were found to advance the existing state-of-the-art in explaining present travel behavior. Disaggregate models can also be applied with greater ease than aggregate models to corridor and project planning within urban areas. This study has developed new disaggregate demand models for work-trip mode choice and for shopping choices as follows: Mode, destination, frequency, and time of day. Specific findings related to these models are presented. The report gives hypothetical examples to illustrate how disaggregate models can be used to forecast the effects of travel changes in the price of gasoline, of a reduction in off-peak transit fare, of an increase in driving time to the downtown, and of change to the transportation models available to individuals.

NCHRP Research Results Digest No. 94, Aug. 1977, 7 pp. ORDER FROM: TRB Publications Off

42 179043 DIMENSIONS OF TRANSIT SERVICE. This paper reviews several approaches to setting service standards for public transit systems and discusses the problems inherent in setting such standards. It examines particularly two attempts to find consistent relationships between measures of transit service and community characteristics in the hope that such relationships can then be used to set service standards for operations based on the demographics of the areas they serve. One effort used data for small urban areas from the National Transportation survey while the other used data for large transit operations in New York State. Both efforts used factor analysis as well as less sophisticated analytical methods to uncover relationships in the data. Neither effort identified any inherent relationships in transit characteristics. It is concluded that the analysis accomplished, using the limited data available does not support establishment of service standards based on the underlying dimensions of transit service. /Author/

Knighon, RG Erlbaum, NS Malec, RJ ; New York State Department of Transportation Res. Rpt. 106, Dec. 1976, 43 pp, 5 Tab., 19 Ref., 2 App.

42 179046 FORMULATION AND EVALUATION OF ALTERNATIVE STATE TRANSIT OPERATING ASSISTANCE PROGRAMS: A QUANTITATIVE PREFERENCE TECHNIQUE. This paper presents three applications of a technique known as trade-off analysis, a tool which allows the analyst to quantify preferences based on survey results which have been transformed into ratio-scaled data. The data is from the NYSDOT Public Opinion Survey, conducted in November 1974 sampling 1,000 households across New York State. The first application discussed is evaluation of alternative transit operating assistance programs, to determine which of several feasible programs are most acceptable to the public. The determination of which levels of individual program attributes are most preferred, and to what degree, is the second application discussed. Leading to information useful in developing new transit operating assistance programs. The last analysis develops preference shifts at different transit fare levels, introducing some interesting theoretical work. /Author/

Donnelly, EP ; New York State Department of Transportation Res. Rpt. 90, Aug. 1975, 25 pp, 5 Fig., 7 Tab., 6 Ref.; This paper was submitted to the 55th Annual Meeting of the Transportation Research Board, Washington, D.C., January 1976.

42 179052 NFTS HOME-INTERVIEW SURVEY--ANALYSIS OF THE "OPINION COMPONENT". This report documents the opinions of households in the Niagara Frontier region (Buffalo, New York) on community problems, transportation, transit service improvements and participation in transportation planning. These views were obtained from the opinion component of the NFTS Home-Interview Survey, conducted in the fall of 1973. The sample consists of 535 voluntary responses. The analysis was performed by cross-tabulating questions contained in the opinion component. The results show that crime and law enforcement is the most serious community problem, and bus service is viewed as having the most serious transportation problems. Too few bus routes and lack of rapid transit service are the major problems with bus service; rail rapid transit is the improvement desired by the largest percentage of households. /Author/

Holthoff, WC ; New York State Department of Transportation Res. Rpt. 77, Apr. 1975, 70 pp, 1 Fig., 20 Tab., 4 Ref.

42 179054 AN APPLICATION OF DISAGGREGATE MODE CHOICE MODELS TO SYSTEMS-LEVEL TRAVEL DEMAND FORECASTING. This paper describes the development and application of disaggregate models to systems-level transit forecasting in the Niagara Frontier Region (Buffalo, New York). In this study, the disaggregate mode choice models are developed from trip information directly obtainable from standard home interview surveys conducted by most State or local transportation planning agencies. The data set used is a 12% sub-sample of the 1962 home interview in the Niagara Frontier. Binary logit models are calibrated for four kinds of trips, classified by trip purpose and auto availability. For each model, the individual's probability of using transit is related to two system variables: the transit-to-auto travel time ratio, and trip length. Aggregated transit usage proportions for the entire system are then obtained by combining the disaggregate probabilities with an approximation term which reflects the "within-zone" variance of system characteristics. The prediction performance of the disaggregate modeling approach is compared to that of the conventional modal split model. Results suggest that the disaggregate mode choice method can produce at least as accurate modal split predictions as the conventional method, by using the same type of information, but only 12% of the sample. The report also contains a description of the procedures necessary to integrate the disaggregate mode choice method into typical urban transportation planning modeling systems. /Author/

Liou, PS Cohen, GS Hartgen, DT ; New York State Department of Transportation Res. Rpt. 75, Apr. 1975, 25 pp, 3 Fig., 7 Tab., 9 Ref.; This paper was presented at the 54th Annual Meeting of the Transportation Research Board, Washington, D.C. January, 1975.

42 179070 INTRODUCTION, SUMMARY AND FINDINGS OF THE TRANSPORTATION SYSTEM MANAGEMENT CONFERENCE. The conference on Transportation System Management (TSM) was designed to address three objectives: To provide the latest information and requirements; to provide the latest information on experiences with the actual implementation of a range of TSM actions; and, to examine the emphasis of the regulations on a regional or metropolitan planning perspective. Throughout the conference, three major issues arose continually in the substantive and information presentations as well as during the discussions of the implementation of individual TSM actions: TSM as a planning process and the role of the MPO's in that process; perceived conflict between short-term and long-term transportation objectives; and, public involvement and acceptance of TSM actions. Two additional key issues stand out. The first is the question of the appropriate role for a planning professional in an MPO and the appropriate role for the MPO given its authority and resources. The second issue stems from the frustration felt by many of the participants when hearing case histories of both successful and unsuccessful TSM actions. The difficulty of identifying the "right" and "wrong" way before a project is actually started. Papers on each of the major topics addressed during the conference appears in the volume. Also included are reports of the workshop discussions and the case studies of cities in which TSM actions have been or are being implemented.

Rosenbloom, S (Texas University, Austin) *Transportation Research Board Special Report* No. 172, 1977, pp 1-5; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179074 MANAGEMENT OF DEMAND. The scope of the workshop discussion was with the manipulation of work schedules to influence patterns of demand for urban transportation facilities. Experience suggests that the abandonment of uniform working hours is popular with employees and employers. Furthermore, society at large gains from the reduction of peak-hour congestion on transportation facilities. As to maximizing the beneficial transportation consequences, the best form of work schedule adjustment appears to be the most radical: flexible working hours. The New York City experience suggests that flexible working hours are more difficult to promote to employers than are less radical forms of schedule adjustment. The 4-day workweek appears to be the least popular form of schedule adjustment with employers, and to a lesser extent with employees too. A local government that is strongly committed to promoting staggered work hours should also consider fiscal or legal incentives for firms to participate.

Kemp, MA (Urban Institute) *Transportation Research Board Special Report* No. 172, 1977, pp 9-10; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Trans-

portation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179075 ACTIONS TO REDUCE VEHICLE USE. The workshop identified a list of objectives and constituencies that were relevant to TSM. Five categories were developed: National objectives, citizen participation objectives, transit objectives, taxpayer objectives, and local and national government objectives. Several general conclusions were drawn from the discussion: There may be negative reactions to TSM, especially if it involves reducing vehicle use; a careful understanding should be developed of local public objectives, and public involvement and support should be reached before moving ahead with TSM actions; efforts must be made to define local transportation problems and to analyze closely alternative solutions in which the public is involved. Although TSM may be viewed as a set of projects, it is also a planning process emphasizing short-term, low capital solutions that may also complement long-term capital intensive solutions, which are the traditional focus of this process.

Fisher, RJ (Urban Mass Transportation Administration) *Transportation Research Board Special Report No. 172, 1977, pp 10-12*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179076 ACTIONS TO IMPROVE TRANSIT MANAGEMENT EFFICIENCY. Workshop participants began by listing the following areas in which improvements could be made in the management efficiency of transit operations: Service standards, commuter market approaches, organization of planning and operations; integration of paratransit, use of standard cost information, role of state departments of transportation, integration of control, small capital improvements, marketing, parking strategies, and payment of transit fares. However, only the first four topics were fully discussed. The workshop agreed that adequate service standards were needed but that provisions should be made so that new forms of public transportation would not be hindered by strict adherence to such service standards. The majority of the participants agreed that the cost of providing service to commuter markets with additional fixed-route, fixed-schedule transit systems or even express systems appeared to outweigh the benefits derived. With respect to paratransit, the discussion concluded with the general feeling that no one approach could be viewed as a panacea but that experimentation was needed with a variety of approaches to see what could be achieved in various urban areas. With respect to planning and operations, participants concluded that closer cooperation was necessary between planning and operation, and that an organizational form that encompassed both these functions with appropriate control mechanisms was highly desirable.

Mundy, RA (Tennessee University, Knoxville) *Transportation Research Board Special Report No. 172, 1977, pp 12-13*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179077 DEFINITION, OBJECTIVES, AND IMPLICATIONS OF TSM. Transportation system management is a process for planning and operating a unitary system of urban transportation. Its key objective is conservation of fiscal resources, of energy, of environmental quality, and of quality of urban life. Broader implications of and issues raised by the TSM concept include (a) the need for a national policy on urban conservation (the federal government cannot set local land use policy, but it must restore locational neutrality to its programs); (b) institutional challenges (all elements of the urban transportation system cannot be treated in a unitary way unless the various governments cooperate fully); (c) federal support of TSM (UMTA may need transit operating funding to seed TSM operations); and (d) urban transportation and private ownership (UMTA should attempt some demonstration of private ownership of multipurpose urban transportation systems). /Author/

Patricelli, RE (Urban Mass Transportation Administration) *Transportation Research Board Special Report No. 172, 1977, pp 14-17*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179078 HEADING IN THE RIGHT DIRECTION. This paper discusses how the Federal Highway Administration arrived at the policy of transportation system management, why FHWA thinks TSM is important, and just how it will contribute to improving urban transportation. /Author/

Tiemann, NT (Federal Highway Administration) *Transportation Research Board Special Report No. 172, 1977, pp 17-19*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179083 STATE HIGHWAY DEPARTMENT VIEW OF TSM. Transportation system management is not a new concept but has been practiced as long as there have been transportation facilities. The need now is to have a balanced transportation system in which each mode does

the job that it is best suited to do and for which there is an expressed need or desire. In addition, one mode is not artificially enhanced by impeding the efficiency of another mode. Achieving a balanced transportation system requires the cooperative efforts of all agencies involved. /Author/

Hunter, RN (Missouri State Highway Department) *Transportation Research Board Special Report No. 172, 1977, pp 33-34*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179091 MANAGEMENT BY OBJECTIVES APPLIED TO TRANSPORTATION SYSTEM MANAGEMENT. Management by objectives requires input by all members of the management and supervisory staff of an organization; efforts are aimed at the achievement of stated results or objectives. Transportation system management in urban areas demands that transit and highway interests join forces in developing plans and action programs to make better use of existing facilities. This paper explores both management by objectives and transportation system management and provides suggestions on how the MBO technique can be used to design a TSM action plan. /Author/

Ross, HS (Louisville University) Maull, PJ Smerk, GM (Indiana University, Bloomington) *Transportation Research Board Special Report No. 172, 1977, pp 81-86, 5 Ref.*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179096 PACKAGING TRANSPORTATION ELEMENTS TO MEET ENVIRONMENTAL OBJECTIVES. Controversy over the relation between air quality requirements and urban transportation planning appears to center around two basic issues. The first is whether the implementation of transportation measures that improve air quality is consistent with the achievement of other transportation objectives. The second concerns the changes in the planning process needed to accommodate air quality requirements. This paper outlines the basic elements of a potential resolution of these issues. The transportation measures that have been proposed to improve air quality are virtually identical to the measures now being proposed to achieve a wide variety of other transportation objectives. However, the various measures are not necessarily equally effective in improving air quality and achieving other objectives. Thus, the process of selecting transportation measures for implementation often will involve making trade-offs between air quality objectives and other objectives. The need for such trade-offs is recognized by the Environmental Protection Agency, and the

changes in the transportation planning process needed to enable the trade-offs to be made are consistent with current planning trends. However, three problem areas may require further attention in the future: encouraging the implementation of innovative demand-management approaches, developing procedures for mediating disputes between EPA and state and local agencies over the rate at which transportation change should take place, and preventing the planning process from becoming overly cumbersome. /Author/

Horowitz, JL (Environmental Protection Agency) *Transportation Research Board Special Report No. 172, 1977, pp 122-127, 11 Ref.*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179097 ROLE OF THE MPO IN FORMULATING THE TSM ELEMENT. Developing and implementing effective transportation system management elements in urban transportation plans will depend greatly on the ability of the metropolitan planning organization to develop an acceptable institutional framework for cooperation and joint action that does not detract from the basic responsibility and authority of participating local and state agencies. MPOs, particularly those operating within the framework of councils of governments, can play a key role in the further refinement and implementation of TSM elements because of their ability to work with local and state policy and decision makers to achieve consensus in a metropolitan area. Because of their concerns with a wide range of functional and social service goals and needs, MPOs can recommend trade-offs among competing objectives, identify opportunities for applying locally successful TSM measures to other parts of a metropolitan region, and integrate and relate TSM planning to other elements of the areawide transportation planning process. /Author/

Grant, AA (Metropolitan Washington Council of Governments) *Transportation Research Board Special Report No. 172, 1977, pp 127-132, 2 Fig., 2 Tab.*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179098 IMPLEMENTING TSM: A DISCUSSION. Selected viewpoints of the public sector, the business community, and the media regarding the implementation of TSM are highlighted. For the elected official it is noted that the major problem is one of communication. Measures adopted that will ultimately affect the freedom of citizens to come and go as they please require prior communication. Citizen involvement is one way of opening channels of communication and allowing for citizen input. With respect

to the business community, it is noted that unless they are involved. TSM actions such as staggered work hours, and carpool programs will not be as successful as they could be with respect to the media, it is noted that relations could be improved by informing the press of the conferences, better timing of press conferences and more cooperation.

Kelm, D (Twin Cities Area Metropolitan Transit Commission) Wyson, JD, Discussor (Montgomery County, Ohio) Gay, OD, Discussor (Minneapolis Downtown Council) Olsen, G, Discussor (Minneapolis City Council) Fields, AC, Jr, Discussor (WGN Continental Broadcasting Company) *Transportation Research Board Special Report No. 172, 1977, pp 132-134*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179099 BOSTON, MASSACHUSETTS, A CASE STUDY PRESENTED AT THE TRANSPORTATION SYSTEM MANAGEMENT CONFERENCE. The Boston case study deals with the development of an automobile-restricted zone (ARZ) in the retail center of the city through a reordering of circulation patterns of all the transportation elements converging in the area: private automobile, transit, service vehicles, taxis, pedestrians, and paratransit vehicles. This plan is one of several TSM elements included in the broad transportation plan for the Boston region. Two aspects of the plan are discussed in this report: First, this plan reflects the development of Boston's transportation policy during the past several years. Second, the implementation of a TSM element can be a complex process. TSM strategies, the ARZ development process, and the implementation of the ARZ plan are included in this case study.

Lloyd, E (Office of the Mayor, Boston) *Transportation Research Board Special Report No. 172, 1977, pp 135-138*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179101 PORTLAND, OREGON, A CASE STUDY PRESENTED AT THE TRANSPORTATION SYSTEM MANAGEMENT CONFERENCE. The nature and purpose of many decisions, programs, and projects acted on in the city of Portland and in the Portland region before the final regulations conserving TSM were set forth, were consistent with the objectives and rationale of the TSM program. Because of this and because of the relatively high level of success on TSM efforts in Portland, the Portland experience provides a perspective on the early application of the TSM approach. More specifically, the TSM experience in Portland offers some useful insights on the relation between broad policies and TSM strategies and projects, considerations

that should be addressed in the implementation of individual TSM projects, and apparent problems that must be confronted if TSM is to play an effective role in regional transportation planning and implementation process. TSM projects undertaken include the efficient use of road space, vehicle reduction in congested areas, and actions to improve transit service. It is noted that the public acceptance of TSM projects, flexibility of projects after completion, the simultaneous development of several projects, and a strong transportation policy direction are prerequisites to the eventual success of TSM.

Wright, DG (Portland Bureau of Planning) *Transportation Research Board Special Report No. 172, 1977, pp 142-148, 4 Ref.*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179102 MADISON, WISCONSIN, A CASE STUDY PRESENTED AT THE TRANSPORTATION SYSTEM MANAGEMENT CONFERENCE. This article describes the efforts undertaken by the city of Madison with respect to TSM planning and implementation. It is noted that the city already has a developed set of transportation objectives and policies. Also, the Madison Department of Transportation is currently engaged in developing a municipal transportation policy that will provide a policy base for the city in its dealing with the legislative bodies of the county, state, and federal governments as well as their respective administrative branches. An inventory of the existing situation that includes travel patterns, street volumes, core area parking, and the transit system is described. The major activities of the transportation system management element include the following: Improve traffic operations by managing and controlling vehicle flow; provide preferential treatment for transit and other high occupancy vehicles; provide improvements for bicycles and pedestrians; improve management and control of parking facilities; reduce peak-hour traffic; reduce vehicle use in congested areas; and, continued action to improve transit service. Improvement planning in the Madison urban area for 1976-1980 and continued efforts to increase transit management efficiency are discussed. The problems of implementing TSM are described and it is noted that the main problem involves conflict between different policies or objectives.

Somerfeld, WO Hoffman, M (Madison Department of Transportation) Favour, T (Dane County Regional Planning Commission) *Transportation Research Board Special Report No. 172, 1977, pp 148-157, 4 Fig., 16 Ref.*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179103 RESPONSE TO THE CASE STUDIES PRESENTED AT THE TRANSPORTATION MANAGEMENT CONFERENCE.

Three questions are addressed in this article. What are the problems to which TSM is addressed? How great is the challenge of integrating the new planning requirements that have been imposed on urban areas for the past several years? And, what are the constituencies of TSM? It appears at first glance that congestion is the primary problem and that TSM is the new traffic engineering strategy for alleviating congestion. However, issues such as increased equity, increased amenity, air quality improvements, and energy conservation also appear to be primary objectives. It is not always clear the extent to which TSM is addressed explicitly to these other issues on the extent to which it is an instrument for dealing with them. With all of the various types of planning—highway, transit, paratransit, long- and short-term capital & operating—to what extent is this proving to be a nearly insuperable burden or one that is proving to be quite manageable in urban areas? It is noted that in those regions that still have major highway, transit, and capital-intensive transit projects, policymakers and planners are finding it difficult to focus on TSM and paratransit kind of issues. TSM, it is noted, is an initiative that has only succeeded insofar as it has pursued modest objectives that have not inconvenienced significant numbers of drivers or voters and not significantly changed the basic urban transportation system. Such constituencies as the downtown businesses, central city governments, and transit authorities may eventually enable TSM to try more bolder initiatives and become more pervasive with respect to the nature of the urban transportation system.

Altshuler, AA (Massachusetts Institute of Technology) *Transportation Research Board Special Report* No. 172, 1977, pp 157-158; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

42 179720 A TRANSPORTATION PLANNING MODEL FOR DETAILED TRAFFIC ANALYSES.

This paper contains a brief outline of a transportation planning model developed for the purpose of providing detailed analyses of commuter traffic. It sets out to model the movement of automobile, transit and pedestrian traffic taking into account the interaction between and within each of the traffic components. The model is most appropriately applied to areas of high traffic activity, such as the central business district of a metropolitan area or arterial streets of a region-wide network during peak demand. /Author/

Fisk, C (British Columbia University, Canada) *Canadian Journal of Civil Engineering* Vol. 5 No. 1, Mar. 1978, pp 18-25, 5 Fig., 4 Ref.; ORDER FROM: Toronto University Press, 5201 Dufferin Street, Printing Department, Downsview, Ontario M3H 5T8, Canada

42 179822 CURRENT TRENDS AND ISSUES IN PUBLIC TRANSPORTATION.

This report discusses four broad categories: Political decision making and transportation development; rail transit and urban development; concepts in transportation systems management; and, ethics in policy development and decision making. A five point approach to transportation development and decision making is presented. Three hypothesis on rail transit policy are given. First, rail transit in itself is neither good nor evil, but it possesses certain qualities and attributes which make it suitable in some circumstances and inappropriate in others. Second, rail transit varies considerably in design characteristics, costs, performance capabilities and level of service. Third, rail transit can serve as a tool of urban revitalization. The objective and development of the TSM concept are described. These include neighborhood conservation, paratransit, the brokerage concept, and transit performance. Lastly, eight ethical issues in transportation policy making are outlined. It is noted that overriding alternatives should be given by the transportation profession to the balancing that has to do with public access to information, simplification of alternatives, and a weighing of interests of many alternatives.

Emerson, NH ; Hawaii University CETP-TS-78-1, Mar. 1978, 58 pp; This paper was presented at the Transportation Seminar, University of Hawaii, Honolulu, Hawaii, March 15, 1978.

42 179901 DISTRIBUTION OF URBAN TRANSPORT SERVICES IN THE COMMUNITY.

The structure of urban housing markets tends to segregate low income households into (1) inner suburbs where they generally suffer high personal costs imposed by external effects of other people's transport, and affecting different members of the household to different extents or else (2) into outer suburbs where they face high access costs through poor quality of provision and differential pricing. The outer suburban 'transport-poor' are particularly compelled, by the structure of blue-collar employment markets, to a high level of automobile use. The report suggests that any effective transport policy must include such elements as: differential pricing of fuel and of other components (with price related to income and to location); pricing to reflect imposed external costs; impact amelioration programs to correct external effects, or else to compensate for them; rationing of parking space in inner city and similar areas, but with exemptions for the handicapped and other disadvantaged persons, etc. Further however, there must ultimately be fundamental changes to the division of labour and division of leisure: the distribution of transport services is merely a symptom of historic processes of competition and conflict, whose effects must be reversed if 'transport' policies are to have real success. Paper presented at 48th ANZAAS Congress Melbourne 1977. /TRRL/

King, R ; Melbourne University, Australia Monograph 1977, 26 pp, 10 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-231235), Australian Road Research Board

42 179927 AN INITIAL REPORT ON MINIMUM LEVELS OF SERVICE FOR RURAL PUBLIC TRANSPORT.

This report is presented in 10 sections. Section 1 covers the context

of the study (background, approach, scope and main elements), and reviews the main findings regarding development of rural transport policy, definition of transport needs and scope for improved evaluation. Subsequent sections deal with: (2) objectives for rural transport policy; (3) rural transport policy and minimum standards; (4) issues relating to the role of minimum standards; (5) the definition of needs; (6) evidence on the importance of rural public transport; (7) evidence on the factors affecting need; (8) evidence on how far needs are being catered for; (9) the value of meeting needs; and (10) conclusions and recommendations. Two appendices list (A) the authorities and organizations visited, and (B) references. /TRRL/

National Bus Company Monographs Apr. 1977, 129 pp, Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 232222)

42 179989 PUBLIC TRANSPORT-THE UNCERTAIN FUTURE?

The authors depict three ways in which public transport might have evolved by the 21st century, and follow this with a review of the current public transport situation, looking particularly at those aspects where public transport has, and will continue to have, a strong role to play. In the second part of the paper the authors briefly examine some ways in which first the transportation engineer and then the public transport industry itself can strengthen and enhance that role over the next 20 years or so. /Author/TRRL/

Ball, RR (West Midlands County Council, England) Percival, AJP (West Midlands Passenger Transport Exec, England) *Highway Engineer* Vol. 25 No. 3, Mar. 1978, pp 6-11, 2 Fig., 3 Tab., 33 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 232492)

42 180024 THE ROLE OF PLANNING IN THE PRE-CONSTRUCTION OF URBAN TRANSPORT PROJECTS IN AUSTRALIA.

Metropolitan communities demand and use transport facilities as a tool which is ancillary to their normal social and economic activity. Few individuals have an inherent preference for particular modes of routes but will simply choose the most convenient, cheapest and safest way of getting from a to b. Transport is not an end in itself. The aim of this paper is to make a number of suggestions relating to the purpose, scope, position and timing of the transport planning process as one part of our future activities, which lead to new transport projects or adjustments to our existing system in the years ahead. /Author/TRRL/

English, N (Voorhees (Alan M) and Associates, Incorporated) *Institution of Engineers (Australia) Civ Eng Trans* Vol. CE19 No. 2, 1977, pp 117-124, 2 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 231233), Australian Road Research Board

42 180326 SUBURBAN CONNECTION.

A variety of transit modes and operating strategies that are available to connect the core areas with suburban communities are described. These options range from capital intensive programs with transit operating on an exclusive right of way through more modest schemes of buses operating on surface streets.

Cherwony, W (Simpson and Curtin, Incorporated) Polin, L. *Consulting Engineer* Vol. 50 No. 3, Mar. 1978, pp 82-88; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 180373 THE SUCCESSFUL TRANSPORTATION SYSTEM AND THE REGIONAL PLANNING PROBLEM: AN EVALUATION OF THE MUNICH RAPID TRANSIT SYSTEM IN THE CONTEXT OF URBAN AND REGIONAL PLANNING POLICY. The development of the Munich Rapid Transit System, coupled with the growth of the Munich region, has had a major effect on the spatial structure of the region. The radial form of the rapid transit system has led to an outward movement of higher income families and a strengthening of the service function of the city centre, to the cost of local centres. Lower income families are tending to settle in the city centre fringe areas, although their primary employment opportunities, in manufacturing industry, are increasingly moving to the urban fringe. There is, thus, a growing spatial separation between homes and workplaces and although the rapid transit system has reduced traffic congestion in Munich, it has encouraged the development of an urban structure which is not compatible with the objectives of either the state or the region.

Kreibich, V (Dortmund University, W Germany) *Transportation (Netherlands)* Vol. 7 No. 2, June 1978, pp 137-145, 4 Fig., 22 Ref.; Also available from ESL; ACKNOWLEDGMENT: Transportation (Netherlands); ORDER FROM: Elsevier Scientific Publishing Company, P.O. Box 211, Amsterdam, Netherlands

42 180377 INTERACTION BETWEEN PUBLIC TRANSPORTATION AND OTHER SOCIAL ACTIVITIES: A SYSTEMS APPROACH. This paper describes a quantitative method of evaluating public transportation systems in areas in which the frequencies of transportation services are low. The starting point of the evaluation is an overall view of the interaction between public transportation, private transportation, and the area with its physical and socio-economic variables. The problem concerning the evaluation of the public transportation system is treated.

Jensen, OH (Royal Technical University of Denmark) *Transportation Research* Vol. 12 No. 2, Apr. 1978, pp 83-89, 9 Ref.; ACKNOWLEDGMENT: EI, TRRL (IRRD 233932); ORDER FROM: ESL

42 180381 IMPACT OF BART ON HIGHWAY PLANNING AND POLICY. The construction and operation of BART resulted in no dramatic changes in State highway facilities and planning. However, the State of California and BART did enter into policy agreements to develop existing highway rights-of-way for joint transit and highway use. The policy decision-making process and BART-State interactions were traced through the period of BART planning and construction to assess changes in highway planning and policy that might have resulted from BART. The policy outcome--joint use of facilities for transit and highways--appeared to be a cost effective development strategy in terms of broad public constituencies. An assessment of this policy outcome also provides some "lessons learned" for other communities considering rapid rail transit development such as the need for an independent third

party to make trade-offs during negotiations and the need for clarity and formality in policy agreements.

Graebner, LS (Booz-Allen and Hamilton, Incorporated) Higgins, TJ *ASCE Journal of Transportation Engineering* Vol. 104 No. 4, July 1978, pp 475-487, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 180497 FORECASTING PASSENGER AND FREIGHT TRAVEL. Contents: Predicting car-pool demand; Analysis and prediction of nonwork travel patterns of the elderly and handicapped; Policy-contingent travel forecasting with market segmentation; Effects of small sample origin-destination data on transportation study results; An application of diagnostic tests for the independence from irrelevant alternatives property of the multinomial logit model; Effects of parking costs on urban transport modal choice; Analysis of predictive qualities of disaggregate modal-choice models; Adaptable-zone transportation-assignment package; Propensities to ship manufactures by rail within four U.S. traffic flows; Approach to measurement of modal advantage; Approximation equations for costs of rail, trailer-on-flatcar, and truck intercity freight systems; Evaluation of potential policies for intercity passenger transportation in Canada; Analysis of truck deliveries in a small business district.

Horowitz, AD ; Transportation Research Board, Washington, D.C. TRB/TRR-637, 1977, 93p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279673/8ST

42 180508 RHODE ISLAND STATEWIDE TRAVEL: BASE YEAR AND FORECAST YEAR ESTIMATES. The paper describes the application of the various surveys conducted as part of the 1971-1972 Rhode Island Origin-Destination Update Study conducted in the fall of 1971 and the spring of 1972. The basic purpose of the process was to establish travel patterns for auto, truck, and taxi travel within and through the state as part of the statewide forecasts. (Portions of this document are not fully legible)

Crevo, CC Low, JF ; Rhode Island Statewide Planning Program., Providence.**Urban Transportation Systems, Associates, Inc., Newton, Mass. TECHNICAL PAPER-66, Sept. 1977, 58p; Prepared in cooperation with Urban Transportation Systems Associates, Inc., Newton, Mass.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279586/2ST

42 180625 FULLY AUTOMATED URBAN TRAFFIC SYSTEM [Final Report, Jul. 1976-Aug. 1977]. The replacement of the driver with an automatic system which could perform the functions of guiding and routing a vehicle with a human's capability of responding to changing traffic demands was discussed. The problem was divided into four technological areas; guidance, routing, computing, and communications. It was determined that the latter three areas being developed independent of any need for fully automated urban traffic. A guidance system that would meet system requirements was not being developed but was technically feasible.

Dobrotin, BM Hansen, GR Peng, TKC Rennels, DA ; Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. NASA-CR-155947, Dec. 1977, 126p

Subm-Sponsored in Part by NASA.; Contract DOT-AS-60067; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-20020/1ST

42 181164 A THEORETICAL MODEL FOR ESTIMATING THE EFFECTS OF FARES, TRAFFIC RESTRAINT AND BUS PRIORITY IN CENTRAL LONDON [Laboratory report]. A theoretical model which represents passenger and vehicular travel in the Central Area of London by the characteristics of the average main road has been used to estimate, in the central London situation (1) the effect of different fare levels (profit, breakeven, zero fares), (2) the benefits which might result from restraint of non-bus traffic, (3) the benefits from comprehensive bus lanes and (4) combinations of (1) to (3). Benefits in this study relate mainly to changes in time and money costs of travel and do not include social and environmental aspects. The absolute values of the benefits predicted by this relatively simple model should be treated with caution, but it is believed that the model is able to provide a ranking of the different options. Where these options require substantial public expenditure, however, no account has been taken of the scarcity of available financial resources or of the competition between transport services and the many other demands on such limited funds.

Oldfield, RH ; Transport and Road Research Lab., Crowthorne, (England). TRRL-LR-749, 1977, 54p; Also pub. as ISSN 0305-1293.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-280869/9ST

42 181331 THE IMPACT OF BART ON STATE HIGHWAY PLANS AND POLICIES. The report presents an assessment of the impact of BART on State highway plans and policies. BART impacts evaluated include changes in highway facility development to access or parallel BART, changes in State highway policies with respect to BART and the outcome of agreements between the State and BART on joint use of highway facilities.

Higgins, TJ ; Metropolitan Transportation Commission, Booz-Allen and Hamilton, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-30-8-77, Oct. 1977, 59 pp; Prepared by Booz, Allen and Hamilton, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282925/7ST, DOTL NTIS

42 181735 THE SPATIAL UNIFORMITY OF TRIP RATES IN THE READING AREA IN 1971. Data from the 1971 Reading Travel Survey are used to determine the effect of location on the number of trips made by households. After classifying households according to their size and composition, car ownership, and location within one of three concentric sub-areas, the importance of each classification factor is tested statistically. Both household and person trip rates are considered for several combinations of trip purpose and mode of travel. The effect of linking trips through incidental purposes is also examined. The results show that household location generally had little effect on the trip rates. The two exceptions are cycle trips to school where the trip rate was lower

in the central area; and walk trips to work where the trip rate was higher in the central area. For some combinations of trip purpose and mode of travel it is not necessary to classify by household size or composition when person trip rates are used. Linking trips through incidental purposes makes little difference to the significance of the classification factors. (Copyright (c) Crown Copyright 1977.)

Fawcett, F Downes, JD ; Transport and Road Research Lab., Crowthorne, (England). TRRL-LR-797, c1977., 23p; Also pub. as ISSN 0305-1293.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281411/9ST

42 181736 AN ANALYSIS OF TRAVEL PATTERNS USING THE 1972/73 NATIONAL TRAVEL SURVEY. The study analyses travel patterns in Great Britain, using data from the 1972/73 National Travel Survey. Information is provided on journey length, journey duration and mode of travel for five major trip purposes; variations in these which result from social factors are considered. The car and walk modes each account for 41 percent of the journeys made. Two thirds of all journeys are less than 4.8 km in length and three-quarters last for less than 30 minutes. Journeys for work and social purpose are, on average, longer and involve greater use of motorised modes than those for education, personal business and shopping purposes. Members of car owning households make more journeys than do those from non-car owning households. They also make much greater total use of the motorised travel modes--car, bus, rail and motorcycle. Car ownership is three times higher and female licence holding four times higher in those households with heads in professional or managerial occupations than they are in those households whose heads have manual occupations. (Copyright (c) Crown copyright 1977.)

Rigby, JP ; Transport and Road Research Lab., Crowthorne, (England). TRRL-LR-790, c1977., 41p; Also pub. as ISSN 0305-1293.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281412/7ST

42 181986 MONETIZATION OF TRANSPORTATION IMPACTS: POLICY EVALUATION METHODOLOGY. The impacts of transportation investments are often measured in units that make comparisons difficult. Converting the units of an impact into equivalent dollar values (called monetization) will allow the combination of diverse effects measured in different inherent units. The result of this monetization process should provide additional objective and useful information in the decision-making process, and thus improve the analysis of investment alternatives. This report concentrates on those impacts that are relatively easy to monetize (travel time, energy use) and those impacts that are relatively difficult to monetize (pollution, accidents). Monetization for current values only is considered. The report consists of nine parts: an introduction and summary of the findings plus eight appendixes detailing the monetization process for a number of transportation impacts. The appendixes discuss the following: pollution, crime, accident costs, comfort, residential and business relocation, travel time and energy use.

Rock, SM ; Illinois University, Chicago, Urban Mass Transportation Administration Final Rpt. UMTA-IL-11-0008-78-1, Apr. 1978, 138 p.; ACKNOWLEDGMENT: NTIS, UMTA;

ORDER FROM: NTIS; PB-284585/7ST

42 182028 SYMPOSIUM PROCEEDINGS ON COMMUNITY DEVELOPMENT AND PASSENGER TRANSPORTATION, HELD IN WASHINGTON, D.C. ON NOVEMBER 8-9, 1977. The objective of the symposium was to exchange information among local multi-purpose project operators and federal program managers interested in improving passenger transportation and community development. The report is a compilation of material that was presented at the symposium and contains summaries of remarks presented at one plenary session and four workshops. Discussion topics include the joint economic development of land uses and transportation facilities; non-work trip purposes and multi-use community development; community development planning and site selection for transportation benefits; and uses of passenger transportation for community resource management. Viewpoints on the relationship between community development and passenger transportation are presented by major Federal programs dealing with community development, and illustrated with significant Federal demonstrations.

Institute of Public Administration, Urban Mass Transportation Administration UMTA-DC-06-0106-78-1, June 1978, 143 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284798/6ST

42 182059 INNOVATION IN PUBLIC TRANSPORTATION: A DIRECTORY OF RESEARCH, DEVELOPMENT AND DEMONSTRATION PROJECTS, FISCAL YEAR 1975. The purpose of UMTA's RD&D Program is to provide information about possible improvements to urban mass transportation systems which communities can use in selecting the best way to deal with their particular transportation requirements. The principal means of providing this information is through annual publication of the compilation of reports on the status of individual projects. Research projects are intended to produce information about possible improvements in urban mass transportation; development projects involve fabrication, testing and evaluation of new equipment, facilities, systems or methods; and demonstration projects introduce, on an experimental basis, new methods, equipment or systems of urban mass transportation into a representative urban environment. This volume is a supplement to the 1972 comprehensive volume. The directory is divided into the following subject areas: bus transit and paratransit, rail transit, new systems and automation, socioeconomic and special projects, transit planning, and transit management.

Urban Mass Transportation Administration Final Rpt. UMTA-UPA-1-1, June 1975, 114 p.

See also report dated 30 Jun 74, PB-285244 and PB-213228.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, GPO; PB-285245/7ST, GPO-050014000061, DOTL RP

42 182456 A STUDY OF FACTORS AFFECTING TRAVEL BEHAVIOUR AND TRANSPORTATION ATTITUDES AMONG YOUNG ADULTS. A 1976 survey of third-and fourth-year undergraduates at two Toronto universities provides the data base for an extensive

analysis of factors underlying transportation behaviour and transportation-related attitudes among young adults. The study examines how behaviour and attitudes are affected by early transportation experience, "automobility," quality of available transit service, socio-economic circumstances and variations in urban structure. Its conclusions draw on the statistical analysis and on the transportation attitudes and policy preferences expressed by study participants to address important concerns for future urban transportation policy. /Author/

Keall, M Frisken, F (York University, Canada); Toronto-York University Joint Program in Transp Res. Rpt. No. 47, No Date, 132 pp

42 182609 UCOST: A MICRO APPROACH TO A TRANSPORTATION PLANNING PROBLEM. UCOST is a software system that has been developed for use by planners in estimating the cost of proposed mass transportation systems. The models in UCOST represent an unusual micro approach to a planning problem. To derive its cost estimates, UCOST finds feasible vehicle schedules and an accurate estimate of crew requirements over the day for the proposed multi-modal transit system. The procedures in UCOST differ from the usual macro approach of costing transit systems which are based on simple characteristics of the proposed transit system such as vehicle in-service hours. Through the development of fast computational procedures such a micro approach is possible. UCOST is being implemented within the Urban Transportation Planning System, a computer package for transportation planners developed by the Urban Mass Transportation Administration. A description of the procedures in UCOST and its implementation is presented.

Bodin, L (Maryland University, College Park) Rosenfield, D Kydes, A *Journal of Urban Analysis* Vol. 5 No. 1, 1978, pp 47-69, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 182667 TOWARDS A MULTI-DIMENSIONAL ASSESSMENT FRAMEWORK FOR DEVELOPING AND EVALUATING ALTERNATIVE URBAN TRANSPORTATION PROPOSALS. Since transportation planning is basically concerned with accessibility to resources, it is a political decision making process with both direct and indirect distributional effects. Transportation planners must, therefore, extend their evaluation criteria from transport-specific, efficiency standards to explicitly include issues of equity and accountability. This study suggests ways of addressing this situation by highlighting the need: for an interdisciplinary approach to planning; for community interaction; to consider the range of alternative courses of action available; to determine the implications of each as fully as possible, including the no-build alternative; to develop compensation programmes for adversely affected interests; and to yield the highest social return on the investment. /Author/TRRL/

Potter, AG ; New South Wales Department of Main Roads, Australia Thesis Oct. 1977, 65 pp, Refs.; ACKNOWLEDGMENT: TRRL (IRRD-234096), Australian Road Research Board

42 182672 URBAN STRUCTURE, PASSENGER TRANSPORT AND ENERGY CONSUMPTION. URBAN STRUCTURE AND THE INCREASE IN WORKING TRIPS DURING THE SEVENTIES [Ortsstruktur, persontransporter och energikonsumtion. Utspridning av bbyggelse och arbetsresornas oekning under 70-talet]. This report deals with the following problems in Gothenburg and a region in the south west of Sweden. (1) General changes concerning location of residential areas and working areas during the seventies. (2) The development of travel patterns for journeys to work during recent decades and changes in travel patterns during recent years. (3) Influencing the location of residential areas and working areas with the purpose of influencing the need for working trips. (4) Influencing the traffic process with the purpose of reducing the energy dependence without changing the location pattern. Problems 3 and 4 are briefly dealt with. The following conclusions were drawn from the studies: (A) The introduction of measures reducing the spreading of residential areas is the most strategic method of achieving balance between working areas and residential areas. (B) Transferring activities from large urban areas to smaller urban areas may satisfy the need for residential areas near the place of work. (C) Present urban and regional planning is developing unfavourably from the point of view of working trips. (D) Public transport is of importance from the point of view of energy only in cities. (E) The car, the bicycle and the footway are the most realistic transport modes considering the quality of residential areas. (F) Changing the urban structure by locating works within walking and cycling distance is in the long term the most interesting alternative from the energy viewpoint. (G) The urban and regional planning and residential policy during the seventies regarding the possibilities of travelling to work and saving energy has been erroneous. /TRRL/ [Swedish]

Listerus, J Lorentzon, S Nordstroem, L ; Gothenburg University, Sweden Monograph Choros No. 114, 1978, 113 pp. Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 233499), National Swedish Road & Traffic Research Institute

42 182680 PLANNING FOR PERSONAL MOBILITY--A DIFFERENT VIEW. An investigation into the economic advantages of providing a comprehensive system of urban cycle-ways in Bedford is described. The Bedford urban transportation study (1974/76) showed that nearly as many people cycled in the area as travelled by bus, and that the average journey length by cycle and car was 3.75 km. It is planned that some 39 km of cycle-way be constructed by 1991 at a cost of .04 million (1974 prices). Lighting, signing and nineteen signal controlled crossings are envisaged. Adequate parking facilities in the centre are to be provided. The environmental advantages, as well as reduced accidents and the potential increased daily capacity of the highway network are examined. It is claimed that an annual saving in accidents worth over ,37000 could be achieved when the scheme is completed. On this basis alone, benefits are large compared with minor road improvements. /TRRL/

Snelson, P (Bedfordshire County Council, England) *Chartered Institute of Transport Journal* Vol. 38 No. 3, Mar. 1978, pp 87-88, 2 Tab., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233540)

42 183025 AN EXPERIMENT TO DERIVE PREDICTIVE MODELS OF PUBLIC RESPONSE TO POLICY MANIPULATIONS IN PUBLIC BUS TRANSPORTATION. This report summarizes the methodology and results pertinent to an experiment in predictive modeling of demand for public bus transportation as a function of several policy-sensitive factors. /GMRL/

Louviere, JJ Meyer, R Stetzer, FC Beavers, LL ; Iowa University Technical Rpt No. 35, Dec. 1974, 33 pp; ACKNOWLEDGMENT:

42 183113 MASS TRANSIT IN HAMBURG. Under the German Marshall Fund of the United States, Professor Naftalin recently visited Hamburg to look at the intergovernmental arrangements that are the underpinnings of the city's renowned integrated transit system. He found that few cities have given the problem of transport more profound or more sustained study, or with better outcome. The United States and other countries can learn a great deal about transit planning and operations from Hamburg. /GMRL/

Naftalin, A (Minnesota University, Minneapolis) *Transportation Engineering* Vol. 47 Dec. 1977, pp 36-34; ACKNOWLEDGMENT:

42 183114 MASS TRANSIT IN JAPAN. One of the most densely populated nations in the world, Japan banks heavily on mass transit to alleviate traffic congestion and to move people with more speed. Present and planned Japanese mass transit facilities may well be the most modern and extensive of any country. /GMRL/

Wynne, GG (Council for International Urban Liaison) *Transportation Engineering* Vol. 47 No. 10, Oct. 1977, pp 46-48; ACKNOWLEDGMENT:

42 183117 METHODS FOR MEASURING RURAL TRANSPORTATION NEEDS AND DEMAND, AN ITE INFORMATIONAL REPORT. The objective of Committee 6F-10, Rural Transportation Needs, is to survey the state-of-the-art literature on rural public transportation needs and demand, and to synthesize currently available methods for needs estimation and demand forecasting. The scope of the study is focused on pre-implementation planning rather than post-implementation evaluation of a demonstration project. Distinction is made between the need versus potential demand for rural public transit services. /GMRL/

Transportation Engineering Vol. 48 May 1978, pp 39-46; ACKNOWLEDGMENT:

42 183126 RURAL TRANSIT NEEDS AND FEASIBILITY TECHNIQUES. Members of the Transportation Institute at North Carolina Agricultural and Technical State University visited 12 rural areas which had operating transit systems. The research team attempted to synthesize the various steps that were taken in the planning and implementation of these systems. A critical and difficult step in the sequence leading to implementation is an assessment of the need for a rural transit system. Once a measure of the need has been developed the rural transit planner is faced with deciding whether it is possible to put together the economic resources and political institutions to make a system feasible. These two

steps, collectively called the Needs and Feasibility Study, are the focus of this paper.

Saltzman, A ; North Carolina Agricultural and Technical State U 1976, 20 pp; Presented at the Transportation Research Forum, 17th Annual Meeting, Boston, Massachusetts, October 28-30, 1976.; ACKNOWLEDGMENT:

42 183132 TRANSIT OPTIMIZATION-TEST 1 ANALYSIS. The purpose of the Test 1 analysis phase was to debug the mating of the transit optimization theory and the mathematical programming package used. The specific purpose of the transit optimization technique is to allocate bus service to each link in this system so that either total revenue or total profit to the system is maximized subject to various system constraints. /GMRL/

Guinn, CR ; New York State Department of Public Works, (Project no 00-242) Report No. 2, Mar. 1976, 17 pp; ACKNOWLEDGMENT:

42 183140 TRAVEL TIME EMPIRICAL STUDY. The purpose of this empirical analysis was to determine the relative significance of several parameters influencing the travel time rate on urban streets. The main thrust was toward an understanding of which parameters had a significant primary effect and which did not. This research phase was not directed toward an empirically derived travel time estimation equation such as a regression equation. /GMRL/

Guinn, CR ; Michigan Area Coalition PRR-8, June 1978, 81 pp; ACKNOWLEDGMENT:

42 183141 URBAN TRAVEL ALTERNATIVES: MODELS FOR INDIVIDUAL AND COLLECTIVE PREFERENCES. A method of estimating preference functions for alternative urban travel modes using non-metric scaling and conjoint measurement is introduced. The method treats travel alternatives as alternative collections of generic attributes and disaggregates preference orderings for alternative modes into components associated with the generic attributes. Preference functions are fitted for individual respondents and alternative methods of estimating collective preference functions for the group of respondents are examined. Particular attention is given to the error associated with aggregating individual responses. The methods are designed to be effective with relatively modest quantities of survey data. /GMRL/

Odland, J Jakubs, J *Socio-Economic Planning Sciences* Vol. 11 No. 5, 1977, pp 265-271; ACKNOWLEDGMENT:

42 183230 MANAGING THE TRANSPORT SERVICES FUNCTION. SECOND EDITION. This book groups together all the factors involved in the movement of freight and personnel. This second edition incorporates the changes made since 1972 in the transport industry, not least the effects of EEC regulations and new tax legislation. Cost figures have been brought up to date. The book is divided into the following chapters: part 1- management objectives (area responsibility, organisation and management structure, transport services management); part 2 -financial controls (achieving a cost-effective operation, budgetary controls, setting financial standards); part 3- movement of freight (transport planning, vehicle selection and design, vehicle

plan, mobility of the sales and service function); part 4-movement of personnel (company car and chauffeur services, company air service). An appendix lists companies specializing in air taxi operations and charter services. /TRRL/

Woodward, FH; Gower Press, Teakfield Limited Monograph 1977, 333 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-233620); ORDER FROM: Gower Press, Teakfield Limited, Westmead, Farnborough, Hampshire, England; B7806653

42 183428 IS MODAL CHOICE MODELING BECOMING OBSOLETE? Increasing emphasis on promoting public transport and restricting the car during the 1960s led to changes in urban transport modelling. Models depicting choice of mode as a consequence of continuous adjustments to differences in modal generalised costs were introduced. Doubts that this concept of choice is valid are growing. Recent studies indicate very little choice of public transport, providing a car is available for use, while theoretical work has stressed the importance of habitual selection. The size of the error term in estimating small amounts of effective choice suggests that little accuracy is gained by using conventional choice modelling. Moreover, the modal choice issue is becoming less important as transport policy evolves and problems are seen in a fresh light. /Author/TRRL/

Starkie, DNM (Reading University, England); Director General of Transport, Western Australia. (0313-6655) 1978, pp 109-119; Australian Transport Research Forum. Fourth Annual Meeting, May 24-26, 1978, Perth, Forum Papers.; ACKNOWLEDGMENT: TRRL (IRRD-234194), Australian Road Research Board

42 183436 EFFECTIVE TRANSPORT OPERATION IN THE HIGHWAY SYSTEM. The report describes work by the Transport Operations Research Group, University of Newcastle upon Tyne, on traffic control and bus operations, and sets it in the context of other related work. The benefits of urban traffic control are outlined, current possibilities and the results of recent research in this field, and the capacity of signal-controlled junctions, are considered. Techniques for giving priority to buses at traffic signals are outlined. A framework for the study of many of the principal aspects of the operation of urban bus routes is set out, and illustrated by results from a range of studies. Research into the possibility of using traffic control to influence the traffic pattern is briefly examined. /TRRL/

Allsop, RE (University College, London) Chapman, RA Ferguson, JA (Newcastle upon Tyne University, England) *Highway Engineer* Vol. 25 No. 7, July 1978, pp 2-8, 4 Fig., 1 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234444)

42 183452 PROCEEDINGS OF SEMINAR F ON TRAFFIC AND ENVIRONMENTAL MANAGEMENT. The following papers were presented at the Seminar on Traffic Management: Environmental Traffic Management-The End of the Road? McKee,WA; Urban Traffic Control for Sheffield, Coventry,PS; Pedestrian-Vehicle conflict at Pelican Crossings, Bruce,S; A Method of Predicting Traffic Assignment and Queues in Urban Areas, Leonard,DR, Tough,JB and Baguley,PC; The Application of Equilibrium Assign-

ment Techniques to Co-ordinated Signal-controlled Networks, Charlesworth,JA; Dependence of Traffic Patterns of Signal Timings, Gipps,PG; A Model for the Simulation of Traffic Management Schemes, Bolland,JD; Modelling for Traffic Management in an Urban Environment, Logie,DMW; Calculation and Use of the Critical Cycle Time for a Single Traffic Controller, Murchland,JD; Traffic Control and Route-choice: A Control Which Minimises Rush-hour Congestion, Smith,JM; The Bradford Transport Interchange, Waller,MH; Bus Priority Using Selective Detection, Jenkins,RP; Different Buses for Different Applications,-The "Rapid Transfer Bus", Kilner,AA; Rish Analysis Applied to the Evaluation of a Bus Lane, Lewis,P; Justification for Bus Lanes in Urban Areas, Bly,PH, Webster,FV and Oldfield,RH; Private Non-residential Parking in Central London, Carr,R; Traffic Restraint-A Function of Parking Control? Armitage,GA; The Effect of Price on Usage at Westminster City Car Parks, Wright,CC; The Use and Misuse of Parking Meters, Benn,GK; Controlled Parking in Residential Areas, Elliott,JR; and, Parking Policy and Enforcement, Cutts,JC. /TRRL/

Planning & Transport Res & Comp, Sum Ann Mtg, Proc REPORT No. P152, 1977, 252 p., Figs., Tabs., Refs. P152 Proceedings of Seminar F on Traffic and Environmental Management, PTRC Summer Annual Meeting, 27-30 June.; ACKNOWLEDGMENT: TRRL (IRRD 232260)

42 183453 PUBLIC TRANSPORTATION, FEARS AND RISKS. Train and flight services make up only a small portion of passenger traffic in Sweden. The major part consists of private motoring, which is more dangerous and is not very convenient for society as a whole. The public does not seem to choose means of conveyance on the basis of safety and those who do not dare to fly have fears that are more readily related to classical phobias than to (real) danger. It might well be that feelings of repulsion, fear and aversion direct peoples choice more than is generally suspected with regard to habits of travelling. Also, in the future, the public would be expected to choose less by novelty and status or other evaluative aspects but more by efficiency of means. Train and flight services are safe compared with buses, private cars, motor cycles and bicycles and one reason for that is the clear-cut responsibility. Decentralization of public transportation might lower its safety in a way the public would not notice. /TRRL/

Blomkvist, AC; Gothenburg University, Sweden Monograph Report 4-78, 1978, 76 p., 5 Fig., 6 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 234407), National Swedish Road & Traffic Research Institute

42 183535 PROCEDURE FOR ESTIMATING DEMAND FOR REGIONAL FRINGE PARKING FACILITIES. Purpose of this study was to determine the best location and the optimum feasible quantity of additional parking spaces that would effectively serve potential demand for change-of-mode parking at the interface between highway and passenger rail systems. Selection criteria, such as available land, accessibility to highway system, current rail ridership, and current parking demand, were used to identify 20 potential fringe parking sites. Future demand for parking spaces at the selected sites was deter-

mined in four steps. The first step dealt with trip interchanges. All future trip makers who reside in the influence area of each of the potential sites, and whose trip destinations lie in the distribution service area of the passenger rail system were identified and quantified. In the second step, the market share of each mode was calculated by using a disutility mode-choice model. Disutility rates for the automobile and rail modes were computed for each of the trip origin areas, and the percentage of passenger rail trips was derived from diversion curves. In the third step, the proportion of projected commuter rail patrons demanding parking spaces at each site was established by using a relationship between the distances patrons travel to the station and their access modes to the station. Finally, additional parking spaces over and above the number of spaces already existing or planned were calculated for each site. /Author/

Mufti, RK Golfin, LS Dougherty, CD (Delaware Valley Regional Planning Commission) *Transportation Research Record* No. 644, 1977, pp 15-19, 1 Fig., 6 Tab.; This article appeared in *Transportation Research Record* No. 644; Highway Capacity, Traffic Flow, and Traffic Control Devices.; ORDER FROM: TRB Publications Off

42 183649 VARIATION IN URBAN WORK TRIP LENGTH BY MODE, LOCATION AND WORKER CHARACTERISTICS. Variation in work trip length is examined as related to mode of travel, spatial distribution of residence and employment locations, and socioeconomic characteristics of workers. Using multiple regression analysis on dummy variables, 15 characteristics of workers in a metropolitan area were related to work trip length. Statistically significant relationships (p less than 0.001) were found for 13 of 15 variables, but the explained variance of ten of these variables was less than one percent. Travel mode and the two location variables each explained more variation than any of the socioeconomic variables. Both additive and multiplicative models were tested: the models performed equally well and the statistical significance of the variables did not appreciably differ. An improved understanding of work trip length variation is needed to provide a theoretically sound basis for calibration of a general class of spatial interaction models including trip distribution, residential location, and work and shopping location models. This research indicates that disaggregation of a trip distribution model by workers' socioeconomic characteristics will not improve its performance. Disaggregation by zone of residence or employment will result in only slight improvements in model performance. /Author/TRRL/

Murawski, CA (General Motors Research Laboratories) Boyce, DE *Transportation Research* Vol. 12 No. 2, Apr. 1978, pp 97-109, 2 Fig., 7 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-233930); ORDER FROM: ESL

42 183653 TRANSPORTATION PLANNING, POLICY AND ANALYSIS. After tracing the development of modern transport planning, the author describes changes in transport administration (role played by central and local government structure, organization of conurbation transport studies, establishment of the Greater London Council and passenger transport authorities). Various traffic and public transport policies

proposed during the 1960's such as traffic management techniques, traffic restraint and promotion of public transport are outlined together with methods of evaluating transport policies. Mention is made of the transportation planning models used in mathematical simulation. In part 2, developments during the 1970's (including transport policies and programmes and transport supplementary grants) are reviewed. In conclusion, the importance of the preservation of environmental quality and accessibility is emphasized. /TRRL/

Starkie, DNM (Reading University, England) *Urban and Regional Planning Series Monograph Vol. 13 1976, 147 p., 12 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-233660)*

42 183696 MANAGERIAL DECISION-MAKING CRITERIA IN URBAN MASS TRANSIT. The changing role of public transit in North America has generally not been accompanied by improvements in the state-of-the-art data collection and analysis. The new orientation that transit has acquired through public control has become increasingly costly and exceeded revenues generated from the specific services rendered. Only little evidence exists regarding the nature and size of benefits resulting from specific programs and services. Unless the transit industry is perceived to be of merit such as defense and higher education, it will increasingly be challenged to support the magnitude of the social benefits that result from specific expenditures and services. To avoid unwise expenditures, programs and services, the industry should embark on a program to develop the necessary technology and resources to measure specific impacts of public transit services and relate these measurements to the broad social objectives that transit is supposed to achieve.

Horn, KH *Transportation Journal Vol. 17 No. 4, July 1978, pp 56-72, 3 Tab.*

42 183698 A STUDY OF APPLICABILITY-POLITICAL IMPACT ANALYSIS IN TRANSPORTATION PLANNING. This article discusses the applicability of an innovative planning tool, the Political Impact Analysis, in community planning and, more specifically, urban transportation. The basic premise of this concept is that all too often planners fail to determine the effect of their plan on an individual community, or the community political reaction to a particular issue. That failure not only adversely affects a community because negative social and economic impacts may not be realized until after the fact, but it also could delay the implementation of the entire planning project because of potential political reactions and pressures brought about by the communities. The Political Impact Analysis attempts to uncover these potential community impacts and subsequent political reactions through a proposed multi-step methodology. The most important step includes interviews of key informants. The execution of this concept also improves the communication and participation processes between the planner and the community. This type of analysis was tested for feasibility in Cincinnati, Ohio. The results indicate that the Political Impact Analysis has potential to be a viable concept in community planning. /Author/

Robertson, KA (Delaware University, Newark) *Journal of Community Development Soc of America Vol. 9 No. 1, May 1978, pp 112-123, 8 Ref.*

42 183837 TRAVEL TIME VARIABILITY ON COMMUTER JOURNEYS. This paper presents some results from a study of travel time reliability for private car commuter journeys conducted in Melbourne, Australia. Statistical analyses of the data were used to investigate the distribution of travel times, the independence of travel times on adjacent sections of a route and the relationship between congestion and the variability of travel times. Some new and some confirmatory results were obtained. The use of the results in a traffic assignment context is discussed and areas of future research outlined.

Richardson, AJ (Cornell University) Taylor, MAP *High Speed Ground Transportation Journal Vol. 12 No. 1, Apr. 1978, pp 77-99, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL*

42 183952 MODELING THE JOINT DISTRIBUTION OF HOME AND WORKPLACE LOCATIONS IN A CITY. This paper investigates the fit of a spatial model to the joint distribution of homes and workplaces, taking into account that home and workplace locations are interrelated. The model is expressed as a single continuous function of the home and workplace coordinates, and in its simpler form has three parameters, each with a clear physical interpretation. The model is compared with data on desire-line lengths of work-trips in London and Bristol in the United Kingdom. For different modes of transport, and the results show close agreement in most of the cases that are examined. The model describes the spatial pattern of travel, provides a direct estimate of the travel demand, without the need for an iterative procedure. Some implications of the model are discussed and it is shown that the model can be expressed as a continuous variable form of the standard gravity model.

Blumenfeld, DE (University College, London) *Transportation Science Vol. 11 No. 4, Nov. 1977, pp 307-337, 28 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL*

42 184090 GUIDELINES FOR STUDIES OF REORGANISATION OF URBAN TRANSPORT NETWORKS [Guide des etudes de restructuration des reseaux de transport collectif]. This report outlines the aims of a public transport reorganisation study which can be divided into 5 phases: analysis of the current situation, study of services after 10 and 5 years, definition of the network at 2-3 year, implementation and follow-up study. Each phase is very detailed. An appendix discusses the collection of data, forecasting of patronage, calculation of the operating costs of a bus network, examples of contracts between the community and urban transport contractor. /TRRL/ [French]

Direction des Transports Terrestres Monograph May 1975, 171 p., Tabs., 4 Ref.

42 184099 JOURNEYS IN AN URBAN ENVIRONMENT. GUIDELINES AND REPORT [Les déplacements en milieu urbain-avis et rapport 711K appended. /TRRL/]. The first part of the report describes urban transport problems, the place of the car in urban transport, permanent aspects of public transport, two-wheeled vehicles, pedestrians, freight transport. In part 2 some proposals are put forward for integrating the

travel factor in town planning. A study is conducted of a better conception of urban transport networks, of car restraint, improvement in the conditions of pedestrians, integration of bicycles in urban traffic, better organization of freight transport. Tabulated data on various aspects of urban transport are appended. [French]

Schmider, A *Journaux Officiels Monograph June 1976, 150 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 105154), Central Laboratory of Bridges & Highways, France, Institute of Transport Research*

42 184110 A NEW METHOD OF APPRAISAL OF TRAFFIC FLOW [Ein Neues Verfahren zur Schätzung des Verkehrsumfanges]. Until now reliance has been placed mainly on the Lillian laws of travel or a simplification of the newtonian gravity model for the forecasting of traffic flows. The criticism of these methods is of their schematic method of approach and the insufficient statistical weight given to the traffic relieving factors. A new method of calculation attempts to overcome these deficiencies. The starting point is the travel requirements of the population, whereby the differing communal and economic conditions of different groups of people are taken into account. Also the differences in travel habits between large, medium and small towns which result from the differences in their economy and their attractiveness are taken into account. The use of the new method is illustrated using as an example the rail and road traffic of the Lahn area in 1972. /TRRL/ [German]

Leibbrand, K *Bundesbahn Vol. 53 No. 6, June 1977, pp 389-394, 6 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-306861), Federal Institute of Road Research, West Germany*

42 184265 PUBLIC TRANSPORT IN URBAN AREAS [Kollektivtransport i tettsteder; problemstillinger belyst ved eksempler fra tre tettstedsområder]. The report presents three different studies concerning public transport in urban areas in Norway. The consequences of different land-use patterns are analysed for the verdal area. Different modes of service are tested for a small town, Mandal. Restraints on the use of cars in peak hours and increased public transport are discussed and compared to further investments in roads and parking facilities in Tromsø. /Author/TRRL/ [Norwegian]

Kolken, KM (Transportoekonomisk Institutt); Institute of Transport Economics, Norway, (82 7133 192 2) Monograph Temaserien 4, Oct. 1977, 80 p., 14 Fig., 13 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-233159), Norwegian State Highway Laboratory

42 184291 TRANSPORTATION MODELS-ASSIGNMENT AND ROUTE CHOICE, DISTRIBUTION MODELS AND TRIP END MODELLING; DISAGGREGATE MODELS, TRAVEL ATTITUDES AND PERCEPTION, THE APPLICATION OF TRANSPORTATION MODELS. The following papers were included in these sections of the seminar on transportation models: Route choice, Outram, VE; Speed flow relationships, Cooper, JSL and Coombe, RD; An approach to modelling the distribution of households, by their size and by the number of employed residents, for use in estimating trip generations, Stroud, AA; The county Surveyors Society trip rate data bank: A

survey of progress in data collection techniques and early results of research, Mollett, TJ; Temporal stability and forecasting ability of trip generation models in reading, downes, JD; Disaggregate models: An overview of some recent research results and practical applications, Ben-Akiva, Me, Lerman, SR and Manhein, ML; An investigation of households' response to car restraint and other policy measures, Jones, PM; An evaluation procedure for comprehensive transportation planning, Duran, RF and Mateos, A; Modal split analysis in South Yorkshire, Neffendorf, H and Wicks, R. /TRRL/ for the proceedings is IRRD 228467. For details of the paper by downes,jd see IRRD abstract no 228471.

Planning & Transport Res & Comp, Sum Ann Mtg, Proc No P142, pp 218-374, Figs., Tabs., Refs. Proceedings of Seminar N, Summer Annual Meeting, University of Warwick, July 1976.; ACKNOWLEDGMENT: TRRL (IRRD-228469)

42 184293 TEMPORAL STABILITY AND FORECASTING ABILITY OF TRIP GENERATION MODELS IN READING. The paper examines the temporal stability of trip generation models, and the accuracy of current forecasting methods. Three methods were used to explain trip generation. The first adopts the traditional approach of applying multiple regression analysis to explain zonal trips in terms of zonal characteristics. The second method uses the main alternative of category analysis or, more generally, the cross classification of household trip rates. With the growing interest in household regression for conserving the variability of household trip data, the third approach applies regression analysis directly to the household data. All three methods are examined for the degree of representation which they provide at zone level for the temporal stability of the explanation and for the ability of the 1962 mode to produce satisfactory 1971 zonal forecasts. /TRRL/

Downes, JD (Transport and Road Research Laboratory) *Planning & Transport Res & Comp, Sum Ann Mtg, Proc, R ANNUAL MEETING, UNIVERSITY OF WARWICK, JULY 1976* 1976, pp 272-288, 7 Tab., 9 Ref.; Proceedings of Seminar N, Summer Annual Meeting, University of Warwick, July 1976.; ACKNOWLEDGMENT: TRRL (IRRD-228471)

42 184300 THE POLITICS OF URBAN TRANSPORT PLANNING. Highway construction policies encourage the use of private vehicles, the dispersal of residential areas and the reduced patronage of public services. Public service improvements generate the opposite trends. The balancing or mixing of these two policies is complex, and methods of effectively achieving the combined benefits of both are not well developed. The purpose of this book is to demonstrate the importance of transport planning in cities, to present the basic arguments of the two policies, and to analyse the processes by which these arguments were resolved in the three county boroughs of Portsmouth, Southampton and Nottingham during the period 1947 to 1974. The chapter headings are as follows: (1) transportation in urban areas; (2) theories of urban policy making; (3) research methods; (4) relevant environment of transportation planning 1947-1974; (5) case studies: Portsmouth, Southampton and

Nottingham; (6) analysis of the technicians in the policy making process; (7) analysis of community groups in the policy making process; (8) analysis of the politicians in the policy making process; (9) conclusions (measures of needs and resources, implications). /TRRL/

Grant, J; Earth Resources Research Limited, (0 90596602 3) Monograph 1977, 164 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-232755)

42 184334 BUS POLICY-CONCLUSIONS FROM A CASE STUDY. The main policy conclusions from a recent bus study in the new town of Telford in the UK are summarised and discussed. The choice of bus routes and their combination into networks is examined. Alternative fares systems are compared and the implications for the fare levels necessary to cover costs are discussed. It is argued that bus services can generally be financed from the fare-box but that, unless services are cut as passenger demand falls, unduly high fares will result and these will unnecessarily drive more passengers away from the buses. Several particular aspects of service marketing are then examined and the paper concludes by discussing the actual organisation of the bus services. /Author/TRRL/

Buchanan, CM (Buchanan (Colin) and Partners, London) *Transportation (Netherlands)* Vol. 6 No. 4, Dec. 1977, pp 333-343, 2 Fig., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233288)

42 184335 THE IMPORTANCE OF ATTITUDES IN THE DECISION TO USE MASS TRANSIT. This paper reports the results of tests of the hypotheses that attitudinal variables are important in mode choice decisions and that they can significantly increase the explanatory power of network-based mode choice models. Conflicts between the results of previous work by Lovelock and Johnson are resolved by this study. Attitudinal items used by Johnson and by Lovelock in separate studies in the San Francisco Bay area were included in a survey of Chapel Hill households. Tests of the incremental explanatory power of the attitudinal variables in mode choice models confirm that the items used by Johnson do not contribute to the explanatory power of models using network time and cost data. Similar tests showed that Lovelock's attitudinal items do significantly increase the predictive ability of the models. The conflicting results of these previous studies are therefore due to the content of the items. Attitudinal data, including both attitude items and measures of perceptions of system attributes, do enhance the predictive power of models involving network data.(a) /TRRL/

Gilbert, G Fuerster, JF (North Carolina University) *Transportation (Netherlands)* Vol. 6 No. 4, Dec. 1977, pp 321-332, 1 Fig., 2 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233289)

42 184336 AN EMPIRICAL COMPARISON OF DISAGGREGATE CATEGORY AND REGRESSION TRIP GENERATION ANALYSIS TECHNIQUES. Category and regression household trip generation analysis techniques were compared and contrasted. The comparative research was facilitated through a discussion that revealed the interchangeability of two methods of calibrating a category model. While the cell mean method is simple to implement, it does not readily yield statistical indexes for comparison with

regression models. The general linear model analysis of variance (Glanova) readily provides statistical indexes for the comparison of category and regression trip generation models, and it produces identical empirical results to the simpler cell mean approach of calibrating a category model. The empirical comparison supports the widespread use of category models for trip generation analysis in transportation planning studies. It was found that regression and category models yielded equivalent results for typical planning applications at the district level of aggregation. In addition, both techniques estimated overall trip rate with equal accuracy in the calibration phase, and the two approaches were indistinguishable with respect to sample size sensitivity. However, households with extremely large trip rates were underestimated to a greater degree by category models than regression models. This tendency, in turn, resulted in larger calibration coefficients of determination for regression models. Since the cell mean method of calibrating a model is simpler and easier to understand than a regression model representation, category models can be recommended over regression models for planning studies.(a) /TRRL/

Dobson, R (Charles River Associates, Incorporated) McGarvey, WE (University of Southern California) *Transportation (Netherlands)* Vol. 6 No. 3, Sept. 1977, pp 287-307, 1 Fig., 10 Tab., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233290)

42 184338 A METHODOLOGY FOR PLANNING BUS SERVICE. A methodology to assist transportation planners in designing bus services is developed. The methodology is most relevant for use in locations where bus service of the type being studied does not currently exist and therefore no information is available on past choice behavior, or in instances when transferability of travel models estimated in another location is difficult. The methodology assesses the sensitivity of bus service characteristics upon intended bus usage using survey data collected in Orange County, California, by the Orange County Transit District (OCTD). The methodology is based on a nonparametric statistical test developed by Kolmogorov and Smirnov. Scenarios describing hypothetical operations of bus service are presented to survey respondents who indicate their intended levels of bus usage under each situation. Significant differences between the response distributions associated with pairs of scenarios are identified and potential ridership levels, as bus operations become more favorable, are assessed. Various user segments are then identified on the basis of their levels of intended bus usage and the corresponding marketing implications associated with each segment are discussed.(a) /TRRL/

Nicolaidis, GC Krishnan, KS (General Motors Corporation) *Transportation (Netherlands)* Vol. 6 No. 3, Sept. 1977, p 24902631, Fig., 7 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233292)

42 184427 CONTROL MEASURES USED IN TRAFFIC PLANNING IN URBAN AREAS [Styrmedel vid trafikplanering i taetorter]. Although car ownership and car travel are regarded as an important democratic right, control measures are necessary to reduce their negative effects. In Stockholm, traffic policy goals are: (1)

to improve communications, (2) to counteract environmental disturbances, (3) to reduce accident risks, (4) to give public transport priority, (5) to give goods deliveries priority. Control measures may relate to (1) changes in land use, (2) traffic system, (3) standard of public transport, (4) parking, or consist of (5) economic and administrative measures, (6) traffic management measures. The choice of measures depends on whether traffic is to be restricted on some streets or in certain parts of a municipality, or whether the use of certain vehicle types, or the use of vehicles for certain purposes is to be restricted. There is a discussion of control measures applicable to these choices. The use of parking restrictions is an important means of controlling the type of traffic. The introduction of tolls for travel into a certain area, or of charges for journeys inside a certain area, can also be considered. Traffic management measures may consist of restriction of access to certain areas at certain times of the day. /TRRL/ [Swedish]

Wallin, B *Stadsbyggnad* Vol. 44 No. 1-2, 1978, pp 13-17, 5 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234696), National Swedish Road & Traffic Research Institute

42 184438 MEETING TRAFFIC PRESSURES IN TOWNS AND VILLAGES. The paper first reviews the main changes that have taken place in transport over the past fifteen years and the way in which projections of traffic growth have had to be amended. The Newbury case study in "traffic in towns" and the approach used for studying towns in the recently-completed West Yorkshire transportation studies are used to exemplify changing attitudes to the means of meeting traffic pressures. The benefits from defining issues and objectives at an early stage in the latter study are described, together with the choice of appropriate measures and standards. /Author/TRRL/

Earp, JH (Halcrow, Fox & Associates, London) *Highway Engineer* Vol. 25 No. 5, May 1978, p 30, 2 Tab.; Institution of Highway Engineers North National Conference, Highways and Transportation Problems 1977/78, held in London, December 8-9, 1977.; ACKNOWLEDGMENT: TRRL (IRRD-233213); ORDER FROM:

42 184484 TRANSPORTATION CONFERENCE, 1977. ORANGE, 24-26 OCTOBER 1977. THE WAY AHEAD-NEW CITIES OR BIGGER CITIES. PREPRINTS OF PAPERS. The conference was organized by the National Committee on Transportation of the Institution of Engineers, Australia. The main purpose of the conference was to provide the venue and motivation for open and constructive discussion of the main issues associated with planning for the urban centres in Australia. Papers discuss causes of problems associated with development of urban areas and practicable planning solutions. /TRRL/

Institution of Engineers, Australia, (085825-0861) Monograph Natl Conf Pub N77/10, 1977, 123 p.; ACKNOWLEDGMENT: TRRL (IRRD 234299), Australian Road Research Board

42 184581 MARKET SEGMENTATION ANALYSIS: THE POTENTIALS OF CARTOGRAPHIC ANALYSIS AND CENSUS DATA. Segmentation of transportation markets is based on the principle that areas within the metropolitan region which have similar attitudinal/demo-

graphic characteristics will have similar transportation needs. This study examines several ways in which these homogeneous subareas of the city may be identified and in turn how they relate to the transportation (work trip) patterns, namely, mode split. The purpose of this study is to illustrate the strength of the relationships between demographic characteristics and modal choice patterns using census data. Most of the arguments developed use a cartographic based analysis supplemented by statistical measures; hence, the arguments rely extensively on visual interpretation. It is contended herein that such interpretations can, in some cases, be as powerful and convincing as numerically based evaluations. The maps produced in this study use the U.S. Bureau of the Census Urban Transportation Planning Package (UTPP) as input data. The authors demonstrate and conclude the validity/utility of three basic premises: 1) there are distinct areas within the metropolitan region which can be delimited by demographic variables which correspond to mode specific areas for the purpose of market segmentation; 2) the U.S. Bureau of the Census UTPP data can be easily used to easily and quickly perform such an analysis; and 3) this analysis can be conducted principally with maps to give visual credence to the relationships discussed. The authors point out that the main advantage of the UTPP data is that it can be readily mapped. /UMTA/

Soot, S Sen. AK ; Illinois University, Chicago, (IL-11-0008) UMTA-IL-11-0008-78-3, 33 p.; ORDER FROM: NTIS; PB-285056

42 184610 DOWNTOWN TRANSPORTATION CENTER STUDY MILWAUKEE, WISCONSIN. Data was collected to describe the central business district (CBD) in physical, functional and operational terms. This data was used to establish baseline conditions and likely changes which could then be interpreted into more specific needs for a CBD transportation center (a facility to serve a mode change function). The CBD is described in terms of the major land-uses, the transportation systems and activity patterns. CBD travel characteristics are also described. The basis for future planning is discussed. In order to develop real or site-specific alternatives, 2 steps are necessary. Planning objectives with corresponding criteria have to be articulated. These interpret notions about the transportation centers into a series of end-state conditions or achievements. The criteria establish quantitative measures for those achievements. Second, the planning objectives creating a framework or context, inventory and travel information can be analyzed to more precisely describe service needs. On the basis of research findings and considerations of the goals and objectives, a set of transportation center alternatives were developed. The process began with basic concepts for individual elements, then proceeded to possible combinations and more detailed designs (physical and operational). The intent was to identify the broadset range of potentially feasible alternatives for testing and evaluation. The alternatives were evaluated with respect to the set of approved planning objectives in terms of certain specific criteria related to: patron service, operational performance, cost, land-use relationships, and implementation. A recommended plan was developed on the basis of the study findings, additional analyses, and comments from various agencies.

Gilman (WC) and Company Incorporated May 1978, 115 p., 41 Fig., 17 Tab., 2 App.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.

42 184611 MULTI-USER VEHICLE SYSTEMS FEASIBILITY ASSESSMENT. An evaluation was made to determine the feasibility of utilizing a multi-user vehicle system (MUVS) as an integral part of an urban transportation system. The analysis began with an appraisal of existing experience with MUVS city circulation services to determine whether the limited success with MUVS to date is indicative of inherent weaknesses with the concept or whether it can be attributed to isolated factors which could be overcome in future demonstration projects. It is concluded that neither of the two experiments with MUVS to date-one in Montpellier, France, and the other in Amsterdam, The Netherlands--provided conclusive evidence on the ultimate viability of MUVS. In both instances, a variety of unique and potentially correctable institutional and system design factors limited the potential of the systems. Based upon a thorough analysis of the key factors related to MUVS demand and supply issues and overall feasibility of a successful MUVS demonstration, however, it has been concluded that it is unlikely that MUVS is a viable and promising alternative mode for intra-CBD service with or without auto restrictions. The basic reasons for this conclusion are the following: unreliability of service; low system utilization; potentially large fleet size and terminal requirements; and potentially high system cost; These conclusions are derived from both qualitative and quantitative analyses.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated Final Rpt. UMTA-VA-06-0042-78-2, Dec. 1977, 93 p., 17 Fig., 13 Tab., 2 Phot., Refs.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; Contract DOT-TSC-1057; ORDER FROM: NTIS

42 184640 COMPARISON OF RAPID TRANSIT PLANNING EFFORTS. The recent major rapid transit planning efforts of four medium sized metropolitan regions were reviewed. Comparisons are made of existing characteristics, planning procedures, and the recommended guideway proposals. Major technical considerations that led to the proposals are also reviewed. Existing characteristics are introduced first, including political structure, demographic information, topographic features, existing transportation facilities, and transit usage indicators. Next, each region's varying approach to rapid transit planning is examined. The identification of the priority guideway corridor, the selection of the first segment for implementation, and the evaluation of technologies are all reviewed for each area. Recommended proposals are described that emphasize facility type, patronage, and cost estimates. To enhance the understanding of these programs, major technical considerations are highlighted. These include unique aspects of transit ridership forecasts, benefit-cost estimates, existing transportation system analysis procedures, and citizen participation programs.

West, CR (California Department of Transportation, San Diego) Frystacki, WR *ASCE Journal of Transportation Engineering* Vol. 104 No. 5, Sept. 1978, pp 695-712, 12 Ref.; ACKNOWLEDGMENT:

EI; ORDER FROM: ESL

42 184641 CASE STUDY OF BUFFALO'S RAIL TRANSIT DEVELOPMENT. The history of the Buffalo, N.Y., Light Rail Rapid Transit System is presented. The 10-yr development period includes the establishment of a regional public transportation authority, the initial planning, the alternatives analysis, and the final development of the LRRT system. Guidelines for other cities planning rail transit systems are offered from this experience. They include establishing a strong transportation authority, involving the public from the conception of the project, developing public support, organizing political leaders, being cost conscious, and emphasizing cost of delay.

Wilson, TM (Niagara Front Transportation Authority) *ASCE Journal of Transportation Engineering* Vol. 104 No. 5, Sept. 1978, pp 665-676, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 184676 MOBILITY COSTS AND METROPOLITAN DECENTRALISATION IN SYDNEY. The research described in this paper was undertaken to quantify the value of supportive land use and transport planning policies, and thus to quantify the extent to which a traditional transport problem (the provision of upgraded railway connections and additional capacity between developing fringe areas and the centre of the city) can be solved by a non-transport action--the creation of employment concentrations in the fringe areas. The "transport solution" and the "land use" solution were both tested and the benefits of both solutions are compared. The second purpose of the study was to examine the work journey mobility costs of the future residents of a growth centre on the fringe of a metropolitan area to justify the decentralisation of a balancing and significant amount of employment in addition to significant improvements in the transport services to the fringe. (a) the number of the covering abstract of the conference is IRRD No. 234299.

Smyth, RB (NSW Planning & Environment Commission, Australia) Johnston, DK (Voorhees (Alan M) and Partners Pty Ltd, Australia); Institution of Engineers, Australia, (0 85825 0861) Conf Paper 1977, pp 1-6, 1 Fig., 5 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234301), Australian Road Research Board; ORDER FROM: Institution of Engineers, Australia, 11 National Circuit, Barton, A.C.T., Australia

42 184695 INTERACTIVE GRAPHICS SKETCH-PLANNING MODEL FOR URBAN TRANSPORTATION. This paper presents a description of an interactive graphics sketch-planning model for urban transportation developed at Princeton University. The model was developed to operate in an IBM 370 VM/CMS environment with functions and subroutines written in both APL and assembler language to improve flexibility and speed in accessing and manipulating large networks and data bases. Benefits of the interactive sketch-planning aspects of the model are described. The sensitivity of sketch planning to spatial aggregation of demand data and remedies for alleviating the inaccuracies resulting from spatial aggregation are discussed. /Author/

Kornhauser, AL Hess, JL (Princeton University) *Transportation Research Record* No. 657, 1977,

pp 1-8, 4 Fig., 2 Tab., 3 Ref.; This paper appeared in *Transportation Research Record* No. 657, Applications of Interactive Graphics.; ORDER FROM: TRB Publications Off

42 184710 THE EFFECTS OF URBAN STRUCTURE ON AUTOMOBILE OWNERSHIP AND JOURNEY TO WORK MODE CHOICES. This study documents an investigation of the effects on automobile ownership and use of intermetropolitan differences in transit and highway service levels and overall urban development patterns. Specifically, we present models of the determinants of automobile ownership and mode choice for 163,488 white, single-worker households from the largest 125 standard metropolitan statistical areas in 1970. Indexes of highway capacity, transit service levels, and overall residential density for each area as well as each household's socioeconomic characteristics, work-place location, and residence choice, are used to explain the number of automobiles owned by each household, and, given that, each household's work trip mode (automobile, bus, or rail passenger; or walking). The models offer a framework for considering the effect of alternative urban development scenarios on automobile ownership and use, and for comparing alternative development and infrastructure policy options. Because the models were estimated using households from different areas, they are particularly appropriate for investigation changes in spatial structure. /Author/

Kain, JF Fauth, GR (Harvard Univ, Dept of City & Regional Planning) *Transportation Research Record* No. 658, 1977, pp 9-17, 8 Tab.; This paper appeared in *Transportation Research Record* No. 658, Transportation Development and Land Use Planning.; ORDER FROM: TRB Publications Off

42 184711 A TRANSIT-ORIENTED CITY. Cities are designed to accommodate the automobile. A transit-oriented city is one that from inception is designed for public transportation modes rather than the automobile. In such a city, automobile use would be possible but unnecessary. The goal of a transit-oriented city is to make public transportation travel more attractive than driving so that automobiles will be little needed or used. One possible transit-oriented city is described. From this example we see that many of the advantages of current urban and suburban life-styles are attainable without automobiles. The building of a transit-oriented city as an experiment is suggested. /Author/

Walbridge, EW (Illinois University, Chicago) *Transportation Research Record* No. 658, 1977, pp 17-21, 7 Fig., 12 Ref.; This paper appeared in *Transportation Research Record* No. 658, Transportation Development and Land Use Planning.; ORDER FROM: TRB Publications Off

42 184714 IMPACT OF TRANSPORTATION ON URBAN DENSITY FUCTIONS. A method is proposed for analyzing the variable impact of transportation on urban structure. The varying coefficient model, which uses the negative exponential density function as a theoretical base, provides a means for systematically incorporating hypothesized effects of current and past levels of transportation while holding constant population, income, and other factors identified with

current urban spatial structure. The aspects discussed include the following: the theoretical basis for the hypothesized effects of the conditioning variables to be investigated, the development of the model in relation to changing density functions, the estimation of model parameters by use of available cross-sectional data, the application of the model to the generalized problem of the urban density function, and simulated forecasts and analyses of transportation-related changes in urban structure for selected cities. /Author/

Johnson, SR (Missouri University, Columbia) Kau, JB (Georgia University, Athens) *Transportation Research Record* No. 658, 1977, pp 31-37, 3 Fig., 5 Tab., 10 Ref.; This paper appeared in *Transportation Research Record* No. 658, Transportation Development and Land Use Planning.; ORDER FROM: TRB Publications Off

42 184893 TRAVEL ESTIMATION PROCEDURES FOR QUICK RESPONSE TO URBAN POLICY ISSUES. The results of a 2-phase effort are presented here. In Phase I, policy issues facing transportation planning agencies were identified by onsite visits to agencies at the state, regional and county levels. Questionnaire responses from urban areas, planning documents and literature were reviewed. Policy issues were compiled and classified and the demands placed on travel estimating procedures were determined. Available estimation procedures were compiled, cataloged, described and evaluated. Phase I recommended that a set of capabilities be developed that include: simplified computerized methods for the 4-step (trip generation, distribution, mode split and traffic assignment) procedure that is efficient and will provide quick response at the regional and subarea level; an efficient, policy-sensitive procedure that would evaluate transportation service and cost changes in terms of economics and social and environmental impacts on a macro basis; manual methods useful for short-range application at the corridor and project level. A Users Guide was developed in Phase II to describe transferable parameters, factors, manual techniques, and the like to enable the user to carry out a simplified analysis without the need for reference to other sources. The Guide covers the following planning elements: transportation planning; trip generation; trip distribution; mode choice; auto occupancy; time of day distribution; traffic assignment; capacity analysis; and development density/highway spacing relationships. The guide also illustrates how models may be changed or modified and applied to provide a quicker and less expensive planning tool.

Sossiau, AB Hassam, AB Carter, MM Wickstrom, GV (Comsis Corporation) *NCHRP Report* No. 186, 1978, 70 p., Figs., Tabs., 19 Ref.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286889/1ST

42 184938 FORUM PAPERS OF THE AUSTRALIAN TRANSPORT RESEARCH FORUM : SECOND ANNUAL MEETING, ADELAIDE, 13-14 APRIL 1976. This conference volume contains the following papers: "The Structure of Journeys and Nature of Travel Patterns" by D. A. Hensher; "Land Use Transport Interaction or What Went Wrong with MATS?" by B. C. Thompson; "The Canberra Short Term Transportation Study" by RWJ Morris; "Implications of the Perth Public Transport Flat Fare System" by G.A. Shea; "The

Economic Viability of the South Australian Metropolitan Public Transport System; by D. H. Fidock; "Transport Research, Planning and Operations Within the Department of the Capital Territory" by L. M. Webb; "Bus Service Planning in Adelaide" by T. J. Wilson; "The Problems of Planning and Building a Large Bus Depot" L. A. C. Ellis; "Pedestrian Planning in the Central Area" by F. Uloth et al; "Collection and Use of Road Vehicle Operating Cost Information" by I. R. Ker; "Vehicle Costing in a Trucking Company" by L. E. Browne; "Traffic Predictions in Remote Areas-The Stuart Highway Study" by T. M. Coad et al; "RUCAS: An Overview Implementation and Operation of a Sum Outting and Scheduling System for Buses" by J. F. Field; "Computer Models for Scheduling Buses and Their Crews" by M. E. Parker; "Economic Planning for Transport-Some Practical Considerations" by G. K. R. Reid; "A More Critical Look at Some of the Assumptions Used in Allocating Commonwealth Government Assistance for Land Transport Investment" by J. D. MacLean et al; "Towards an Integration of Macro Transport Modelling and Micro-Economics" by D. M. Gray et al; "Towards Coordinated Transport Planning and Research" by T. H. Cooke; "Towards an Overview of the Australian Transport Section" by N. Clark; and "The Dynamics of the Personal Travel System; by M. Chaffin.

Department of Transport South Australia. Monograph Apr. 1976, 763 p., Figs., Tabs., Refs.

Theme of the Second Annual Meeting: Transport Research Planning and Operations; ACKNOWLEDGMENT: TRRL (IRRD 234020), Australian Road Research Board

42 184939 TRANSPORT DECISIONS IN AN AGE OF UNCERTAINTY. PROCEEDINGS OF THE THIRD WORLD CONFERENCE OF TRANSPORT RESEARCH. This conference volume contains 54 papers on such topics as: urban transportation planning and policy; the role of research and analysis as an influence on policy decisions; intercity passenger and freight transportation; modal split models; travel demand forecasting; bus fleet planning; energy saving measures in transport: pedestrian safety; environmental effects; transportation system management; land use planning; transportation services for the elderly, handicapped, and poor; transportation planning in developing countries; airport and highway planning in rural areas. /TRRL/ [French]

Visser, EJ, Editor (Netherlands Institute Of Transport); Martinus Nijhoff, (90-247-2061-3) Monograph 1977, 657 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 232922), Institute for Road Safety Research

42 185297 TRANSPORTATION SYSTEM MANAGEMENT. This publication contains workshop reports, conference papers and case studies that were presented at the conference on Transportation System Management (TSM). The conference addressed three objectives: provision of the latest information on DOT policies and requirements, the provision of the latest information on experiences with the actual implementation of a range of individual TSM actions, the examination of the emphasis of the regulations on a regional or metropolitan planning perspective. The conference emphasized urban areas that had

or were having success in implementing TSM actions. Three major issues were highlighted in the presentations as well as during the discussion of implementation of individual TSM actions. The issues are: TSM as a planning process and the role of metropolitan planning organizations in that process, perceived conflict between short-term and long-range transportation objectives and public involvement and acceptance of TSM actions.

Transportation Research Board Special Report No. 172, 1977, 163 p., Figs., Tabs., Refs. For individual papers see HRIS 179070 through 179107.; ORDER FROM: TRB Publications Off

42 185387 GUIDELINES FOR COMMUNITY PLAN TRANSIT DEVELOPMENT. These guidelines, which are oriented to the creation of a useful public service, are intended to provide direction for planners of transit services in developing areas. The objectives for community transit development are listed. Studies have shown that a "convenient" transit stop should be within 1,300 ft of a person's origin or destination. Factors which should be considered in making this distance criterion possible are listed. The principles of route layout are detailed and figures are used as illustrations. The planning of timed connections, and the viability of community transit service are considered. The estimation of patronage and mapping requirements and review procedures are also discussed.

Thompson, G (San Diego Metropolitan Transit Development Board) *Transportation Perspectives* Vol. 1 No. 2, Dec. 1976, pp 19-33, 5 Fig.; ACKNOWLEDGMENT: Transportation Perspectives

42 185409 GLOSSARY OF URBAN PUBLIC TRANSPORTATION TERMS. This glossary attempts to serve as a basic reference for persons interested in urban transit planning. It is designed to assist transit system operators to understand the analytical language of urban planners and the latter to understand the operational language of transit system operators. The glossary organizes and to some extent standardizes terms related to urban public transportation. The definitions are organized alphabetically by term. Acronyms and abbreviations are presented at the beginning of each alphabetical section.

Transportation Research Board Special Report No. 179, 1978, 39 pp ORDER FROM: TRB Publications Off

42 185702 BUS TRANSPORTATION. PART 1. NATIONAL AND GENERAL STUDIES (A BIBLIOGRAPHY WITH ABSTRACTS). A broad coverage is made of research on bus transportation. Part 1 deals with topics of general and national scope, such as safety, maintenance, scheduling, engines and propulsion, travel demand, costs, stations and terminals, subsidies, fuel, special services, user groups, bus types, vehicle engineering, and highway aspects. Traffic models, mathematical analysis, computer aided planning, marketing, and urban needs are also discussed. Other subjects are express routes, air pollution, fares, ridership, bus lanes, forecasting, simulation, park-and-ride, personnel training, crime and vandalism, comfort, operating and handling dynamics, and allied topics. (This updated bibliography contains 242 abstracts, 31 of which are new entries to the previous edition.)

Kenton, E ;

National Technical Information Service Bibliog. Sept. 1978, 248 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0967/6ST

42 185734 PLANNING FOR AIRPORT ACCESS: AN ANALYSIS OF THE SAN FRANCISCO BAY AREA. A multidisciplinary systems analysis of airport access to the major airports of the San Francisco Bay Area was made. Basically, it was found that there is no major airport access problem. The argument of the report is that commonly perceived airport access problems are either minor inconvenience magnified out of proportion by a combination of the traveler's unreasonable expectations, anxiety over flight departure and lack of information, or not subject to solutions which do not consider the entire urban transit system. Nine specific conclusions and recommendations for improvement are presented and discussed.

Dajani, JS Jucker, JV Jones, JL ; Ames Research Center NASA-CP-2044, A-7347, May 1978, 300 p.; Conf-Stanford-NASA-Asee Summer Faculty Fellowship Program on Engineering System Design Held at Moffett Field, Calif., 1977.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-26152/6ST

42 185857 REGIONAL PRODUCTIVITY, SUMMARY. Metropolitan Affairs Nonprofit Corporations (MANCs) explored means for improving productivity and technology utilization in the nonfederal public sector. In the first phase of the project, conferences were held in four regions--San Francisco, Minneapolis, Pittsburgh, and New York. The regions were selected to represent a cross section of the country's large urban areas. The subjects included four key technological concerns--transit, environmental monitoring, service delivery, and physical development. Participants included leaders from industry, government, civic organizations, foundations, universities, and consulting firms. In the second phase, the conclusions were tested and refined through review conferences in the additional cities of Detroit, Atlanta, and Washington, DC. As a consequence of this conference study and review process, this report constitutes a comprehensive appraisal by more than 300 highly-experienced practitioners of technology and public affairs in seven representative urban regions across the country. Included in the summary are the report findings, and recommendations.

Metropolitan Affairs Nonprofit, Corporations.-*National Science Foundation,, Washington, D.C. Applied Science and Research, Applications. NSF/RA/G-75070, Aug. 1975, 49p; Grant NSF-DI-39565; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283251/7ST

42 185882 PREFERENCES, PERCEPTIONS, AND MARKET SEGMENTS IN TRAVEL BEHAVIOR [Transportation research record]. Contents: Measurement of psychological factors and their role in travel behavior; Comparative analysis of determinants of modal choices by central business district workers; Development of market segments of destination choice; Evaluation of alternative market segmentations for transportation planning; Perceptual maps of destination characteristics based on similarities data; Instrumental and life-style aspects of urban travel

behavior; Public attitudes toward transit features and systems.

Transportation Research Board, Washington, D.C. TRB/TRR-649, 1977, 55p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283594/OST

42 185975 NOTTINGHAM ZONES AND COLLAR STUDY, RESULTS OF THE 'AFTER' SURVEYS. The Nottingham 'Zones and Collar' experiment in the western sector of the city was implemented in August 1975. The principal aim of the experiment was to make bus travel in the morning peak period more attractive by re-locating traffic queues at points where buses could be given priority. At the same time it was intended to limit the flow of traffic on the approaches to the city center to August 1973 levels. Away from the selected delay points, the reduction in traffic would allow the remaining vehicles, including buses and commercial vehicles to flow freely. A 'before' study was made in April/May 1975 and a report on the results has been published. The present report gives results of the 'after' study made in April/May 1976 by TRRL, Nottinghamshire County Council and the Traffic Advisory Unit, now of the Department of Transport. These include surveys of bus and car journey times, traffic flows, infringements of the newly introduced traffic regulations and the use of the newly introduced traffic regulations and the use of the special 'park and ride' sites. To complement these a roadside interview survey was held and also a household interview survey to determine changes in the travel habits of individuals. (Copyright (c) Crown Copyright 1978.)

Cooper, BR Layfield, RE ; Transport and Road Research Lab., Crowthorne, (England). 65 TRRL-SUPPLEMENTARY-3, c1978., 60p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284514/7ST

42 185977 CALIFORNIA INNOVATION GROUP, INTEGRATED LIST OF URBAN NEEDS [Final rept]. The report should serve as the initial phase of a process by which NASA's existing technology can be matched with identified urban problems. A review of the various problems/needs lists (included) should provide an entry point for technological and analytical problems which are within NASA's ranges of interest. Objectives of the study were to: (1) provide an integrated problem/needs listing with participation in the needs assessment by Anaheim, Fresno, Pasadena, and San Jose; (2) provide a preliminary analysis to determine the priority ranking of the identified problems/needs; (3) provide some identification of approaches to potential solutions, utilizing aerospace technology; (4) begin to establish a working relationship between the member cities of the California Innovation Group and NASA, as well as other Federal Laboratories, to more effectively utilize existing technology in satisfying urban needs. Items selected by the Science Advisors as meriting special consideration for technology transfer activity are included.

Weiss, J ; Lockheed Missiles and Space Co., Inc., Sunnyvale,, Calif.**California Innovation Group, Inc., San, Jose.*National Science Foundation, Washington,, D.C. Applied Science and Research Applications. NSF/RA/G-74/076, Nov. 1974, 40p; Prepared in cooperation with California Innovation Group, Inc., San Jose.; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-284528/7ST

42 185987 CHICAGO TECHNOLOGY AND URBAN NEEDS PROGRAM. The study examines how to overcome social and technological barriers in the process of technology transfer to the public sector. The program described is experimental in nature, realizing that the mechanisms for improving technology transfer are not yet well defined. The program began operations in December 1973. It was to be a five-year effort to develop a cooperative public-private organization called the Chicago Technology Council. The activities of this organization were to identify and develop processes and institutional linkages to transfer technology to the public sector. Public and private sector officials participated in a set of councils organized around functional areas of education, environment, health, housing, management support, manpower, protection of persons and property, recreation and leisure time, and transportation. The report is a description of the first year activities of the Program in terms of the nature of the program, the barriers to technology transfer encountered and the successes and failures of actions taken to overcome these barriers.

IIT Research Inst., Chicago, Ill.**Chicago, Technology Program Staff, Ill.*National Science Foundation, Washington, D.C. Applied Science and, Research Applications. NSF/RA/R-75/010, June 1975, 159p; Prepared in cooperation with Chicago Technology Program Staff, Ill.; Grant NSF-DI-039620; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-284645/9ST

42 186115 ON THE DEVELOPMENT OF A THEORY OF TRAVELER ATTITUDE-BEHAVIOR INTERRELATIONSHIPS. No abstract available.

Charles River Associates, Incorporated, Transportation Systems Center 3 Volumes, Aug. 1978, 482 p.; See also Volume I through Volume III, PB-286663 through PB-286665 in RRIS 23 186116 through 186118 respectively; Bulletin 7901.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286662-SET/ST

42 186116 ON THE DEVELOPMENT OF A THEORY OF TRAVELER ATTITUDE-BEHAVIOR INTERRELATIONSHIPS: VOLUME I. INPUT TO THEORY DEVELOPMENT. The first volume of this Final Report is principally directed at the generation of materials to facilitate the development of a theory of traveler attitude-behavior interrelationships. Such a theory will be useful in the design of transport systems and operating policies which satisfy passenger requirements. Literature review efforts were undertaken to survey attitudinal and marketing concepts which could contribute to theory development. Attitudes are divided into three components in order to better understand how they relate to traveler behavior. Hierarchical and multiattribute models are explicitly considered. It is recognized that not all travelers are identical, and market segmentation is an aspect of our modeling orientation designed to account for differences between groups of travelers. A tentative model framework is presented along with an overview of how to quantitatively evaluate variations within the framework. This volume concludes with a review of data collection

considerations that support quantitative analyses of traveler attitude-behavior interrelationships.

Charles River Associates, Incorporated, Transportation Systems Center Final Rpt., OL-1 CRA-347-VOL-1, DOT-TSC-RSPA-78-14-V, Aug. 1978, 195 p.; See also Volume 2, PB-286664. Also available in a set of 3 reports, PB-286662/SET.; Contract DOT-TSC-1326; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286663/OST, DOTL NTIS

42 186118 ON THE DEVELOPMENT OF A THEORY OF TRAVELER ATTITUDE-BEHAVIOR OF INTERRELATIONSHIPS. VOLUME III: EXECUTIVE SUMMARY; OVERVIEW OF METHODS, RESULTS, AND CONCLUSIONS. The summary report offers an overview of methods, results, and conclusions which support the development of a theory of traveler attitude-behavior interrelationships. Such a theory will be useful in the design of transport systems and operating policies which satisfy passenger requirements. A summary of project methods and achievements as evidenced by project reports serves as an introduction of theoretical considerations which guided the study. Various attitudinal components are identified and defined. Brief discussions of multiattribute models, hierarchical models, market segmentation, and structural equations are offered as a basis for appreciating theoretical and empirical findings. Selected findings are presented to clarify the nature of traveler attitude-behavior interrelationships. The relevance of study findings to traveler behavior theory and transport policy analysis is noted.

Charles River Associates, Incorporated, Transportation Systems Center Final Rpt., OL-3 CRA-34-VOL-3, DOT-TSC-RSPA-78-14-V, Aug. 1978, 41 p.; See also Volume 2, PB-286 664. Also available in a set of 3 reports, PB-286662/SET.; Contract DOT-TSC-1326; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286665/5ST, DOTL NTIS

42 186193 A DESCRIPTION OF BART: ITS FACILITIES, SERVICE, AND SURROUNDINGS. BART IMPACT PROGRAM. The report provides an overview of the BART system within its Bay Area setting. The planning, design and construction of the system are described here, as are its physical facilities, operations, and management. Physical and social characteristics of the nine-county San Francisco Bay Area, the primary BART service area (Contra Costa, Alameda, San Francisco and northern San Mateo counties) and the immediate surroundings of the system are discussed, and the populations within those areas are defined. Data is presented here without analysis or evaluation and is intended to serve as background and perspective for viewing the various studies within the BART Impact Program. (Color illustrations reproduced in black and white)

Graff, DL Scarlett, M ; Gruen Associates, Incorporated, Metropolitan Transportation Commission, Department of Housing and Urban Development, Department of Transportation DOT-BIP-WP-44-4-77, Dec. 1977, 116 p.; Prepared in cooperation with Metropolitan Transportation Commission, Berkeley, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-287338/8ST, DOTL NTIS

42 186648 REPORT TO THE NINTH LEGISLATURE OF THE STATE OF HAWAII, REGULAR SESSION OF 1978, RELATING TO THE STATEWIDE TRANSPORTATION COUNCIL (LIMITING NUMBERS OF VEHICLES-ACT 179, SEC. 9). The document contains the report relating to the work of the Interdepartmental Transportation Control Commission, 1972 to 1975 on the following: vehicle emission inspection and maintenance program, staggered working hours demonstration, commuter carpooling, road pricing, alternative transportation modes, and automobile tax based on weight and engine displacement. The document also contains the report relating to the work of the Statewide Transportation Council, 1975 to 1977 on the following: the Seminar on Limiting the Number and Kinds of Vehicles, September-October 1975 (Seminar topics--congestion, mass transit not enough, proposed vehicular limits-1975, survey of alternative transportation strategies, vehicle emissions, safety, economics); the Workshop on Limiting Numbers of Transportation Units, 1976 (limiting numbers of land transportation units, environmental criteria, congestion criteria, aircraft limits, marine criteria); and Limiting Number of Vehicles Update (vehicle limits-1978, public opinion). The document further contains the following legislation for consideration by the 1978 Legislature to attempt to limit the vehicle population: An Act Relating to Congestion, An Act Relating to Automobile Emissions, An Act Relating to Limiting the Size of the Vehicle Population Through Safety.

Hawaii State Dept. of Transportation, Honolulu. 1977, 63p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285506/2ST

42 186650 THE OHIO TRANSPORTATION PROGRAM, 1975-77 BIENNIUM; A REPORT IN RESPONSE TO THE JOINT SENATE-HOUSE PUBLIC IMPROVEMENTS INSPECTION COMMITTEE, 11TH GENERAL ASSEMBLY. Contents: The Ohio transportation program--1976 goals and objectives; Public transportation (Capital improvements, Capital assistance to private non-profit corporations and associations, Rural highway public transportation demonstration program, Ohio elderly bus fare assistance); Transportation safety (State and community safety, Highway safety, Rail-highway crossings, Ohio's rail-highway project programs); Rail transportation (Rail freight, The Regional Rail Reorganization Act of 1973, Ohio branch line plan, Rail passenger service); Port development (Lake Erie ports, Ohio River facilities, Issues in port development); Aviation (Aviation program summary, County airport program, Ohio's commercial airline service); Highways (New construction- federal aid, Classification of highways, Major arterial highway, Urban highway system, Rural collector highway system, Economic growth center development highways, Special bridge replacement program, Appalachian access road program, Pavement repair and resurfacing, Bridge repair and replacement, Slides, washouts, restoration of haul roads, detours and emergencies, Capital improvement planning and research programs, Miscellaneous highway related programs, Advertising device control program, Pioneer work in

metrication, Lands and building program); A new program-Ohio rail transportation authority.

Ohio Department of Transportation Feb. 1976, 76 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285509/6ST

42 186692 ANNUAL REPORT, 1977 [Annual rept. for 1 Jan-31 Dec 77]. Highlights of the year's accomplishments include: opening of Phase II (the Blue Line, National Airport-Stadium Armory) on July 1, drawing a daily ridership of 135,000, the combined system now had 25 stations and carried over six times as many passengers as before, rerouting of 385 bus routes to serve the rail stations and eliminate duplicate service, reorganization of the Authority staff to function as a transit service agency in addition to a construction agency, purchase of 281 buses, over half equipped with wheelchair lifts, implementing two fare increases, phasing in two-way bus radios and improving graphics in the rail stations. At year's end, five stations and 14.2 miles of line were substantially completed and 21 stations and 21.0 miles of line were under construction, and another 21 stations and 27.2 miles of line were under design.

Washington Metropolitan Area Transit Authority,, DC. WMATA-78/1, Dec. 1977, 29p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285991/6ST

42 186792 MESA NEW YORK BIGHT ATLAS: TRANSPORTATION [Monograph no. 24]. Transportation facilities in the New York Bight region include extensive highways, subways, railroads, airports, tunnels, and bridges. In 1970, 14.9 million people lived in the Bight region; there were 6.8 million jobs. The dominant mode of transportation is the automobile. Fully 70% of all weekday trips in 1970 were made by car; 13% were made by rapid transit (predominantly the subway) and 12% by bus. Though New York City contained most of the region's employment (60%) and population (53%) in 1970, decentralizing influences are at work. As the suburban and outer fringe counties grow, their almost total dependence on the automobile will mean increased congestion and pollution unless mass transit utilization is encouraged.

Brail, RK Hughes, JW ; New York Sea Grant Inst., Albany.*National Oceanic, and Atmospheric Administration, Rockville, MD., Office of Sea Grant. NYSSGP-AM-77-005, NOAA-78092709, Feb. 1977, 41p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287876/7ST

42 186796 ECONOMIC DEVELOPMENT/CENTRAL BUSINESS DISTRICT STUDY [Final rept]. The Central Business District (CBD) has played a multi-level role in the economy of the city. The new and future trends in the central business district towards the development of retail sales, tourism and recreation hotel activity and other business development provide the basis for a diverse strategy to improve the economic vitality of the Center City. The Central Business District plays a unique role in the economic and social existence of the city and complements the functions and activities of other sections of the urban community. To further their objectives, a series of conferences was held, bringing together nationwide policy-level management in govern-

ment and in the private sector. The workshops pointed out that with thirty-eight participating cities, that there are many common problems relative to the Central Business District that all of these cities are presently facing.

Administration and Management Research Association, of New York City, Inc.*Economic Development, Administration, Washington, DC. Publications Div. EDA-78-0136, Apr. 1978, 168p; Grant EDA-99-6-09402-2; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288344/5ST

42 186869 METRORAIL ALTERNATIVES ANALYSIS. Since 1968 cost estimates for completing the 100-mile Metrorail system within the Washington Metropolitan Area have escalated, and concern has been expressed about financing the full system and whether the full 100-mile system provided the best solution to the transportation problems of the area. The study reviewed a full range of rail and non-rail alternatives for the 'E' Route to Greenbelt, the 'F' Route to Branch Avenue, the 'J-H' Route to Franconia, and the 'K' Route to Vienna. The study was designed to analyze the relative costs and effectiveness of each alternative. Criteria used to evaluate each alternative included patronage, costs, deficits, funding requirements, automobile use, energy consumption and economic measures. Of the 1700 possible regional combinations, 72 were analyzed in detail; five regional candidates were chosen for final study. After eighteen months of study, the JPSC reaffirmed a complete system for the area.

Metropolitan Washington Council of Governments, Urban Mass Transportation Administration Final Rpt. UMTA-IT-09-0077-78-1, June 1978, 37 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288579/6ST

42 186870 METRORAIL ALTERNATIVES ANALYSIS. The Metrorail Alternatives Analysis project has been completed with the selection of a preferred regional system by the Joint Policy Steering Committee (JPSC) charged with that responsibility in the Washington region. This report summarizes many of the issues addressed during the project, and focuses on the final regional alternatives that were developed as a prelude to the selection of the preferred regional system.

Metropolitan Washington Council of Governments, Peat, Marwick, Mitchell and Company, JHK and Associates, Dames and Moore, Urban Mass Transportation Administration, (UMTA-IT-09-0077) Final Rpt. UMTA-IT-09-0077-78-2, Aug. 1978, 207 p.; Prepared in cooperation with Peat, Marwick, Mitchell and Co., Washington, DC., JHK and Associates, Alexandria, VA., and Dames and Moore, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288580/4ST

42 187070 SUMMARY OF NATIONAL TRANSPORTATION STATISTICS. This annual report provides time series data collected from a variety of government and private statistical handbooks. The information consists of selected national-level transportation statistics, including cost, inventory, and performance data describing the passenger and cargo operations of the following modes: air carrier; general aviation; automobiles; trucks; buses; local transit; rail; water; and oil pipeline. The report covers basic

descriptors of U.S. transportation such as operating revenues and expenses, number of vehicles and employees, vehicle miles, and passenger miles. Previous editions cover selected data over a 10-year span beginning in 1960.

Office of the Secretary of Transportation No Date, n.p.; ACKNOWLEDGMENT: Department of Transportation Library; ORDER FROM: GPO

42 188000 NEW TECHNIQUES FOR TRANSPORT SYSTEMS ANALYSIS. This publication represents the papers presented at a workshop held in Melbourne, Victoria in November 1976 sponsored by the Australian Road Research Board and the Bureau of Transport Economics and aimed at discussing a wide range of urban transport planning methods.

Wigan, MR ; Australian Road Research Board Monograph Special Rpt No. 10, Nov. 1977, 266 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-234000), Australian Road Research Board

42 188011 INTEGRATED URBAN TRANSPORTATION—A MAJOR CHALLENGE FOR TRANSPORTATION ENGINEERS. Pedestrians, private automobile, public transportation and other modes are components of a total urban transportation system. However, for historical reasons and because of major differences in their physical, operational and cost characteristics, different modes are being planned and operated by different organizations or public agencies. Transportation, including all modes, should be treated as a single activity which must be closely coordinated with urban form and land use. Coordination of different modes should be based on the fact that the basic unit in transportation is not a vehicle, but a person.

Vuchic, VR (Pennsylvania University, Philadelphia) ; Institute of Transportation Engineers 1977, pp 263-268; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188012 NO-BUILD POLICY AS A MEANS TO IMPROVE TRANSPORTATION IN URBAN AREAS. No-build policy is as important an element of urban transport planning as the improvement of public transport, the expansion of the road system and the linking of land use and planning to transport need. It therefore has to be developed and evaluated as part of a comprehensive approach taking into account these and socioeconomic aspects of city and transport planning. In this paper a review of no-build policies is given summarizing concepts and experienced results. Because the potential and chance of implementation of no-build policies is often dominated by the local situation and its characteristic restrictions, no general methodology can be presented and therefore a structure of measures was developed which have certain aspects in common. Refs.

Keller, H (Technical University of Munich, West Germany) ; Institute of Transportation Engineers 1977, pp 116-122; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Confer-

ence, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188022 TRAVEL ANALYSIS AND IMPLICATIONS FOR THE FUTURE. The paper reports on a study to evaluate results from various policy scenarios tested in the SANBAG Mode Choice Model used for travel forecasting. An attempt was made to predict transit ridership if one or a combination of several changes occur in the factors affecting travel characteristics in the San Bernardino Valley Metropolitan area. All tests were made using variations of two basic transportation systems—a historical base of 1970 highway and transit networks and future year systems networks. The policy variables tested were auto operating costs, auto parking costs (in major commercial areas), transit running speed, transit fares, and auto occupancy. The scenarios tested were identified as Base, Moderate, and Extreme.

Sweet, CE, Jr (Sweet (CE) and Associates) Tidwell, E ; Institute of Transportation Engineers 1977, pp 497-503; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188207 TRAVEL TO WORK IN BRITAIN: A SELECTIVE REVIEW. This report presents information about the changing pattern of the work-journey in Britain. Since 1950 a number of studies have been made of various aspects of the work-journey including modal split, spatial distribution of residences and workplaces and broad patterns of movement. These studies are reviewed briefly in this report. The information obtained from the literature review is supplemented with 1975/76 National Travel Survey data giving modal split, journey length and time for different socioeconomic groups. The main findings from the review and the survey data include: An increase in the use of cars as the principal mode of travel to work and a corresponding decline in the use of public transport; An increase in average length for the work-journey at the annual rate of 1 per cent between 1921 and 1966; Residential locations of car users are more widely distributed than those of public transport users; A progressive outward shift of residences from inner areas to conurbation peripheries with an attendant increase in in-commuting; An increase in out-commuting by residents of conurbations and conurbation centres; Residents in inner areas make shorter trips than residents in outer areas; and Workplaces in inner areas attract longer work-journeys than workplaces in peripheral areas. /Author/

Das, M ; Transport and Road Research Laboratory, (0305-1293) Lab. Report 849, 1978, 36 p., 6 Fig., 18 Tab., 37 Ref., 2 App.; ACKNOWLEDGMENT: TRRL

42 188305 CHALLENGE IN DEVELOPING A MULTI-MODAL URBAN TRANSPORTATION SYSTEM. The paper discusses ways in which urban transportation systems can be planned and developed, within the framework of current issues and resources.

Smith, WS (Smith (Wilbur) and Associates) *ITE Journal* Vol. 48 No. 6, June 1978, pp 23-26, 14 Ref.; ACKNOWLEDGMENT: EI;

ORDER FROM: ESL

42 188311 SUMMARY REPORT OF A SURVEY "MONITORING EFFECTS OF MODAL INTERCHANGES ON TRAVEL PATTERNS". This report of a survey has been prepared for the Victorian Ministry of Transport, which is involved in the implementation of large structural improvements centred on Frankston and Box Hill railway stations designed to improve and facilitate modal interchange movements and thereby to stimulate the use of the rail and feeder bus services. The purpose of the survey is to collect information relating to detailed individual behaviour "before" and "after" to provide a basis for the formulation of prediction models, which explain the change in aggregated travel patterns. Data were collected for the following parameters: pedestrians, parking, taxis, traffic, buses and trains. Each different parameter is dealt with separately, and where relevant, under the following headings: description of parameter, how it was measured, problems encountered in measurement, how it relates to modal interchange, results and commentary on results. /TRRL/

Nairn (RJ) and Partners Pty Limited Monograph Dec. 1977, 80 p., 32 Fig., 18 Tab., Photos., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-235137), Australian Road Research Board; ORDER FROM: Nairn (RJ) and Partners Pty Limited, 408 King William Street, Adelaide, South Australia, Australia

42 188357 PRACTICE OF SIMULATION AT RATP [Pratique de la simulation a la RATP: resultats, enseignements, perspectives]. This article describes the results obtained by simulating the Paris subway with different models. The second part shows a model under development about a bus line. [French]

Doras, JL Girardot, M Heurgon, E *Automatisme* Vol. 23 No. 5-6, May 1978, pp 124-132, 19 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188410 EFFECTS OF AN EMPLOYEE TRANSPORTATION PROGRAM. Following the national trend, the excessive use of the automobile to get to work was experienced at a large administrative and laboratory complex located in suburban St. Paul, Minnesota. After an extensive survey in 1970, the various employee transportation trend lines were projected into the future, and it was determined that the ultimate number of people that could be employed on the site would be determined by the access that could reasonably be expected. In order to remove this barrier, the transportation trend lines would have to be altered and an employee transportation program was implemented to accomplish this. The paper discusses the initial program, subsequent modifications, and results.

Owens, RD (Minnesota Mining & Manufacturing Company) Heglund, CT ; Institute of Transportation Engineers 1977, pp 621-640; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers and the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188453 A PARTIAL BUS PATRONAGE COMPOSITION SURVEY. This study was designed to: expose the students to an established

method of bus usage data collection; assess the capability of first-semester juniors to conduct such counts accurately; obtain data that could be used as a rough check of the factors in current use; and provide a first-level approximation of bus usage by handicapped pass holders. A mathematical formulation of the method used for the estimation of the total ridership and its composition is presented. The details of the study are given. The survey developed additional factors corresponding to transferring revenue passengers, handicapped riders and other non-revenue users. The usefulness of the information that may be derived from patronage composition surveys supports a recommendation to study the feasibility of installing a strategic number of fareboxes equipped with special counters. The implementation of these instruments would require the cooperation of bus drivers.

Papacostas, CS Gordon, L ; Hawaii University Sept. 1978, 44 p., Figs., Tabs., Refs.

42 188499 THE EFFECTS OF URBAN STRUCTURE ON HOUSEHOLD AUTO OWNERSHIP DECISIONS AND JOURNEY TO WORK MODE CHOICE. This report presents the first phase of a comprehensive study of the interrelationships between urban transportation and land use. More specifically, it considers the effects of inter-metropolitan differences in transit and highway service levels and urban spatial structure on the auto ownership and modal choice decisions of a sample of 163,488 white, single-worker households residing in the 125 largest SMSAs in 1970. The principal contribution of the present study is its consideration of the determinants of auto ownership and modal choice of households working and living in different metropolitan areas, where they face different metropolitan areas, where they face different combinations of work-place, housing, and transportation costs. /Authors/

Kain, JF Fouth, GR ; Harvard University Res Report R76-1, May 1976, 136 p., 4 Fig., Tabs., 14 Ref., 3 App.; This research was sponsored by the Department of Transportation.; Contract DOT-OS-30099

42 188913 ESTIMATING THE FUNCTIONAL FORM OF TRAVEL DEMAND MODELS. This paper shows how many particular models found in the travel demand literature, such as the linear, multiplicative, logit forms and their formulation in terms of first differences, can be derived as special cases of the specification of the fixed and stochastic parts of more general models. Estimates of the appropriate functional form of the two equations of a cross-sectional inter-city travel demand model and of the two equations of a time-series urban travel demand model are presented. It is demonstrated, using current maximum likelihood techniques extended to take multiple-order auto-correlation into account, that estimating the functional form dominates more restricted procedures on grounds both of the statistical significance and of the economic reasonableness of the results.

Gaudry, JJ (Montreal University, Canada) Wills, MJ *Transportation Research* Vol. 12 No. 4, Aug. 1978, pp 257-289, 40 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188927 TRAVEL FORECASTING: SADAT CITY, EGYPT--NEW TOWN. The paper outlines the major steps in the forecasting of travel. The transportation analysis flow diagram presents the various forecast methodology steps outlined within the context of the total transportation analysis process. The steps relating to internal trip distribution and trip assignment were accomplished using mathematical models developed by Dr. El Hawary of the Cairo University.

Tadross, RE (Parsons, Brinckerhoff, Quade and Douglas, Inc) *ITE Journal* Vol. 48 No. 9, Sept. 1978, pp 39-42; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188928 TSM: TINKERING SUPERFICIALLY AT THE MARGIN? This paper summarizes the findings of a 2 yr. evaluation of the Transportation System Management (TSM) program of the U. S. Department of Transportation. The study assessed both the technical options commonly associated with TSM--such as car pool matching, flexible work hours, exclusive lanes for buses and car pools, and discriminating pricing--and the planning philosophy implicit in the federal regulations. The analysis suggests that a package of TSM measures combining preferential freeway entry, car pool matching, paratransit, and flexible working hours, which emphasize exploiting underutilized capacity, are technically and politically superior to the more drastic penalty-centered alternatives, such as dedicating freeway and arterial lanes to high-occupancy vehicles, removing parking in congested areas, and heavy auto-disincentive surcharges (in excess of marginal cost pricing). The research concludes that time-management strategies, such as variable work hours, are the least exploited of the promising measures available, and thus deserve increased attention.

Jones, DW (California University, Berkeley) Sullivan, EC *ASCE Journal of Transportation Engineering* Vol. 104 No. 6, Nov. 1978, pp 817-834, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 188992 VALIDATION TEST OF DISAGGREGATE MODE CHOICE MODEL. A model of work trip mode choice was developed on a sample of workers taken before Bay Area Rapid Transit (BART) opened for service. Validation tests of the model were performed on a sample of workers taken after BART service began. Two validation methods were used: the actual mode shares in the post-BART sample were compared to the mode shares predicted by the models estimated on the pre-BART sample, and the parameters of models estimated on the post-BART sample were compared with the parameters of the models estimated pre-BART. Three possible reasons were explored for the differences in actual and predicted shares and in the pre- and post-BART model parameters.

Train, K (Cambridge Systematics, Incorporated) *Transportation Research* Vol. 12 No. 3, June 1978, pp 167-174, 8 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 189244 TRIP RATE CHARACTERISTICS OF EDUCATIONAL LAND USES. The authors report that trips for educational purposes form a major component of non-work journeys; for example, in the West Midlands morning

education trips account for 60 per cent of all peak-hour non-work trips and nearly a quarter of all peak-hour trips. An understanding of the behavioural context within such trips is considered to be crucial to the formulation of plans and policies more sensitive to the needs of particular social groups. This paper reports the first stages of a study into both trip-synthesising models for non-work trips and also into the question of behavioural content. The background to the survey is presented, information given on some previous studies, and the survey methods described. The surveys were carried out on a Tuesday and Thursday at 114 primary and 60 secondary schools using the 'whole-class' response technique, and 12 colleges, a polytechnic and a university also took part by means of a self-administered questionnaire. The results of the survey are presented in a series of tables, and the data collected by means of a more detailed supplementary survey are also described. A number of conclusions indicate that (1) the choice of a 'whole-class' response method for the schools surveyed appears to have been vindicated, (2) the use of self-administered questionnaires was also successful, (3) the trend forecast by the West Midlands transportation study for an increased reliance on private rather than public transport within a purely vehicular category has, to date, been confirmed, (4) in terms of measures-of-attraction, school type appears the most significant factor affecting modal choice, whilst the precise relationship between student trips and certain trip-maker characteristics has yet to be determined. /TRRL/

Lellumsen Joyce, FE (Aston University, England) Parsons, G *Traffic Engineering and Control* Vol. 19 No. 5, May 1978, pp 222-226, 8 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236321)

42 189464 MANUAL METHODS OF ESTIMATING PUBLIC TRANSPORTATION NEEDS IN SMALL URBAN AND RURAL AREAS. This manual provides manual analytical techniques assigned to assist small urban and rural technicians in analyzing public transportation options. It is intended for use primarily by planners, engineers and others in communities with less than 50,000 residents. Outside assistance, including computer analysis, should not be required if this manual is used. Two approaches using ten techniques are considered in this manual, and include a rate making and budgeting "How To Do" discussion. /Author/

Gamble, P ; Washington State Department of Transportation Final Rpt. Aug. 1978, 109 p., Figs., Tabs., 2 App.; Contract WA-09-8001-1; ORDER FROM: Washington State Department of Transportation, Public Transportation and Planning Division, Olympia, Washington, 98504

42 189497 THE LOCATION OF PUBLIC SERVICES CONSIDERING THE MODE OF TRAVEL. By reason of their generally longer travel times, transit users are not so well-served by many public facilities as are automobile drivers. This paper investigates the implications of this fact for the location of a specific type of service, public child day care. A location-allocation model is employed to determine the most accessible locations for a set of centres in Edmonton, Canada, for users of both modes. Transit is

found to be capable of providing only 51% of the accessibility of the automobile, at 2.4 times the average travel time. The argument is advanced that in order to reduce the inequality of service to a minimum, public facilities should be located with the accessibilities of transit users in mind. The optimal systems are compared with Edmonton's present system which is found to be spatially inefficient and quite discriminatory in its inefficiency against transit users. This is attributed to the city's piecemeal planning policy and an inadequate understanding of the notion of accessibility. The paper concludes by recommending improvements which would improve our simple diagnostic model to the level of a useful planning device. /Author/

Hodgson, MJ (Alberta University, Canada) Doyle, P *Socio-Economic Planning Sciences* Vol. 12 No. 1, 1978, pp 49-54, 6 Fig., 1 Tab., 10 Ref.; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

42 189498 A PROCEDURE FOR FULLY EVALUATING THE ANTICIPATED IMPACTS OF SELECTED PUBLIC SYSTEM INNOVATIONS ON VARIOUS ENVIRONMENTS USING CITIZEN-GENERATED INFORMATION INPUTS. A flexible, yet relatively comprehensive and easy to implement, technique of project evaluation is presented. Its contrasts to traditional cost-benefit techniques are made explicit. The procedure relies on judgmental inputs from both citizens and technicians, thereby establishing an appropriate division of labor that takes expert opinion into account and at the same time permits citizens to play a key role in planning. Raw benefit data are obtained by soliciting a set of numerical ratings from concerned citizens and/or a panel of experts. These data are then transformed by matrix multiplication to yield numbers that provide rankings for all projects in all areas. Given the properly discounted costs of each possible project in each subarea, a set of benefit-cost ratios can be calculated. Then, given a capital budget for the entire city or region, projects can be implemented in order of decreasing benefit cost ratios. Sample application of the technique involving the evaluation of urban transportation system innovations is presented in detail.

Gordon, P Hiendern, JH (University of Southern California) *Advances in Heat Transfer* Vol. 12 No. 2, 1978, pp 77-85; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

42 189549 DYNAMIC MODELS OF MODAL CHOICE. The paper is described as an attempt to produce an approach to general time-dependent transportation analysis based on the best understood transport problem where time-dependent effects are important: namely, the modal choice between private car and bus. The paper contains formulations, results and discussions of this study of the dynamic modal choice problem. The object of the work being to determine the degree of representation required to bring out time-dependent effects, how simple the formulations could realistically be made, what effect different optimisation criteria would have, and, to what overall factors were the equilibria most sensitive. /TRRL/

Pauley, NJ (Transport and Road Research Laboratory) Wigan, MR (Australian Road Research Board) ; International Symp on Transport & Traffic Theory Proceeding 1977, pp 889-917, 10 Fig., 8 Ref.; Proceeding of the Seventh International Symposium on Transportation and Traffic Theory, August 14-17, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 236918)

42 189554 ELEVENTH SYMPOSIUM ON THE FUTURE OF CONURBATION TRANSPORT 18-20 OCTOBER 1977. The following papers were presented at the symposium: session I-The Changing structure of urban areas: Implications for transport planning, Harrison, AJ; Session II-The changing urban structure in greater Copenhagen: The transport planning response, Lemberg, K; Session III- Transport planning in Milan: Implications for urban transport planning, Galante, P; Session IV-The changing structure in Strathclyde: The transport planning response. A transport strategy, Davies, AS; Discussion group reports, Helliwell, DS and Adams, RA; Session V-Forum on transport management and worker participation: Introduction, Lee, N; The present debate and some issues, Goodman, JFB; Discussion group reports, Young, AP; Ling, DJ; Session VI-Selling the bus-How to win passengers and influence the politicians, Barrett, BMM; Session VII-Planning for bus services to ride hard times, Parker, GB; Discussion group report, Hughes, RV. /TRRL/

Manchester University, England Oct. 1977, 113 p., Figs., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 235343)

42 189557 FACTORS AFFECTING URBAN PUBLIC TRANSPORT DEMAND. This article summarises the New Zealand state-of-the-art report on the relations between public passenger transport patronage and the various factors, e.g. fare and petrol price changes, that influence it. The demand for public transport is considered, and it is concluded that information required for soundly based decision-making is lacking. /TRRL/

Nicholson, AJ (Ministry of Works and Development, New Zealand) ; National Roads Board, New Zealand Newsletter No 56, May 1978, pp 16-18, 4 Fig., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237094)

42 189601 PLANNING SYSTEMS FOR LOCAL PUBLIC TRANSPORT. STAGE 1. PROBLEM ANALYSIS [Planeringsssystem foer kollektiv lokaltrafik. Etapp 1. problemanalys]. This report is stage one in a project aiming at the working out of a planning system for local public transport to be used by transport and local authorities. The project deals with short term (0.5-1 year) and medium term (about 5 years) planning. Furthermore this project is intended to survey and suggest directions for future research within this area. The present stage comprises problem analysis and working programme for the future pursuit of the project. The following topics are dealt with: (a) compilation of statistics. (b) description of organization and working methods within public transport-results of interviews. (c) summary and conclusions of official reports. (d) survey of problem analysis. (e) compilation of planning data- preliminary survey and problem analysis. (f) proposals for working programme for stage two. /TRRL/ [Swedish]

Transportforskningsdelegationen Monograph No. 1, TFD 1978:1, 1978, 143 p., 13 Fig., 7 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 236495), National Swedish Road & Traffic Research Institute

42 189626 SPECIFICATION, TRANSFERABILITY AND THE EFFECT OF DATA OUTLIERS IN MODELING THE CHOICE OF MODE IN URBAN TRAVEL. Three problems of great importance to urban travel demand modeling using multinomial logit models are examined in this paper. They are (1) the effect of data outliers on model coefficients; (2) the effect of model specification on coefficients and model explanatory power; and (3) the transferability of model coefficients within the region, between regions, and in time. Four data sets are used in the study. They are: Washington, DC, Minneapolis-St Paul, and two data sets from the San Francisco Bay area, pre-bart and post-bart. The data are standard home-interview survey data appended with network supplied modal travel cost and time information. The findings of the research are occasionally contradictory; the majority of the evidence supports the following conclusions. The "outliers" do not have a statistically significant effect (at 0.05 level) on the coefficients; however, the outliers can have a substantial effect on the point estimates of some of the coefficients. Model specification has an impact on model coefficients and model explanatory power. In particular, the definition of out-of-vehicle travel time appears to be important and, if available, the use of separate walk and wait times is preferred over their sum, the out-of-vehicle time. Finally, the model coefficients do not appear transferable within region, between regions, or in time.(a) /TRRL/

Talvitie, A (State University of New York, Syracuse) Kirshner, D (Cambridge Systematics) *Transportation (Netherlands)* Vol. 4 No. 3, Sept. 1978, pp 311-331, 6 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237092)

42 189630 THE STEVENAGE SUPERBUS EXPERIMENT. APPLICATION OF RESULTS TO TRANSPORTATION PLANNING. This paper discusses the stevenage superbus experiment with respect to the application of results to other transportation plans. The philosophy of providing an improved bus service as a positive benefit to the community is one which is finding fruition in the West Hertfordshire transportation study. The cost-benefit relationship of deference to improved public transport has been investigated in depth in Stevenage and application of results of the superbus experiment, in particular a generalised-cost/demand model, has led to a public transport strategy which is to be implemented in Hemel Hempstead. A demand model is derived for the newly introduced superbus 3 service and the results are compared with previous models derived for the first two superbus services. A high degree of correlation between these models would reinforce the application of previous results to the Hemel Hempstead public transport system. /TRRL/

Tarry, S *Chartered Mechanical Engineer* Vol. 105 No. 11, Nov. 1978, pp 301-304, 1 Fig., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 237072)

42 189657 THOUGHTS ON THE MERITS OF TRANSPORT-PLANNING PACKAGES.

Transport-planning packages are increasingly being reappraised for technical content and role, in the current climate of capital rationing and short-run planning horizons. This paper outlines in a broad manner the major roles of established packages and suggests the major areas of deficiency, given that the present perceived planning emphasis will hold in the future. The important distinction between the concept of packages per se and the particular models used therein is emphasised. Particular reference is made to the improved urban transportation planning system (UTPS) package of the U.S. Department of Transportation (1977). /Author/TRRL/

Hensher, DA (Macquarie University, Australia) *Environment and Planning A* Vol. 10 No. 10, 1978, pp 1155-69, 3 Tab., 33 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237255)

42 189659 TRANSPORT PLANNING AND ENERGY CONSUMPTION [Transportsektorns energibehov].

This report presents some examples of calculations in order to investigate the connection between different forms of traffic planning and energy consumption. During recent years questions concerning efficient management of energy resources have increasingly come to the attention of researchers in various fields. One field of particular interest is the transportation sector, which is responsible for 15% of the total oil consumption in Sweden. The private car has by far the greatest fuel consumption, and transferring passengers from private cars to buses and other public transport would result not only in less fuel consumption, but would bring other welfare benefits as well. In the examples presented in the report, estimates are made of the changes in fuel consumption to be expected from such measures or assumptions as: 50% or 100% increase of bus travel; introduction of bus lanes; rerouting of traffic from the city center; introduction of zones for pedestrians. The study was conducted in Gävle (population 90000), Sweden and detailed account of the city's traffic environment is given in the report. /TRRL/ [Swedish]

Kjellin, B Skagersjoe, B ; Swedish Council for Building Research, (91-540-2872-8) Monograph Rapport R51:1978, 1978, 144 p., Figs., Tabs., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236471), National Swedish Road & Traffic Research Institute

42 189660 TRANSPORTATION AND THE QUALITY OF HUMAN LIFE.

This article represents part 1 of a two-part discussion related to the author's concern that traffic technology has been developed in a direction that satisfies the requirements of those who provide transportation services, but that the needs and requirements of those who are transported, have been almost totally forgotten. Japanese experience at international transport exhibitions in Paris and Chicago are described to explain the development of modern technology, and this is related to Japanese experience as a whole. Reports are presented based on visits made by the author to cities in a number of countries to investigate their transport systems and problems. In the USA reference is made to the Washington subway (partially opened in 1976) and the buses in the area which are under the management of the Washington Area Transit Authority, the high level of services

provided for and to attract customers, and the reduction of daytime traffic congestion in the central business district of Los Angeles by the use of minibuses and the large scale telephone enquiry centre. In the Netherlands, the operation of a "traffic mixture" system in Delft, a city of 70,000 population, is described, whereby in certain selected areas sectors called "woonerf" have been established to enable pedestrians and vehicles to coexist. The supplementary licensing system in the two million population city of Singapore is described, established to deal with congestion in a 6.2 square kilometre area in the central business district. The operational aspects of park and ride systems and restricted zones is described.

Oka, N (Asahi Shimbun Press) *Wheel Extended* Vol. 7 No. 2, 1977, pp 27-35, 1 Fig., 14 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 237157)

42 189661 TRANSPORTATION PLANNING PRACTICE. PROCEEDINGS OF SEMINAR J HELD FROM WEDNESDAY 29-THURSDAY 30 JUNE 1977 DURING THE SUMMER ANNUAL MEETING AT THE UNIVERSITY OF WARWICK, ENGLAND.

At this seminar the following papers were presented: (A) The relationship between the Public, the Politician and the Planner--(1) Public Involvement: A Case Study, Fowler, G and Seldon, J; (B) The Appraisal of Transportation Programmes--(1) The Changing Role of the Traffic Planner, Launbjerg, V; (2) Priority Ranking of Schemes Within the TPP, Ball, RR; (3) Monitoring Transport Policies and Objectives, Fells, PJ and Tweedale, D; (4) The Assessment of Transport Programme Options, Priestwood-Smith, P and May, AD; (C) Techniques for Programme Development--(1) An Economic Forecasting Model for Public Transport, Cole, WS and Tyson, WJ; (2) Techniques for Inter-Urban Investment Studies, Steer, JK and Glave, GR; (D) The West Yorkshire Transportation Studies: A Case Study--(1) An Introduction to the West Yorkshire Transportation Studies, Martin, BV; (2) Personal Accessibility Analysis, Cooper, J; (3) Environmental Analysis, Headicar, P; (4) The Free Standing Towns Studies, Large, BJW. /TRRL/

Planning and Transport Res and Computation Co Ltd Monograph No. 155, June 1977, 151 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 23223)

42 189664 URBAN TRANSPORTATION PLANNING. CURRENT THEMES AND FUTURE PROSPECTS. PARTS 1, 2, 3, 4 AND 5.

The papers which form the major part of this book have been edited from material presented at a conference on urban transport planning held at The University of Leeds in the spring of 1976. Part 1--"Introduction" contains: "The Development of Transport Objectives", Prestwood-Smith, P; Part 2 entitled: "Estimation of Demands for Travel", contains the following papers: Trip Generation: What Should we be Modelling? Dale, HM; Travel as a Manifestation of Activity Choice: Trip Generation Re-Interpreted, Jones, PM Greater London Transportation Study: A Procedure for Forecasting Trip-Ends, Havers, GE. Part 3 entitled: "Modelling the Interaction between Land-Use and Transport" contains the following papers: Problems in the Integration of Land-Use/Transportation models, Senior, ML; A Dynamic Activity Allocation Transportation

Model, Mackett, RL; Compact Land/Use/Transportation Models, Echenique, M and de La Barra, T. Part 4 entitled: "Transport Networks: Some Technical Problems in Assignment" contains the following papers: Congested Assignment: Test Problems With Known Solution, Murchland, JD; An Application of Mathematical Programming to Network Assignment, Van Vliet, D. Part 5 entitled: "Evaluation: Consistency, Efficiency and Equity" contains the following papers: The Generation of Consistent Travel-Demand Models and Uses-Benefit Measures, Williams, HCWL; Problems of Optimising Investment in Road Networks, Pearman, AD; The Redistributive Impact of Road Investment, Dalvi, MQ and Nash, CA. /TRRL/

ABACUS Press Monograph 1977, pp 1-217, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 236342)

42 189665 URBAN TRANSPORTATION PLANNING. CURRENT THEMES AND FUTURE PROSPECTS. PARTS 6, 7 AND 8.

Part 6 of this book entitled: "Application of Strategic Transportation Planning Techniques" contains the following papers: Greater London Transportation Study: Calibration of Trip-Distribution and Modal-Split, Hathaway, PJ; An Evaluation Package for a Strategic Land-use/Transportation Plan, Flowerdew, ADJ; Interpretation of the Results of a Strategic Transportation Model, Bonsall, PW, Champernowne, AF and Mason, AC. Part 7 entitled: "Environmental Impact: Attitude-Measurement and Evaluation" contains the following papers: Determination of Perceived Attributes of the Pedestrians' Environment, Clyde, CA; Attitude-Measurement in the Forecasting of Off-Peak Travel Behaviour, Thomas, K, Bull, HC and Clark, JM; Prediction and Evaluation of Accidents to pedestrians, Crompton, DH, Goldschmidt, J and Warriner, D. Part 8 entitled: "Future Direction in Transportation Planning" contains the following papers: Priorities in urban Transport Research, Bayliss, DA; Problems of Short-Run Resource Allocation: Implementing the TSG/TPP System in Britain, Bischof, D; the Contribution of Research to Transportation Planning, Wilson, AG. /TRRL/

ABACUS Press Monograph 1977, pp 219-386, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 236343)

42 189765 PUBLIC TRANSPORT PLAN 1979/80. PRELIMINARY DRAFT FOR CONSULTATION.

The Transport Act 1978 requires non metropolitan county councils in England and Wales to publish public transport plans and reach agreement with operators over the financing and maintenance of socially necessary but commercially unsuccessful public passenger transport services. This publication is the Kent County Council's draft outline public transport plan, presented in 12 sections as follows: (1) county council duties towards public transport; (2) problems of the public transport industry; (3) summary of needs for public transport; (4) county council objectives and policy; (5) area review of public transport; (6) school transport; (7) finance; (8) rail service; (9) consultation; (10) agreements; (11) summary of major tasks to be undertaken over the five years 1979/80-1983/84; (12) appendices consisting of summaries of passenger road services and existing rail services, together with proposals for adjustments, and a summary of

major comments on the plan from district councils and other interested bodies.

Kent County Council Monograph 1978, 116 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD-237750); ORDER FROM: Kent County Council, Highways and Transportation Department, Kent House, Maidstone, England; P7812018

42 189836 CONSUMER PSYCHOGRAPHICS: TRANSIT RIDER AND NONRIDER MARKET SEGMENTS. This study attempted to apply psychographic analysis to the mass transit market and more specifically: to obtain a lifestyle profile of the users as compared to the nonusers of mass transit; to pinpoint some of the subtle variations between riders and nonriders in terms of their psychographics; and to establish some of the motive the transit marketer can appeal to in marketing efforts directed to the rider and nonrider market segments. The research methodology is detailed, and the findings are tabulated and discussed. The findings provide useful insights for the effective design of marketing programs. Some of the programs offered by transit operators reflect and cater to the tendencies noted in the findings. Thus, the data serve to validate marketing policies, or to give a sense of direction for future marketing efforts. Separate marketing programs can be designed to appeal to each of the market segments, rider and nonrider.

Vanier, DJ (San Diego State University) *Transit Journal* 1979, pp 35-44, 11 Fig.

42 189843 QUICK-RESPONSE URBAN TRAVEL ESTIMATION TECHNIQUES AND TRANSFERABLE PARAMETERS. USER'S GUIDE. This report provides detailed descriptions of manual techniques for use in each aspect of travel demand estimation, i.e., trip generation, trip distribution, modal choice, auto occupancy, time-of-day distribution, Traffic assignment, capacity analysis, and development density versus highway spacing relationships. Numerous charts, tables, and nomographs are included to simplify each analysis step. Data requirements are also reduced by making maximum use of transferable parameters developed from other studies and urban areas. Three scenario applications of the manual techniques are included to illustrate the potential usefulness of the various analysis techniques. Much of the information contained in the report is also applicable to computer analysis. The presentation of the procedures is structured to allow their utilization by transportation planners with various levels of experience. A companion document, NCHRP Report 186, describes and evaluates other manual and computer methodologies that are available. /Author/

Sosslau, AB Hassam, AB Carter, MM Wickstrom, GV (Comsis Corporation) *NCHRP Report* No. 187, 1978, 229 p., 169 Fig., 72 Tab., 73 Ref.; Research performed by COMSIS Corporation and the Metropolitan Washington Council of Governments.; ORDER FROM: TRB Publications Off

42 189969 SERVICE AND METHODS DEMONSTRATION PROGRAM. ANNUAL REPORT. The Urban Mass Transportation Administration's Service and Methods Demonstration (SMD) Program addresses the national

need to improve the quality, quantity, and efficiency of public transportation services of innovative transit operating techniques and services which utilize existing technology. This report contains a description of the SMD Program for Fiscal Year 1977. Program activities and accomplishments are reviewed, including current and future demonstration project descriptions, project findings, and other support activities. Project findings are organized into four program areas: Conventional Transit, Pricing and Service Innovations, Paratransit, and Special User Groups. In this report, results of demonstration projects and studies leading to or in support of demonstrations are summarized. Areas where there are gaps in the understanding of innovative concepts are mentioned, together with future projects aimed at obtaining necessary experience to arrive at more conclusive understanding of the applicability and potential of these concepts. Other activities carried out in support of the demonstrations are reviewed, such as the development of structured approach to project evaluations, studies of independently initiated local innovations, and the information dissemination program. /UMTA/

Kendall, D ; Transportation Systems Center, (DOT-TSC-UMTA-78-33) UMTA-MA-06-0049-78-6, MA-06-0049, July 1978, 343 p.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-292008

42 189971 PUBLIC TRANSPORT SYSTEMS IN URBAN AREAS. INTERNATIONAL CONFERENCE AND EXHIBITION IN GÖTEBORG, SWEDEN, JUNE 27-30, 1978. VOLUMES A1-D. The following subjects were discussed at the conference: bus and light rail systems, paratransit systems, transportation for elderly and handicapped persons, marketing of public transport service, security and vandalism problems, vehicles and propulsion systems, vehicle monitoring, automated guided systems, traffic models and computer simulation, evaluation of public investment and conditions and strategies for tomorrow. /TRRL/

Svenska Maessan Stiftelse 1978, 994 p., Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (IRRD 235987), TRRL

42 190094 EQUILIBRIUM SOLUTIONS TO COMBINED URBAN RESIDENTIAL LOCATION, MODAL CHOICE, AND TRIP ASSIGNMENT MODELS. Urban land use and transportation models have historically incorporated the effects of highway capacity and congestion in a conceptual sense; however, methods for solving these models that satisfy Wardrop's conditions of user-equilibrium have been developed only recently. The application of these convergent equilibrium methods to Lowry-type residential location models provides a means for determining the spatial distribution of residential activities which is in equilibrium with multi-model transportation costs.

Boyce, DE ; Regional Science Research Institute RSRI Disc Paper 98, May 1977, 32 p.; ACKNOWLEDGMENT:

42 190102 KNOXVILLE METROPOLITAN AREA PUBLIC TRANSPORTATION STUDY. PARTS I, II AND APPENDICES. This document outlines a transit development

program for shortrange transit improvements in Knoxville-Knox County and encompasses a five year period beginning in 1977. Capital improvements and operating strategies required to meet the public transit mobility needs of the community over the next five years are specifically documented. The recommended public transit service concept and system are based on an analysis of several alternative schemes. Each alternative was evaluated in terms of estimated costs, revenues, and the mobility needs of the population. The primary concern was limited to short-range improvements which could be implemented realistically over a five year period and which would make maximum use of existing facilities and service providers, whether public or private, and established operating concepts.

Tennessee University, Knoxville TC 77-015, June 1977, 522 p.; Grant DOT-TN-002-9601; ACKNOWLEDGMENT:

42 190108 TRANSPORTATION PLANNING EFFECTIVENESS: TWENTY CASE STUDIES. This document consists of 20 site-specific case studies of urban area experience with the Technical Study Grant Program of the Urban Mass Transportation Administration (UMTA). The objective of the case studies is to determine how the Technical Study Grant Program has contributed to transportation planning effectiveness by impacting local transportation policy and decision-making or guiding capital investments. The case studies employ a standardized format which focuses on transportation planning effectiveness in terms of development of professional planning capability, acquisition of capital equipment, introduction of new or improved service, and altered institutional climate. In addition, this document contains matrices which summarize and compare urban area transportation planning effectiveness, an explanation of the urban area selection procedure, and an appendix, describing the data collection procedure.

Barber, J Stearns, MD ; Transportation Systems Center, (UMTA-MA-09-9003-77-2) DOT-TSC-UMTA-77-4, Dec. 1977, 314 p.; Prepared for the Urban Mass Transportation Administration.; ACKNOWLEDGMENT:

42 190109 TSM-LEARNING FROM EACH OTHER. A study of transportation systems management practices, habits and institutional mechanisms in 16 European cities in 10 countries could prove useful to U. S. transit planners and operators.

Britton, FEK (Eco Plan International) *Mass Transit* Vol. 5 June 1978, pp 16-20; ACKNOWLEDGMENT:

42 190162 PROPOSAL FOR TECHNICAL SERVICES SUPPORTING THE SEMTA BUSINESS DEVELOPMENT PROGRAM. This document is a proposal to provide various data analysis and evaluation services in support of the Southeastern Michigan Transportation Authority's (SEMTA's) business development activities. The proposal is focused on SEMTA employment access services to Detroit's Central Business District. The initial efforts of the work program will be to aid SEMTA in developing new business for public transportation services which already serve the Renaissance Center and to assist SEMTA in the definition of additional

transportation services to support the growing demand to this site.

General Motors Corporation EP-77084, Aug. 1977, n.p.:

42 190218 PENINSULA TRANSIT STUDY: SIMPLIFIED TRANSIT SYSTEM PLANNING AND ASSESSMENT PROCESSING FOR LOW DENSITY, SMALL TO MEDIUM SIZED CITIES. The objectives of this research project are (1) to develop simplified processes for relating land use and transit operations and, (2) develop simplified processes for assessing the transportation need of transit-dependent consumers for low density, small to medium-sized cities of 50,000 to 300,000 population. This project was conducted in four phases: 1) Background data collection and mapping; 2) Conduction of bus ridership and household surveys; 3) Application of alternative planning and assessment processes; and 4) Use of simplified processes and procedures for producing an effective public transit system for low density, small to medium-sized cities. The study restricts itself to the examination of particular local problems faced by Peninsula Transportation District Commission (Pentran) and its service area (cities of Hampton and Newport News, Virginia). Since the findings will apply to this local area, generalizations from this study must wait similar findings for other similar areas. This report states that within the Pentran service area, transit ridership depends upon (1) density variation of residential land use; (2) zero and one car households; and (3) low income populations. Due to the density variation and dispersed activity centers, the transit system cannot effectively compete with the car as an alternative transportation mode, but the need of the system remains strong due to transit-dependent consumers. More than 50 percent of the transit trips and, therefore, distribution of non-residential land use has a strong impact on route structuring. This report provides a bibliography. /UMTA/

Hall, J, III Aichbhaumik, D ; Hampton Institute UMTA-VA-11-0007-79-1, Oct. 1978, 197 p.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291879

42 190219 NEW MEXICO PUBLIC TRANSPORTATION DIRECTORY. Public transportation providers in New Mexico are composed mainly of three groups: private companies, non-profit organizations, and publicly-owned systems. The purpose of the New Mexico Public Transportation Directory is to acquaint the general public with the accessibility of transportation by bus, van, taxi, and train. This directory is a comprehensive guide to the transportation services available throughout the state, and it represents an effort to provide social service and governmental agencies with a source of reference to aid in determining future needs, developing programs, and to encourage coordination of existing services. The directory includes urban transit companies, Amtrak intercity rail passenger service, taxi companies. Data presented in this directory has been gathered from various individual state and local agencies and is the most accurate information available as of June 1, 1978. The data is arranged according to the State Planning Office Regional Planning Districts; Regional Planning Agencies for each of the seven districts are also listed. Included in this report are maps of Regional Planning Districts, of Amtrak

and Intercity Bus Routes, and of Taxicab Companies. /UMTA/

New Mexico State Highway Department, (NM-09-8004) Directory UMTA-NM-09-8004-79-1, Oct. 1978, 59 p.; Sponsored by the Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-291875

42 190228 GUIDELINES FOR UNDERTAKING A NEIGHBORHOOD TRANSPORTATION NEEDS ASSESSMENT. The purpose of this Manual is to present guidelines by which a neighborhood organization or individual citizens can analyse their transportation needs and present their problems to the proper agency so that they will get that agency's attention and a serious evaluation of their problem. The Manual provides instructions, information, sources, and guidelines which may be used by neighborhood organizations to undertake analysis of transportation problems in their area. The main body of this report is subdivided into the three major areas into which most neighborhood related transportation problems fall: transit projects, parking projects, and traffic projects. Typical problems, and a suggested format to solve the problems are contained in each of these three sections. These problems were included because they were identified by neighborhoods as being serious problems and they seemed solvable, if the neighborhoods take the proper approach. Based on a literature review, results from a national questionnaire, and two case studies in neighborhoods (Baltimore and Pittsburgh), the report concludes that the problems discussed in this Manual appear to be the major transportation problems now affecting the neighborhoods in the United States. The Appendixes contain typical forms which can be used to collect data, a list of useful references, a discussion of the field survey which was performed along with the actual survey questionnaires, the warrants for stop signs and traffic signals, an appreciation for other neighborhood transportation problems, and a glossary of terms. /UMTA/

Mulinazzi, TE Smailes, JA Bish, RL ; Maryland University, College Park, (MD-11-0003) Final Rpt. UMTA-MD-11-0003-79-1, Nov. 1978, 124 p.; Sponsored by the Urban Mass Transportation Administration. Related reports: "Urban Transportation and Neighborhood Preservation," UMTA-MD-11-0003-79-2; "Pittsburgh's Central Northside Neighborhood: A Transportation Case Study," UMTA-MD-11-0003-79-3; and "Baltimore's Hollins Park Neighborhood: A Transportation Case Study," UMTA-MD-11-0003-79-4.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-290589

42 190229 IMPROVING URBAN MOBILITY: A DIRECTORY OF RESEARCH, DEVELOPMENT AND DEMONSTRATION PROJECTS IN PUBLIC TRANSPORTATION. The purpose of the Urban Mass Transportation's RD&D Program is to provide information about possible improvements to urban mass transportation systems which communities can use in selecting the best way to deal with their particular transportation requirements. The principle means of providing this information is to publish annually a compilation of reports on the status of UMTA's projects. Research projects are intended to produce information about possi-

ble improvements in urban mass transportation; development projects involve fabrication, testing and evaluation of new equipment, facilities, systems or methods; and demonstration projects introduce, on an experimental basis, new methods, equipment or systems of urban mass transportation into a representative urban environment. This report is a supplement to the 1972 volume, and contains updated descriptions of projects sponsored and funded by UMTA. The project numbering scheme used in this volume was changed in FY 72 and conversion tables from old to new project numbers are provided in the 30 June 72 report compilation, but are not repeated in this supplement. The annual volumes that comprise UMTA's RD&D projects are: "Research, Development and Demonstration Projects, 30 June 72" (this report is an historical record of all projects funded earlier under authorization of the Housing Act of 1961, and is available from the National Technical Information Service, NTIS Order No. PB 213-228), and "Innovation in Public Transportation: A Directory of Research, Development and Demonstration Projects, 30 June 1974" and for fiscal years 1975 and 1976 (three separate reports with the same title), which are also available from NTIS. The annual report for FY 1977 will be available within the near future. /UMTA/

Urban Mass Transportation Administration Bibliog. UMTA-RDD-73.1, June 1973, 213 p.; Contract RDD-73; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB 285427/AS

42 190265 SOME ASPECTS OF THE OUTLOOK FOR URBAN TRANSPORT. This paper was presented to the workshop on the future of urban passenger transport in Australia, Canberra, 1978. A major problem confronting transport planning authorities is the continuing low density urban expansion and the accompanying dispersion of travel movements throughout urban areas. Major factors influencing the growth pattern for urban transport demand in Australia are identified to be population, real incomes, real fares, service levels and car ownership, and the implications of these factors are discussed. Demand levels for private motor car transport are expected to increase and patronage levels on public transport are expected to decline less rapidly than indicated by simple extrapolation. In order to better understand the nature of the urban passenger transport task and the problems associated with it, it is important to know the distribution of urban transport demand by mode, time of day and trip purpose. For abstract of a summary report of the workshop see IRRD no. 236740.

Hutton, TM Smith, AB ; Bureau of Transport Economics, Australia Monograph 1978, 22 p., 11 Tab., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-236739), Australian Road Research Board; ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

42 190522 THE DYNAMICS OF URBAN EVOLUTION. VOLUME I: INTER-URBAN EVOLUTION. The concept of "order by fluctuation," that has appeared recently in physico-chemical and biological systems, is applied to the description of urban growth. It is shown that fluctuations play a vital role in the evolutionary process of urban growth. The evolution of a complex system cannot be known simply by

studying deterministic equations describing the system. It is necessary, in addition, to study the effects of fluctuations, or historical accident, which can drive the system to new modes of behavior. Taking account of both the deterministic elements of urban growth and the appearance of innovations at chance locations in an economic region, a transportation-sensitive dynamic model of the evolution of the organization of urban centers was developed.

Allen, PM Deneubourg, JL Sanglier, M Boon, F dePalma, A ; Brussels University, Belgium, Transportation Systems Center Final Rpt. DOT-TSC-RSPA7820VO11, Oct. 1978, 85 p.; See also Volume 2, PB-288958.; Contract DOT-TSC-1185; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288957/4ST

42 190769 TRANSPORTATION ISSUES. The Federal Government spends over \$18 billion a year on transportation programs. These programs affect every part of the transportation system including aviation, highways, inland waterways, intercity buses, motor vehicles, ocean shipping, pipelines, rail freight service, rail passenger service, trucking and urban mass transit. This study examines current and emerging issues relating to Federal involvement in transportation. It emphasizes congressional interests and potential congressional needs for GAO assistance.

General Accounting Office CED-78-159, Oct. 1978, 76 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287194/5ST

42 190941 FORECASTING AUTO OWNERSHIP AND MODE CHOICE FOR U.S. METROPOLITAN AREAS. VOLUME II: MODEL EQUATIONS. Volume I of this report describes a multivariate model of auto ownership and mode choice, as well as its use in forecasting 1990 travel behavior, for a sample of 346,000 households and 407,000 workers in the largest 125 SMSAs. Household auto ownership decisions depend on family type and composition, household income, residential location, workplace location, highway and transit service levels, and measures of overall urban spatial structure for each SMSA. Given the number of cars owned and the variables used to explain auto ownership, each worker in the household selects one of five worktrip modes. This volume presents the coefficients of the detailed equations which comprise the models described in Volume I. (Portions of this document are not fully legible)

Kain, JF Fauth, GR Zax, J ; Harvard University, Department of Transportation Final Rpt. DOT/RSPA/DPB50-78/22, Dec. 1978, 194 p.; Contract DOT-OS-30099; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291373/9ST

42 190959 THE DYNAMICS OF URBAN EVOLUTION. VOLUME II: INTRA-URBAN EVOLUTION. In this report the concept of "order by fluctuation," that has appeared recently in physico-chemical and biological systems, is applied to the description of urban growth. It is shown that fluctuations play a vital role in the evolutionary process of urban growth. The evolution of a complex system cannot be known simply by studying the deterministic equations describing the system. It is necessary, in addition, to study the effects of fluctuations or historical accident which can drive the system to

new modes of behavior. Taking account of both the deterministic elements of urban growth and the occurrence of fluctuations in population in an urban region, a transportation-sensitive, dynamic model of the evolution of the spatial distribution of urban populations was developed. This is the second of two volumes. Volume I presented a model of the evolution of the organization of urban centers.

Allen, PM Deneubourg, JL Sanglier, M Boon, F dePalma, A ; Brussels University, Belgium, Transportation Systems Center Final Rpt. DOT-TSC-RSPA7820VOL2, Oct. 1978, 139 p.; See also Volume 1, PB-288957 in RRIS 15 190522; Bulletin 7902.; Contract DOT-TSC-1185; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288958/2ST, DOTL NTIS

42 191437 TRANSPORTATION SYSTEM MANAGEMENT: PROMISE, PERFORMANCE AND PROGNOSIS. The report is an assessment of the efficacy of transportation system management (TSM) as both a strategy of transportation system improvement and a philosophy of planning administration. The report summarizes the results of two years of technical and institutional studies conducted by faculty and students at the University of California at Berkeley, but in the form of a policy-oriented executive summary rather than an all-inclusive technical summary. The companion technical reports are referenced. The report is organized into four sections. The first discusses the impetus for TSM and its roots in the recent history of transportation planning and finance. The second section articulates a set of assertions and propositions that are imbedded in the Federal regulations and critiques them in light of the research findings. Section three reaches conclusions about the efficacy of TSM--as both a transportation improvement strategy and a philosophy of public administration. Section four proposes an "idealized" or "model" TSM planning process that responds to the conclusions reached in the previous sections. The various research activities supported by the DOT Program of University Research from September 1975 to December 1977 and covered by this report were conducted under the general title of "Managing the future evolution of the urban transportation system."

Jones, DW Garrison, WL May, AD ; California University, Berkeley, Department of Transportation Final Rpt. DOTRSPA/DPB-50/78/30, Dec. 1978, 43 p.; Contract DOT-OS-50237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292447/0ST

42 191438 TRANSPORTATION SYSTEM MANAGEMENT ACTIONS: IMPLICATIONS OF FLEXIBLE WORK HOURS. Strategies to reduce peaking in urban transportation through work rescheduling are a promising element of Transportation System Management (TSM). To date most discussions of work-schedule management have focused on work staggering and the four-day week. This report explores the merit of flexible or variable work hours as a traffic management strategy. It concludes that flextime is compatible with programs that seek to increase bus ridership and carpooling. Flextime also appears promising as a strategy of congestion relief. These conclusions are based on a survey of almost 500 employees of a California State agency which recently adopted flexible work hours. The report

also offers an analysis of the peaking characteristics of travel to and from the San Francisco Central Business District.

Jones, DW Nakamoto, T Cilliers, MP ; California University, Berkeley, Department of Transportation Final Rpt. DOTRSPA/DPB-50/78/29, UCB-ITS-RR-78-4, Dec. 1978, 66 p.; Contract DOT-OS-50237; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292448/8ST

42 191608 STATISTICAL ANALYSIS AND GENERATION OF DRIVING CYCLES FROM THE ST. LOUIS HEAVY-DUTY CHASE-CAR DATA. This report presents a summary and documentation of the work performed under EPA Contract NO. 68-03-2429 entitled "Statistical Analysis and Generation of Driving Cycles from the St. Louis Heavy-Duty Chase-Car Data". Program Objectives were successfully met with a statistical analysis of the driving patterns of 70 trucks and 5 buses, the development of driving cycles representative of various categories of operational data, and a comparison of the St. Louis and CAPE-21 data bases to help validate the assumption that the CAPE-21 cities, New York City and Los Angeles, represent extremes in heavy-duty vehicle speed patterns.

Smith, M ; Systems Control, Incorporated, Environmental Protection Agency EPA/460/3-77/026, Apr. 1977, 63 p.; Contract EPA-68-03-2429; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289945/8ST

42 191660 THE IMPACT OF BART ON LOCAL TRANSIT SERVICE AND FINANCIAL POLICY. The paper assesses the public policy impacts of BART on existing and planned local transit service and its financing in the three BART counties in the San Francisco Bay Area. Three specific policy areas were considered: (1) The impact of BART on changes in service, routes, fare, transfer and personnel policies of existing local transit operators; (2) the impact of BART on the creation of new local transit systems to provide feeder service to BART as well as local transit service; (3) the impact of BART on changes in State, regional or local policies for financing local transit service.

Graebner, LS Higgins, T Curtis, E ; Metropolitan Transportation Commission, Booz-Allen and Hamilton, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-42-8-77, Sept. 1977, 119 p.; Prepared by Booz, Allen and Hamilton, Inc., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292402/5ST, DOTL NTIS

42 191682 FORECASTING AUTO OWNERSHIP AND MODE CHOICE FOR U.S. METROPOLITAN AREAS. VOLUME 1. The report describes a multivariate model of auto ownership and mode choice, as well as its use in forecasting 1990 travel behavior, for a sample of 346,000 households and 407,000 workers in the largest 125 SMSAs. Household auto ownership decisions depend on family type and composition, household income, residential location, workplace location, highway and transit service levels,

and measures of overall urban spatial structure for each SMSA. Given the number of cars owned and the variables used to explain auto ownership, each worker in the household selects one of five worktrip modes. The research advances the field of travel demand forecasting by considering auto ownership and mode choice behavior in a large number of metropolitan areas; by quantifying how metropolitan land use patterns affect auto ownership and use; by documenting the influence of racial discrimination on black household behavior; and by analyzing walk to work trips. The 1990 projections indicate that increases in household income will have the most significant impact on urban travel behavior, with changes in household composition and size and land use patterns having smaller effects.

Kain, JF Fauth, GR Zax, J ; Harvard University, Department of Transportation Final Rpt. DOT/RSPA/DPB50-78/21, Dec. 1978, 186 p.; Portions of this document are not fully legible. See also Volume 2, PB-291373; Contract DOT-OS-30099; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292873/7ST

42 191689 CHARACTERISTICS OF URBAN TRANSPORTATION DEMAND; A HANDBOOK FOR TRANSPORTATION PLANNERS. The handbook is intended to guide transportation planners, engineers, and decision-makers in: assessing demands for urban, highway, and transit systems; applying and validating conventional transportation planning techniques; and establishing sound transportation planning decisions. It contains characteristics of urban bus, rail, and highway systems, and urban trip-making. The handbook may be used to compare travel parameters for a given community with those in other cities, thereby providing a basis for cross-checking and refinement. As part of the Urban Transportation Planning System (UTPS) of UMTA and FHWA, it provides basic inputs to the urban transportation planning process as well as ways of checking the results for reasonableness and relevance.

Levinson, HS ; Smith (Wilbur) and Associates, Urban Mass Transportation Administration, (UMTA-IT-06-0049) UMTA-IT-06-0049-79-1, Apr. 1978, 129 p.; See also report dated Feb 77, PB-265 830.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293220/0ST

42 191758 EXPLANATORY MODELING OF TRANSBAY TRAVEL CHOICE. The 71-mile Bay Area Rapid Transit (BART) System, serving San Francisco, Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. The report analyzes the reasons underlying BART-bus and BART-automobile travel choices in the key transbay travel corridor linking San Francisco and Oakland. Travel modes are defined in terms of 14 service attributes including quantifiable attributes such as travel time and cost, and more difficult-to-quantify attributes such as dependability and safety. Disaggregate models which relate mode-choice probability to perceived satisfaction with the alternative modes are estimated using data for the 14 attributes collected by semantic differential scales. Several different models are estimated and compared for BART-bus and BART-auto choices, for work and nonwork trip purposes, for geographic stratifications of the data, and using linear and logit

functional forms. The models provide convincing explanations of mode choice behavior and show that travel time and travel time-related attributes such as dependability and flexibility are the dominant determinants of choice.

Fan, H Sherret, A ; Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-34-3-77, Nov. 1977, 130 p.; Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294011/2ST

42 191934 TRAVEL TIME STUDIES FOR SURFACE TRANSPORTATION (A BIBLIOGRAPHY WITH ABSTRACTS). Reports are cited on the transportation time as regards surface systems. Data are presented on shuttles, delays, bus and automobile usage, networks, queuing, walking, journey to work, planning, and human factors. Mathematical models and computer applications are included. References are to central city, urban, rural, and interstate movements of passengers. (This updated bibliography contains 219 abstracts, 29 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Bibliog. Mar. 1979, 228 p.; Supersedes NTIS/PS-78/0146, NTIS/PS-77/0023, and NTIS/PS-76/0002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0167/1ST

42 192051 BRIDGES TO THE FUTURE: FORCES IMPACTING URBAN ECONOMIES. The report briefly discusses forces which have been singled out by the author as being potentially important factors in the future of urban economies. Chapter headings include: Urbanization and Economic Change; Technology; Personal Consumption Patterns; Private Sector Institutional Changes; Government Policy; The Impacted Cities; and Implications for Public Policy.

Schwartz, GG ; Academy for Contemporary Problems, Economic Development Administration, (EDA-OER-99-7-13387) Final Rpt. EDA/OER-79/051, May 1978, 40 p.; Grant EDA-OER-580-G-77-27; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-290756/6ST

42 193388 SADAT CITY: TRANSPORTATION PLANNING FOR MAJOR NEW TOWNS IN DEVELOPING COUNTRIES. Sadat City, Egypt is a new town planned on the edge of the Nile Delta halfway between Cairo and Alexandria with a population possibility of one million people. The preliminary planning phase has just been completed, and transportation considerations were among the major determinants of location, macroform, and the detailed physical plan. The overall city plan calls for relatively high density and compact shape—which will make all activities readily accessible, reduce total trip distances, and increase the potential for short walking and cycling trips. At a population of 500,000, the city's public transportation system is designed to operate buses within exclusive rights of way. The proposed transitways can be

operated efficiently through a wide range of traffic loads, which gives the system excellent staging characteristics and the flexibility to respond to natural traffic growth and to unforeseen patterns of development.

Byrne, PC Tadross, RE Grava, S (Parsons, Brinckerhoff, Quade and Douglas, Inc) *Transportation Research Circular* No. 199, Feb. 1979, p 3; ORDER FROM: TRB Publications Off

42 193389 CAN TRANSPORT POLICY DECISIONS CHANGE URBAN STRUCTURE?. It is generally believed that compact cities, such as typically found in developing countries, require comparatively little motorized travel, since more opportunities in them are within walking distance. This belief can easily lead to the conclusion that changing dispersed cities into compact ones would result in less motorized travel and gasoline savings. In an effort to prove or disprove such an assumption, this paper compares the relationship between population density and automobile use in six cities in the United States with that of six cities in developing countries. The comparison was made in terms of population, area, and number and length of person and auto trips. Contrary to popular belief, it was found that the actual car trip rates are significantly higher in cities in developing countries than in U.S. cities despite the higher population density and compactness of the former. Although the examples are limited, it is evident there may be other interpretations than the conventional ones to explain travel patterns and behavior in different cities.

Zahavi, Y *Transportation Research Circular* No. 199, Feb. 1979, pp 4-6, 2 Fig., 1 Tab.; ORDER FROM: TRB Publications Off

42 193395 TRANSPORTATION NEEDS IN DECLINING URBAN AREAS. The speaker expressed concern about the fact that most highway builders and transit operators favor the multi-billion dollar facilities that are proposed in the long-range transportation plans of most older metropolitan areas. He argued that efficiency calls for getting more out of existing system capacity and de-emphasizing new construction. He cited three areas for emphasis in developing an efficient transportation plan: improvement of mobility of the transit dependent population; better use of existing transportation facilities including consideration of street use pricing and ramp metering; and improvement of compensation (incurred by transportation development) for poor cities and poor people.

Krumholz, N (Cleveland Department of Community Development) *Transportation Research Circular* No. 199, Feb. 1979, p 14; ORDER FROM: TRB Publications Off

42 193396 COPING WITH REALITY: TRANSPORTATION PLANNING IN THE 1980'S. The speaker prefaced a discussion about transportation planning in the 1980's with a profile of transportation systems and community dynamics experienced since the 1950's. He then examined the federal role and emerging state and local roles in that regard. He concluded by saying the major goal for the 1980's should be to achieve cost efficient, energy efficient, high urban density by directing the stream of new growth into infill areas. "However, he urged that this goal must be achieved gradually and realistically because of the

attachment most Americans have to their automobiles, resulting from the pattern of suburban scatteration that began over two decades ago.

Levin, MR (Rutgers University, New Brunswick) *Transportation Research Circular* Vol. N No. 99, Feb. 1979, p 14; ORDER FROM: TRB Publications Off

42 193476 TRANSPORTATION POLICIES, PROGRAMS, AND PRIORITIES: QUESTIONS OF EQUITY, EFFICIENCY, AND REVITALIZATION OF CITIES. Among the issues addressed in the discussion are: the existence of a pluralistic society precluding discovering which of several courses of action is the "right" one (since each alternative will affect different segments of the population differently); revising the definition of efficiency so that land-related impacts (positive and negative) be included in calculation of costs and benefit; and the need for planners to examine whether by their actions some individuals have been deprived of their constitutional rights) especially regarding travel and mobility.

Tomazinis, AR (Pennsylvania University) *Transportation Research Board Special Report* No. 183, 1978, pp 41-43; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

42 193608 TRANSIT SERVICE OPTIONS FOR SMALL CITIES. The purpose of this guide is to develop an awareness and understanding of the potential afforded by transit services and to begin to apply this toward the development of methods for continuing creative, unique resolution and use of transit services in small cities. It is not a guide to transit design; rather, it is a guide to the options to be used in such designs. Its scope is to define and expand on the use and meaning of transit in order to stimulate ideas for transit services that are innovative and at the same time, relevant and practical. The guide is divided into three major sections: the need for transit services in small cities, the various options available for each of the major components of transit service, and the selection process for transit service options.

Lea (ND) and Associates, Limited Sept. 1978, 129 p., Figs., Tabs., 4 App.; Prepared for the Urban Transportation Research Branch, Canadian Surface Transportation Administration, Montreal, Quebec.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada, TRRL (IRRD 241000)

42 193610 APPLICATIONS OF BEHAVIORAL SCIENCES TO ISSUES IN TRANSPORTATION PLANNING. This paper investigates the potential for applying methods and concepts in the behavioral sciences to transportation planning. A review of recent trends in transportation planning shows increasing concern for more policy-sensitive and behavioral approaches. Some behavioral science methods, particularly from sociology, psychology, and social psychology, have been used to date in transportation. A brief summary of issues in 4 content areas (short-range transit operations, transportation for mobility limited, environmental and social impact analysis, and energy) shows that certain elements from the behavioral sciences

have (or may be) proved useful in understanding these issues. Particularly strong bonds now exist between the disciplines in attitude theory and measurement, behavior, and attitude-behavior linkages. Other potential areas are life style and family, culture, human factors, group dynamics, and certain methodologies. The paper concludes that interaction between transportation and the behavioral sciences should be encouraged and established at numerous methodological and conceptual points. /Author/

Hartgen, DT ; New York State Department of Transportation Research Report 148, Nov. 1978, 44 p., 11 Tab., 56 Ref.

42 193618 FUTURE DIRECTIONS FOR PUBLIC TRANSPORTATION: A BASIS FOR DECISION. This report is a long range planning study that was prepared to assist the Urban Mass Transportation Administration (UMTA) in its planning to meet the mobility needs of the American population in the coming decades. The authors have identified a number of important societal forces and considered reasonable scenarios based upon those forces, with particular attention to the implications for the mobility of people in the public sector. Based upon considerations of (1) population growth and dispersion, (2) energy costs and availability, (3) technological advances, and (4) economic conditions, the report concludes that urban decentralization is likely to continue through the year 2000. Therefore, UMTA must accept and support to a greater extent than presently innovative uses of the automobile and paratransit modes as the most efficient mode for most urban area trips. At the same time, existing conventional transit systems in dense areas must continue to be supported. But a major opportunity exists for UMTA to support a total efficient transportation system in a low-density environment. This report provides conclusions and recommendations for future UMTA policy decisions as well as a list of references. /UMTA/

Wiener, AJ Pignataro, LJ Bloch, AJ Crowell, WH McShane, WR ; Polytechnic Institute of New York, (UMTA-NY-11-0017) Final Rpt. UMTA-NY-11-0017-79-1, Dec. 1978, 87 p.; Sponsored by the Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-292781

42 193710 PERSPECTIVES ON THE EVALUATION OF URBAN TRANSPORTATION SYSTEMS. The term evaluation is very broad and has different implications for different people: An evaluation can be designed only after it is specified who is evaluating for what purpose against what criteria. The different perspectives of some of the more important actors are discussed here. There is a difference between comprehensive evaluation and functional evaluation. Comprehensive evaluation is concerned with external effects, e.g., pollution, energy consumption, evolution of land-use patterns, and other contributions to the quality of life. Functional evaluation is concerned with system performance parameters, e.g., wait times, coverage, productivity, ridership, and the other variables that characterize the supply characteristics and their appropriateness to the markets served. Two primary conclusions are developed. The first is that intelligent interpretation of an observed set of system descriptors requires a knowledge of the

ridership pattern being served. Both potential productivity and service level are sensitive to ridership pattern, and without a knowledge of its nature, other comparisons are uncertain. The second is that the equilibrium between supply and demand is unstable. This implies that an observed trend in ridership will, in the absence of external change, probably continue. Thus the rate and direction of change in ridership is the single most important evaluative measure, because it portends the future of the system and can be an early warning signal of a need for change. /Author/

Ward, JD *Transportation Research Board Special Report* Vol. N No. 84, 1979, pp 118-124, 9 Fig., 8 Ref.; This paper appeared in TRB Special Report 184, Urban Transport Service Innovations.; ORDER FROM: TRB Publications Off

42 193906 TRANSPORTATION-THE NEXT TWENTY FIVE YEARS. AN APPRAISAL OF THE PROSPECTS AND POSSIBILITIES FOR DEVELOPMENT OF THE COUNTRY'S TRANSPORTATION SYSTEM UP TO THE END OF THE CENTURY. The first part of this document comprises a comprehensive statement of the county surveyors society's views and assessments of all aspects of the transport problem: economic and financial considerations, availability of energy, desire of personal mobility, movement of freight, modes of transport, roads, environment, safety and public opinion. The views are based on data contained in five detailed appendices dealing with economic and financial considerations, energy and transport, demand for personal mobility, standards for public transport, standards for roads. /TRRL/

Hardy, MF Fell, PJ (Hertfordshire County Council, England) ; County Surveyors Society Monograph Sept. 1978, 51 p., Figs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 237417)

42 193934 STRUCTURAL MODELS FOR THE ANALYSIS OF TRAVELLER ATTITUDE-BEHAVIOUR RELATIONSHIPS. Traveller attitudes and behaviour have been shown to correlate in numerous previous studies. However, the correlation by itself leaves open the nature of the interrelationships between traveller attitudes and behaviour. For example, attitudes could either cause or be caused by behaviour. In fact, both options are concurrently possible. Structural equations are applied to a set of data gathered from Los Angeles central business district workers to ascertain the direction and nature of interrelationships between attitudes and behaviour with respect to frequency of taking the bus to work. A mutual dependence between attitudes and behaviour is demonstrated in the context of this dataset and behavioural choice situation; behaviour and attitudes concurrently cause each other. In addition, it is found that two attitudinal components, perceptions of and affect toward a mode, function differently with respect to travel behaviour.(a) /TRRL/

Dobson, R Dunbar, F Smith, CJ (Charles River Associates, Incorporated) Reibstein, D Lovelock, C (Harvard University) *Transportation (Netherlands)* Vol. 7 No. 4, Dec. 1978, pp 351-363, 5 Fig., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237687)

42 194110 ACCESSIBILITY INDICES IN URBAN STUDIES: FROM THEORY TO PRACTICE [Les indicateurs d'accessibilite dans les etudes urbaines: de la theorie a la pratique]. An attempt is made to summarize the present knowledge on accessibility indices. The development of accessibility indices is outlined together with their theoretical basis. Practical methods of calculation and use are described, and several examples of application as a function of transport supply and demand for different population groups are given. Details are given of recent investigations carried out in France on the relations between accessibility and urban development. /TRRL/ [French]

Koenig, G *Revue Generale des Routes et des Aerodromes* No. 533, July 1977, pp 5-24, 9 Fig., 6 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 105481), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

42 194154 TRANSPORTATION SKETCH PLANNING REPORT. This report describes the sketch planning undertaken to give planners and decision makers an overview of the range of transportation options for the Houston area up to 1995, including intensive citizen involvement in each aspect of the planning process. The citizens groups contributed ideas regarding Houston's residential and employment growth patterns, established criteria, and generated and selected alternatives; while the staff had responsibility for technical input to the citizens and the more in-depth analysis of the travel demand resulting from the population and employment scenarios. Citizens were generally in agreement on the nature of the system, important corridors, and an incremental development approach. An important characteristic of this type of planning is that it creates a forum for citizen input and increasing confidence in the chosen set of priority corridors. It also precluded premature conclusions about "optimum" long-range plans by forcing planners to keep a broad perspective of the transportation options. The variety of citizen concern left no doubt that all potential solutions should be analyzed.

Houston Office of Public Transportation
TX-9-0066.4, July 1978, v.p., Figs., Tabs., 8 App.

42 194156 125TH STREET CORRIDOR TRANSPORTATION STUDY. The justification and purpose for the analysis and planning of the 125th Street Corridor are clear: the Corridor is the heart of one of the City's major communities-Harlem. This report attempts to analyze the assets and weaknesses of the Corridor and to propose strategies towards strengthening its roles as Harlem's principal "downtown" and one of this City's key commercial Districts. While specific proposals are directed towards the improvement of existing transportation systems, the underlying patterns of human activity are of primary concern. Transportation is viewed as a servant system by which the major social and economic goals of the community can be effected. Therefore, the report isolates, as far as possible, the major developmental issues within the community in order to ascertain their implications for future transportation needs. Of the many dimensions inherent in this analysis, one is more useful in describing the existing state of affairs than time. The study of the roots of a community is crucial both to the evaluation of the present and

to the formulation of policy for the future. The report includes a brief historical profile and a sketch of the forces which have shaped the economy of Harlem. /Author/

Office of the Mayor, New York, City of
IT-09-0023/TS D121, TS 6460, July 1978, v.p., Figs., Tabs., 1 App.

42 194164 CHARACTERISTICS OF URBAN TRANSPORTATION DEMAND--A HANDBOOK FOR TRANSPORTATION PLANNERS. This report is a handbook which can be used by urban transportation planners in estimating the various components of urban transportation demand. It contains characteristics of urban bus, rail, and highway systems, and urban trip-making. A part of the Urban Transportation Planning System (UTPS) of UMTA and FHWA it provides basic inputs to the urban transportation planning process as well as ways of checking the results for reasonableness and relevance. It also complements the previously distributed UTPS handbooks: Characteristics of Urban Transportation System (CUTS) is available on the UPS distribution tape and from NTIS as PB 233 580/AS and Traveler Response to Transportation System Changes Limited copies available from FHWA (HHP-22) or from NTIS as PB 265 830/AS. This handbook is being distributed to State DOT's, MPO's and transportation libraries and will be distributed on the UTPS tape in the future. It will be available from NTIS by Project No. UMTA IT-06-0049-78-1. An Appendix to the CUTD handbook offers detailed data on individual cities, roads, routes, stations, etc. These are not in a form that is comparable from place-to-place but may be of interest from an historical perspective for the urban areas concerned. The Appendix is available only from NTIS as Project No. UMTA IT-06-0049-78-2. /UMTA/

Levinson, HS ; Smith (Wilbur) and Associates, De Leuw, Cather and Company
UMTA-IT-06-0049-78-1, No Date, 128 p., Tabs.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration.; ORDER FROM: NTIS

42 194180 CANADIAN URBAN TRANSPORT RESEARCH INFORMATION STRUCTURE AND DATA BASE-PHASE 1. This is the product of the first phase of a project to establish a structured Canadian Urban transportation data base and improve primary data sources and reporting mechanisms. This first phase established the content and format of the data base and developed a suitable Urban reference zone system and Urban transportation level-of-service indicator. The report details data presentation, demographic and transportation data presentation, and data sources. The data will be presented at 3 levels of spatial disaggregation in each city: entire Urban area, which is divided into core frame and fringe areas, which are divided into reference zones. A discussion of urban level-of-service indicators covers the combination of "accessibility" and "personal reference", the application of the proposed accessibility index, and the personal reference factor. The implementation of the data base is discussed in some detail.

Lea (ND) Associates, Limited TP 1819, Oct. 1978, v.p., Figs., Tabs., 7 Ref., 1 App.; Prepared by N.D. Lea and Associates for the Urban Transportation Research Branch, Canadian Sur-

face Transportation Administration, Transport Canada.

42 194182 URBAN MASS TRANSIT IN ARIZONA: ITS PAST AND ITS POTENTIAL. Within Arizona, only Phoenix and Tucson provide public mass transit service. In each city a substantial part of the operating costs of the bus system is provided by government funds. Both cities face the problems of extended Urban areas, low population density, and low utilization of their bus systems. Tucson's public transportation history is briefly described as an example of the complex problems inherent in providing mass transit in a middle sized, sprawling city where the private automobile is not only the dominant travel mode but a symbol of a way of life. System management and performance is described and passenger response to increased service and fares is discussed. Fare increases succeeded in raising total revenue from 17% of operating cost during 1975-76 to 26% during 1977-78. The community benefits of public transportation are outlined, and policy suggestions are presented. The suggestions include: constant review and adjustment of the route system; reduce peak hour travel without losing total passengers (by for e.g. offering student and reduced fare service during off-peak hours); use portion of student fees allocated to parking lots to cover bus passes--thus reducing University of Arizona traffic and congestion; substitute low-cost subscription service for a direct subsidy; establish more express buses; and construct safe, comfortable shelters.

Billings, RB (Arizona University) *Arizona Review* Vol. 27 No. 10, Oct. 1978, pp 5-10, 1 Tab.

42 194183 SPECIAL STUDY--ST. LOUIS CENTRAL BUSINESS DISTRICT. This study documents the results of efforts to develop current socioeconomic and transportation data on a detailed level needed for major transportation planning efforts to be undertaken in the near future. The data developed includes pedestrian counts, peak-hour cordon line traffic counts, employment estimates and auto occupancy counts. /Authors/

Sheehan, EM Hubbard, JR ; East-West Gateway Coordinating Council Final Rpt.
EWG-ES-0364-10-2, June 1978, 62 p., 8 Fig., 11 Tab., 3 App.; Sponsored by the Federal Highway Administration, Urban Mass Transit Administration.; Contract UMTA:IT-09-0090; ORDER FROM: East-West Gateway Coordinating Council, 112 North 4th Street, St Louis, Missouri, 63102

42 194408 RURAL TRANSPORT AND COUNTRY PLANNING. PROCEEDINGS OF THE CONFERENCE HELD AT THE UNIVERSITY OF NOTTINGHAM IN MARCH 1977. The four parts of this book cover many aspects of rural transport and country planning, from the broad social needs, through aspects of structure plans and the economics of rural transport operation to the new experiments which are now emerging. In Part 1: Rural development policy and public transport, the needs of rural communities are considered, together with the place of public transport in structure plans covering rural areas. A case study of rural transport policy in the Netherlands presents a comparison with the British situation.

Part 2: Rural transport policy and finance highlights the economic and future policy issues involved in providing rural passenger transport services. Part 3: Public transport operation in rural areas examines the priorities for public transport in the transport policies and programmes and considers the coordination of rural transport and the place of rural rail services. Part 4: New rural transport techniques deals with the various experiments which are being carried out or are proposed in order to attempt to develop new methods of providing rural transport, including the possibilities of smaller buses, part-time drivers, amended routing and timings, and the modification of the controlling legislation. /TRRL/

Cresswell, R ; Hill (Leonard), (0 249 44156X) Monograph 1978, v.p., Figs., Tabs., 10 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 237874)

42 194459 DETERMINANTS OF TRAVEL CHOICE. The book provides a comprehensive introduction to the subject of the determinants of travel choice and is intended to form a starting point for future research in this area. The following chapters discuss the subject: (1) The transport determinants of travel choices: an overview (Goodwin, PB and Hensher, DA); (2) Economic theories of travel choice, (Dalvi, Q); (3) Behavioural dimensions of travel choice, (Heggie, IQ); (4) Behavioural analysis of travel and activity choices, (Stoner, J and Milione, V); psychological measurement of travel attributes (Louviere, J); (6) Issues in the estimation of journey attribute values, (Daly, AJ); (7) Valuation of journey attributes: some existing empirical evidence, (Hensher, DA); (8) Destination choice and travel attributes, (Jones, PM); (9) Travel choices for recreational journeys, (Vickerman, RW); (10) Improved multiple choice models, (Daly, AJ and Zachary, S); (11) Travel choice and time budgets, (Goodwin, PB); and, (12) Concluding comments, (Dalvi, Q and Beesley, M). /TRRL/

Saxon House, Teakfield Limited, (0 566 00184 5) Monograph 1978, 394 p., 25 Fig., 23 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 237995)

42 194888 A GUIDE TO COMMUNITY TRANSPORT. This book discusses the concept of "community transport", defined as the use of volunteer, unpaid drivers to organise and operate a rural public transport service. The intention of the book is to give practical advice and information to enable local communities to evaluate the options available to run such a service. The two main forms of community transport discussed are social car and community bus schemes: chapter 1-first steps, discusses the basic options available, while chapter 2-community bus services, and chapter 3-social car schemes, discuss these services individually. The appendices give brief details of planning a flexibly routed bus service, instructions for driver and controller, and traffic commissioners requirements. /TRRL/

Her Majesty's Stationery Office, Department of Transport, England Monograph 1978, 60 p., 2 Fig., 6 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 239067)

42 194898 TRANSPORTATION SYSTEM MANAGEMENT: TSM-TYPE PROJECTS IN SIX SELECTED EUROPEAN COUNTRIES. The report provides an inventory and analysis of

156 projects in Denmark, France, West Germany, the Netherlands, Sweden and the United Kingdom. Transportation system management (tsm) is concerned with strategies that make the most efficient use of existing transportation systems by means of low cost improvements. The following eleven classes of strategy were considered: paratransit, parking control, pedestrian/bicycle priority treatment, pricing, traffic engineering techniques, traffic restraint, transit management and marketing, transit operations, goods movement, work schedule. The study procedure is described: a literature study, initial contacts and identification of projects, completion of inventory forms, visits and interviews in the six selected countries. The projects identified are reviewed and the characteristics of the projects for each of the selected countries are described. Each of the eleven strategies is considered separately. In addition, references classified according to strategy class and subdivided between the six countries, are listed. /TRRL/

May, AD (California University) Westland, D (Delft University of Technology, Netherlands) ; Printerhall Limited, (0041 0685) Monograph Feb. 1979, 30 p., 1 Fig., 15 Tab., Refs.; This is a Supplement to the February 1979 issue of Traffic Engineering and Control; ACKNOWLEDGMENT: TRRL (IRRD 239070)

42 194968 DEMAND ORIENTATED PASSENGER PUBLIC TRANSPORT POLICY [Nachfrageorientierte Personennahverkehrspolitik]. The supply of public passenger transport should in future be improved both as regards quantitative and qualitative demands. This applies also to the introduction of new transport technology. The number of public transport passengers shows a downward trend. In competition with private cars, public transport can only succeed if comparable conditions are obtained. This is a question of covering costs where this is possible. Where no private of private sector alternative is available, the introduction of public transport is essential to ensure a minimum availability of means of transport. [German]

Storsberg, G (Bundesministerium fuer Wirtschaft, West Germany) *Zeitschrift fuer Verkehrswissenschaft* Vol. 48 No. 2, 1977; ACKNOWLEDGMENT: TRRL (IRRD 307561), Federal Institute of Road Research, West Germany (EKWZ)

42 195412 EFFECT OF POPULATION DENSITY CHANGES ON TRANSIT RIDERSHIP. This report is to be considered as a companion piece to the report titled An Analysis of Transportation Planning Effectiveness. (Ref. 1) In that report the impact of Technical Standards and Capital Grant monies on planning effectiveness is analyzed. Among other findings, that report found that the average annual increase in transit system ridership relates directly to increased capital acquisitions. But, as an adjunct to the study, it was also found that no relationship existed between increased transit ridership and increased population densities. The purpose of this companion document is to examine more closely that one issue only, the relationship between transit system ridership and population density. The results of this study indicate that a positive relationship between transit ridership and population density growth, in fact, does exist. /Author/

Kahn, D Hassler, FL ; Transportation Systems Center Staff Stdy SS-20-U. 3-34, Aug. 1977, 23 p., Figs., Tabs., 6 Ref.

42 195465 TRANSPORT AND PUBLIC POLICY: PAPERS AND DEBATE, VOLUME 2.

This document contains the papers presented at a transport policy symposium, together with the contributions to the ensuing debate on each paper. The papers presented were as follows: Car Ownership Forecasting, (Beilby, MH and Walker, MBA) Which Looked at the Questions Posed on the Consultative Document on Transport Policy Issued by the Government in 1976 and at the Technical Side of the Forecasting Methods. It attempts to answer the question, "is the present method of traffic forecasting sound and fair?" Accessibility in the Design of Local Transport Policies, (Benwell, M), which discusses the recent changes that have taken place in transport planning, and outlines the potential applicability of an accessibility framework for the development of techniques appropriate to normative transport planning. Options for Public Transport Policy in Rural Areas, (Knowles, RD), which discussed rural transport services as related to policies put forward by successive governments, and suggests what are considered to be available alternative options as solutions to rural problems. Superstores, Shopping Trips and Public Policy in Great Britain, (Thorpe, D), which describes the impact of such stores on shopping patterns, and the locational impact of a superstore as related to the catchment zone and changes in social behaviour. A Reaction to the Government White Paper on transport, (Taitz, L), in which it is suggested that the white paper fails to recognise that the essential issues of transport are environmental and social, not economic, hence the failure of economists to make sense of them. It is argued that in the long run, the decisions on transport are going to have to be made on social and political grounds, and not economic ones. A summary of government white paper decisions is given in an appendix. /TRRL/ Williams, AF, Editor ; Birmingham University, England Monograph 1977, 94 p., Figs., Tabs., Refs.; Proceedings of a Symposium on Transport and Public Policy, Aston University, Birmingham, September 1977.; ACKNOWLEDGMENT: TRRL (IRRD 240439)

42 195466 TRANSPORTATION AND TRANSPORT RESEARCH. FUTURE DIRECTIONS [Transporter och transportforskning. Ett framtidsperspektiv]. The aim of this study is to provide a basis for the long term direction of R&D work within the Swedish transport research delegation in the field of transportation. The report contains the following chapters: (1) Transport Systems and Society--An Introductory System Outline, (2) the Present Transport Systems and Problems: Passenger Transport, Freight Transport, Side Effects of Transport Systems, Financing and Transport Policy, (3) Alternative Developments of the environment of transport systems, (4) Technical Development Within the Field of Transportation, (5) Plans and Trends Within the Field of Transportation, (6) Transportation Research Management and (7) Problem and Research Areas. /TRRL/ [Swedish]

Transportforskningsdelegationen, (91-85562-11-4) Monograph TFD 1978:7, 1978, 435 p., Figs.,

Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 238999), National Swedish Road & Traffic Research Institute

42 195475 THE EFFECTS OF DIFFERING LEVEL OF SPATIAL MOBILITY: A DISCUSSION. This paper reports the initial stages of a study of the impact of differing levels of spatial mobility upon various sections of the population and is based on a review of the literature relevant to the social dimension of the urban transport problem. A conceptual framework for studying mobility is outlined but the difficulty of defining operational measures is emphasised. A summary follows of the principal results of empirical studies which have sought to describe variations in mobility in the population and their effects on both trip-making behaviour and activity patterns. Relevant social, economic and physical trends are discussed and conflicting views of the value to society of increasing mobility are presented. This leads to an assessment of the objectives and policies which might be pursued in approaching the social aspect of the urban transport problem and of the planning process necessary for devising suitable policies.(a) An earlier version of this paper was read at the Annual Conference of the Universities Transport Study Group at the University of Surrey, January 1975. /TRRL/

Doubleday, C *Martin Centre Transactions* Vol. 1 1977, pp 95-112, 27 Ref.; From the Transactions of the Martin Center for Architectural and Urban Studies, Cambridge University, England.; ACKNOWLEDGMENT: TRRL (IRRD 240324)

42 195479 FACTORS AFFECTING PUBLIC TRANSPORT PATRONAGE. THE PROCEEDINGS OF A SYMPOSIUM HELD BY THE TRANSPORT AND ROAD RESEARCH LABORATORY, LIVINGSTON, 14 JUNE 1977. The main objective of the symposium was to review the current state of knowledge in this field, and to examine the implications for transport policy. A further objective was to inform delegates more fully about relevant TRRL activities. This report contains the papers given to the symposium, together with summaries of the discussion for each session. The papers were as follows: The need for an understanding of the factors which affect travel by public transport (Stirling, WN); Methods of estimating passenger response to operational and fares changes (McTavish, AD); passenger response to service factors (White, PR); NBC studies of patronage and travel demand factors (Kilner, AA); studies of Scottish operations (Stark, DC); Passenger response to changes in public transport-an overview (Bly, PH); Some implications of the results of elasticity determinations (Webster, FV). /TRRL/

Transport and Road Research Laboratory, (0305 1315) Proceeding Supple Report SR 413, 1978, 65 p., 14 Fig., 5 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240261)

42 195497 INTERNATIONAL COLLABORATIVE STUDY ON FACTORS AFFECTING PUBLIC TRANSPORT PATRONAGE. The aim of this report is to collect and evaluate Swedish experiences from studies of factors affecting public transport patronage and to analyse factors affecting travel patterns and modal choice

in urban areas. Development trends in urban areas and domestic travel are described together with a general framework of factors affecting travel consumption in a 40-year context. Four different methods of analysing travel behaviour are discussed and aggregated and disaggregated models are compared. Results from Swedish cross-sectional studies are presented. An analysis of different factors such as modal choice and demand elasticities is performed. This analysis comprises disaggregate studies using the logit model and studies based on aggregate data (a car ownership model and a transportation market-equilibrium model-trama). The interdependence between urban structure and travel pattern is analysed by means of three different sensitivity studies. The first of these studies uses the ic-s-model, based on a combined cross-sectional and time-series data set. The two following sensitivity studies utilize the trama-model as a tool for evaluating travel pattern in different urban structures. /TRRL/

Algers, S Hansson, A Tegner, G Widlert, S ; Royal Institute of Technology, Sweden Monograph Mar. 1977, 69 p., 11 Fig., Tab., 22 Ref; ACKNOWLEDGMENT: TRRL (IRRD 239000), National Swedish Road & Traffic Research Institute

42 195527 A RATIONAL ASSESSMENT OF TRAVEL DEMAND THROUGH INTEGRATION OF PHYSICAL AND TRANSPORTATION PLANNING OBJECTIVES: CASE STUDY OF MADRAS METROPOLITAN AREA. The conventional four stage modelling process to determine the travel demand primarily developed in the West, relates the existing travel pattern to the prevailing socio-economic and land use characteristics to forecast the travel demand. The procedure suffers from certain basic limitations in not reflecting the rapid socio-economic changes taking place in the Indian situations and also not incorporating the planning objectives stipulated for the perspective land use plan. It is felt that substantial modifications and moderations are needed at various stages for assessing travel demand under Indian situations. The Madras metropolitan plan envisages a ring and radial pattern of transportation system. Six urban nodes are proposed to be developed with varying socio-economic and land use characteristics providing a high degree of self-containment to reduce the travel demand for work, shopping, recreation and other facilities. In estimating travel demand for Madras metropolitan area the conventional process is moderated to suit the specific situation of relating physical planning objectives to transportation planning process. /TRRL/

Rao, MSV Sharma, AK *Indian Roads Congress, Journal of* Vol. 39 No. 1, Aug. 1978, pp 75-104, 11 Fig., 11 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240263)

42 195539 THE VALUE OF TIME: SOME IMPLICATIONS FOR URBAN ANALYSIS. This study investigates how the different valuations that individuals put on travel time savings can best be treated in urban and transportation evaluation models. An essential distinction is drawn between two concepts imbedded in the term 'value of time'. One of the assumptions underlying the utility maximising derivation of travel time values is shown to be inapplicable in practice in Great Britain. The effect of differential wage rates on travel time values is explored but is

found to be less important than that of differential working hours. This influences residential location patterns in the conurbations. The necessity for a parallel theoretical treatment of time and money is outlined. Some contemporary issues are discussed to illustrate the importance for planning policies of time spent on travel.(a) /TRRL/ Williams, I *Martin Centre Transactions, URBAN STUDIES, UNIVERSITY OF CAMBRIDGE* Vol. 3 1978, pp 259-300, 5 Tab., Refs.; Transactions of the the Martin Centre for Architectural and Urban Studies, University of Cambridge.; PERFORMING AGENCY; ACKNOWLEDGMENT: TRRL (IRRD 240318)

42 195619 PASSENGER TRANSPORT. This paper, published by the American Public Transit Association, is the weekly publication of the transit industry. This issue contains articles of national interest in areas such as: allocation of fuel for public transit, President Carter's transit budget, and appraisal of Transbus. It also contains several articles concerning transit issues of local importance in various major population centers in the United States and Canada.

Passenger Transport Vol. 37 No. 18, May 1979, 12 p. ORDER FROM: American Public Transit Association, 1100 17th Street, NW, Washington, D.C., 20036

42 195874 TRANSIT NEEDS ANALYSIS VOLUME I: TRANSIT NEEDS ASSESSMENT, APPENDIXES. The St. Louis Mass Transit Program was undertaken to determine if an improved regional transit system is needed; it is directed at the mobility requirements of the total population. Special emphasis was given to travel characteristics and need of transit-dependent persons. This report, Volume II, provides a detailed description of the methodology employed in the analysis. The appendixes are as follows: A-Definition of Terms; B-Review of nationwide research on latent demand and transit-dependency; C- Detailed analysis of existing St. Louis travel data with regard to identifying regional transit service needs; D- Key person community survey results; E-Results of transit-dependent survey; F-Estimates of persons in autoless household (for 1985) and supplemental tables; G- Summary of literature review, with annotated bibliography. Volume I titled "Transit Needs Analysis, Volume I: Transit Needs Assessment" (UMTA-IT-09-0067-79-4) describes the transit needs analysis, including total transit needs and mobility needs of transit-dependents. "Volume II: Procedural Manual" (UMTA-IT-09-0067-79-6) consists of procedures use in analysis of existing data sources, in transit-dependent survey, and in key person community survey. Other reports of this study are: "Mass Transit Program for Saint Louis Metropolitan Area" (UMTA-IT-09-0067-79-7) defines a 1985 Mass Transit Program for the area and consists of an expanded all-bus system with the addition of Freeway Bus Service and Park-Ride facilities in eight corridors; and "Public Acceptance Plan" (UMTA-IT-09-0067-79-8) basically describes the need to promote and sell public mass transportation. /UMTA/

Rouse (WV) and Company, (IT-09-0067) UMTA-IT-09-0067-79-5, Nov. 1977, 133 p.; Sponsored by the Urban Mass Transportation Administration. Prepared for East-West Gateway Coordinating Council.; ACKNOWLEDGMENT:

UMTA; ORDER FROM: NTIS; PB-295119

42 195875 TRANSIT NEEDS ANALYSIS VOLUME II: PROCEDURE MANUAL. After ten years of serious consideration of some type of steelwheel-steelrail public transit improvements, the conclusion was reached that for the foreseeable future buses operating on existing streets and highways with certain modifications are the most cost-effective means to meet this region's transit needs. Attention is now focused on financing existing transit service and the improvement proposals made in this report. This volume, Volume II, provides a description of the methodology utilized in the analysis, and it is intended to provide guidelines for other urban areas. This volume consists of procedures employed in the transit dependent survey, in transit analysis of existing data sources, and in the key person community survey. In addition, Volume II includes four appendixes. The first two appendixes present the survey instruments used in both the transit dependent and the key person community surveys. Appendix C details the survey manual used to train interviewers for the transit-dependent survey, and Appendix D describes the community participation program. Other reports of the Mass Transit Program are: "Volume I: Transit Needs Assessment" (UMTA-IT-09-0067-79-4); "Volume I: Transit Needs Assessment, Appendixes (UMTA-IT-09-0067-79-5); "Mass Transit Program for the Saint Louis Metropolitan Area" (UMTA-IT-09-0067-79-7); and "Public Acceptance Plan" (UMTA-IT-090067-79-8). /UMTA/

Rouse (WV) and Company, (IT-09-0067-79-6) UMTA-IT-09-0067-79-6, Dec. 1976, 96 p.; Sponsored by the Urban Mass Transportation Administration Prepared for the East-West Gateway Coordinating Council.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-295118

42 195886 PUBLIC ACCEPTANCE PLAN. Public transportation in the St. Louis area will be buses on the local streets and highways for the next 10-15 years. The improvements suggested in this Mass Transit Program are modest and designed to strengthen the existing bus service. This brief report reflects the view that the need for a public acceptance plan is not to try to promote and sell major transit improvement to the public, but to promote and sell public mass transportation with the relatively modest improvement which have been recommended and to gain support for the necessary financing. The report identifies and very briefly describes the five basic themes that comprise the public acceptance effort, namely; public transportation as a Public Service; Efficient Operation; Improvements in Service; Environmental Improvements; and Equity of Service. Other reports of the St. Louis Mass Transit Program are: "Transit Needs Analysis, Volume I: Transit Needs Assessment" (UMTA-IT-09-0067-79-4); "Transit Needs Analysis, Volume I: Transit Needs Assessment Appendixes (UMTA-IT-09-0067-79-5); "Transit Needs Analysis, Volume II: Procedural Manual" (UMTA-IT-09-0067-79-6); "Mass Transit Program for the Saint Louis Metropolitan Area" (UMTA-IT-09-0067-79-7). /UMTA/

Daniel, Mann, Johnson and Mendenhall, (ITR-09-0067) UMTA-IT-09-0067-79-8, Oct. 1978, 10 p.; Prepared for the East-West Gateway Coordinating Council. Sponsored by the Urban

Mass Transportation Administration ; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-295116/8ST

42 195944 DEVELOPMENT OF AN EVALUATION FRAMEWORK FOR TRANSPORTATION SYSTEM MANAGEMENT STRATEGIES. The overall purpose of this project was to develop a framework for the evaluation of Transportation System Management (TSM) strategies. The general intent of the research was to conduct a practical framework which can be easily integrated into the current urban transportation planning process and which can also be adapted to previously established institutional arrangements with medium-sized metropolitan areas. For this, a systems analytic approach was applied to build the specific components which must comprise the framework. Based on this approach, six specific tasks were undertaken to construct such a framework: 1) the identification of specific transportation objectives which can be achieved through various TSM strategies; 2) the construction of a set of TSM performance measures or measures of effectiveness to monitor the performance of TSM strategies; 4) the development of a decision rule which when given the TSM objectives, measures of effectiveness, and strategies, can be used to evaluate overall performance of TSM strategies; 5) the testing of monitoring techniques for various TSM strategies; and 6) the development of an information system for the collection, retention, and retrieval of TSM information. In order to test this framework, a case study of TSM evaluation within the Omaha-Council Bluffs Metropolitan Area was undertaken. Based on the review of other TSM elements and this case study, an implementation program for the framework was proposed. This program includes the identification of the evaluation tasks, an identification of the specific roles for each implementing agency and Metropolitan Planning Organization, and a recommended TSM information system which encompasses data generation, data retention and retrieval, and data transmission. /UMTA/

Lima, PM McCoy, PT Jepsen, SR ; Nebraska University, Lincoln, (NE-11-0001) Final Rpt. UMTA-NE-11-0001-79-1, Aug. 1978, 177 p.; Sponsored by the Urban Mass Transportation Administration.; Contract NE-11-0001; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-295023/AS

42 195945 TRANSPORTATION SYSTEMS MANAGEMENT ELEMENT. Transportation Systems Management (TSM) denotes a process designed to increase the efficiency of existing transportation facilities and resources by implementing low-capital measures which reduce the need for major capital improvements. In addition to fiscal economy, the TSM process insures that meaningful steps can be taken toward attaining broader local and national goals, which include: energy conservation; environmental improvements; equity for transit dependents; and urban preservation. Several factors strongly influence the conception of the TSM planning process. First, TSM must be an integral part of some overall scheme or approach to transportation planning in the region. Second, in order to be successful, TSM planning must conform to a key set of attributes or requirements. Third, and most

important, the process must effectively generate results, because the process itself is not the end product. TSM planning must produce projects designed to meet preconceived goals and objectives in the most cost-effective and publicly acceptable manner. This report documents the TSM planning process in the St. Louis, Missouri region, and includes TSM goals and objectives, planning programs, projects and concepts, and project monitoring. A part of this document sets the stage and direction for future TSM planning for this area. /UMTA/

Sterman, L Schold, S Ferris, B ; East-West Gateway Coordinating Council, (EWG-LS-0377.10.0) Final Rpt. UMTA-MO-09-0014-79-1, Mar. 1979, 112 p.; Sponsored by the Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-295349/AS

42 195962 REDEFINING THE SCOPE OF TODAY'S TRANSPORTATION PROBLEMS. Because of current fiscal restraints, transportation planners must revise their concept of transportation needs to include only those projects which are essential. Transportation needs studies should focus mainly on identifying near-term (up to five years) problems (i.e. project-related problems within a planning period for which fiscal resource projections can reasonably be made). This article describes a study by the Illinois Department of Transportation which worked under this assumption. The study evaluated the highway system, public airports, and the public transportation system in the metropolitan areas. Although a year 2000 horizon was chosen, the study emphasis is on projects required now to solve transportation problems, as well as on those required during the next five years.

Dees, DC (Illinois Department of Transportation) *Transportation Research News* No. 82, May 1979, pp 5-7; ORDER FROM: TRB Publications Off

42 195964 SENSITIVITY ANALYSIS OF SELECTED TRANSPORTATION CONTROL STRATEGIES. The relative potential of 13 different transportation control strategies for reducing projected regional vehicle kilometers of travel in the San Francisco Bay Area is analyzed. Through the use of a series of representative home-based work trips, it is possible to analyze mode-choice sensitivities directly by means of additional runs of the recently developed set of mode-split models for the region. These mode-split models are stratified by three automobile ownership categories for both primary and secondary workers. Ranges of potential mode-split shift for automobile, transit, and shared-ride modes are established for each transportation control strategy. Four combinations of strategies are examined. Graphs that help to depict relative mode shift potentials are developed by using stepwise incremental testing of various control measures. Mode-split sensitivities for representative trips are generalized to the regional level.

Maxman, RL Stuart, DG (Barton-Aschman Associates, Incorporated) *Transportation Research Record* No. 677, 1978, pp 7-15, 4 Fig., 5 Tab., 9 Ref.; This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

42 195965 EVALUATION OF ROAD AND TRANSIT SYSTEM REQUIREMENTS FOR ALTERNATIVE URBAN FORMS. Research was performed for the purpose of evaluating the road and transit system requirements of a range of cities that have different density and spatial patterns and thereby assessing the effects of varying urban forms on transportation investment and service measures. The assessment is conducted in the context of a proposed policy evaluation framework that uses the end-state transportation and land-use plan for policy guidance and the time stream of benefits and costs as the object of evaluation. For the analysis of the transportation implications of a number of urban forms, a two-mode network generation model is developed and applied to six hypothetical city types of 2 million population. The comparison of the transportation requirements for these urban forms indicates a range of transit use among the city types of from 8 to 24 percent and wide differences in the need for high-capacity service routes. In terms of person hours of travel and mean trip length, the multicentered city in particular and the centrally oriented cities in general have the lowest requirements. These conclusions have important implications for the use of horizon-year transportation and land-use plans within the proposed framework of dynamic evaluation. /Author/

Rice, RG (Toronto University, Canada) *Transportation Research Record* No. 677, 1978, pp 15-22, 7 Fig., 3 Tab., 17 Ref.; This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

42 195966 MODELERS, MUDDLERS, AND MULTITUDES: ESTABLISHING A BALANCED TRANSPORTATION PLANNING PROCESS. Urban model builders and policy makers are turning a more flexible approach to planning and implementing urban transportation investments. This paper seeks to extend these recent efforts in unexplored planning processes to enable the newly emerging transportation planning process to better cope with the uncertainties of complex urban and regional systems. The discussion is conceptual and builds on current literature and trends. Diagrammatic representation of "old" and "new" approaches to transportation planning are set out to clarify and the nature of the emerging processes. The paper concludes that the trend away from highly structured analytical methods of planning toward more synthetic and open-ended approaches is worthwhile but should not be overdone. What is most needed is a delicate balance between rigorous analytic techniques and less rigorous synthetic and qualitative ones. It is through such balance that technicians (analysts) will work closely with politicians and other policy makers (synthesists) to provide flexible responsive, and carefully thought-out urban transportation planning. /Author/

Goldberg, MA (British Columbia University, Canada) *Transportation Research Record* No. 677, 1978, pp 23-28, 3 Fig., 19 Ref.; This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

42 195968 MODELS FOR PREDICTING THE IMPACT OF TRANSPORTATION POLICIES ON RETAIL ACTIVITY. Comprehensive urban land-use models designed in the past to predict the affects of large, capital-intensive transportation facilities on the spatial distribution of urban activities are not well suited for predicting the impacts of newer policies to control and manage existing facilities. This paper describes a case study that develops two alternatives models with a much sharper, policy-oriented focus and substantially reduced requirements for data and computational resources. The case selected for study involves the hypothetical adoption of transportation control measures to improve air quality in the Denver central business district and the potential impact of controls on retail activity. The two models are a cross-section, lagged-adjustment regression that identifies determinants of aggregate sales at any location and a set of disaggregate travel demand models that predicts the equilibrium between shopping trips and retail activity. The forecasts of both models are consistent in predicting substantial declines in retail activity in response to restrictions on automobile access and negligible offsetting effects of improvements in transit service. It is concluded that compensatory nontransportation measures that enhance downtown amenities or the uniqueness of downtown retail opportunities may offset the negative influence of reduced accessibility. /Author/

Kern, CR (State University of New York, Binghamton) Lerman, SR (Massachusetts Institute of Technology) *Transportation Research Record* No. 677, 1978, pp 34-41, 1 Fig., 1 Tab., 13 Ref.

This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

42 195980 CREATION OF URBAN TRANSPORTATION NETWORK MODELS FROM DIME FILES. The development of a set of computer programs that use U.S. Bureau of the Census geographic data to create urban transportation network models is reported. The process uses the Dual Independent Map Encoding (DIME) files created by the U.S. Bureau of the Census for each of the major standard metropolitan statistical areas of the United States. Manual coding of networks is reduced to a minimum, and highly detailed network models can be created. Functioning and use of the program are documented, and the way in which computer graphic displays are readily generated from DIME file data is demonstrated. Examples of computer graphic output from the program are presented. /Author/

Lutin, JM (Princeton University) *Transportation Research Record* No. 677, 1978, pp 102-105, 4 Fig., 2 Ref.; This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

42 195985 ATTRIBUTE IMPORTANCE IN MULTIATTRIBUTE TRANSPORTATION DECISIONS. This report describes a study of the relative importance of various travel attributes as influences on commuters' choices among car, bus, and Bay Area Rapid Transit (BART) for traveling to work in the San Francisco Bay area. A sample of commuters were interviewed, and each was asked to rate his or her satisfaction with

car, bus, and BART on each of the attributes studied. The relative importance of the attributes was inferred by examining these ratings and the relationships between the ratings and the usual choice of travel mode. The study differed from previous similar research in that attribute importance was measured with a statistic that estimated how much each attribute contributed to differences in utility among the choice alternatives. Most previous research failed to consider an essential component of the quantity measured by this statistic, namely, average differences in utility among alternatives caused by average differences among alternatives in the levels of each attribute. Among the attributes judged to be most important were safety from crime, seat availability, and dependable arrival, which are ordinarily not included in quantitative planning procedures such as travel demand forecasting and cost-benefit analysis. /Author/

Johnson, MA (California University, Berkeley) *Transportation Research Record* No. 673, 1978, pp 15-21, 2 Fig., Tabs., 16 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 195987 FORECASTING TRAVEL DEMAND IN SMALL AREAS BY USING DISAGGREGATE BEHAVIORAL MODELS. A study was done to forecast the patronage of a new transit system proposed for a suburban city in the San Francisco Bay Area, using disaggregate behavioral models of transportation choice. The results suggested that behavioral models of the type used in the study can be applied to travel demand forecasting in small urban areas but that additional development and testing of the models should be done before they are used for policy decisions. The time and expense required for data collection and analysis were within reasonable limits for general application. Although implementation of the forecasting methodologies was quite successful, results of tests of the predictive accuracy of the behavioral models were disappointing. /Authors/

Johnson, MA Adiv, A (California University, Berkeley) *Transportation Research Record* No. 673, 1978, pp 26-31, 6 Tab., 11 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 195988 MANUAL TECHNIQUES AND TRANSFERABLE PARAMETERS FOR URBAN TRANSPORTATION PLANNING. This paper summarizes research conducted under the National Cooperative Highway Research Program to identify contemporary transportation policy issues and to evaluate current travel estimation models and procedures in terms of their abilities to respond to such issues. A set of manual techniques and transferable parameters corresponding to the commonly used four-step transportation planning process is described. Brief descriptions are provided for trip generation, trip distribution, mode choice, traffic assignment, time-of-day characteristics, car occupancy factors, capacity analysis, and land development and highway spacing relationships. The travel estimation material developed has been organized in the form of a user's guide, which also includes applications to three scenarios of realistic situa-

tions. The manual methods are more advantageous than the computer methods in that transferable parameters allow for quick response in terms of the time required to collect and process local information. /Authors/

Sossau, AB Carter, MM (Comsis Corporation) Hassam, AB (Peat, Marwick, Mitchell and Company) *Transportation Research Record* No. 673, 1978, pp 32-40, 3 Fig., 3 Tab., 42 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 195989 TABULATING DEMAND ELASTICITIES FOR URBAN TRAVEL FORECASTING. This paper presents a compendium of demand elasticities in a tabulated form in order to facilitate urban travel forecasting. A number of elasticity estimates have been reported for a variety of cities over the past decade, but the scenarios or base conditions differ from one site to another. In order to systematically tabulate these disparate estimates, demand elasticities were pooled into four cells according to urban size (large versus medium) and urban structure (core-concentrated versus multinucleated). Such a classification has been verified to stratify cities into groups sharing common socioeconomic and travel patterns. Demand elasticities can be divided into two categories: empirical elasticities and calibrated elasticities. The former were measured in the field before and after notable incidents such as a fare increase in the transit system, while the latter were derived from demand models. The elasticities can be further identified as either aggregate or disaggregate depending on whether they are calculated from demand models. The elasticities can be further identified as either aggregate or disaggregate depending on whether they are calculated from areawide or subarea data. All these result in a collection of elasticities that have rather different values. This paper tries to explain some of these differences to gain insights into the general characteristics of elasticities for urban areas of different sizes and structures. The elasticity tabulation and the general properties of the elasticities provide both practitioners and researchers with factual information for estimating urban travel demand simply and systematically. /Authors/

Chan, Y Ou, FL (Pennsylvania Transportation Institute) *Transportation Research Record* No. 673, 1978, pp 40-46, 2 Fig., 4 Tab., 25 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 195990 TECHNIQUE FOR DETERMINING TRAVEL CHOICES FOR A MODEL OF NONWORK TRAVEL. In transportation corridor studies, it is not always clear whether the effects of non-mode-choice decisions for discretionary travel demand should be considered in detailed analyses. This paper presents a manual approach that can be used by planners to determine quickly whether time-of-day, trip frequency, or destination choice effects can be neglected early in the planning process. The approach relies on demand elasticities obtained from disaggregate travel demand models. Demand models that capture the causal structure of shopping trip decisions were first introduced in 1972 in a study performed by Charles River Associates for the Federal Highway Administration. To simplify the

modeling approach, the study developed the concept of inclusive price. This paper presents a revised specification of the inclusive price variables and identifies the resulting new elasticity equations for separable discretionary travel demand models. The differences between the previous and revised definitions of elasticity with respect to travelers' responses to changes in transportation level of service are highlighted. /Author/

Parody, TE (Charles River Associates, Incorporated) *Transportation Research Record* No. 673, 1978, pp 47-53, 1 Fig., 3 Tab., 9 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 195997 SPATIAL AGGREGATION OF DISAGGREGATE CHOICE MODELS: AREAWIDE URBAN TRAVEL DEMAND SKETCH-PLANNING MODEL. This paper describes an aggregate urban travel demand model designed for areawide transportation policy evaluation with limited preparation of input data and fast response times. It does not include supply models but it can be used by itself for travel demand predictions with exogenously specified transportation level-of-service changes or it can be incorporated in the framework of the TRANS model. The methodology is generally applicable to urban transportation sketch-planning situations in which large geographic units are used. Aggregation is performed over spatial travel alternatives and spatially distributed individuals to produce required aggregate travel demand forecasts. An efficient solution method for spatial aggregation was developed that employs mathematical functions, expressed in terms of coordinates in the urban space, to describe the spatial choice process and to represent the geographic distribution of behavioral units, spatial alternatives, level-of-service characteristics, and locational attributes. This allows the spatial aggregation problem to be solved efficiently, by integrating the travel demand models over the urbanized area. Monte Carlo simulation techniques are employed and the procedure entails (a) generation of a sample of representative households distributed over the urban area using available census data, (b) generation of a sample of destinations for each trip purpose for each household, (c) computation of travel demand forecasts for each household based on the sampled destinations using a system of disaggregate travel demand models, and (d) accumulation and expansion of disaggregate predictions to produce aggregate forecasts. /Authors/

Watanatada, T (International Bank for Reconstruction & Development) Ben-Akiva, ME (Massachusetts Institute of Technology) *Transportation Research Record* No. 673, 1978, pp 93-99, 2 Fig., 26 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 195999 PLANNING MODEL FOR TRANSPORTATION CORRIDORS. The paper describes a planning model for transportation corridors and outlines its application to one such study. The components of the model--demand, level-of-service equilibration, and computation of travel impacts--all have new features that make

the model system easy and inexpensive to operate. Demand is predicted on the basis of a representative sample of households from the study area by using a disaggregate logit model; level of service is expressed by means of equations, which avoids the pitfalls and costs of lengthy network coding procedures; equilibration is accomplished by solving, in essence, the demand and level-of-service equations. Finally, the consequences of policies can be computed by any user-defined market segment. This is made possible by use of a representative household sample and the disaggregate demand and level-of-service models. /Author/

Talvitie, A (State University of New York, Buffalo) *Transportation Research Record* No. 673, 1978, pp 106-112, 4 Fig., 3 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196001 DISAGGREGATE TRAVEL DEMAND MODELS FOR THE SAN FRANCISCO BAY AREA. SYSTEM STRUCTURE, COMPONENT MODELS, AND APPLICATION PROCEDURES. Significant advances have recently been made in developing and applying disaggregate behavioral travel demand models to many aspects of urban travel decisions. What has not previously been developed is a full set of urban models integrated into a complete forecasting system for use by a metropolitan planning organization. The purpose of this paper is to describe the first such system, which was developed for the Metropolitan Transportation Commission, the designated metropolitan planning organization for the San Francisco area. First, the background of the current modeling project is briefly set out, followed by a description of the structure of the model system. The model development process--estimation, prediction testing, and validation--is described, and two computerized model application procedures--a regional network analysis system compatible with available urban transportation planning packages and a generalized policy analysis system based on random sample forecasting--are presented. Conclusions concerning the advantages and disadvantages of the system of disaggregate models are presented. /Authors/

Ruiter, ER (Cambridge Systematics, Incorporated) Ben-Akiva, ME (Massachusetts Institute of Technology) Dunbar, FC, Discussor (Charles River Associates, Incorporated) Shunk, GA, Discussor Kollo, HPH, Discussor (Berkeley Metropolitan Transportation Commission) *Transportation Research Record* No. 673, 1978, pp 121-128, 8 Fig., 17 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196002 DISAGGREGATE TRAVEL DEMAND MODELS FOR THE SAN FRANCISCO BAY AREA. NON-HOME-BASED MODELS. This paper describes a practical model of non-home-based travel that can be incorporated in existing urban transportation model systems. The model is estimated by using a disaggregate sample of trips drawn from the 1965 home interview survey of the San Francisco Bay Area for the Metropolitan Transportation Commission. The model predicts trip generation, distribution, and mode split with full sensitivity

to travel times, costs, and zone characteristics. The paper describes the overall model structure and estimation results. Comparisons with other research on non-home-based travel are drawn and recommendations for future research presented. /Authors/

Ben-Akiva, ME (Massachusetts Institute of Technology) Sherman, L Kullman, B (Cambridge Systematics, Incorporated) Dunbar, FC, Discussor (Charles River Associates, Incorporated) Shunk, GA, Discussor Kolb, HPH, Discussor (Berkeley Metropolitan Transportation Commission) *Transportation Research Record* No. 673, 1978, pp 128-137, Figs., Tabs., Refs.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196011 MODEL TO ESTIMATE COMMUTER AIRLINE DEMAND IN SMALL CITIES. This paper considers the factors indicating a community's potential demand for commuter air carrier service compares these factors to a profile of commuter airline passenger characteristics, and reports the results of an extensive regression analysis to develop a model to estimate commuter airline demand in small cities. The final regression model was nonlinear in nature and incorporated community populations and measurements of isolation from the certificated air carrier transportation system. This model was the basis of a recommended program to integrate commuter air carriers into Iowa's total transportation system. /Authors/

Thorson, BA (City of Des Moines) Brewer, KA (Iowa State University, Ames) *Transportation Research Record* No. 673, 1978, pp 187-193, 1 Fig., 5 Tab., 34 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196013 COMMUTER RAIL DIVERSION MODEL (ABRIDGMENT). Over the past two decades, commuter railroads have been experiencing declines in ridership that have led to a rather stable but low level of ridership. One of the methods of offsetting losses resulting from declining ridership is to increase commutation rates to increase the entire fare structure. This paper describes a diversion model that presents a general technique for determining the number of people diverted to other modes of transportation as a result of fare increases. Although the diversion rate may differ from railroad to railroad and from urban area to urban area, the model can be used to determine a general diversion value applicable anywhere in the country. Furthermore, the methodology provides a framework in which railroads and transit properties, or any other agency, can develop their own relationships or assess the impact of a specific rate increase. Based on the analyses performed, it can be concluded that: a ridership loss of approximately three percent can be expected for every ten percent increase in commuter rail fares; ridership on other transit facilities appears to be affected similarly to that of commuter railroads by fare increases; an increase in commuter fares, when accompanied by an increase in service, does not necessarily result in ridership losses; and user and system characteristics differ throughout the country.

Gordon, GA (Gloucester City) Mulinazzi, TE (Maryland University, College Park) *Transporta-*

tion Research Record No. 673, 1978, pp 197-200, 2 Fig., 4 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196014 IMPACT OF THE RELATIVE TRANSIT AND HIGHWAY SERVICE LEVELS ON TRIP DISTRIBUTION (ABRIDGMENT). The purpose of this investigation is to measure the impact of the public transit service level on the destination choices of trip makers. It is often hypothesized that trip makers will have a tendency to make more trips to areas with a relatively high level of public transit, particularly if the service is superior to that provided by the auto, and to make fewer trips to areas with poorer transit accessibility. This propensity is measured by comparing the error in travel volumes predicted by a standard Bureau of Public Roads highway time gravity model with the relative transit and highway service levels, as measured by the disutility difference measure used in most utilitarian modal split models. Doubly constrained gravity models were calibrated on the basis of highway travel times for three trip purposes: home-based work, home-based non-work, and non-home. The results of the models were obtained for the Delaware Valley Region, which has an extensive public transit system--some 2900 route kilometers (1800 route miles) of high-type rail facilities. Examination of the results yielded the following conclusions: a highway-based gravity trip distribution model has a measurable bias in the Delaware Valley Region with respect to the relative public transit and highway service levels; this bias is well defined, rational, and statistically significant for home-based work, home-based non-work, and non-home-based trips; the bias varies only marginally by trip purpose, for only the non-home-based trips are significantly different from home-based work trips and total trips; the highway time-based gravity model has a significant tendency to underestimate person-trip interchanges even when the transit and highway service levels are equal; and the correction of the bias results in significant changes in the synthetic person-trip tables. Although these conclusions are drawn from a specific region, they can probably be generalized to other regions that now have or are considering some form of high-speed public transit service; because the total amount of transit service may not be as significant as the relative quality of transit service in individual corridors.

Walker, WT (Delaware Valley Regional Planning Commission) *Transportation Research Record* No. 673, 1978, pp 200-202, 1 Fig., 4 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196015 AUTOMOBILE AVAILABILITY PER WORKER: A TRANSPORTATION-SYSTEM-SENSITIVE SOCIOECONOMIC VARIABLE (ABRIDGMNET). The general objective of this research was to investigate the impact of a viable transit alternative on household decisions to have automobiles for use in making home-based trips. The specific objectives were to determine differences in automobiles available per worker (APERW) between households in areas

served by transit and to recommend socioeconomic variables that appear to have high correlation and possible causal effects on APERW for consideration in travel demand models. The study was carried out in Laurel, Maryland, which has a population of 48,000 and an area of 23 sq km (9 sq mi) and is located approximately midway between Baltimore and Washington, D.C. The transit service hypothesized to influence APERW is an express commuter service operated by Greyhound from Laurel to Washington. Other transit service is provided to Washington by the B&O Railroad. Automobile competition with transit is substantial. One limited-access highway (Baltimore-Washington Parkway) and a primary highway (US-1) link Laurel with Washington. Ninety-two percent of all households in the study area were given a questionnaire to complete and return to convenient pick-up areas. In addition to socioeconomic and sociodemographic questions, respondents were asked to identify all work trips and the modes taken for all family members. The response rate was 4.2 percent. The finding of other studies, that the variable automobiles-available-per-worker is strongly related to mode choice, was corroborated. For work trips to Washington, the percentages carpooling or using transit greatly decreased with increasing automobiles available per worker.

Kingham, RI (National Cooperative Highway Research Program, TRB) *Transportation Research Record* No. 673, 1978, pp 202-205, 3 Fig., 5 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196017 MODIFIED SIMULATION TECHNIQUE FOR MODE-CHOICE ANALYSIS (ABRIDGMENT). This paper describes the simulation process developed by the Delaware Valley Regional Planning Commission to forecast travel demand for the bi-state Philadelphia metropolitan area. The modeling concept consists of a four-step process. Trip generation (step 1) uses a disaggregate trip rate; and it requires extensive knowledge of the magnitude and location of regional activities such as land use, employment, and the demographic characteristics of the resident population. Trip distribution (step 2) uses a typical gravity formulation stratified by trip purpose. Mode choice (step 3) estimates the proportion of the trips between two zones that will use the transit system and the proportion that will use the highway system. The final step of the process is the assignment of the various types of trips to the transportation system networks. Also described in this paper is a modified simulation technique (MST)--which is applicable to the study of changes in mode choice resulting from changes in service level, skip-stop or express service, station spacing, and shifts in route alignment. The underlying assumption is not that the primary transit submode route does change, but that the specific links of the path might change. The primary impact of these service changes will be in the level of transit mode choice for a given trip interchange. The MST does provide a useful and cost effective means around the expense of the standard simulation process; although, its applicability is limited to those studies where the underlying assumption of "no significant change in primary transit submode route" is considered a reasonable approximation.

Dougherty, CD (Delaware Valley Regional Planning Commission) *Transportation Research Record* No. 673, 1978, pp 209-211, 3 Fig., 2 Ref.; This paper appeared in TRB Research Record No. 673, Transportation Forecasting and Travel Behavior.; ORDER FROM: TRB Publications Off

42 196056 TRANSPORTATION CORRIDOR IN NORTHWEST INDIANA. This report describes a study of passenger transportation service in Northwestern Indiana South Bend to Chicago. The objective of the study was to determine the appropriate transportation service that would meet the travel needs of the residents of Northwestern Indiana including St. Joseph, La Porte, Porter and Lake counties. The transportation corridor is defined by existing public transportation and highway facilities in the area from South Bend, Indiana, to Chicago, Illinois. A summary of the history of commuter transportation in the corridor is presented herein. Estimates of the number of railroad and other trips that would be made in the corridor in 1980, 1990, and the year 2000 are made. Nine options for providing commuter transportation in the corridor were presented and evaluated in the terms of environmental criteria, quality of service, economic and financial factors, and special factors. The study recommends that the Chicago, South Shore and South Bend passenger service be continued. The study found that the South Shore is the most energy efficient, the safest, and fastest, and the least costly mode of commuter transportation in the corridor. In addition, it does not increase the congestion of highways or parking problems in downtown Chicago. It has positive economic effects on and is essential to the efforts to decrease air pollution in the heavily industrialized area. Finally, the study found that the continuation of the South Shore would have positive effects on recreation at the National Lakeshore Park and the proposed multimodal terminal at St. Joseph County airport. /UMTA/

Shlay, D Gil, H Mullins, CJ ; Indiana University, Bloomington, (IT-09-0062) Final Rpt. UMTA-IT-09-0062-79-1, July 1978, 232 p.; Sponsored by the Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-295994

42 196298 MODE CHOICE MODELS WITH PERCEIVED RELIABILITY MEASURES. Several previous attitudinal surveys indicated the importance of reliability of travel modes. This research identifies perceived reliability measures of urban transportation modes. These measures are included in a multinomial mode choice logit model for work trips in the Chicago area. The statistical significance of the reliability measures is evaluated as well as their importance relative to more traditional performance measures such as travel time and travel cost.

Prashker, JN (Technion - Israel Institute of Technology) *ASCE Journal of Transportation Engineering* Vol. 105 No. 3, May 1979, pp 251-262, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 196317 TSM PLANNING FOR FRINGE PARKING TRANSIT. The transportation planning profession lacks documentation and examples of explicit procedures for determining the feasibility of specific Transportation System Management (TSM) strategies and when warranted,

their planning and design. A series of tasks that define a method for investigating one TSM strategy, i.e., express bus-fringe parking transit service, are described. The methodology addresses the following tasks: (1) Feasibility study; (2) designation of potential lot sites; (3) demand analysis for alternative sites; (4) evaluation and comparison of potential lot sites; and (5) the development and marketing of the transit service. The set of procedures that are identified and applied are recommended as a standard method for planning express bus-fringe parking transit.

Wester, KW (Virginia Department of Highways and Transportation) Demetsky, MJ *ASCE Journal of Transportation Engineering* Vol. 105 No. 3, May 1979, pp 279-295, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 196322 POLICY EVALUATION WITH TRAVEL BEHAVIOR MODELS: METHODOLOGICAL ISSUES AND CASE STUDIES.

The purpose of this study was to test the ability of disaggregate demand models to evaluate the cost-effectiveness of a variety of transportation system improvements such as air quality transportation control plans, and recommend further improvements in demand modeling and policy evaluation. The issues raised include the ability of such models to isolate short-run from long run travel behavior, to incorporate supply side characteristics of modes, and to facilitate generation of meaningful impact measures. The study found that disaggregate demand models need to integrate information from before and after studies in order for them to more readily distinguish short run from long run effects. These models, estimated from cross-section data currently tend to overpredict the short run responsiveness of individuals to transportation system changes. The study also found that using small samples and simple network configurations, relatively accurate cost-effectiveness evaluations of various express bus and paratransit feeder systems as well as non-transit strategies such as parking, gas, or toll surcharges were possible. Disaggregate demand models were found to be versatile in accounting for the distribution of impacts in performing a cost-benefit analyses of a project. Measures of user benefit were easily obtained from these models. /Author/

Charles River Associates, Incorporated Jan. 1979, 184 p.; ACKNOWLEDGMENT: Charles River Associates, Incorporated; ORDER FROM: NTIS

42 196543 A NATIONAL PARK-AND-RIDE PLAN FOR THE NETHERLANDS [Een national park-and-ride plan voor Nederland]. In September 1977 the ANWB presented a draft for a national park and ride plan to the then Minister of Transport. This resulted in a discussion in which Netherlands railways play a major role. The scope of the park-and-ride concept is likely to be widened to include other means of public and private transport. [Dutch]

Verkeerskunde Vol. 30 No. 3, Mar. 1979, pp 106-107, 2 Phot. ACKNOWLEDGMENT: TRRL (IRRD-240844), Institute for Road Safety Research; ORDER FROM: Dutch Touring Club ANWB, Wassenaarseweg 220, Box 2200, The Hague, Netherlands; PB14490

42 196571 NATIONAL TRANSPORTATION POLICIES THROUGH THE YEAR 2000. This report analyzes and forecasts passenger and

freight transportation needs for both domestic and international markets. Based on these analyses and in compliance with Public Law 94-280 (1976), 80 policy recommendations are made; 33 of these are summarized in the accompanying Executive Summary. The chapters: Transportation functions, Institutions and activity in the U.S. Federal transportation policy and programs; State and local transportation policies and programs; General social and economic forecasts to the year 2000; Comparative transportation policies in other countries; Technological trends in transportation and communications; Transportation and Externalities; Transportation and energy; Forecasts of future transportation activity; Capital requirements for the transportation forecasts; The relative price of transportation to the year 2000; Emerging transportation issues; Policy recommendations; Impacts of the policy recommendations; Staging policy changes; Summary and conclusions.

National Transportation Policy Study Commission Final Rpt. June 1979, 527 p., Figs., Tabs., Refs., 4 App.; ORDER FROM: GPO

42 196583 ALTERNATIVE METHODS FOR DEVELOPING TRANSPORTATION IMPROVEMENT PROGRAMS FOR URBAN AREAS. Three approaches for preparing a transportation improvement program (TIP) are examined. The first involves ratification by the metropolitan planning organization of programming decisions made by state and local transportation-implementing agencies. The second would rely on the collective judgment of an urban-area committee or forum to choose projects for implementation. The third would also use such a forum but would provide the committee with a formalized decision-making structure whereby programming decisions would be based on an expressed determination of priorities. Such a structure is described in detail: Projects are first submitted by implementing agencies. They are then reviewed for consistency with the transportation plan and those found to be consistent are placed on needs lists by type of project. The projects from the needs lists are placed in groups of similar relative priority. The groups are arrayed in priority order by funding source. The available money in from that source arrayed in priority order. Projects in whole groups covered by available funds are inserted directly in the TIP. An analysis is made of the intermediate connective transportation system that will result. The results of this analysis are combined with other considerations, and projects from the unfunded groups are selected to use the remainder of the available funds. /Author/

Schulz, DF Evenson, PC (Southeastern Wisconsin Regional Planning Comm.) *Transportation Research Record* No. 680, 1978, pp 1-8, 1 Fig., 1 Tab.; This paper appeared in TRB Research Record No. 680, Transportation Finance and Charges, Programming, and Costs.; ORDER FROM: TRB Publications Off

42 197469 MASS TRANSIT PROGRAM FOR THE SAINT LOUIS METROPOLITAN AREA. The Mass Transit Program is Phase I of the Alternatives Analysis program for the St. Louis metropolitan area. The major activities included surveys of community leaders, transit dependents and areawide survey (a telephone

random sample). An analysis of transit needs of the region with special emphasis on the transit dependent was performed. Physical opportunities for transit improvements were identified. Three alternative regional systems were prepared and analyzed for patronage, costs, benefits and impact. Four refined (composite) systems were prepared and analyzed. Initially, light rail transit was considered worthy of Phase II alternatives analysis, but the final decision was to proceed with an all-bus on local streets system.

Daniel, Mann, Johnson and Mendenhall, St. Louis, MO. *Urban Mass Transportation Administration, Washington, DC. *East-West Gateway Coordinating Council, St. Louis, MO. UMTA-IT-09-0067-79-7, Oct. 1978, 143p; Sponsored in part by East-West Gateway Coordinating Council, St. Louis, MO.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295120/OST

42 197553 TRANSPORTATION SYSTEMS CENTER BIBLIOGRAPHY OF TECHNICAL REPORTS [Rept. for Jan-Dec 78]. The bibliography lists unlimited distribution reports released by the Transportation Systems Center from January through December 1978. It supplements the Transportation Systems Center Bibliography of Technical Reports, July 1970 -December 1976 (DOT-TSC-OST-77-17) and January-December 1977 (DOT-TSC-OST-78-14). Reports are listed by sponsoring agency, and are indexed by subject, personal author, corporate author, title, contract number and report number.

Bilsback, JA ; Raytheon Service Co., Burlington, MA. *Transportation Systems Center, Cambridge, MA. DOT-TSC-RSPA-79-5, Mar. 1979, 133p; ñSee also report dated Apr 77, PB-271 327. ñ; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-296342/9ST

42 197901 CITY REDEVELOPMENT (A BIBLIOGRAPHY WITH ABSTRACTS). Information is given on the revitalization and renewal of cities. Transportation planning, housing improvement, community development, neighborhood upgrading, and industrial programs are documented. Much attention is given to the central business district. Projects are reported for a few specific cities, and discussions are made of Federal programs, financing, trends, and tax incentives. Other topics include blighted areas, historic site preservation, and open space and park studies, as well as abandoned dwellings, migration problems, slum clearance, and street maintenance. (This updated bibliography contains 143 abstracts, 38 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Bibliog. May 1979, 149 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0434/5ST

42 197965 NATIONAL TRANSPORTATION STUDY, 1974. REPORTS OF URBAN AGENCIES, VOLUME III. Kern COG served as lead agency for the study. CAL/Trans District 06 prepared the street and highway forms and data, working closely with the cities in the area and with County of Kern departments. The study indicated that in order to meet the estimated 1990 need, fifty-four busses costing approximately \$1.9 million will be required; that 1,037 miles of highways costing \$112.7 million will be required; and that airport improvements costing \$48.6

million will be required. The total estimated transportation expenditure by 1990 is \$165.9 million. Kern COG's adopted areawide transportation goals and objectives are to achieve a safe, efficient, and balanced system of transportation facilities capable of serving the needs of all the citizens.

California State Dept. of Transportation, Sacramento. Div. of Transportation Planning. July 1974, 464p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293116/OST

42 198006 NATIONAL TRANSPORTATION STUDY (1974). NARRATIVE REPORT. The General Plan of the state of Hawaii provides the basis for an integrated and coordinated land development policy, geared directly to anticipated population and economic growth. Included are state projects essential to the level of expected and desired economic activities. It is a statement of policy concerning objectives and the means of accomplishing the same objectives. The policy is presented in plans and programs for the use of land and for the development of facilities which will be required to produce the most desired living, working, and traveling conditions for the people of Hawaii.

Wright, EA ; Hawaii State Dept. of Transportation, Honolulu. July 1974, 163p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293471/9ST

42 198016 CONSOLIDATED TRANSPORTATION PROGRAM (1978-1982), MARYLAND. The document presents forecasts of the Department's expenditures for operating, constructing and improving transportation facilities during the period 1978 through 1982. Highway, transit, port and aviation capital projects are included, as well as operating programs funded from the Department's Transportation Trust Fund. The Consolidated Transportation Program has been developed within the framework of the preliminary Maryland Transportation Plan and is consistent with the policies and the long-range plans described there. Also, the program is based on schedule forecasts, revenue forecasts and cost estimates which incorporate assumptions of future socio-economic conditions and trends.

Maryland Department of Transportation Feb. 1977, 182 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293505/4ST

42 198096 A COMPENDIUM OF FEDERAL TRANSPORTATION POLICIES AND PROGRAMS. The report describes and summarizes Federal transportation policies and programs as enunciated by the executive, congressional, and judicial branches. The report contains a narrative description of the sources of Federal policies and programs for the intercity, urban, rural, and international markets, with attention to the gaps and conflicts in these policies and programs. Appendixes A and B list, respectively, the 30 congressional committees and the 64 Federal agencies with transportation responsibility. Appendix C provides more detailed descriptions of approximately 1,000 transportation policies and programs of these 64 agencies.

National Transportation Policy Study Commission Spec Rpt. NTPSC/SR-79/06, Mar. 1979, 423 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294454/4ST

42 198209 SHORT-TERM IMPLICATIONS OF SELECTED TRANSPORTATION POLICY ALTERNATIVES. The Continuing, Comprehensive, and Cooperative (3-C) Transportation Planning Process recently completed an analysis of travel demand likely by the year 1985. The primary conclusion of the analysis is that peak traffic is likely to continue increasing. In many locations, traffic conditions will significantly deteriorate unless actions are taken to reduce the growth in peak vehicular traffic or to construct and improve highways. Several alternatives could reduce the projected increase in vehicular traffic volumes. The purpose of this report is to determine how effective each alternative would be in reducing traffic demand, fuel consumption and auto emissions. Each alternative was explored independently to provide a thorough understanding of the potential ramifications. The implications of seven alternatives are estimated for the year 1985.

Goodman, CR Rosapep, TJ Bent, MD Mordecai, JM ; Regional Planning Council, Maryland Department of Transportation, Federal Highway Administration, Urban Mass Transportation Administration Spec Rpt BTL/RPC-77/002, May 1977, 63 p.; Sponsored in part by Federal Highway Administration, Washington, DC., Maryland Dept. of Transportation, Baltimore, and Urban Mass Transportation Administration, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297049/9ST

42 198219 CHARACTERISTICS OF TRAVEL IN THE BALTIMORE REGION. A concerted effort is being made in the Baltimore region to deal with travel and its implications on personal mobility, traffic congestion, job accessibility, economic development, parking shortages, air quality and energy consumption. To assist this effort, information has been collected on the characteristics of the region's travel. In summary, travel in the region is currently: Peaked (60% of commuter work trips are made during short rush hours); Auto dependent (88% of peak trips are in automobiles); Work trip dominated; Dominated by long trips (80% of commuter traffic on trips longer than 10 miles one way); Made in low occupancy vehicles; and Diffused.

Goodman, CR Rosapep, T ; Regional Planning Council, Federal Highway Administration, Maryland Department of Transportation, Urban Mass Transportation Administration Spec Rpt BTL/RPC-79/002, Dec. 1976, 41 p.; Sponsored in part by Federal Highway Administration, Washington, DC., Maryland Dept. of Transportation, Baltimore, and Urban Mass Transportation Administration, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297272/7ST

42 198229 TRANSPORTATION CONTROL PLAN, VOLUME 2: TRANSPORTATION CONTROL PLANNING IN THE BALTIMORE REGION. The Transportation Control Plan for the Baltimore metropolitan area sets forth the actions that will be taken by the region between now and 1987 to reduce the amount of air pollution caused by motor vehicles. Volume II describes the Baltimore region's transportation control planning process and the control measures to be studied and implemented.

Hines, E DeHart, G ; Regional Planning Council, Department of Transportation, Environmental

Protection Agency, Maryland Department of Transportation, Maryland Department of Health and Mental Hygiene BTL/RPC-78/006, Sept. 1978, 176 p.; See also Volume 1, PB-297523, and Volume 3, PB-297525. Sponsored in part by Department of Transportation, Washington, DC., Environmental Protection Agency, Washington, DC., Maryland Dept. of Transportation, Baltimore, and Maryland Dept. of Health and Mental Hygiene, Baltimore. Also available in set of 4 reports PC E11, PB-297 522-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297524/1ST

42 198230 TRANSPORTATION CONTROL PLAN. VOLUME 3: TECHNICAL DOCUMENTATION. The Transportation Control Plan for the Baltimore metropolitan area sets forth the actions that will be taken by the region between now and 1987 to reduce the amount of air pollution caused by motor vehicles. Volume III contains technical documentation of emissions inventory and travel impact calculations, as well as the assumptions underlying the evaluation of the control measures.

Anderson, JH Fostel, H DeHart, G ; Regional Planning Council, Department of Transportation, Environmental Protection Agency, Maryland Department of Transportation, Maryland Department of Health and Mental Hygiene BTL/RPC-78/007, Sept. 1978, 105 p.; See also Volume 2, PB-297524, and Volume 4, PB-297526. Sponsored in part by Department of Transportation, Washington, DC., Environmental Protection Agency, Washington, DC., Maryland Dept. of Transportation, Baltimore, and Maryland Dept. of Health and Mental Hygiene, Baltimore. Also available in set of 4 reports PC E11, PB-297 522-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297525/8ST

42 198231 TRANSPORTATION CONTROL PLAN. VOLUME 4: EVIDENCE OF COMMITMENTS. The Transportation Control Plan for the Baltimore metropolitan area sets forth the actions that will be taken by the region between now and 1987 to reduce the amount of air pollution caused by motor vehicles. Volume IV consists of evidence of the state and local commitments required for implementation of the recommended measures.

Bailey, JM Duvall, WWJ DeHart, G ; Regional Planning Council, Department of Transportation, Environmental Protection Agency, Maryland Department of Transportation, Maryland Department of Health and Mental Hygiene BTL/RPC-78/008, Sept. 1978, 138 p.; See also Volume 3, PB-297525. Sponsored in part by Department of Transportation, Washington, DC., Environmental Protection Agency, Washington, DC., Maryland Dept. of Transportation, Baltimore, and Maryland Dept. of Health and Mental Hygiene, Baltimore. Also available in set of 4 reports PC E11, PB-297 522-SET.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297526/6ST

42 198266 TRAVEL AND ENVIRONMENTAL CHANGES THROUGH 1985-AN EXTRAPOLATION OF PAST TRENDS. During the next decade, traffic volumes are projected to continue increasing significantly, with about a 39 percent increase in overall traffic levels. The use

of public transportation, presently 8 percent of the region's travel, is projected to increase about 13 percent. Both of these estimates are consistent with recent trends. Within the region, major variations in traffic increases are projected. The largest increases are projected for radial roads outside of the Beltway and on cross-county highways. As traffic levels increase, peak traffic congestion will deteriorate. The amount of congestion depends on the particular corridor in question. Though congestion is projected to increase, pollutants emitted and gasoline consumed by autos will most likely decrease below today's levels because of federal mandates on new car sales.

Goodman, CR Mordecai, JM ; Regional Planning Council, Federal Highway Administration, Maryland Department of Transportation, Urban Mass Transportation Administration, (Special Rpt. No. 4) BTL/RPC-76/003, Dec. 1976, 51 p.; Sponsored in part by Federal Highway Administration, Washington, DC., Maryland Dept. of Transportation, Baltimore, and Urban Mass Transportation Administration, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297294/1ST

42 198271 DIRECTIONS TO IMPROVE URBAN TRAVEL DEMAND FORECASTING: CONFERENCE SUMMARY AND WHITE PAPERS. Recent research in travel behavior has provided many new insights into the travel needs and actions of the public. The most promising areas for additional research are the application of time and money budgets to planning, increased understanding of location theory (land use, spatial perception, accessibility measures), development of multinomial supply models, and determination of the temporal and geographic stability of demand and supply models used in transportation planning. Also recommended is additional research in data collection procedures, especially diary data and household interactions.

Skinner, LE ; Urban Institute, DTM, Incorporated, Transport and Road Research Laboratory, Cambridge Systematic, Incorporated, Federal Highway Administration Final Rpt. FHWA/PL-79/007, 1978, 411 p.; Prepared in cooperation with DTM, Inc., Bethesda, MD., Transport and Road Research Lab., Crowthorne (England), and Cambridge Systematics, Inc., MA.; Contract DOT-FH-11-9386; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297409/5ST

42 198282 PROCEEDINGS OF THE WORKSHOP ON TRANSPORTATION/URBAN FORM INTERACTIONS HELD AT CAMBRIDGE, MA. ON AUGUST 14-15, 1978. Contents: A form of utility function for the UMOT model; An analysis of transportation/land use interactions; Toward a methodology to shape urban structure; Approaches for improving urban travel forecasts; Quasi-dynamic urban location models with endogenously determined travel costs; Criticality and urban retail structure—aspects of catastrophe theory and bifurcation; Dynamic models of competition between transportation modes; Dynamic urban growth models; Measures of the spatial distribution of U.S. populations 1790-1970 and their correlation with transport, energy consumption and GNP.

Kahn, D ;

Transportation Systems Center Final Rpt. DOT/TSC/RSPA-79/16, June 1979, 288 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297565/4ST

42 198649 TRANSPORTATION NEEDS, REPORT FROM A WORKSHOP CONSIDERING PROBLEMS IDENTIFIED BY THE INTERGOVERNMENTAL SCIENCE, ENGINEERING AND TECHNOLOGY ADVISORY PANEL HELD AT LEESBURG, VIRGINIA ON FEBRUARY 1-3, 1979. The workshop presents critical problems facing state and local governments on transportation needs. The following problem areas are considered: transit system productivity; the integration of paratransit and conventional transit, including small community mass transportation systems; and road and bridge construction and maintenance, including permanent winter repair materials. One issue of general concern was diffusion of innovation and its application. Recommendations for each of the problem areas are summarized.

American Association for Advancement of Science, National Science Foundation AAAS/PUB-79/R/2, NSF/RA-790066, Feb. 1979, 184 p.; Grant NSF-OPA78-24464; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295992/2ST

42 198706 STATE AND LOCAL TRANSPORTATION POLICIES AND PROGRAMS. The report considers transportation institutions, programs, and policies from an intergovernmental perspective. It includes: an inspection of pertinent Federal legislation and programs; an analysis of state and local institutions responsible for transportation, including state departments of transportation, modal transportation agencies, state regulatory bodies, local governmental and quasi-governmental bodies; a discussion of state and local transportation programs; an overview of transportation policies and policy issues of concern to state and local governments; and a discussion of major conflicts engendered by present approaches to the provision of transportation at the state and local level.

National Transportation Policy Study Commission Spec Rpt. NTPSC/SR-79/04, Apr. 1979, 133 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297659/5ST

42 198837 MULTIMODAL TRANSPORTATION PLANNING (A BIBLIOGRAPHY WITH ABSTRACTS). The bibliography presents many aspects of transportation planning—passenger and freight—for urban areas and intercity corridors. Multimodal systems, planning and programming, transportation models, forecasting and management is covered. This includes work travel patterns, trip generation, urban transportation demand, modal choice, and travel forecasting models. Urban and intercity freight transportation as regards modal choice, planning and intermodal systems, including intermodal consolidation terminals is also included. (This updated bibliography contains 87 abstracts, all of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Bibliog. July 1979, 95 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0737/1ST

42 199011 TRANSPORTATION AND THE FUTURE. The document covers technological developments in connection with urban, rural, intercity, cargo and space transportation over the next twenty to thirty years. Demographic changes will place an added emphasis on automated systems around the turn of the Century, and energy constraints may make electrically-powered systems more attractive. The passenger automobile will probably retain dominance of transportation; public transportation systems in urban areas will evolve into more complex, multi-element operations serving both downtown and the suburbs. Energy constraints may lead to added reliance on rail and bus travel for intercity runs. Cargo vehicles will make more sophisticated use of intermodal containers. Finally, the advent of the space shuttle will completely alter the nature of orbital missions.

Paulhus, NG, Jr ; Office of the Secretary of Transportation Final Rpt. DOT-I-79-1, Jan. 1979, 71 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298907/7ST, DOTL NTIS

42 199063 THROUGH THEIR EYES, PART IV: PROVIDING TRANSPORTATION FOR RURAL AMERICANS. The report documents the process of state and local government consultation used in developing the new Department of Transportation (DOT) rural and small urban transit assistance program. Special emphasis is placed on four consultative trips, conducted during summer 1979, in which top DOT officials visited a number of innovative state and local operations. The groups consulted put a lot of emphasis on reducing red tape, and allowing sufficient flexibility in the program to reflect local conditions. This led to the evolution of an approach in which individual states would develop their own program management plan. Other issues highlighted included insurance costs, importance of coordination, the need to simplify or waive labor protection (13(c)) provisions, and technical assistance needs.

Paulhus, NGJ Dawson, TC ; Department of Transportation Final Rpt. DOT-I-79-2, May 1979, 70 p.; See also report dated August 1977, PB-279041.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298952/3ST

42 199133 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: ANNOTATED BIBLIOGRAPHY [Final rept]. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. The report contains the annotated summary of each of the analytical aids submitted for review and consideration. In each case, it identifies the person or agency that submitted the aid, provides a brief description of the aid, and in many cases, provides a reference document which describes the technique and/or an application of the technique. These descriptions are intended to assist the transportation analyst in determining which of these analytical aids might be useful in a particular local application and they also provide a source or reference for obtaining additional information concerning the technique.

Peat, Marwick, Mitchell and Co., Washington, DC.*Urban Mass Transportation Administration., Washington, DC., (UMTA-IT-06-9020) UMTA-IT-06-9020-79-1, Jan. 1979, 112p; nSee also PB-299 981. n Also available in set of 6

reports PC E11, PB-299 979-SET.; Contract DOT-UT-50021; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299980/3ST

42 239530 URBAN MASS TRANSIT PLANNING PROJECT, TECHNICAL REPORT NO 5: RECOMMENDATIONS FOR URBAN MASS TRANSPORTATION RESEARCH. THE REPORT DOES NOT ATTEMPT TO RECOMMEND PRIORITIES AMONG THE PROPOSED RESEARCH TOPICS; RATHER, IT SEEKS TO PROVIDE AN INVENTORY OF RELEVANT STUDY PROJECTS FROM WHICH SUCH PRIORITIES CAN BE DEVELOPED. THE INTRODUCTORY TEXT EXAMINES SOURCES OF FEDERAL FINANCIAL ASSISTANCE FOR R&D AND CONCLUDES THAT DESPITE COMPREHENSIVE PROGRAMMING SUBSTANTIAL KNOWLEDGE GAPS REMAIN WITH REFERENCE TO CERTAIN BASIC TRANSPORTATION ISSUES. FOUR BROAD CATEGORIES OF RESEARCH RELEVANT TO THE PLANNING AND OPERATION OF MASS TRANSPORTATION ARE IDENTIFIED: (1) ADMINISTRATION; (2) SYSTEMS DESIGN; (3) URBAN TRAVEL CHARACTERISTICS; AND (4) EDUCATION AND TRAINING. TWENTY-THREE SPECIFIC RESEARCH TOPICS ARE RECOMMENDED WITHIN THESE GUIDELINES, BROKEN DOWN BY PROBLEM, PROPOSED STUDY, AND RESEARCH STRATEGY. SIX ADMINISTRATIVE RESEARCH TOPICS ARE ADVANCED: (1) LEGAL IMPEDIMENTS TO IMPROVED TRANSIT SERVICE; (2) THE EFFECT OF LABOR REGULATIONS ON IMPROVED TRANSIT; (3) ADVANTAGES OF AN URBAN TRANSPORTATION MANAGEMENT ADVISORY CENTER; (4) THE RELATIONSHIP BETWEEN SCHOOL BUS AND TRANSIT SERVICE; (5) THE EFFECTIVENESS OF TRANSIT MARKETING; AND (6) THE IMPLICATIONS OF RISING LABOR COSTS. SEVEN SYSTEMS DESIGN PROPOSALS ARE ADVANCED: (1) THE IMPACT OF RAPID TRANSIT ON LAND USE; (2) A STUDY OF FORECASTING TECHNIQUES, PLANNING PROCEDURES, AND IMPACT ANALYSIS OF THE BAY AREA RAPID TRANSIT SYSTEM IN SAN FRANCISCO; (3) THE DEVELOPMENT OF IMPROVED ANALYTICAL AND MANAGEMENT TOOLS; (4) APPLICATION OF TRAFFIC ENGINEERING IMPROVEMENTS TO TRANSIT SYSTEMS DESIGN; (5) THE IMPACT OF TRANSIT SYSTEMS ON URBAN STRUCTURE; (6) A COMPARATIVE CASE ANALYSIS STUDY; AND (7) THE EFFECTS OF SPECIAL VEHICLE PRIORITIES ON URBAN FREEWAY LANES. SIX TOPICS WITH REFERENCE TO URBAN TRAVEL CHARACTERISTICS ARE DELINEATED: (1) THE IMPACT OF TRANSIT SERVICE ON TRAVEL PATTERNS; (2) THE EFFECT OF IMPROVED SERVICE ON TRANSIT PATRONAGE; (3) LAND USE TRANSPORTATION REQUIREMENTS; (4) DATA REQUIREMENTS FOR AN ORIGIN-DESTINATION SURVEY; (5) COMPREHENSIVE ANALYSIS OF FACTORS INFLUENCING MODE CHOICE; AND (6) TRAVEL BETWEEN AIRPORTS AND ADJACENT MET-

ROPOLITAN AREAS. FINALLY, FOUR EDUCATION AND TRAINING PROJECTS ARE PROPOSED: (1) SPECIALIZED TRAINING PROGRAMS; (2) SPECIALIZED TRAINING MATERIALS; (3) CREATION OF A TRANSPORTATION INFORMATION CENTER; AND (4) DEVELOPMENT OF AN URBAN TRANSPORTATION MANAGEMENT COURSE. /UMTA/

Voorhees, Alan M & Associates Inc Dec. 1967; ACKNOWLEDGMENT: UMTA

42 241820 THE RAPID TRANSIT PLAN FOR THE METROPOLITAN SEATTLE AREA-TECHNICAL APPENDIX. THE REPORT IS A DETAILED TECHNICAL APPENDIX TO THE LONG-RANGE TRANSIT PLANNING STUDY FOR METROPOLITAN SEATTLE IN 1985. SIXTEEN CRITERIA FOR EVALUATING PROPOSED TRANSIT SYSTEMS ARE ADVANCED WHICH EMPHASIZE CAPACITY, FLEXIBILITY, SPEED, PASSENGER AMENITIES AND RIDE QUALITY, ECONOMY, PERFORMANCE, AND URBAN ECOLOGY. TWENTY-NINE POTENTIAL TRANSIT SYSTEMS WERE THEN EVALUATED. BASED UPON THE RESULTING DATA, THE AUTHORS SYNTHESIZED FOUR POTENTIAL TRANSIT ALTERNATIVES FOR IMPLEMENTATION. THESE INCLUDED: (1) BUSES IN MIXED TRAFFIC; (2) BUSES ON METERED FREEWAYS; (3) GRADE-SEPARATED BUSWAYS; AND (4) A DUAL-MODE BUS AND RAIL SYSTEM. COMPARATIVE ESTIMATES OF REVENUES, OPERATIONAL AND CAPITAL COSTS, TRIP TIMES, AND RIDERSHIP WERE EMPLOYED TO YIELD THE OPTIMAL SYSTEM. THE AUTHORS RECOMMEND ADOPTION OF THE FOURTH ALTERNATIVE. THE REPORT CONTAINS A TRANSPORTATION CORRIDOR ANALYSIS DESIGNED TO LOCATE DESIRABLE ROUTES FOR TRANSIT OPERATIONS. SPECIFIC DESIGN STANDARDS ARE ALSO ADVANCED FOR THE VEHICLES, STATIONS, AND GUIDEWAYS. ECONOMIC FACTORS ARE EXAMINED AT LENGTH. AN IMPLEMENTATION PROGRAM IS ALSO DISCUSSED WHICH WILL REQUIRE A REGIONAL TRANSPORTATION AUTHORITY SUPPORTED BY PUBLIC FUNDING. A DETAILED COST-BENEFIT ANALYSIS IS INCLUDED. FINALLY THE REPORT DOCUMENTS RESULTS OF URBAN DESIGN STUDIES TO CALCULATE THE EFFECTS OF THE COMMUNITY ON TRANSIT, ENVIRONMENTAL AND SOCIETAL EFFECTS OF ALTERNATIVE TRANSIT SYSTEMS, AND THE IMPACT OF TRANSIT ON THE METROPOLITAN AREA. THE AUTHORS CONCLUDE THAT TRANSIT CONSTRUCTION WILL BE A STIMULUS TO LAND USE DEVELOPMENT, PROVIDED THAT EFFECTIVE ECOLOGICAL CONTROLS ARE MAINTAINED. /UMTA/

De Leuw, Cather and Company Mar. 1970; ACKNOWLEDGMENT: UMTA

42 260122 PARTICIPATORY PLANNING FOR BOSTON METRO-AREA TRANSPORTATION. Participation of private citizens, organized groups, and local officials in the

transportation planning and decision-making process are important elements of the new approach to Boston metro-area transportation. Transit for access to the city center, improvement of existing transportation corridors, increased emphasis on local road and transit needs, the management of existing facilities for more efficient use and improved formulas for funding are goals of the new approach, after community objections led to the halting of work on two Boston area freeway projects. /Author/

Wofford, JG (Boston Transportation Planning Review) *ASCE Civil Engineering* Vol. 43 No. 4, Apr. 1973, pp 78-81, 1 Fig.

42 260145 1974 NATIONAL TRANSPORTATION STUDY. The 1974 National Transportation Study is the second in a series of biennial National Transportation Studies undertaken cooperatively by the U.S. Department of Transportation, state and local governments, and the private transportation industry. Northwestern Indiana's contribution to the study has been built from numerous procedures, standards and source studies. Primary responsibility for the coordination of the study was given to the Northwestern Indiana Regional Planning Commission. The major purpose of this report is to provide a source document of Northwestern Indiana's contribution to the 1974 Study. The report is divided into the following four sections: (I) A summary of the 1974 National Transportation Study; (II) Modes of transportation reported in the 1974 National Transportation Study for Northwestern Indiana; (III) Northwestern Indiana--1995 Transportation Plan; and (IV) 1974 NTS Issues and Comments. Appendices contain monthly progress reports, quarterly financial reports, and selected correspondence.

Kiebles, CR ; Northwestern Indiana Regional Planning Commission, (219/923-1060) Jan. 1974, 8 Ref., 3 App.; The preparation of this report has been financed in part through a grant from the U.S. Department of Transportation, Urban Mass Transportation Administration, under the Urban Mass Transportation Act of 1964, As Amended.

42 260183 THE USE OF MODELS IN URBAN TRANSPORTATION PLANNING. The report describes the most commonly used models in urban transportation planning. A background on urban transportation planning is given including changes in planning objectives and the effects of Federal legislation. General concepts and problems in the use of the models are also presented. An assessment of the situation is made and recommendations for improvement are suggested.

Barker, WG ; Transportation Systems Center Final Rpt. DOT-TSC-OST-72-25, Apr. 1973, 82 pp; ACKNOWLEDGMENT: NTIS (PB-222893/0); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-222893/0

42 260302 THAMESMEAD TRANSPORTATION STUDY. This paper describes in detail the Thamesmead road and public transport models and their recent application in the examination of the transport implications of the latest planning proposals for Thamesmead. The study also took account of the GLDP planning and transport context which had been developed since the

earlier Thamesmead travel predictions were made. The form of the two models is explained; the input data, test structure and analysis of results are described and the form of road and public transport systems most likely to meet the needs of Thamesmead is indicated. /TRRL/

Eldridge, DA Chakraborti, SC ; Greater London Council R&D Rpt. Research Memo. 346, 1973, 66 pp, 14 Fig., 17 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 207132)

42 260545 SEGMENTING A TRANSPORTATION MARKET BY DETERMINANT ATTRIBUTES OF MODAL CHOICE. A summary is presented of actions undertaken in the area of problem definition and research goal delineation, conferences with interested agencies and personnel, and a literature survey. Details are given of questionnaire design and pretesting (an exploratory questionnaire and a second questionnaire were administered to two samples of Austin residents). The analytical procedures used and on-going work and follow-up for future reports is discussed. A method was developed for identifying the transportation mode features or attributes that determine modal choices for specified trip purposes. An estimate was made of the percentage of people using private cars who would be likely to switch to public transportation if it was improved. Existing low-density (cars) and high-density transportation modes (buses) were evaluated to spot critical gaps between perceived features of buses versus cars, along determinant attributes of modal choice. Local media most utilized by potential high density rider 'converts' were determined and recommendations will be made with regard to advertising. The general community and a "leaders" subset was surveyed for attitudes towards high-density transportation and appropriate means of financing improvements.

Davies, S Alpert, M ; Texas University, Austin DOT-OS-30093 RM6, Oct. 1973, 26 pp

42 260601 JOURNEY TIMES BY BUS AND CAR IN CENTRAL LONDON IN 1972.. Twenty-five journeys between randomly selected points in Central London, previously studied by the Road Research Laboratory in 1963, were resurveyed in 1972 to find the effect of the changes which have occurred in the road and was also made of travel by motor cycle. It was found that mean direct travel speeds (straight line distance divided by journey time) have increased for car travel from 10.2 mile/h in 1963 to 11.2 mile/h in 1972. The mean direct travel speed by motor cycle for the 25 journeys was found to be 13.2 mile/h. It was found that the journey time by bus for these journeys could be estimated by assuming a direct journey speed of 5.3 mile/h and adding 4.4 minutes. On average if a journey was less than 0.68 miles it was quicker to walk than travel by bus. It was found that for bus journeys the total travel time had increased by 12 per cent between 1963 and 1972; 80 per cent of this increase was due to increased time spent traveling on the bus, 16 per cent to increased walking time and 4 per cent to increased waiting time. The results from this study also indicated that in central London in 1972 the average journey takes approximately 2.5 times as long by bus as it does by car, whereas in 1963 bus journey times were approximately twice car journey times. /Author/

Buckles, PA *Traffic Engineering and Control* Vol. 15 No. 7, Nov. 1973, pp 337-339, 4 Fig., 3 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208099S)

42 260620 MODE PREFERENCE MODEL. The concept of the mode preference model has evolved in response to the need for information that transit operators can use in their efforts to tailor efficient public transit systems to the potential market for transit patronage. This technique is based on the theory that people who have common trip destinations often also have common trip origins. The basis for the market research that underlies the mode preference model is a series of attitude surveys that relate to major trip attraction areas in the metropolitan region of Kansas City. This model is perhaps more sensitive to public socio-economic needs than any other method of market research and some of its findings can serve as meaningful input into such techniques as the modal-split system. The method's relatively low cost and the very limited research period required, make it an ideal tool for transit inquiries and ongoing research that cannot await complex traffic studies.

Roeseler, WG *Traffic Quarterly* Vol. 28 No. 3, 1974, pp 401-418

42 260752 DEVELOPMENT AND CALIBRATION OF THE CRISTAL TRANSPORT PLANNING MODEL. The Report describes the development of a strategic urban transport planning model known as CRISTAL. The object is to enable rapid comparisons to be made of the traffic benefits of alternative transport policies or investment plans when these can be expressed in a sufficiently generalized form. The model deals with four passenger travel modes and with road goods vehicles and uses the concept of the generalized cost of a trip, i.e. the sum of time and money costs. The representation of demand and modal splits permits straightforward economic evaluation. A distinctive feature of the model is the use of a simplified geographical representation, in which the actual road and railway networks are represented by idealized transportation corridors of a symmetric ring and radial form. This simplification reduces the data handling requirements and therefore speeds up the computing process. The first part of the report describes the logical and theoretical structure of the model. The second part describes how the model has been set up to represent the Greater London area and lists the numerical values of the various parameters. Possible applications of the model are also discussed, and relevant data presented.

Tanner, JC Gyenes, L Lynam, DA Magee, SV Tulpule, AH ; Transport and Road Research Laboratory TRRL-LR-574, 1973, 114 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-226-689/8

42 260850 CENSUS DATA AND URBAN TRANSPORTATION PLANNING. This report results from a conference conducted to review the process for tabulating census data, hear reports on experiences in using these data, evaluate how useful or adequate the data are for transportation planning, and recommend improvements for consideration by the Bureau of the Census and the U.S. Department of Transportation in future programs. The conference was

attended by approximately 70 professionals working in census and transportation planning activities. One session was devoted to discussions of the Urban Transportation Planning Package (UTPP), which contains tabulations of the 1970 census socioeconomic and journey-to-work data, another to reports of user experiences, and a third to suggestions for future direction. Two more sessions were devoted to workshops for developing recommendations regarding the type of data collected and the use of those data by planning agencies. The workshop sessions included discussions of experiences and requirements of census data users and a review of a questionnaire that was distributed to conference participants. Questions pertained to both short-range and long-range data uses. The recommendations that were developed by the workshops and presented in this report deal with different aspects of the preparation and use of the census Urban Transportation Planning Package. Although they emphasize the overwhelming consensus of the conference: Far greater federal-local communication and joint planning are required if present and future programs are to be useful.

Transportation Research Board Special Reports Conf Paper No. 145, 1974, 103 pp, Figs., Tabs., Refs., 1 App. Proceedings of a conference held in Albuquerque, New Mexico, August 21-23, 1973.; ORDER FROM: TRB, Orig. PC

42 260851 CONCEPTS AND PROCEDURES USED IN TABULATING 1970-CENSUS DATA FOR THE URBAN TRANSPORTATION PLANNING PACKAGE. In response to the request from many Urban Transportation Studies for 1970-census place-of-work data, the Federal Highway Administration submitted tabulation specifications to the Bureau of the Census for the compilation of both socioeconomic and journey-to-work data from the 15 and 20 percent sample data (Appendix C in this paper explains the sample design) for traffic zones in standard metropolitan statistical areas. The standardized tabulations contained in this 1970-census Urban Transportation Planning Package (UTPP) were designed to provide a common data base for transportation studies in the country and reduce processing costs for such tabulations. This paper focuses on the concepts of the 1970 Census of Population and Housing as they relate to the UTPP, the procedures used to code the place-of-work data for the 15 percent sample, the processing steps involved in tabulating these data by traffic zone, and the limitations of these data for use in the transportation planning process.

Manka, PT (Census Bureau) *Transportation Research Board Special Reports Conf Paper No. 145, 1974, pp 11-29, 2 Fig., 8 Tab., 2 Ref., 3 App.*

This article appeared in "Census Data and Urban Transportation Planning."; ORDER FROM: TRB, Orig. PC

42 260852 APPLICATIONS AND USES OF THE CENSUS URBAN TRANSPORTATION PLANNING PACKAGE. The 1970-census Urban Transportation Planning Package (UTPP) represents a minimum common data set intended to be useful to urban transportation planning studies for continuing planning purposes. The package provides a useful supplemental base data source to aid studies in routine review of changing socioeconomic and travel conditions. It also provides a source of data that can be incorporated

into the maintenance and updating of an urban transportation plan and program. This paper discusses the following two main issues: (a) how and where the UTPP can be applied in the continuing urban transportation planning process and (b) how the data can be used for transportation model development. Suggestions are presented for incorporating data from the 1970 census into the continuing urban transportation planning process, and it is concluded that in the continuing plan and program review process, census data can be applied as a basis for current socioeconomic data for generating current trips with existing models, in the development of new trip generation models, in the refinement of old trip generation models, as a benchmark against which new updated long-range and short-range land use and socioeconomic data may be compared, and as a beginning base or a benchmark to check an ongoing surveillance program.

Fleet, CR (Federal Highway Administration) *Transportation Research Board Special Reports Conf Paper No. 145, 1974, pp 30-40, 12 Fig., 9 Ref.;* This article appeared in "Census Data and Urban Transportation Planning."; ORDER FROM: TRB, Orig. PC

42 260853 EXPERIENCES IN USING CENSUS DATA FOR TRANSPORTATION PLANNING: THE RHODE ISLAND PROJECT. To answer the question of whether the 1970-census Urban Transportation Planning Package (UTPP) for various areas of the country provides a valid source of data for use in updating urban transportation studies, the Federal Highway Administration awarded the Comsis Corporation a contract to investigate the use of these data. The project is being accomplished in conjunction with the state of Rhode Island and the Office of the Secretary of Transportation. The intent of the project is to run a series of comparisons between data obtained in the census and data obtained in origin-destination surveys conducted by the state of Rhode Island in 1961 and 1971. The project includes 3 tasks: to investigate and report on the feasibility of the project and detail the remaining tasks, to develop assignment volumes by using the 1970-census journey-to-work data, and to evaluate the methods used for developing assignment volumes. The first task has been completed and is the subject of this report.

Sosslau, AB (Comsis Corporation) *Transportation Research Board Special Reports Conf Paper No. 145, 1974, pp 41-51, 4 Fig., 5 Ref.;* This article appeared in "Census Data and Urban Transportation Planning."; ORDER FROM: TRB, Orig. PC

42 260854 EXPERIENCES IN USING CENSUS DATA FOR TRANSPORTATION PLANNING: THE ALBUQUERQUE PROJECT. This report gives the preliminary results of a study conducted in Albuquerque to verify the reliability of the data from the 1970-census Urban Transportation Planning Package (UTPP) and to test and evaluate their practical usefulness in an actual transportation planning program. The study was conducted prior to the official release of the UTPP to other metropolitan areas in the anticipation that results of the Albuquerque study would be of general benefit to all transportation planning staffs at-

tempting to use the census data. Phase 1 of the study was a test of the validity of the UTPP data and of the techniques used in assigning them to traffic subzones. This phase was specifically an evaluation of the data contained in the zone-of-residence table. Phase 2 incorporated the UTPP data into the transportation planning process. In this phase, the zone-of-work data and home-to-work trip table were evaluated.

Davenport, OA Howell, KM (Middle Rio Grande Council of Governments) *Transportation Research Board Special Reports Conf Paper No. 145, 1974, pp 51-54;* This article appeared in "Census Data and Urban Transportation Planning."; ORDER FROM: TRB Publications Off

42 260855 EXPERIENCES IN USING CENSUS DATA FOR TRANSPORTATION PLANNING: THE WILMINGTON PROJECT. The 1970-census Urban Transportation Planning Package (UTPP) was evaluated to determine if it would provide actual data to satisfy generation equations and data for developing a modal-split model, in an effort to produce a multimodal transportation plan for the Wilmington region. The following shortcomings of the UTPP were observed: (1) nonresidential employment data are not provided; (2) for population and dwelling units, the data are sample data and, therefore, are subject to expansion error; (3) automobile tables do not contain precise counts for cases having more than 2 automobiles; (4) the small area geographic accuracy for employment coding is inadequate, i.e., too much emphasis is given to coding by zip code; and (5) given the above, part IV (Work-trip data by zone of residence to zone of work) should be deleted from the package for economic reasons. Overall it was considered that the package was good, but needed refining.

Carter, MM (Delaware Department of Highways and Transportation) *Transportation Research Board Special Reports Conf Paper No. 145, 1974, pp 54-57;* This article appeared in "Census Data and Urban Transportation Planning."; ORDER FROM: TRB, Orig. PC

42 260856 EXPERIENCE IN USING CENSUS DATA FOR TRANSPORTATION PLANNING: THE TRI-STATE REGION. In order to show how the Tri-State Regional Planning Commission has used data from the 1970 census, the region is briefly defined and its role as a census processing center is described. The region's experience so far with the journey-to-work and the Urban Transportation Planning Package (UTPP) is then discussed. Since the UTPP was not considered flexible enough for the Tri-State region, the "Worker File" was developed, and a description of this set of records is included in this report.

Boswell, H (Tri-State Regional Planning Commission) *Transportation Research Board Special Reports Conf Paper No. 145, 1974, pp 57-61;* This article appeared in "Census Data and Urban Transportation Planning."; ORDER FROM: TRB, Orig. PC

42 260931 INTERACTIVE GRAPHICS AS A TOOL IN PLAN EVALUATION. INTRANS is a man-computer interactive graphics system designed for real-time analysis of transportation and urban data. During mid-1973, INTRANS was used by the Chicago Area Transportation

Study as an aid in the evaluation of alternative plans for the 1955 major review. This paper describes the project. INTRANS has been proved effective as a tool for choice and design of figures, as a convenient medium for retrieving planning data, and in analysis of specific problems. A number of problems and difficulties, some of them marginal, have prevented more extensive and effective use of the system. It is concluded that interactive graphics systems in general, and INTRANS in particular, are cost-effective tools for transportation planners. Increases in their effectiveness and capabilities will come mainly through more extensive use by practicing professionals.

Gur, Y (Hamburg Incorporated) *Transportation Research Record* No. 491, 1974, pp 60-68, 6 Fig., 4 Ref.; Publication sponsored by Task Force on Interactive Graphics; ORDER FROM: TRB, Orig. PC

42 260932 ASSESSING THE UTILITY OF AN INTERACTIVE GRAPHIC COMPUTING SYSTEM: A TRANSPORTATION SYSTEMS DESIGN PROBLEM. An experiment designed to assess the amount of improvement in the quality of a design that can be obtained by using an interactive graphic computing system was undertaken and is interpreted. The problem was design of a bus rapid transit system by five teams of students at the University of Washington. Each team used a man-computer system called UT-RANS to search for a design for a BRT system that would satisfy 11 performance measures. None of the teams found a wholly satisfactory design, but the average improvement in performance (design quality) for all teams was close to 50 percent (relative to their initial designs). Further experiments of this type are needed to assess the utility of interactive graphic design tools in the transportation systems field.

Schneider, JB Porter, D (Washington University, Seattle) *Transportation Research Record* No. 491, 1974, pp 69-79, 4 Fig., 5 Tab., 10 Ref.; Publication Sponsored by Task Force on Interactive Graphics; ORDER FROM: TRB, Orig PC

42 260968 OPERATING COST MODELS FOR URBAN PUBLIC TRANSPORTATION SYSTEMS AND THEIR USE IN ANALYSIS. Data concerning operating cost of bus and rail systems were collected from operating agencies and the American Transit Association. Operating cost models were prepared for individual rail rapid transit systems and bus systems. The use of these models in economic comparisons with highway and other transit alternatives is discussed and illustrated. Data deficiencies are discussed, and recommendations concerning accounting formats are made. /Author/

Roess, RP *Transportation Research Record* No. 490, 1974, pp 40-54, 4 Fig., 7 Tab., 27 Ref., Apps.; ORDER FROM: TRB, Orig PC

42 260974 CHARACTERISTICS OF URBAN TRANSPORTATION SYSTEMS--A HANDBOOK FOR TRANSPORTATION PLANNERS. This report consists of a handbook to be used by transportation planners and urban specialists for estimating system parameters for conventional transportation technology. Three modes are evaluated: rail transit, local bus and bus rapid transit, and highway systems. Each

mode contains an assessment of the following seven selected supply parameters: (1) speed-average, maximum; (2) capacity (service volume)-vehicle, person; (3) operating cost (vehicle); (4) energy consumption (vehicle or source); (5) pollutant emission (vehicle or source); (6) capital cost-land, construction, vehicle acquisition; and (7) accident frequency. These parameters are organized as proxy variables in describing the characteristics of each transport mode. Each mode has an analogous Appendix section whereby these parameters are evaluated in further detail and for particular geographic areas. Two additional Appendix sections contain all references used in the tables/figures and a general bibliography for further information. /UMTA/

Sanders, DB Reyen, TA Bhatt, K ; De Leuw, Cather and Company, (IT-06-0049) UMTA-IT-06-0049-74-1, May 1974, 111 pp; ACKNOWLEDGMENT: UMTA, Federal Highway Administration; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233580/AS

42 260990 COORDINATION OF URBAN DEVELOPMENT AND THE PLANNING AND DEVELOPMENT OF TRANSPORTATION FACILITIES. This report presents the results of an investigation of planning practice in cities in England, Scotland, Spain, Switzerland, France, Germany, Denmark, Sweden, Australia, and Canada. The cities were selected not as necessarily representative of the general situation prevailing in those countries but as examples of effective practice in one or more aspects of the area of investigation: the manner in which the technical aspects of planning are coordinated or related, the coordination in timing and financing in areas of transportation and general planning as they are undertaken, the sources of funds for transportation improvements, the legal requirements and administrative practices that either require or permit desirable coordination, and the extent and manner of involving public (citizen) approval and support of programs in the decision making. /DOT/

Holmes, EH ; Government Printing Office Mar. 1974, 132 pp; ORDER FROM: GPO, Repr. PC; 5001-00076

42 261459 MASS TRANSIT SURVEY REPORT FOR THE 1971-72 RHODE ISLAND ORIGIN--DESTINATION UPDATE STUDY. The completion of a major portion of the Interstate Highway System in Rhode Island has changed travel patterns and travel characteristics. It therefore became necessary to do an update Origin-Destination study, in order to reflect these changes and to test the validity of various models. A small sample home interview survey was conducted. The O&D update study included an airport survey, a mass transit survey, a truck-taxi survey, an external and a goods movement survey. Methods of data collection are stated. Data collection for the mass transit survey was by questionnaires which were given to the riders themselves, in order to obtain detailed data not available through the home interview survey. Information was obtained concerning the characteristics of the trip maker, as well as O&D data.

Rhode Island Statewide Planning Program Tech Paper No. 42, Jan. 1974, 52 pp, 3 Fig., 10 Tab., 7 Ref., 6 App.

42 261681 TRANSIT IN THE ENERGY ERA. In his remarks to the 15th Highway Transportation Congress, Professor Wohl of the Carnegie-Mellon Institute exhorted government and industry to consider the energy shortage not as a crisis unto itself, but a problem in conjunction with the rest of today's problems: highway safety, air pollution, inflation. The danger ahead lies in not studying the problem as a whole, and jumping into so-called solutions that have not been thoroughly researched for their real value. Dr. Wohl does not see public transit as the immediate alternative to the use of private vehicles, thereby producing a reduction in energy consumption. The possibility of creating free transit in order to increase ridership is valueless, since it probably increases energy consumption, rather than the reverse. Other, more attractive alternatives must be sought, such as express bus service, and more efficient use of taxicabs. The main points to be kept in mind in working out solutions to this energy shortage are that individual agencies must work together, and that public transit is not the panacea that some have created it.

Wohl, M (Carnegie-Mellon University) ; Highway Users Federation for Safety and Mobility Conf Paper May 1974, 6 pp; Presented at the 15th Highway Transportation Congress, Washington, D.C., May 8, 1974.

42 261727 MANUAL OF TRANSIT OPERATIONS IN CIVIL EMERGENCIES. A case study of transit service in Wilkes-Barre, Pa., following the Hurricane Agnes flood of June 1972, reveals the need for improved nationwide transit disaster procedures. All phases of planning for transit support in civil emergencies require upgrading by Federal, state and local governments. This manual describes the actions necessary to accomplish contingency planning, emergency transit evacuation and relief services in a systematic manner. Recommendations are offered. These include the following: according to the author, Federal efforts should focus on incorporating disaster preparedness into the existing requirements for capital grants by, for example, expanding "Exhibit O--Evaluation of Flood Hazards" in the capital grant application to include fixed-facility vulnerability to the pertinent major disasters; states should avail themselves of Federal matching funds for disaster planning with the state department of transportation or highway department responsible for transit planning input; etc. Chapters discuss Federal, state and local emergency frameworks and emergency transit operations preparedness procedures. References are furnished. A sequel report, "Manual for Transit Operations in Civil Emergencies--Transition Period," documents return to normal operations after emergency transit service in the Wilkes-Barre area.

Simpson and Curtin Incorporated, (PA-06-0028) UMTA-PA-06-0028-74-1, Apr. 1974, 60 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB 234668/AS

42 262183 BUS USE AND ATTITUDES IN MODAL CHOICE. This study, based on surveys of the Christchurch public transport system, sought to investigate the concept of "captive" bus passengers. The study is reported in two parts. Part I summarises the research and lists conclusions and recommendations. Part II provides background information, detailed results and

technical data. The investigation considers the results of surveys undertaken in 1968 and 1969 and tests variables including: (a) person characteristics; (b) trip purpose characteristics; (c) stated personal attitudes to public transport; (d) some aspects of the transport system. It is concluded that it is not possible to identify any particular group of this New Zealand community likely to use public transport. There is a growing tendency for the bus system to be used more specifically for the trip to work. Passengers, are however, drawn equally from all income groups and geographic areas and are representative of the general characteristics of the Christchurch population. The one exception to this representativeness is in the tendency towards greater use of buses by females, especially in the 15 to 24 year age group. There is little evidence as to the best policy that can be pursued to suit the existing users of public transport. Increased future use may result from planning urban development patterns better suited to higher levels of exposure to the public transport system. It is concluded that there is no advantage in including forced choice "attitude question" within future "on bus" self administered transport survey questionnaires. It is firmly recommended that there is a need for complementary sociological, personal interview studies, of attitudes, habits and situations which may affect the individual's choice to use public transport.

Douglass, M Kissling, CC ; National Roads Board, New Zealand No. 14, 1973, 48 pp., 19 Ref., 10 App

42 262432 DISCUSSION OF RESOURCE PAPER-WORKSHOP 2: POLICY PLANNING.

This discussion which covers such aspects as the definition of policy, the derivation of policy, the determinants of good or bad policy, and outlines a plan for solution of urban transportation problems, also presents a framework that might be applied to policies on statewide transportation planning. The basic policy of such planning will establish long-range systems and corridor development plans that are designed to: serve the states objectives for economic growth, energy conservation, land use, safety and preservation and enhancement of the environment; provide optimization of the service provided by all modes of transportation consistent with efficiency, cost effectiveness, environmental protection, and enhancement of the quality of life; and support national goals and objectives. A policy on systems planning is described in which all transportation agencies in the state shall: develop long-range transportation plans for a minimum period of 10 years; formulate such plans to show the target accomplishments toward which the current capital expenditures will be directed; estimate maintenance and operating expenditure for the period of the plans; show the relation of recommended expenditure provisions to projections of revenues in accordance with traditional sources and trends; describe and show values pertaining to the economic and environmental impacts of systems and systems configurations as related to environmental categories and situations that will be affected by the plan outlines; provide for continual development of plans with a minimum update of every 2 years; notify the agencies of changes in plans; and recommend priorities for development of the systems. The policy on corri-

dor or route planning sets forth that, based on priorities developed in the systems plan, the transportation agencies shall: analyze costs, economic effects and environmental impacts of alternative service concepts within corridors to the degree necessary to establish a fully supportable corridor plan; compare concepts utilizing other corridors or no corridors; select and fully document corridor plans; consult with government and private agencies having responsibilities related to the impacts of corridor development; conduct meetings with local officials, interest groups and the public; and develop environmental impact statements.

Johnson, RD (Jorgensen (Roy)and Associates, Incorporated) *Transportation Research Board Special Reports* No. 146, 1974, pp 88-90; This report is part of five workshops of a conference, Issues in Statewide Transportation Planning, held February 21-24, 1974 at Williamsburg, Virginia.; ORDER FROM: TRB, Orig. PC

42 262445 RESOURCE PAPER-WORKSHOP 2: POLICY PLANNING.

This paper which defines responsibilities and discusses how states meet the issues of transportation planning, recognizes that the prevailing national and state situation is one of a multiplicity of separate, uncoordinated and often conflicting modal policies. The product and the process of transportation planning are defined. The policy analysis or policy planning which precedes and follows policy determination, and the hierarchy in the levels of policy processes are discussed. Policy planning and statewide transportation planning are more than a delineation of facility and service plans for intercity passenger and freight systems at the statewide scale. They include recommendations for changes in federal, state, local and private transportation policies. It is observed that the consequences of existing and proposed policies must be examined. For the former, past and current trend data may be instructive. Consequences may be traced out by making illustrative plans under present or assumed constraints or, alternatively, by estimating plan output. Professional aid is emphasized in specifying the consequences and circumstances to provide the background against which evaluation can be made. Transportation policy issues are grouped in 6 classes. A discussion of the allocation of responsibilities for the provision of transportation facilities and services, covers the aspects of new responsibilities for the states; obsolete jurisdictions; construction versus operation; and federal-assistance policies. Traditional transportation decision-making, independent authorities, comprehensive planning, public participation, litigation, and pass-through funds are aspects of the decision-making process that are reviewed. The integration is reviewed of privately provided public transportation into the state system (traditional regulatory theory; railroad branch lines). Changing the demand for transportation facilities and services (land use and transportation, selective provision of transportation facilities and services, changing government control of development, changing government policies to affect land development; peaking characteristics; accidents and pollution; energy and transportation) is reviewed. Funds for transportation (transportation needs and plans; funding arrangements) and charging for transportation are also reviewed in detail.

Breuer, R Schad, FD (New York State Department of Transportation) *Transportation Research Board Special Reports* No. 146, 1974, pp 64-87; This report is part of five workshops of a conference, Issues in Statewide Transportation Planning, held February 21-24, 1974 at Williamsburg, Virginia.; ORDER FROM: TRB, Orig. PC

42 262447 RESOURCE PAPER-WORKSHOP 3A: SYSTEMS PLANNING AND PROGRAMMING METHODOLOGY-PASSENGER TRAVEL.

This paper on passenger travel demand forecasting methodology presents a brief survey of existing state methodologies, discusses the desirable attributes of a statewide passenger planning and programming methodology, outlines a program of long range research, and identifies what can be done immediately to improve the existing methodology available to state transportation agencies. Four major areas are reviewed: emerging issues facing statewide planning as background for methodology for statewide planning and programming; existing methodology for statewide planning and programming; proposed improvement to statewide planning and programming methodology; and continuing statewide planning process. Priority programming, citizen participation and other issues strongly related to statewide transportation planning must be interrelated with the methodological issues of passenger travel forecasting. Among the aspects discussed are the changing state role in transportation decision-making, modal competition, citizen and community participation, equity, the planning and programming processes, highway simulation model, modal models, travel forecasting and impact prediction techniques, master planning versus the strategic, and the time-staged investment approach. It is recommended that a flexible analysis environment be developed for each state as well as a variety of multimodal modeling tools (general and specialized), with the capacity to predict travel, environmental and economic impacts, and trade-offs and equity issues for a wide variety of spatially and temporally different investment programs. These investment programs must include short-run, low-capital highway options, low-capital transit or para transit alternatives, and the more traditional longer range capital-intensive investments. A more strategic planning approach is also recommended that can be used in the past. Staging strategies will be evaluated not only for economic and environmental impacts but also for the flexibility to adapt to a wide variety of conditions that may evolve in the future. This approach would provide for a more positive influence in the actual programming and implementation process inherent in statewide planning. It will also allow for flexibility to interact with regional plans in an interactive, participatory, and interative manner.

Pecknold, WM (Massachusetts Institute of Technology) *Transportation Research Board Special Reports* No. 146, 1974, pp 101-144, 6 Fig., 79 Ref.; This report is part of five workshops of a conference, Issues in Statewide Transportation Planning, held February 21-24, 1974 at Williamsburg, Virginia.; ORDER FROM: TRB, Orig. PC

42 262487 BALANCED TRANSPORTATION. PART II. This second part of a three part paper, explores the imbalance in funding of the different

modes of travel within the urban areas, indicates the need for a national transportation policy and reviews the relationship between transportation and the environment, urban "holding capacity," energy consumption and public and private development. It is conceded by highway officials that cities must be aided in providing public transportation. The merits of a bus system and its high labor cost disadvantage are outlined. Highway funds for the physical facilities of a bus system are now available. However, the outcome of the administration's effort to tap the Highway Trust Fund for transit is as yet uncertain. The question is raised that if transit is essential for the self-supporting, should we not apply Federal aid from general funds rather than draw on an unrelated transportation program of national scope? The point is made that except of a small percentage of trips, transit is not an alternative to highways. Demands by environmentalists for measure to preserve the environment are now backed by strict interpretations in the executive and judicial branches, and in recent legislation. In an effort to limit the inflow of motor vehicles into the downtown area, suggestions have been made for "congestion taxing." Investigations of energy requirements and the relative efficiency of the highway mode in energy consumption, indicates little likelihood of waning dependence on highways. The need is emphasized for the establishment and maintenance of a balance between the growth of cities and the amount and form of transportation that serves that growth. Insurance of such a balance would require a degree of control over private development.

Holmes, EH (International Road Federation) *Public Works* Vol. 104 No. 5, May 1973, pp 88-93

42 262537 GLC LAND USE TRIP GENERATION STUDIES. The author provides an introduction to the subject of trip generation, defining the technical terms involved, and describing a number of land use trip generation studies. Aspects such as trip time-patterns and choice of travel mode are discussed separately, and the way in which data from the studies are used to appraise the effects of a proposed development on the local transport system is illustrated. /TRRL/

Smyth, R *Greater London Council Intelligence Unit Quart Btm* No. 26, Mar. 1974, pp 19-30, 8 Fig., 1 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 209565)

42 262538 SOME APPLICATIONS OF COMPUTER GRAPHICS TO TRANSPORTATION PLANNING. This article shows how contour maps of the spatial variation of urban parameters can be drawn by computer. A complementary program has been developed at the GLC which produces planar projections of the surfaces that have been mapped. Examples of the uses of these techniques are given, based on work with the GLC's transportation model. They include the graphic representation of travel time to the central area of London by public transport and by car, the difference in travel time between these two modes of transport, and the distribution of car ownership in the Greater London Conurbation. The advantages and disadvantages of the techniques are discussed, together with likely future developments in this field. /Author/

Hathaway, P *Greater London Council Intelligence Unit Quart Btm* No. 26, Mar. 1974, pp 31-8, 5 Fig., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 209566)

42 262560 HUMAN RESPONSE IN THE EVALUATION OF MODAL CHOICE DECISIONS. This research is an attempt (1) to evaluate the existing modes of transportation available for mixtures of inter and intra (urban and rural) travel, in terms of perceptions of current users and non-users for each mode; (2) to recommend ways in which non-users may be attracted to high density modes through improvement of key elements of the transport system (comfort, flexibility, etc.), and/or through properly communicating the actual advantages of the modes to potential users; (3) to evaluate proposed future modes and concept, (specifically the new Dallas-Fort Worth Airport) as to their potential demand for key passenger groups; (4) to develop a method for evaluating the relative importance of various transportation features attractive to key passenger groups; and (5) to develop a method for estimating potential users of proposed transportation modes, as well as their usage dates. Validate the method by testing anticipated vs. actual use of the Dallas-Fort Worth Airport, and indicate those identification criteria which successfully discriminate users from non-users. The principal methodology to be used is magnitude estimation, which requires respondents to give estimates of their perceptions of stimuli in the real world. Other multivariate techniques (multiple regression, discriminant analysis and factor analysis) will be utilized. Groups studied will include whites, blacks, and chicanos stratified according to the usual social and economic constraints.

Davies, S Alpert, MA Hudson, WR ; Texas University, Austin, (DOT-OS-30093 RM1) Apr. 1973, 29 pp, Refs.; ORDER FROM: Texas University, Austin, Council for Advanced Transportation Studies, Austin, Texas, 78712 Repr. PC

42 262570 PADUCAH TRANSIT STUDY. Transit patronage in the Paducah, Kentucky metropolitan area has declined so that it is no longer profitable for a private firm to operate the public transit system. This report is developed to improve transit service in order to alleviate, to the greatest extent possible, traffic problems which now exist and to improve the mobility of those people particularly dependent upon public transportation. The basic purpose of this study is to define short-range transit needs in the Paducah metropolitan area and to make recommendations for improvements. The analysis and findings will provide a method for accelerated progress in providing needed mass transportation facilities. Chapters discuss community involvement, transit objectives, evaluation of pre-existing conditions, data collection, transit ridership survey results, the short-range improvement program, implementation, and continuing transit planning. Appendices include the transit attitude questionnaire, projected operating statements by alternate, Kentucky House Bill No. 414, and the legal opinion on establishment of a transit authority. Tables, figures, and maps complement the text.

Schimpler-Corradino, Associates, (KY-09-0003) Tech Rpt. UMTA-KY-09-0003-74-1, Feb. 1974, 170 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235412

42 262692 USE OF PUBLIC TRANSPORT IN TOWNS AND CITIES OF BRITAIN AND IRELAND. It is suggested that, while the importance of public transport for journeys to work in

larger urban areas has been recognized, there is a tendency to underrate its importance for smaller towns and non-work journeys. This article argues that this would be a mistake. It is demonstrated that the decline in public transport trip rates is not less in larger urban areas. Although rates of usage are higher in larger urban areas, they are not markedly so and the proportion of motorized trips made by public transport is not necessarily higher in larger urban areas than smaller ones. A regression equation is outlined to predict the modal split between public and private transport in urban areas which does not require population as a parameter. The ratio of peak to non-peak travel is shown to be lower in the smaller towns and cities. Correspondingly, smaller operators appear to be more profitable. It is concluded that the future of public transport is as secure in smaller urban areas as in larger ones. /TRRL/

White, PR *Journal of Transport Economics and Policy* Vol. 8 No. 1, Apr. 1974, pp 26-39, 3 Fig., 5 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 209584)

42 262694 TRANSPORT AND DEVELOPMENT. This book contains a series of papers, the headings of which are as follows:-Geography, Transportation and Regional Development, Gauthier, HL; Transport Expansion in Underdeveloped Countries, Taaffe, EJ., Morrill, RL., and Gould, PR., briefly presents a theoretical model for network development which is then expanded with detailed reference to Ghana and Nigeria; Transport and Economic Growth in Developing Countries, Hoyle, BS., applies the model used in the previous paper to East African railway development and describes a similar model for port development, with applications; Transport Expansion in Liberia, Stanley, WR., also uses the Taaffe (et al) model and notes three stages of transport expansion-scattered ports, modern period of port construction and consolidation and inter-connection of roads, this being applied to Liberia; Highway Improvements and Agricultural Production, Miller, T., Examines what sort of improvements are justifiable and makes a case-study of an area in Argentina, concluding in this case that alternative aid schemes may be better; The Importance of Passenger Transport in Nigeria, Hay, A., describes four types of passenger transport each with its own characteristic patterns in terms of cost, use, distance travelled and vehicle occupancy. It includes a survey of taxi traffic, identifying the residence and motivation of travellers. Recent Railway Construction in Tropical Africa O'Conner, AM, gives an account of the lines built in this region, the rationale for building, their impact and some suggested evaluation criteria. Container Potential of West African Ports, Hilling, D., gives a breakdown of imports and exports by commodity type, and assesses the potential of containers. Problems of seasonal trade variation, small political units and inadequate transport suggest low potential at present. Transportation and the Growth of the Sao Paulo Economy, Grauthier, HL., investigates the inter-relationships changes in accessibility to the highway network and the growth of urban centres from 1940 to 1960, using canonical analysis. Transportation and Urban development in West Africa, Reichmann, S., discusses route development and urban centre location and expansion and then relates transport to urban form and

urban activities, concluding with a study of urban systems. Towards a Theory of Transport and Development, Wilson, G., discusses the economic opportunity and responses to it, followed by conclusions on policy and investment.

Hoyle, BS *Geographical Readings* 1973, 230 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 208970)

42 262695 TRANSPORTATION PLANNING AND PUBLIC POLICY. This book reviews British transportation planning in recent years. The first chapter presents the framework in which transport planning is done: its purpose, scope and organisation. Examples of planning for parts and local airports are given. The second chapter suggests that planning policy should precede analysis and that in the past the MOT's approach was wrong. Chapter three describes the objectives of planning policy. Several examples of cost-benefit analysis show that the object of a planning exercise should be decided at the start, decisions being taken as to those items which should count as benefits, those which should count as costs, and the way in which they should be accounted. Recent transport plans have accounted for intangibles, non-user benefits, service levels, as well as profits and consumers' surplus. The fourth chapter shows how attitudes have changed to policies such as car restraint, and promotion of public transport. Such alternatives must be included in the planner's brief. Chapter five looks in detail at the methodology of transport planning. Trip generation, modal split, trip distribution and route assignment are discussed, with evidence of recent advances in each aspect. The last chapter presents the major problems facing transport planning in the future, such as how to define criteria for system-wide testing of a wide range of policies.

Starkie, DNM (Reading University) *Progress in Planning* Vol. 1 No. 4, 1973, pp 313-389, 11 Fig., 8 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 208720)

42 262697 MODAL SPLIT THEORY AND PRACTICE. The paper opens with a brief survey of early modal split procedures, discussing the position of modal split in the model and comparing the use of regression and diversion curve techniques. Current practice involves a generalized cost function derived from multiple linear regression, and the problems associated with the function are outlined. Three applications of the model are considered: the twin cities model used time, cost and distance measures to develop a disutility function relating car use to transit use; the Tyne-Wear plan model is more reliable since it uses car ownership instead of income as a discriminant in the degree of choice, and also employs certain land-use variables. Further improvements to this model are outlined, involving the use of weighting and scaling; the Selneq model for the cost function and employs a more efficient calibration procedure. Concluding, the author finds the Selneq and Tyneside models produce similar parameters and it is suggested that further work is necessary on the cost function and on the problems of individual versus aggregate data. A discussion of the paper follows. The covering Abstract for the conference is IRRD Abstract No. 209251

Costinnett, PJ; Promoting Public Transport Conf Paper 1973, pp 1-31, 17 Fig., 5 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 209252)
736

42 263136 PUBLIC SCHOOL TRANSPORTATION AND LOCATION POLICIES: A SYSTEMS ANALYTIC APPROACH. The systems approach can bring to bear the combined expertise of diverse disciplines-to develop quantitative analyses of alternative policies. In the research reported in this paper, systems analysis is used to develop and examine optimal student assignment plans for the Durham junior high schools corresponding to arbitrary levels of racial integration and various organizations of physical plant. The assignment of students to schools is accomplished by repetitive application of a modified operational model for solution of the "transportation problem". The Durham, N. C., city and county school systems are analyzed separately to evaluate the impact of various desegregation policies on such factors as the total transportation effort (bussing mileage or cost), the trip length distribution and the level of compactness and racial disparity of the districting and assignment system which results in an optimal system. Optimality is defined in this model by the case of minimum transportation effort. The combination of the two optimal systems is then compared to an optimal merged system. Finally, the model is used to develop assignment plans assuming alternative sites for construction of a new county school and various enlargements of the existing facilities. The data are presented in such a way as to enable policy makers to objectively evaluate the consequences of such policies, and to enable voters to better understand these consequences and to pass educated judgments on their merits and demerits. The authors feel that the explicit formulation and presentation of supporting data of the type suggested in this paper will set the scene for a better informed decision process.

Dajani, JS Wright, D White, KP (Duke University) *High Speed Ground Transportation Journal* Vol. 8 No. 1, Mar. 1974, pp 25-40, 5 Fig., 4 Tab., 7 Ref.

42 263163 SECTION II: SPECIFIC ECONOMIC FEATURES OF RAILWAY PASSENGER SERVICES IN LARGE CONURBATIONS SITUATION IN THE PARIS REGION. In order to be able to make the correct choice between the various solutions available to the problems posed by daily commuter traffic in large conurbations, it is necessary that comparisons be made by means of the cost benefit technique. This requires detailed analysis, backed by statistical information where possible, of the advantages and disadvantages of each solution. The use of this method, is nevertheless frequent and instances may be quoted of its application in the field of suburban transport. All studies show that beyond a certain number of daily journeys on a given route, it is more economical to use public transport than private transport. Certain measures are, however, necessary to enable priority in favor of public transport: statutory or fiscal measures must be taken to limit the use of the motor car in some areas; public transportation undertakings will benefit from a "normalization" process which will enable them to balance their receipts and expenditures; the infrastructure and rolling stock investment should be the total or partial responsibility of the community to the extent that public transport users are not the only beneficiaries of such investments. The application of these principles

to the case of suburban services operated by railway administrations is discussed, as is also, the coordination of several undertakings in a conurbation. In a discussion of the economy of rail passenger transport in the Paris region, the basic features of commuter traffic are summarized, the organization of public transport in Paris is described, and consideration is given to the economic problems facing passenger transport. Suburban transport undertaking. The transportation networks in the suburban areas of provincial towns of France are briefly reviewed.

Fioc, A *Rail International* No. 4, Apr. 1973, pp 467-479, 3 Fig., 5 Tab.; IRCA/UIC ENLARGED MEETING OF THE MANAGEMENT COMMITTEE OF THE IRCA, Lausanne, 3-9 June, 1973.

42 263932 INTEGRATING SYSTEM AND PROJECT PLANNING FOR EFFECTIVE STATEWIDE PROGRAMMING OF INVESTMENTS. The need to address community and environmental issues in transportation planning has been widely recognized during the past few years. The initial response to these issues has been to include a broader segment of the public and to examine a wider range of impacts in the project planning process. However, a project-oriented approach has proved inadequate for a number of reasons. During system planning, decisions are made that determine many project-related social and environmental impacts, and there are some impacts that by their nature should be treated on a system bases (e.g., air quality, housing dislocations, land use). Uncertainty in funding levels, community preferences, and impacts, particularly during longer-range system studies, further complicate the ability of a planning process to address community and environmental concerns in a continuous manner throughout system and project studies. To address these issues requires planners to develop and approach to planning that provides for continuous coordination between system and project planning. A key to implementing such an approach is recognizing that during system studies attention can be focused on a range of project and system choices that are available, rather than limiting project studies to one set of potential projects. A key level in implementing this approach is to require a system format that includes capital and non-capital options (policy and operating changes), and describes implementation strategies rather than end-state plans. Supporting such a format should be a documentation of ongoing system as well as project environmental studies.

Neumann, LA Manheim, ML Pecknold, WM Reno, AT (Massachusetts Institute of Technology) *Transportation Research Record* No. 499, 1974, pp 83-93, 6 Ref.; ORDER FROM: TRB, Orig. PC

42 264033 SOFTWARE SYSTEMS DEVELOPMENT PROGRAM INTRODUCTION TO URBAN TRAVEL DEMAND FORECASTING-VOLUME I-DEMAND MODELLING. The UMTA Transportation Planning System (UTPS) provides a wide range of analytical and computerized tools for making travel forecasts for existing and proposed transportation systems. This manual is designed as an integral part of UTPS. The object of the manual is to provide an introduction to travel forecasting to enable trans-

portation planners and analysts to utilize UTPS effectively. It provides a comprehensive overview of the methodology of travel forecasting, the analytical tools available and their appropriateness for typical problems the transportation planner faces, input requirements, outputs needed for proper evaluation, and appropriate levels of effort for various stages of analysis. The manual is divided into three parts: the Summary; Volume I—"Demand Modelling;" and Volume II—"Evaluation." /UMTA/

Cambridge Systematics, Incorporated, (IT-06-0050) UMTA-IT-06-0050-74-2, Mar. 1974, 310 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236848

42 264690 RAPID TRANSIT IN THE SAN FRANCISCO BAY AREA: A CHRONOLOGICAL LIST OF SELECTED REFERENCES CONTAINED IN THE LIBRARY OF THE INSTITUTE OF TRANSPORTATION AND TRAFFIC ENGINEERING. No Abstract.

Kleiber, MC ; Council of Planning Librarians Exchange Biblio #528, Feb. 1974, 26 pp, 274 Ref.; ORDER FROM: Council of Planning Librarians, P.O. Box 229, Monticello, Illinois, 61856 Repr. PC

42 264779 URBAN TRANSIT PLANNING GUIDELINES. Pennsylvania DOT's report provides technical information and policy guidelines that should be considered in developing both short range and long range transportation plans. It addresses the issues of: 1) What data are collected, by whom, how and when. 2) The relationship of this data to the process of urban mass transportation in accordance with the U.S. Code, the Urban Mass Transit Act and economic and environmental programs. 3) A comprehensive description of development programs including the plans, priorities, approach and administration. 4) The types of analytical procedures used for the different approaches. 5) Agency relationships. 6) Choice of target years, study area boundaries, contractual relations and consultant selection. 7) What products of planning should result and how they will be used. 8) The relationship between a transit development program and low-capital-intensive transportation programs improvements. 9) The role of capital intensive solutions. 10) Agency responsibility with regard to funding, engineering, construction, maintenance and operation of transit system. Typical transit study work programs are given for both short and long range planning along with a chapter on adopting and updating plans and programs.

Pennsylvania Department of Transportation
June 1974, 190 pp, 9 App.

42 264845 TRAVEL GROWTH IN WASHINGTON REGION HIGHLIGHTS NEED FOR MORE SMALL VEHICLE TRANSIT. This is a report of a research and information project on the impact of energy shortages on the Washington metropolitan area. It is based on interviews with officials involved with transportation planning and a scan of current plans. The population of this area is expected to increase from 3.2 million to 5 million by the year 2000. This means greatly increased travel within the area. Metro will provide some of the areas transportation needs but additional means will be

needed. Metrobus will meet some of this need but the problem of the need to maintain more equipment and personnel to meet rush hour demand than can be economically used during the rest of the day still remains. Any urban mass transit system including Metro and Metrobus impose heavy tax burdens on residents. This means that a wiser use of land, rail, highways and traffic management should be encouraged. Car pools, employer owned vans, jitneys, dial-a-ride buses and group taxis are transit initiatives that could have practical applications in this region. Walters, C ; Washington Center for Metropolitan Studies Report No. 2, Aug. 1974, 36 pp

42 264961 TESTING URBAN TRANSIT'S FUTURE. The Highway Users Federation has developed a sketch planning process for quick analysis of proposed improvements to urban transit. It gives procedures for analysis of broad policy of transit improvements. It includes information on calibration for a modal split model, data from the Nationwide Urban Transit Study and trip characteristics from the study, selecting test alternatives, how to induce demand program costs and revenues and Nationwide study results.

Reed, MF, Jr Difiglio, C ; Highway Users Federation For Safety and Mobility Tech Study Memo No. 10, Sept. 1974, 59 pp, 6 Fig., 40 Tab., 26 Ref.; Presented to the Transportation Convention of the American Society of Civil Engineers in Montreal, Canada, July 15, 1974.; ORDER FROM: Highway Users Federation, 1776 Massachusetts Avenue, NW, Technical Serv Div, Washington, D.C., 20036 Orig. PC

42 265358 FLEXIBILITY IN TRANSPORTATION DECISIONS. The traditional role of cities and of the highway program was dramatically altered by the 1973 Federal-Aid Highway Act. The shift in emphasis was indicated by such provisions as: permission to use highway funds for rail or bus transit equipment; allocation of funds to be used for metropolitan transportation planning purposes; local officials are able to determine their own transportation future through a state-local cooperative process. The means of implementing each of these provisions is discussed further in the article. The initiation of projects to achieve an effective balance in highway construction or reconstruction, bikeways, rail or bus systems, parking, etc., is now to come from local officials.

Tiemann, NT (Federal Highway Administration)
Nations Cities Vol. 12 No. 11, Nov. 1974, pp 62-64

42 265590 A SIMPLIFIED FORM OF THE CRISTAL TRANSPORT PLANNING MODEL IN THE COURSE OF WORK ON THE CRISTAL TRANSPORT PLANNING MODEL OF GREATER LONDON, A GREATLY SIMPLIFIED "SINGLE-LINK" VERSION OF THE MODEL HAS BEEN DEVELOPED. IN THIS, VARIOUS PARTS OF THE AREA ARE TREATED AS IF TRAFFIC CONDITIONS WERE UNIFORM OVER THE AREA REPRESENTED; THIS LEADS TO A MODEL WHICH HAS DEFINITE LIMITATIONS BUT WHICH OVER A LIMITED RANGE OF APPLICATIONS CAN GIVE VERY RAPID ASSESSMENTS OF ALTERNATIVES. THIS PAPER DESCRIBES THE MODEL, THE DATA USED TO SET IT UP

AND THE RESULTS OF SOME APPLICATIONS TO RESTRAINT AND FARES POLICIES. THESE APPLICATIONS ARE MAINLY CONCERNED WITH SENSITIVITY TESTS, WITH ALTERNATIVE ASSUMPTIONS AND WITH VARIATIONS ON THE MAIN POLICY OPTIONS; THE MAIN POLICY OPTIONS THEMSELVES HAVE BEEN DEALT WITH MORE SATISFACTORILY BY THE NETWORK VERSION OF THE MODEL. LIKE THE NETWORK MODEL, THE SINGLE-LINK MODEL ONLY DEALS WITH TRAFFIC EFFECTS AND THEIR DIRECT ECONOMIC CONSEQUENCES, AND NOT WITH THE WIDER SOCIAL ENVIRONMENTAL OR POLITICAL CONSIDERATIONS. /AUTHOR/

Holroyd, EM Tanner, JC ; Transport and Road Research Laboratory TRRL Report 55 UC, 1974, 30 pp, 9 Fig., 10 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 210125); ORDER FROM: TRRL, Orig. PC

42 267019 A SHORT-RANGE TRANSIT DEVELOPMENT STUDY. The study area that is the focus of this report includes the cities of Tuscaloosa and Northport, Alabama, and the unincorporated areas of Holt and Cottondale. Community and operational transit desires and requirements were set forth in the form of goals and objectives; and transit recommendations made in accordance with them. These recommendations include a five-year transit development program, an analysis of long-range transit potential in Tuscaloosa and recommendations for a shuttle bus system on the University of Alabama campus. Important recommendations include: (1) a replacement of all vehicular equipment now owned or leased by the Tuscaloosa County Parking and Transit Authority and the construction of new office and garage facilities; (2) an increase in all transit service and route coverage; (3) the implementation of a transit program that is cognizant of public attitudes; and (4) a shuttle bus system on the University campus to meet present short-range needs. Existing conditions and reestablishment of transit service in the area served by the Tuscaloosa County Parking and Transit Authority are discussed. Census and other available demographic data were studied and on-board bus survey conducted. Transit organization and operation were discussed and a recommended program delineated. Priorities, financial implications and funding alternatives were considered. Appendices include survey results, description of recommended route locations and the University of Alabama proposed shuttle schedule. Tables, figures and maps are numerous.

Bartholomew (Harland) and Associates Final Rpt. UMTA-AL-09-0003-74-1, Mar. 1974, 114 pp; Prepared for Tuscaloosa County Parking and Transit Authority. Technical Memoranda in report number UMTA-AL-09-0003-74-2.; ACKNOWLEDGMENT: UMTA (AL-09-0003); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232332/AS

42 267027 A TRANSIT DEVELOPMENT PROGRAM FOR THE LYNCHBURG URBAN AREA. The report summarizes the findings and recommendations of a technical studies planning grant for the Lynchburg, Va. urban area. Using data and information gathered throughout

the study, the current status of transit service is described, trends over the past five years are provided and the financial prospects for the future operation of the Lynchburg Transit Co. are given. Using the information obtained in the community interviews, public transportation needs in the Lynchburg area are identified and transit goals and objectives are stated. Transit ownership and management alternatives are described indicating the possible advantages and disadvantages of each alternative. In response to the specific transit objectives identified earlier, a set of service modifications are presented and discussed for incorporation into a Transit Development Program.

Voorhees (Alan M) and Associates, Incorporated Tech Rpt. UMTA-VA-09-0006-74-1, Feb. 1974, 181 pp; ACKNOWLEDGMENT: UMTA (VA-09-0006); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231436

42 267031 CHARACTERISTICS OF TRANSIT SUPPLY IN SMALL-AND MEDIUM-SIZED CITIES. This study proposes to demonstrate that with a small- or medium-sized community's given hardware systems, under-utilization of service and hence economic loss for the operator need not always be the case. Instead, by accessing the present ridership rates and route characteristics, analysis can be performed which will suggest a system that is both acceptable to passengers and economically viable to the bus operator. Frequency of service was used as the indicator of the relative quality or level of service. An attempt was made, therefore, to demonstrate the use of a methodological technique to aid transit operators in adjusting bus service using the financial resources available. Objectives were: (1) to test the service specification concept as a means for determining the economic conditions of bus transit operators; and (2) to establish a correlation between economically viable route characteristics and ridership rates. A bibliography is furnished. Appendices include an example of the questionnaire used to obtain data and summary statistics for linear regressions performed in the development of the study analysis. /UMTA/

Kurban, GJ ; Pennsylvania State University, University Park UMTA-PA-11-0010-74-3, Apr. 1974, 69 pp; ACKNOWLEDGMENT: UMTA (PA-11-0010); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233532/AS

42 272068 IMPLEMENTATION OF PUBLIC TRANSPORTATION SYSTEMS. The creation and activities of the Florida Department of Transportation are reviewed and the functions and major approaches to transportation planning are outlined. The organization is briefly described of the urban-oriented, multimodal, professional department of transportation which was evolved from a highly politically oriented highway department. The lessons and customs of the former operation have been carried over to the present. The revenue available to transportation is discussed in which three fourths may be used with flexibility. Florida has advocated the partnership concept in the development of its 11,000-mile primary highway systems with largely non-limited access. The department also designs and builds the secondary road system in cooperation with the counties. Resort to toll facilities is described, some of which are revenue based and others use a combination revenue and county

secondary funds. The budget has been built in all instances on matching available or expected-to-be available federal funds. In working with local government units, a simple mutually acceptable agreement is drawn up that commits the local funds and sets out what the state should do. The department is cooperating with local government and the Urban Mass Transportation Administration to salvage several failing systems, primarily by replacing worn out buses and by providing capital grants to publicly owned urban systems. The development of new systems are being considered and the need is indicated for additional legislation in the financial field. A preference is expressed for local transportation projects to originate at the local level and an attempt is made to anticipate such projects so that consideration may be given in the appropriation process. Good planning has the functions of objectives, establishment of funding commitment and justification of the expenditure program to the funding agencies. The three major planning approaches are: broadscale statewide system planning; specialized regional planning including rapid transit systems; and exclusive service tailored for specific urban area or sub group within the area.

Mueller, EA (Florida Department of Transportation) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 102-105

Appeared in *Issues in Public Transportation*, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

42 272072 PUBLIC TRANSPORTATION PROBLEMS IN URBAN AREAS. A plea is made for reordering priorities that will bring the public transit element of the urban transportation system to its optimum role. This will mean the stabilization of the transit situation by provision of operating subsidies. Investment in transit systems must be increased and more community resources such as roads and terminal facilities must be committed to transit in preference to the private automobile. Heightened public awareness both of the nature of the transit's problems and of the objectives being sought as a solution to these problems is essential. Policy-makers themselves must reach a clear-cut decision as to what needs to be accomplished. The course of events are reviewed with regard to transit fares for the Washington D.C. Transit system. Publicly owned systems throughout the country face the same problems of increasing fares, decreasing ridership, and deteriorating service that gave rise to public ownership. The rate regulation of private utilities, and the aspect of labor relations is discussed. A clear understanding is required of the real causes of the constant upward pressure in transit fares and its attendant decline in ridership levels. The labor-intensive aspect of urban transit is emphasized. Transit management is seriously limited in its ability to absorb the impact of increasing labor cost. The role of the automobile in society is discussed. The stabilization of existing transit service cannot be achieved through conventional regulatory means. Subsidization of transit operating costs through public funds is an essential element of any program to make basic revision in our public transportation systems. The concept of public support raises basic problems such as provision for means to retain an incentive for

efficiency of operations. Bold and innovative programs such as giving priority movement to public transport, must be effected to give the public system competitive travel times and comforts. The question of the need for rail rapid transit systems is discussed.

Avery, GA (Wald, Harkrader and Ross) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 12-20, 1 Ref.; Appeared in *Issues in Public Transportation*, Proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

42 272078 PLANNING, RESEARCH, EDUCATION AND TRAINING, AND LEGISLATION (RESEARCH SEMINAR). The seminar addressed questions relating to the role of research in aiding in the solution of public transportation problems, the identification of high priority research areas, and the question of who should perform the research. Consideration must be given to a balance between technological research and institutional factors. The dissemination of the results of research that already exists, together with a better interchange of information is an important part of research activity. The taxi should be viewed as a transit mode and better integration with other transit facilities as well as innovations in security and surveillance should be considered as research areas. Questions relating to the definition of various strategies with respect to the application of different transit technologies are discussed. The impact of labor in urban transportation and its effect on new systems development is another research need. The effectiveness of non transportation alternatives in achieving stated objectives should be explored. The various aspects of subsidies for urban transit should be studied. A need was expressed for better understanding of the meaning of research and improved communication between the researcher, transit manager and user. A list is presented of suggestions for research submitted by participants at the seminar.

Hoel, LA (Carnegie-Mellon University) Schnell, JB (American Transit Association) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 117-119; Appeared in *Issues in Public Transportation*, proceeding of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

42 272079 IMPLEMENTATION OF PUBLIC TRANSPORTATION SYSTEMS. The effective coordination of urban transportation programs with other goals of metropolitan areas requires that comprehensive institutions exist not only for long-range planning purposes but also for implementation of plans. The enforcement of agreed-on priorities is an essential element of the planning process. Both kinds of decisions must be made by the same institution and, to be effective, that institution must have political power and the requisite technical skills. The problems inherent in long-range planning in U.S. metropolitan areas makes it important that the institution concerned must have legitimacy. The body that plans and sets the priorities must be capable of sensing changes in public attitudes requiring revision of those plans and programs. The most desirable path to follow to achieve the objectives is to

strengthen the present council of governments so that they have sufficient authority to enforce their transportation plans and decisions. States (with limited exceptions) should delegate their present decision-making power relative to highways to the councils but conditional to the latter's capability to act. Action to strengthen the councils must come from the state. However, there are a few instances (mostly small, highly urbanized states with no more than one major metropolitan area) where the state and not a council can do a better job and can also reasonably meet the legitimacy requirement. In such instances, the elaborate organizations of metropolitanism may be both unnecessary and unworkable. The paper discusses the problems posed by the unbalanced financing, the inherent difficulties of the American political system, and the inadequacy of the local institutional structure, with special emphasis on the last problem. The trend toward departments of transportation at the state level and the rapid growth of councils of governments in large urban areas are discussed in detail. The Metropolitan Transportation Commission in the Bay area of San Francisco and the subregional institutions of Los Angeles as well as the state level bodies of Maryland and Massachusetts are reviewed.

Colcord, FC (Tufts University) *Transportation Research Board Special Reports Proceeding No. 144, 1974, pp 105-111; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB*

42 291006 RURAL TRANSPORT IN CRISIS. This article discusses how accessibility to and from rural areas has changed as a result of the uncontrolled growth of car ownership and the lack of government policy in this field. The authors believe a fuller consideration of factors such as pollution, congestion, maintenance, emergency services and other social costs reveals the 'True' cost of car use. Increasing car use has led to reduced use of public transport, and subsequent network reductions and the re-structuring of finance have not arrested the decline. Case studies of the Scarborough-Hull Railway line and Midland Red Bus Co. illustrate the process. This has reduced country people's mobility, increased visitors and physically damaged the countryside. Rationalising the different accounting methods for roads and public transport would be a partial solution, and the authors suggest changes in investment, public transport modes and fare policy to encourage the use of public transport by visitors to the countryside.

Ramblers Association R&D Rpt. No. 4, 23 pp, 1 Fig., 1 Tab., 7 Phot., 42 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 207685)

42 291007 COMPACT A SIMPLE TRANSPORTATION PLANNING PACKAGE. The article describes compact, a single computer program developed by the mathematical advisory unit of the department of the environment to carry out the network building, trip distribution, modal split and assignment phases of a transportation model. The function of transportation models in forecasting travel demand is described with particular reference to the two main inputs: planning variables and transport vehicle descriptions, and the structure is illustrated by means of

a block diagram. The speed and low cost of compact is obtained by forcing users to adopt a coarse zoning system. The model is for two types of travel-car and public transport, and two types of person-car owners and non-car owners. Restrictions on the size of study when compact is used on a cdc 3300 computer are number of zones 98, nodes (including zone centroids) 135, links in each network 540, journey purposes per run 6. Most likely applications would be in small town studies, in structure plans, initial sifting of broad strategies, and as a training tool. The larger cdc 6600 version is being used for testing of land-use alternatives with 87 zones, 200 nodes and 600 links. Both are available to local authorities and others interested but it is pointed out that advice cannot be given on the use and interpretation of program. Versions of compact exist for the cd 6600, icl 1900 series, ibm 360 series and univac computers.

Mackinder, IH *Institution of Municipal Engineers. Journal of Vol. 100 No. 8, Aug. 1973, pp 230-232, 2 Fig., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 207682)*

42 300014 MAP WORKS IN WARWICKSHIRE. Warwickshire County Council and the Midland Red Bus Company (a National Bus Company subsidiary) have cooperated in a Market Analysis Project (MAP) to ensure a viable network which would meet most needs and reduce the amount of revenue support required. The author traces the history of the rationalisation studies in Stratford-upon-Avon and Warwick-Leamington. In the MAP study, each area is treated separately and any surplus in one MAP is not normally transferred to another area to increase its size or subsidise its fares. A county-wide travel survey was undertaken to establish minimum needs for travel in urban areas based on village size and facilities. The methods used for conveying school children are important; Warwickshire Council "buys" passes on stage buses thereby reducing the revenue support which the County Council would otherwise have to pay to the Bus Company. The author regards it as being unfortunate that, as a result of a more efficient service, the government is reducing its revenue support to Warwickshire. /TRRL/

Cameron, GR (Warwickshire County Council) *Surveyor - Public Authority Technology Vol. 153 No. 4518, Jan. 1979, pp 13-15, 1 Fig., 1 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241065)*

42 300041 PRIVATE TRANSPORT MODES ARE FAVOURITE IN COMMUTER TRAFFIC [Eigen vervoermiddelen favoriet in woon-werkverkeer]. The Dutch Institute for Statistics has studied commuter traffic. A comparison with the identical study in 1971 shows interesting modifications. Topics studied are the availability of private transport modes, the journey to work related to income and urbanization and how long the journey takes using public transport. In 1971 36% of the persons interviewed used their own car to travel to their work. In 1978 this number increased to 47%. In the lower social class the use of the private car increased from 28% to 43% and in the lowest social class from 16% to 30%. /TRRL/ [Dutch]

Stichting Weg Bulletin Vol. 13 No. 1, Mar. 1979, p 79041, 4 Tab. ACKNOWLEDGMENT: TRRL (IRRD 240970), Institute for Road Safety Research

42 300068 A STUDY OF TRAVEL LINKAGES: IMPLICATIONS FOR URBAN TRANSPORT PLANNING. This paper outlines the importance of trip linking on the journey home from work, and the importance of relating it to the journey to work. It presents some empirical evidence from Canberra to quantify the significance of trip linking. Some implications for transport planning and policy, and for transport modelling, are discussed. These principally relate to trip generation, mode choice and car pooling. The paper was prepared for presentation at a workshop on Methods and Concepts in Transport Modelling, C.S.I.R.O., Division of Building Research, Melbourne, Feb 1979. /Author/ TRRL/

Graham, NR Ogden, KW ; Monash University, Australia Monograph Working Paper 17/12, Dec. 1978, 16 p., 10 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239170), Australian Road Research Board

42 300072 TESTING THE DOGIT MODEL WITH AGGREGATE TIME-SERIES AND CROSS-SECTIONAL TRAVEL DATA. This paper compares dogit and logit specifications of market share models, taking into account the possibility that conclusions might depend on transformations of the explanatory variables of these models. Parameter estimates are obtained both for a time-series urban transit mode of payment model and for a cross-sectional intercity mode choice model. It is demonstrated, using current maximum likelihood techniques extended to take multiple-order autocorrelation of the residuals into account, that the logit specification is at least equal to, and sometimes clearly superior to, the logit specification irrespective of transformations of explanatory variables. /Author/ TRRL/

Gaudry, MJI Wills, MJ *Transportation Research Vol. 13B No. 2, June 1979, pp 155-166, 4 Fig., 2 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241051)*

42 300089 TRANSPORTATION PLANNING IN LEEDS. Leeds is a commercial and business centre of regional importance. The basic principles of the Leeds approach to transportation planning still apply today. The original plan had to be modified. The recommended strategy now is a modest growth in car usage and an attractive public transport. Parking control, car pooling and staggered or flexible working hours are means of reducing the peaking of transport demand. By the urban traffic control system and an upgrading of the local rail system the demand is catered for. A light transit system could act as a back-up. The public prefers ground level footways. Reacting to and providing for perceived demand is replaced now by the principle of influencing transport demand. /TRRL/

Naylor, AE ; Koninklijk Instituut van Ingenieurs 1978, pp 43-57, 5 Fig.; From Verkeers-En Vervoersplanning in Enige Europese Steden.; ACKNOWLEDGMENT: TRRL (IRRD 240983), Institute for Road Safety Research

42 300139 BACKGROUND TO PRESENT DAY TRANSPORTATION IN THE LEEDS SUB REGION. Leeds was not a city of major importance until the industrial revolution when with the growth in industry and commerce the

population also grew. The major growth of the city took place before the second world war. Passenger transport developed. After the second world war motor car, motor bus and train were the transport modes. The rate of growth of traffic increased. Construction of the road network was part of an overall programme of comprehensive re-development. The city now needs a large scale renewal. The "Leeds approach" should be partially reassessed. There is now a much more restrictive approach towards capital investment in transportation infrastructure. /TRRL/

Finney, JE ; Koninklijk Instituut van Ingenieurs 1978, pp 29-42, 2 Fig.; From: Verkeers-En vervoersplanning in enige Europese St. Eden.; ACKNOWLEDGMENT: TRRL (IRRD 240982), Institute for Road Safety Research

42 300146 CAR OWNERSHIP AND PUBLIC TRANSPORT. A number of studies of the interaction between car ownership and the availability and use of public transport in Great Britain and the United States are presented, based on time series, household level cross-sections and area-based cross-sections. The household level cross-sections show that public transport use increases with increasing income, at a fixed level of car ownership, but decreases with increasing car ownership. When car ownership levels in different areas are compared with public transport levels in the same areas, strong negative correlations are usually obtained. Usually these remain strong even when allowance is made for a number of non-transport variables. One study, however, shows a slight positive correlation. Some of the studies were designed to show particularly the effect of public transport level on car ownership, and these suggest that when for extraneous reasons public transport levels vary over a wide range, ownership may as a result vary by about 0.05 cars per person, mainly associated with second cars. Causality in the reverse direction is shown most clearly by time series data and by household level cross-sections. The effects in the two directions combine to produce the area-based correlations. /Author/TRRL/

Jones, SR Tanner, JC ; Transport and Road Research Laboratory Monograph Supple Report SR464, 1979, 39 p., 8 Fig., 1 Tab., 38 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241107)

42 300155 THE CONSEQUENCES OF "WHO GETS THE CAR" IN THE ONE-CAR FAMILY. Transport planning is still largely focused on the journey to work. Little consideration has been given to individuals not in the workforce. This paper draws attention to the mobility problems of women left at home without the family car as a consequence of the husband using it to commute to work. It is proposed that to improve transport efficiency the trend to leave the family car at home be encouraged, thereby reducing the pressure to acquire a second family car which many families can ill afford. The possibilities of increased car-pooling, improved access to public transport, new cross-country bus services and provision of community buses are discussed. /Author/TRRL/

Stiles, P (New South Wales Public Transport Comm., Australia) ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 100-116, 18 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239205), Australian Road Research Board

search Board

42 300264 ACCESSIBILITY TO EMPLOYMENT AND THE JOURNEY TO WORK IN METROPOLITAN ADELAIDE. This paper examines measures of job accessibility and work trip behaviour in Adelaide. It compares patterns of accessibility to employment at Adelaide with those recently described in Sydney (ref: paper by J. Black titled Changing Accessibility to Employment) using the journey to work data available from the 1971 census. It then attempts to assess the importance of workers of variations in accessibility to job opportunities, using the results of a household survey carried out in Adelaide in 1975. /TRRL/

Forster, C (Flinders University, Australia) ; Monash University, Australia Conf Paper 1978, 18 p., 6 Fig., 6 Tab., Refs.; From the Third Annual Meeting of the Regional Science Association of Australia and New Zealand, Monash University.; ACKNOWLEDGMENT: TRRL (IRRD 239147), Australian Road Research Board

42 300281 CHANGING ACCESSIBILITY TO EMPLOYMENT. The purpose of this paper is to examine some consequences of changes in the location of economic activity and changes to transport on urban society. It is divided into four sections. In the first section, the inter-relationships between accessibility and the amount of travel are introduced in a theoretical way. The argument is that distributions of accessibility (over space), distributions of private vehicle (over space and within households) and distributions of trip-length (over space) are being modified over historical time. Section two explains various measures of accessibility to employment. Section three describes patterns of accessibility to jobs and travel in Sydney in 1971. Section four speculates on how these patterns have evolved in the post war period and how they might evolve in the future. /TRRL/

Black, J ; Monash University, Australia Conf Paper 1978, 33 p., 7 Tab., Refs.; From the Third Annual Meeting of the Regional Science Association of Australia and New Zealand, Monash University.; ACKNOWLEDGMENT: TRRL (IRRD 239149), Australian Road Research Board

42 300365 STATE TRANSPORTATION PLANNING: PRELIMINARY TRANSPORTATION PLAN. This preliminary transportation plan contains the needs and suggested actions for each form of transportation in the State of Washington. The State and local system of highways, roads and streets is the basic transportation network of the State and will remain so in the future. To maintain this status, it is necessary to continue to replace or rehabilitate structurally deficient bridges and maintain serviceability of the roadway pavement as well as other highway maintenance and to complete the interstate highway system by 1990. In addition, it is necessary to improve and coordinate the various forms within that mode as well as improve level of service and coordination with the other transportation modes--water transportation, air transportation, and rail transportation--in an effort to reduce dependence on private automobiles and thus reduce traffic congestion and promote energy conservation. Thus, use of public transit, carpooling, park-and-ride lots, and

reserved lanes for high occupancy vehicles will be encouraged. Marketing support will be provided to private bus systems in an attempt to increase level of service and ridership of intercity bus transportation. Technical assistance will be provided in the development and operation of para-transit systems. Selected existing facilities will be modified and additional facilities developed to better accommodate bicycle and pedestrian travel. Additional technical and financial assistance will be extended to appropriate authorities to enable them to expand and make improvements to existing airports or construct new airports as necessary, and intrastate commuter airlines will be classified as "carriers of convenience and necessity" thereby making them eligible for tax exemptions. Level of service and levels of subsidy for the Ferry System will be maintained. Also, ferry service will be integrated with bus transportation; and incentives will be provided for use of ferries by walk-on transportation; and incentives will be provided for use of ferries by walk-on passengers and bicyclists, buses, and carpools. Finally, rail passenger service will be identified consistent with needs of the state and provisions supported to retain the level of service by AM-TRAK.

Washington State Department of Transportation Feb. 1979, 220 p., 42 Fig., 10 Tab., 1 App.; Prepared for the Washington State Legislative Transportation Committee, and the House and Senate Standing Committees on Transportation.

42 300690 OVERVIEW OF RURAL TRANSIT PLANNING AND IMPLEMENTATION. A typical planning and implementation process for rural transit systems is summarized. Specialized rural transit systems usually are initiated when local authorities perceive and define a transportation problem. The next step in the process is a needs and feasibility study in which efforts are made to determine whether or not a system should be started. After financial and political support are obtained, the system must then be designed and implemented. Finally, a continuous evaluation of whether the system is solving the perceived local transportation problems is necessary. The synthesis of the planning and implementation process that is described in this paper was developed from extensive information on special rural transit systems that was gathered by field visits to 12 systems and from data on other operations. /Author/

Saltzman, A (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 696, 1978, pp 14-16, 1 Fig.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

42 300704 DATA RECORDING AND EVALUATION: THE BARNSTABLE COUNTY EXPERIENCE. A mechanism for collecting data on rider and operating characteristics of regionwide public transportation services is described. The mechanism, a serially numbered rider identification pass, is being tested as part of an ongoing demonstration project in Barnstable County, Massachusetts. Service is provided on a prearranged demand-responsive basis by use of ten 12-passenger vehicles. Passengers acquire passes advance and complete a questionnaire on their socioeconomic characteristics and physical disabilities. When passholders telephone to schedule

a trip, the dispatcher records their pass number, pickup time, trip purpose, and origin and destination. Special attention has been given to minimizing the data are collected for all riders. These data may be used to (a) evaluate vehicle productivity and efficiency, (b) examine the impacts of local policy decisions, (c) assess the portion of a deficit to be paid by each town, (d) develop user charges and contractual agreements for use by social-service agencies, (e) identify those persons who are eligible for the services of a social-service agency, and (f) describe user characteristics. The uses of the pass in fare collection and marketing are discussed, and capital and operating costs of the pass are estimated. /Author/

Warren, RP (Cape Cod Regional Transit Authority) Collura, J (Massachusetts University, Boston) *Transportation Research Record* No. 696, 1978, pp 58-65, 4 Fig., 4 Tab., 7 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

42 301021 SEEMINGLY UNRELATED STATIC AND DYNAMIC URBAN TRAVEL DEMANDS. This paper examines the usefulness of grouping trip demand equations for estimation purposes using as examples two of the markets served by the Montreal Urban Community Transit Commission. The equations are estimated both under the assumption that consumers adjust immediately to changes in fare and service frequency, and under the assumption that their response varies over time. Single-equation estimates obtained by combining Box-Jenkins RTH Order Autoregressive Processes with the Cochran-Orcutt Maximum Likelihood Iterative Technique for non-linear equations are compared to estimates obtained by using a maximum likelihood iterate of parks' seemingly unrelated procedure generalized to higher order autoregressive schemes. Forecasting experience with both estimation methods is also summarized. /TRRL/

Gaudry, M ; Montreal University, Canada Monograph Feb. 1977, 30 p., 2 Fig., 8 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241365), Roads and Transportation Association of Canada

42 301243 THE URBAN TRANSPORTATION SYSTEM. This book is a comprehensive and original examination of the factors that have shaped the U.S. urban transportation system and of innovative options available to today's policy makers. It offers both a systematic, multidisciplinary analysis of the problems and available alternatives in urban transportation, and a political analysis of the ways in which policy makers actually choose among options. /Pergamon Press Library Service/

Pergamon Press, (0-262-01055-0) 1979, 512 p., Tabs.; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

42 301262 CURRENT ISSUES IN TRANSPORTATION POLICY. Dealing with the most important issues in transportation policy on urban, regional, national, and international bases, this book cuts across all major forms of transportation to look at the problems from an interdisciplinary perspective. The contributors are drawn from industry, academia, government, and consumer organizations. /Lexington Books/

Althuler, A, Editor (Massachusetts Institute of Technology) ; Heath Lexington Books, (0-669-02623-9) 1979, n.p., Figs., Tabs., Refs.; ORDER FROM: Heath (DC) and Company, Department RS, 125 Spring Street, Lexington, Massachusetts, 02173

42 301269 THE SELLING OF RAPID TRANSIT: A CRITICAL LOOK AT URBAN TRANSPORTATION PLANNING. No Abstract.

Hamer, AM (Georgia State University) ; Heath Lexington Books, (LC 74-16933) 1976, 368 p., Figs.; ORDER FROM: Heath (DC) and Company, Department RS, 125 Spring Street, Lexington, Massachusetts, 02173

42 301277 URBAN TRANSPORTATION POLICY: NEW PERSPECTIVES. This book is a collection of essays, most of which were prepared for the Urban Transportation Policy Seminar held at Syracuse University during spring 1970. Sponsored by the Urban Transportation Institute, a part of the Metropolitan Studies Program at Syracuse University, the seminar presented a variety of perspectives on urban transport policy. Funds for the series were provided by the Urban Mass Transportation Administration, U.S. Department of Transportation, as part of the University Research and Training grant program. The seminar covered three major topics: The general relationship between policy and "the urban transportation problem." Examples of the impact of specific urban transport programs; and the relationship between transport policy and other aspects of urban growth and development. Each of these is the subject of a section of this volume. There is also a concluding section that presents one of the papers from the seminar series. In closing, the editor attempts to synthesize the conclusions of these papers and to bring the discussion up to date by considering some new developments in policy planning. The authors prepared their papers independently of one another. Nevertheless, several coherent themes emerged as the series progressed, and these themes may be taken to represent the leading edge of current issues in urban transport. The first theme concerns the role of urban transport systems in providing mobility for people. Strange as it may seem, this aspect of transport's role has been rather neglected by scholars and practitioners in the field. Only within the last two or three years has dialogue among them begun to emphasize movement of people rather than vehicles. A second theme is the nature of the relationship between transport facilities and urban growth. Three of the contributors were asked to deal with specific aspects of this issue; their papers comprise Section III. A number of the other contributors also touched on the same issue in their papers. The third theme, recurring perhaps more subtly than the preceding ones, is that "urban transport policy" is really a set of policies developed at various levels of political jurisdiction, concerned primarily with problems of particular modes (until very recently) and administered by a variety of techniques, among them the proverbial carrot and stick and sometimes even total inaction. /Author/

Miller, DR, Editor (Department of Transportation) ; Heath Lexington Books, (0-669-84632-5) 1973, 224 p., Figs., Tabs.

42 301279 URBAN TRANSPORTATION POLICY AND MANAGEMENT. The authors present an indepth investigation of the primary concerns of urban transportation. Lexington Books/discuss regionalism, national transportation policy, federal funding, union activity, practical system financing, and market structure.

Pikarsky, M (Regional Transportation Authority of N.E. Illinois) Christensen, D (Chicago Transit Authority) ; Heath Lexington Books, (0-669-00966-6) 1976, 272 p., Figs., Tabs., Refs., Apps.

42 301280 A DISAGGREGATE TRAVEL DEMAND MODEL. In this critical review of conventional urban travel demand modeling procedures, including work mode-choice and shopping destination-and mode-choice models, the authors suggest that disaggregate simultaneous models not only offer major technical improvements but should be much more responsive to current policy issues. This book is based on a report prepared for the Netherlands Ministry of Transport and Public Works and utilizes Dutch data. /Lexington Books/

Richards, MG Ben-Akiva, ME ; Heath Lexington Books, (9-566-01088-1) 1975, 172 p., Tabs., Apps.

42 301310 GOVERNMENTAL AND PUBLIC CONSTRAINTS TO THE IMPLEMENTATION OF LIGHT-RAIL TRANSIT IN DAYTON, OHIO. This paper discusses the local, state, and federal governmental and institutional constraints to the implementation of light-rail transit. The experiences of the Dayton region are used in an attempt to draw broadbased conclusions and general recommendations applicable to other medium-sized urban areas. The planning process that led to the selection of the light-rail mode in Dayton is also described. /Authors/

Jensen, JL Rude, RG (Transportation Coordinating Committee, Dayton) *Transportation Research Board Special Report* Conf Paper No. 182, 1978, pp 68-74; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

42 301311 ANALYSIS OF TRANSIT ALTERNATIVES. The planning and implementation of major public works projects require the consideration of many engineering, social, environmental, political, and fiscal issues. In particular, the 1970s have seen nonengineering issues take precedence over engineering considerations in project planning and implementation. These issues are highlighted in a conceptual approach based on six tests of feasibility--physical, operational, institutional, social and environmental, financial, and economic feasibility. This paper describes the application of this approach and the nonengineering issues that were identified as having an effect on the planning of a light-rail transit system in Harrisburg, Pennsylvania. The feasibility tests were found to constitute a valuable approach because they lead to a formal or explicit recognition of several planning issues that are usually only implicitly recognized in planning studies. Once they were explicitly identified, these issues could be analyzed in terms of their impact on the planning process. /Author/

Hupp, RC (Southeastern Michigan Council of Governments) Weisstuch, DN (Wegman, (Leonard S.) Company, New York) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 74-82, 5 Fig., 3 Tab., 1 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

42 301312 JOINT-DEVELOPMENT POTENTIAL FOR LIGHT-RAIL SYSTEMS. In recent years, many cities have begun to question the universal application of conventional rapid transit (CRT) systems but have indicated a need for a fixed-guideway solution to their problems. During this period of technological reexamination, light-rail transit (LRT) systems are being evaluated in greater detail to determine their capacity to meet operational specifications. This paper isolates for discussion the potential of LRT systems to inspire joint-development opportunities like those that have been attributed to CRT systems. Current incentives are evaluated in terms of the similarities that exist between the development of CRT and LRT systems. LRT's operational flexibility is widely recognized. This flexibility also provides new dimensions for station-area development; the small scale (compared with CRT stations) provides opportunities for initiating development potential. The barriers to joint development for LRT systems are essentially the same as those for CRT systems. The most significant barrier to a full realization of joint-development potential is the lack of adequate private capital to realize the full opportunity of the public investment. Under the new policy directives for urban revitalization, several new financial assistance programs have been developed. The urban design action grants appear to have a significant potential for use in expanding the joint-development potential of LRT systems. Value-capture options for stimulating private investment in joint development are currently being given considerable attention in demonstrations of LRT and downtown people movers. Each rapid transit system currently under consideration must conduct an assessment of the value-capture potential as part of the requirements for federal funding. Implementation techniques are discussed in terms of development incentives and the control mechanisms that are necessary to guide development along the lines of community objectives. /Author/

Carter, SA (Carter (Stephen) and Associates) *Transportation Research Board Special Report Conf Paper No. 182, 1978, pp 82-88, 1 Tab., 5 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

42 301329 INTRODUCTION: LIGHT-RAIL TRANSIT: PLANNING AND TECHNOLOGY. The conference papers were presented in 5 sessions. The opening session relates accounts of light rail transit (LRT) successes in many cities. Problems and issues that have frustrated significant LRT development in the U.S. are explored in subsequent papers. A series of case studies examine where and how progress has been achieved. The basic dichotomy between socioeconomic and technological issues in the implementation of LRT is reflected in papers on such topics as network planning, joint development opportunities, and the formulation of functional specifica-

tions and fare collection, traffic engineering and power supply. The final session examines the future in the light of past experience. The session papers emphasize the overriding need to inform decision makers at all levels about the characteristics of LRT. Ignorance and bias must be removed before LRT can move forward on a broad front.

Taylor, SF (Sanders and Thomas, Incorporated) *Transportation Research Board Special Report No. 182, 1978, 1 p., 1 Ref.*; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

42 301456 STAGGERED WORK HOURS STUDY--DESIGN AND IMPLEMENTATION OF STAGGERED WORK HOURS IN MANHATTAN. This three-volume report is the product of a \$200,000 grant from the U.S. Department of Transportation to document and further implement staggered work hour programs in Manhattan. The concept of staggered work hours is a proven "low capital-intensive" method of reducing transportation congestion. Experience has shown that the staggered work hours program in Manhattan has not only reduced congestion on transportation systems, but has improved efficiency in business operations by reducing lobby congestion and improved employee attendance, punctuality and morale, all of which are additional non-cost benefits. Most individuals in cities throughout the world go to work at the same time in the morning and depart from work at the same time in the afternoon, which creates severe congestion on many transportation facilities. If this peak demand could be altered by inducing people to change at earlier or later work schedules, transportation systems could operate more efficiently and comfortably, and individuals would benefit in terms of reduced frustration. The objective of this study was not only to further the staggered work hours program in the New York-New Jersey region, but also to determine means and methods to assist other communities in establishing their own staggered work hours program.

Port Authority of New York and New Jersey, (IT-09-0023) Final Rpt. UMTA-IT-09-0023-79-1, Aug. 1977, 73 p.; Sponsored by Department of Transportation, in cooperation with Tri-State Regional Planning Commission, contain 3 Volumes. Volume I--Executive Summary; Volume II--Technical Report (UMTA-IT-09-0023-79-2); Volume III--Staggered Work Hours Manual (UMTA-IT-09-0023-79-3); Contract IT-09-0023; ORDER FROM: NTIS; PB-298936/SET

42 301605 REDEVELOPMENT OF A COMPREHENSIVE APPROACH TO URBAN TRANSPORTATION PLANNING. An attempt is described that is under way in southeastern Wisconsin to convert the conventional urban transportation planning process into a more problem-centered planning process, one that considers and integrates short-range and long-range considerations and comprehensively examines alternative facility and systems management solutions. The key to this improved planning process is the use of a new short-range transportation system plan in place of the conventional short-range transportation systems management plan. The new plan would be aimed at existing

and short-range problems. Alternative solutions to be considered would include management and operations actions as well as facility improvements as staged and recommended in the long-range plan. The recommendations of the short-range plan should be appropriate for direct inclusion in the transportation improvement program. The short-range transportation planning process and its relation to long-range transportation planning, the steps that have been taken to apply the process, and some of the general principles used in developing the new short-range plan are discussed. /Author/

Beimborn, E (Wisconsin University, Milwaukee) Schulz, DF Yunker, KR (Southeastern Wisconsin Regional Planning Comm) *Transportation Research Record No. 707, 1979, pp 5-11, 3 Fig., 1 Tab., Refs.*; This paper appeared in Transportation Research Record No. 707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

42 301606 LONG-RANGE TRANSPORTATION PLANNING IN SOUTHEASTERN WISCONSIN. The evolution of long-range transportation system planning at one planning agency, the Southeastern Wisconsin Regional Planning Commission (SEWRPC), is examined. Some conclusions about the continued role of long-range planning are drawn, and some directions for further evolution of such planning are suggested. After a brief historical review of long-range transportation system planning at SEWRPC, five recent criticisms of the planning process in southeastern Wisconsin and elsewhere are identified: (a) the need for short-range emphasis; (b) an inability to deal with uncertainty; (c) disregard of fiscal constraints; (d) excessive orientation toward facilities; and (e) neglect of local plan impacts. The eight fundamental principles of transportation planning used by SEWRPC are reviewed in light of these criticisms. Although they are found to be basically sound, they are shown to require expansion to (a) include a provision for subregional planning, (b) deal with uncertainty and explain the approach taken by SEWRPC and a possible method that is under development, (c) alter the planning process to consider all alternatives including system operation and management initiatives, and (d) develop an integrated transportation planning process that effectively brings together long-range and short-range transportation system planning and programming. /Author/

Schulz, DF (Southeastern Wisconsin Regional Planning Comm) *Transportation Research Record No. 707, 1979, pp 11-16, Refs.*; This paper appeared in Transportation Research Record No. 707, Urban Transportation Planning, Evaluation and Analysis.; ORDER FROM: TRB Publications Off

42 301608 PRELIMINARY SCREENING OF TRANSIT CORRIDOR ALTERNATIVES. Part of a major analysis of transit corridor alternatives done by the Chicago Area Transportation Study is presented. A method was developed to screen out, for further study, a limited number of proposed transit improvements from a large number of suggested alternatives for a corridor. The principles of this screening are (a) that some alternatives are not consistent with patronage in the corridor and (b) that some alternatives are dominated by others. The screen-

ing methodology is discussed, and the use of corridor supply and demand functions for evaluation and the estimation of these functions are presented. Demand and supply estimates prepared for several light rail alternatives for Chicago's Southwest Corridor are then subjected to preliminary screening. /Author/

Eash, RW Rosenbluh, AH (Chicago Area Transportation Study) *Transportation Research Record* No. 707, 1979, pp 20-26, 7 Fig., 1 Tab., Refs.; This paper appeared in *Transportation Research Record* No. 707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

42 301610 MACROANALYSIS FOR TRANSIT INTEGRATION, ABRIDGMENT. To investigate enough integration options to have some hope of finding a good solution, it is necessary to examine 20 or more alternatives. Even so modest a number of investigations is beyond reason if one is compelled to use the traditional network-based algorithms. The macroanalytic regionwide transportation (SMART) model of SYSTAN, Inc., has been specifically designed to explore large numbers of public transit alternatives. This model can provide the first coarse screen by which the number of transit options is reduced to manageable proportions. The model seeks breadth at the expense of detail. It does not take the place of more complex procedures but helps to focus the use of complex models on a small set of highly attractive alternatives. The SMART Model represents urban travel at three different levels: (a) local, (b) door to door, and (c) regionwide. Local transportation is concerned with trips that take place wholly within a local module and with those portions of longer trips that occur within the local module. Local transportation is studied for two types of modules: (a) residential and (b) major activity center. Residential and major activity center modules are connected by line-haul corridors that handle all interzonal traffic within an urban region. Line-haul corridors give form to the urban structure by establishing connecting routes between the different modules. Line-haul corridors are given a circular representation: Corridors are either radial or circumferential or they emanate from the CBD. Line-haul corridors do not originate or terminate traffic; they handle traffic that originates and terminates in residential or major activity center modules. Door-to-door trips cross module boundaries. A trip may originate in a residential module where it includes a local movement from a residential origin to an access point of a line-haul corridor. The trip continues on one or more line-haul corridors to the egress point nearest the destination. A local movement is then made from the egress point to the destination. A traveler can use a single mode between origin and destination, or modes can be changed at access or egress points of line-haul corridors or at transfer points between line-haul corridors. Door-to-door analysis takes the viewpoint of the traveler and traces the route from origin to destination, accounting for mode changes when they occur and the delays associated with them. The SMART model accumulates regionwide data and prints regionwide summaries. /Author/

Jones, PS Lucas, GR (SYSTAN, Incorporated) *Transportation Research Record* No. 707, 1979, pp 30-33, 3 Fig., Refs.; This paper appeared in

Transportation Research Record No. 707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

42 301611 DISCRETE OPTIMIZATION IN TRANSPORTATION NETWORKS. In most cases, planning capital investment in transportation networks is an unwieldy job because the number of investment options grows so rapidly. The real situation faced by the transportation planner is, in general, when, where, and by how much to allocate available resources. The transportation investment problem can be characterized as the location and timing decisions to be made by the planner. A branch-and-backtrack algorithm is presented that tackles both location and timing aspects of the capital investment problem in small and medium transportation networks. The results presented are encouraging for future research in which the technique can be applied to larger, actual transportation networks. /Author/

Lago, PAR (PROMON Engenharia, S.A.) *Transportation Research Record* No. 707, 1979, pp 33-39, 6 Fig., 5 Tab., Refs.; This paper appeared in *Transportation Research Record* No. 707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

42 301613 ETHICS OF POLITICALLY ORIENTED TRANSPORTATION PLANNING: CONGRUENCE AND CONFLICT OF ROLES. Some of the ethical implications of the involvement of transportation analysts in politically oriented planning processes, particularly in the context of urban transportation planning, are examined. The major point of departure is the concept of fragmentation of intellectual perspectives, which manifests itself among participants in the planning process, both professional and non-professional, and within the individual, who plays a variety of socially recognized roles. The pattern of congruences and conflicts created by the roles of professional transportation analyst, organization member, and participant in the political process is seen as the key to ethics for transportation analysts. Obligations imposed by each of these roles are identified and compared. The major conclusion is that these roles are, for the most part, congruent provided two key points are accepted: (a) that technical competence for transportation analysts consists of mastery of a variety of disciplinary perspectives and (b) that the professional's primary loyalty as a participant in the political process must be to the process itself and not to particular substantive outcomes. /Author/

Banks, JH (San Diego State University) *Transportation Research Record* No. 707, 1979, pp 48-53, Refs.; This paper appeared in *Transportation Research Record* No. 707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

42 301842 ROUTE INVESTMENTS WITHIN THE SCOPE OF THE NATIONAL TRANSPORT POLICY AS ILLUSTRATED IN THE FEDERAL REPUBLIC OF GERMANY. This report refers to the economic impact of investments in the differing transport modes and suggests that with financial resources becoming scarcer, such investments should not lead to

competition between modes but to transport policy targets within a national transport policy. These targets, related to present day conditions in the federal republic are stated to be: the maintenance and furtherance of the mobility of the inhabitant and of the economy; the maintenance of an appropriate transport structure for a steadily developing economy; the securing of the free choice of the means of transport in a controlled competitive system. The present national transport routes investment policy is reviewed, and information provided on the co-ordinated investment programme for the federal transport routes up to the year 1985 in respect of the German Federal Railway, federal trunk roads, federal waterways, air-traffic control and airports. The implementation (and continuing review) of planned investment strategy is discussed, and consideration given to the international aspects of the transport routes investment policy. /TRRL/ Haeusler, U *Rail International* No. 3, Mar. 1979, pp 223-235, 3 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 241530); ORDER FROM: ESL

42 301846 DETERMINING MODAL CHOICE AND STATION CHOICE FOR A RAIL TRANSIT LINE. This paper considers the problem of predicting station choice and modal choice for composite mode trips that involve a trip by private car to a rail transit station and the continuation of the trip to the final destination by a rail transit mode. The choice between car and transit, and between park'n ride and kiss'n ride are both taken into account. One of the models presented takes explicitly into account traffic congestion. The methodology proposed relies on entropy maximization with inequality constraints related to parking capacities at the rail transit stations. The numerical application of one of the models to the Lindenwold high speed line is reported.

Los, M (Montreal University, Canada) *Logistics and Transportation Review* Vol. 15 No. 2, 1979, pp 335-358, 1 Fig., 1 Tab., 30 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241513); ORDER FROM: British Columbia University, Canada, Faculty of Commerce, Vancouver V6T 1W5, British Columbia, Canada

42 301899 EMPIRICAL STUDIES OF JOURNEYS TO WORK BY MODES OF TRANSPORT IN GREATER LONDON: 1966 AND 1971. With the use of 1971 journey-to-work census data for London, the spatial distributions of home and workplace locations at different distances from the city centre were analysed for the main modes of transport. The relationships among the fundamental quantities such as density, trip length, modal split, and level of car ownership were also investigated. These analyses were compared with those of corresponding 1966 data. The comparisons show that although the home density in 1971 within the first 2 km from the city centre decreased by approximately 21%, while the workplace density decreased only by approximately 4%, the actual number of workplaces within this range of distance fell by about 2.5 times that of the homes. The overall decrease in homes and workplaces resulted in a 9% drop in the total number of internal trips for London as a whole. Resolving these trips by modes of transport shows that rail, bus, and walk trips had decreased while car trips had increased. As a result, the most common mode of transport to

work switched from bus in 1966 to car in 1971. This also contributed to the overall increase in the average trip length in 1971. The analysis on the level of car ownership for 1971 shows that more than 50% of the households located more than 12 km from the city centre had at least one car. On average, the number of cars per household in 1971 was approximately 0.64. /Author/TRRL/

Khaw, KH (University College, London) *Environment and Planning A* Vol. 11 No. 4, Apr. 1979, pp 415-422, 6 Fig., 3 Tab., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241486)

42 301954 INTRAMETROPOLITAN TRAVEL DEMAND FORECASTING USING AN ABSTRACT MODES APPROACH. Comparatively little work has been done on utilizing the abstract modes approach, first pioneered by Quandt and Baumol, in an intrametropolitan travel demand forecasting effort. This is surprising because of the method's great flexibility. As urban transportation planning becomes evermore concerned with a variety of para-transit modes as well as the electric transport systems management policies, more powerful travel demand forecasting tools are required for effective planning. We augment the original model to include "second best" characteristics as predictor variables. This innovation is quite important because the urban situation is characterized by auto remaining "best" in most planning situations. Thus, demand changes can only be seen as a response to changes in some "second best" mode characteristic. Other minor innovations are also explored and the model is applied to a data file available from a survey of travel behavior in East Los Angeles, a predominantly mexican-american community. Despite the usual statistical problems, the results are seen to be useful to transportation planners who seek to reach a recommendation on the best transit/para-transit mix for that community.(a) /TRRL/

Gordon, P Williams, CS (University of Southern California) Theobald, PM (Community Research Group) *Transportation Research* Vol. 13A No. 1, Feb. 1979, 49 p., 6 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241385)

42 302120 WANTED: NATIONAL POLICY ON SUBURBAN TRANSIT. The questions are asked if transit operators serving low-to-medium density suburban areas should continue to be evaluated by the policies and standards designed for transit systems in the central city, and what standards should be used to evaluate suburban transit performance? The design of a transit system is dictated by the land-use characteristics of the market it serves. A flexible and multi-leveled transit system is needed to serve the dynamic nature of suburban land use. Paratransit systems such as dial-a-ride are effective in low-density residential areas. An effective combination of paratransit and fixed-route systems could significantly increase the modal split over that which fixed transit might achieve alone. One key to success of such a system lies at the transfer points. The Orange County Transit District (OCTD) has planned a series of transportation centers in response to this need. Experiences of OCTD in planning such centers are described. One obstacle that OCTD faces is the lack of coherent UMTA policy regarding suburban transit centers. Major issues regarding suburban transit which require UMTA attention are listed.

Reichert, JP (Orange County Transit District, California) *Transit Journal* Vol. 5 No. 3, 1979, pp 37-42

42 302173 URBAN TRANSPORTATION PLANNING IN TRANSITION: THE SOURCES AND PROSPECTS OF TSM. A recent federal transportation policy initiative has encouraged metropolitan and local transportation planners to place increased emphasis on near-term, service-oriented transportation problems. This policy, called Transportation System Management (TSM), was designed to affect not only the types of projects to be considered during the planning process, but also the institutional framework established to conduct and guide comprehensive transportation planning. A description is given of the emergence of TSM-type planning from a tradition of large-scale, facility-oriented planning. Characteristics of the TSM program that may significantly affect the process and politics of transportation planning are discussed. The characteristics of TSM program performance and their likely effect on transportation planning in general are identified. These include the greater emphasis on short-range actions and the need to resolve apparent conflicts between efficiency and amenity objectives.

Gakenheimer, R (Massachusetts Institute of Technology) Meyer, M *Journal of the American Planning Association* Vol. 45 No. 1, Jan. 1979, pp 28-35, 13 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 302241 IMPACT OF POPULATION AND ENERGY ON TRANSPORTATION NEEDS: MULTIMODAL APPROACH. This paper documents a computer process developed to explore the potential diversion of automobile trips by purpose and length for various population growths and energy futures and the impact this diversion will have on transportation needs. The technique is a straightforward method of using the existing statewide transportation model to generate statewide highway trip tables for each possible future. These tables are split by trip purpose based on analysis of actual statewide origin-destination data and then split into modes based on trip purpose and length information gained in the survey of air, rail, and bus travel characteristics. Information on the modal split in other mass transit corridors in the United States is also used as a guide. The variables in this process are easily understood and thus may be quickly adjusted to reevaluate transportation needs and to reflect various planning policies. Once the modal trip tables are generated, they are assigned to a statewide air, rail, or bus network based on station accessibility; the remaining trips are assigned to the highway network. The end product is a computer plot that shows the potential travel volumes by mode and the probable impact of each population growth and energy future on state highway needs. This technique is being applied in rural portions of 13 of Michigan's 14 planning regions. (Author)

Newell, J Esch, RE (Michigan Department of Transportation) *Transportation Research Record* No. 710, 1979, pp 19-26, 3 Fig., 3 Tab., 4 Ref.; This paper appeared in TRB Record No. 710, Current Issues in Statewide Transportation Planning.; ORDER FROM: TRB Publications Off

42 302254 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: ESTIMATING RIDERSHIP AND COST. VOLUME 3. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. In January 1976, the U.S. Department of Transportation issued Technical Notice DOT-1-76 requesting transportation planners, engineers, and transit operators to submit useful but not widely known manual techniques that could be developed and distributed as simplified aids for transportation analysis. Over 70 analytical aids were submitted in response to this request. Based on an evaluation process conducted to determine the most useful, easily applied, and generally applicable techniques, several of these analytical aids have been selected and documented in sufficient detail to permit their immediate use. In addition to these techniques, three additional analytical aids were developed as part of the Short Range Transportation Planning project, and an annotated bibliography of each analytical aid reviewed was prepared. These individual analytical aids and the annotated bibliography have been prepared as separate reports and have been brought together in this Manual of Simplified Aids for Transportation Analysis. In this report, an analytical aid is presented which provides a simple method for estimating the annual ridership and operating expenses of fixed-route bus system alternatives in urban areas with population of less than 300,000. This method is based on regression equations generated principally from 1974 operating data for 55 U.S. fixed-route bus systems. These equations can be used to develop preliminary estimates of the annual ridership and public financial operating assistance required for such systems in small urban areas. The equations can be solved using a hand calculator and readily available data inputs. (UMTA)

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, (UTP.PMM.77.1.1) Final Rpt. UMTA-IT-06-9020-79-3, Jan. 1979, 29 p.; Contract DOT-UT-50021; ORDER FROM: NTIS; PB-299982/AS

42 302256 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: ESTIMATING PARKING ACCUMULATION. VOLUME 5. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. The analytical aid described in this report provides a method for estimating the accumulation of parked vehicles within a study area over the course of a typical weekday. Parking accumulation and utilization of parking facilities may be estimated for all parkers, long-term parkers, and/or short-term parkers, based on an estimate of daily automobile trip destinations, an inventory of available parking supply, and a set of parking "accumulation factors" which may be derived from a parking survey within the study area or from default values provided in this report. The primary use of the parking accumulation estimation method is to analyze the adequacy of available parking supply in relation to expected parking demand. The method may also be used to monitor and suggest revisions to automobile travel impedance values used in transportation planning models. Modifications, embellishments,

and improvements to the procedures suggested in this report are encouraged should local data or previous analyses suggest a more appropriate method. (UMTA)

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, (UTP.PMM.77.1.1) Final Rpt. UMTA-IT-06-9020-79-5, Jan. 1979, 47 p.; Contract DOT-UT-50021; ORDER FROM: NTIS; PB-299984/AS

42 302258 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: FORECASTING AUTO AVAILABILITY AND TRAVEL. VOLUME 2. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. In this report, an analytical aid is described which provides a method for deriving and using the variable of automobile availability per household. This is an important socioeconomic variable in travel demand estimation. It is frequently not available, however, at the level desired, e.g., transportation planning zone, traffic zone, or census block, or for the current year at any level. In the course of the research in which this aid was developed, a strong correlation was found between auto availability per household and the product of two other variables: the average market price of homes and the percent of home ownership. Data for these two variables are generally more readily available at the block or zone level or may at least be forecast more precisely at this level than automobile availability. This report describes auto availability per household as a function of the product of the two variables. Estimates of automobile availability derived from this function can be applied to trip generation and modal split analysis in transit system studies, route patronage estimation, and sketch planning studies in urban areas of any size. Examples of trip generation and modal split applications of the variable are also presented in this report. It is pointed out in the report, that because of the intent to provide a simplified analysis aid, modifications, embellishments, and improvements to the suggested procedures and models are encouraged, provided local data or previous analyses suggest a more appropriate method. (UMTA)

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, (UTP.PMM.77) Final Rpt. UMTA-IT-06-9020-79-2, Jan. 1979, 35 p.; Contract DOT-UT-50021; ORDER FROM: NTIS; PB-299981/AS

42 302260 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME IX: URBAN TRANSPORTATION PLANNING WORKSHOP. This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshop on Urban Transportation Planning. It includes discussions of the needs and problems of the transit operating industry in planning for urban transportation and research in transportation planning methods. This volume contains three resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of

the general sessions and a listing of conference participants. These proceedings (Rpt. Nos. UMTA-DC-06-0157-79-1 thru UMTA-DC-06-0157-9) consist of nine separately titled volumes, namely: Volume I: Proceedings of General Sessions and Summarized Reports of Workshops; Volume II: Bus and Paratransit Technology Workshops; Volume III: AGT and Advanced Systems Workshops; Volume IV: Service and Methods Demonstration Workshops; Volume V: UMTA Special Technology Programs Workshops; Volume VI: Rail and Construction Technology; Volume VII: Transit Management Workshops; Volume VIII: Access for Elderly and Handicapped Persons Workshops; and Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association, Urban Mass Transportation Administration, (DC-06-0157) UMTA-DC-06-0157-79-9, Nov. 1978, 29 p.; Volume I, cited above, will be available in December 1979; all other volumes are available at NTIS; Contract DOT-UT-70026; ORDER FROM: NTIS; PB-300994

42 302263 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME IV: SERVICE AND METHODS DEMONSTRATIONS WORKSHOPS. This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Service and Methods Demonstrations. Part I deals with pricing policy innovations and includes discussions of the general objectives of the program, where the emphasis in this program ought to be placed from the viewpoint of the transit operating industry, and the evaluation of this pricing policy innovation program. Part II, conventional transit and paratransit service innovations, includes discussions of conventional transit service demonstrations and the paratransit demonstration program. This volume contains five resource papers which can be found summarized in Volume I of this work along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants. These proceedings (Rpt. Nos. UMTA-DC-06-0157-79-1 thru UMTA-DC-06-0157-9) consist of nine separately titled volumes, namely: Volume I: Proceedings of General Sessions and Summarized Reports of Workshops; Volume II: Bus and Paratransit Technology Workshops; Volume III: AGT and Advanced Systems Workshops; Volume IV: Service and Methods Demonstration Workshops; Volume V: UMTA Special Technology Programs Workshops; Volume VI: Rail and Construction Technology; Volume VII: Transit Management Workshops; Volume VIII: Access for Elderly and Handicapped Persons Workshops; and Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association, Urban Mass Transportation Administration, (DC-06-0157) UMTA-DC-06-0157-79-4, Nov. 1978, 56 p.; This report is a sequel to reports: Proceedings of the UMTA/APTA R&D Priorities Conference, February 1978 (PB 255-898); and Proceedings of the Second R&D Priorities Conference, December 1976 (PB 266-158); Contract DOT-UT-70026; ORDER FROM: NTIS; PB-300989

42 302265 PROCEEDINGS OF THE THIRD UMTA R&D PRIORITIES CONFERENCE, CAMBRIDGE, MASSACHUSETTS, NOVEMBER 1978. VOLUME II: BUS AND PARATRANSIT TECHNOLOGY WORKSHOPS. This is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Bus and Paratransit Technology. Part I deals with paratransit integration and includes discussions of operational technologies (as distinct from vehicle and propulsion system development), experiences of the City of Cincinnati with their Urban Transportation Laboratory Program, the Logan Airport (Boston) Share-A-Cab Program, and the Rochester Dial-A-Ride Program. Part II (Bus Technology, Paratransit Vehicle Development, and Flywheel Energy Storage System) contains discussions of the vehicles themselves and the Flywheel Energy Storage Program. This volume contains six resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants. These proceedings (Rpt. Nos. UMTA-DC-06-0157-79-1 thru UMTA-DC-06-0157-9) consist of nine separately titled volumes, namely: Volume I: Proceedings of General Sessions and Summarized Reports of Workshops; Volume II: Bus and Paratransit Technology Workshops; Volume III: AGT and Advanced Systems Workshops; Volume IV: Service and Methods Demonstration Workshops; Volume V: UMTA Special Technology Programs Workshops; Volume VI: Rail and Construction Technology; Volume VII: Transit Management Workshops; Volume VIII: Access for Elderly and Handicapped Persons Workshops; and Volume IX: Urban Transportation Planning Workshop.

American Public Transit Association, Urban Mass Transportation Administration, (DC-06-0157) UMTA-DC-06-0157-79-2, Nov. 1978, 67 p.; This report is a sequel to reports titled: Proceedings of the UMTA/APTA R&D Priorities Conference, February 1978 (PB 255-898); and Proceedings of the Second R&D Priorities Conference, December 1976 (PB 266-158); Contract DOT-UT-70026; ORDER FROM: NTIS; PB-300987

42 302277 MEASURING THE ACHIEVEMENT OF NATIONAL URBAN TRANSPORTATION GOALS AND OBJECTIVES: THE ROLE OF METROPOLITAN PLANNING ORGANIZATIONS. The U.S. Department of Transportation has issued a data reporting requirement for Metropolitan Planning Organizations (MPOs) to collect general transportation-related data to assess transportation goal achievement in a broad context. The institutionalization of the MPO data reporting requirement is the focus of this report. The purpose of this research is to assess the extent to which the MPO data reporting requirements can serve both local and national needs for quality data without burdening the MPO. The analysis consisted of four parts: 1) the status of urban transportation planning; 2) origins of transportation system management; 3) data collection and its influence on the "type" of planning being done; and 4) the impact of the Transportation Research Board's new data reporting set on two case study MPOs in Cedar Rapids, Iowa and Rock Island, Illinois.

The research in the report analyzed the impacts of financing procedures and constraints on the transportation systems in small urban areas, examined the effectiveness of public transportation planning, and developed and allocation procedure for state transit assistance programs. A case study methodology was employed to permit greater depth of analysis than would be possible with comparative data for all urban areas. Three cities in the state of Iowa were selected: Cedar Rapids, Davenport, and Iowa City. The lack of support for the MPO data reporting program at either the federal or local level might be attributed to the data itself, which resulted from compromise between federal data requirements to assess national policies and programs and local requirements for more location-specific data. Under voluntary compliance, the success of the program is dependent on MPO acceptance of the notion that the data items are useful for their own planning process.

Lookingbill, D Dueker, KJ ; Iowa University, Urban Mass Transportation Administration, (TR 109) Final Rpt. UMTA-IA-11-0001-79-2, Nov. 1978, 38 p.; Contract IA-11-0001; ORDER FROM: NTIS; PB-300417/AS

42 302349 A TECHNOLOGY ASSESSMENT OF TRANSPORTATION SYSTEMS DESIGN IN THREE CASE STUDY COMMUNITIES. Described is a method of technology assessment capable of evaluating transportation alternatives for a variety of city sizes, land-use patterns and socioeconomic characteristics. It is an abstract technology assessment format capable of generic evaluation over a hierarchy of city sizes, shapes and modal transportation technology characteristics using unit cost and impact data. A research agency is able to rapidly examine sensitivities and boundaries of rational or optimal transportation investments. This examination may occur over a group of similar or different regions and may draw significant conclusions about the mix of transportation technology investments most likely needed and capable of compatible operation.

Haefner, LE Hutchins, L Lang, D Meyer, R Yarjani, B (Washington University, St Louis) ; Cross (Richard B) Company Proceeding Vol. 20 No. 1, 1979, pp 205-212, 5 Tab.; Proceedings of the Twentieth Annual Meeting of The Transportation Research Forum, "Transportation Alternatives in a Changing Environment", held October 29-31, 1979, Drake Hotel, Chicago, Illinois.; ORDER FROM: Cross (Richard B) Company, P.O. Box 405, Oxford, Indiana, 47971

42 302371 TRANSPORT TECHNOLOGY: INTRODUCTION TO ECONOMICS OF TRANSPORT [Ingeniería del transporte: introducción a la economía del transporte]. In order to establish the principles upon which the setting up of transport tariffs are based, it is necessary to state certain economic conditions of transport and to define the meaning of the term "transport" and certain other terms in relation to transport and to analyse briefly both the function and the effects of transport on the political, social and economic plan, where the transport sector leads to an increase in markets and a reduction in prices, establishing an equilibrium in the provision of articles and influencing their production and the distribution of the national revenue. A

rapid analysis of the different transport modes and their operation as a service to the community has led the researchers to stress the increasingly pronounced character of the transport sector as a public service, particularly the railways. This has led them to study the intervention of the government in this field and the related problems of competition and monopoly. On these bases, a study has been carried out of the problem of the fixing of railway tariffs, which is thought to be a question of establishing an equilibrium between supply and demand for transport. Thus an analysis of the supply (cost of production, specific charges and costs of each item) and demand in the transport service leads to the conclusion that the determination of a railway tariff may be based on the following considerations: (1) the individual tariff for each item and the general level of profits determining the value of service: equilibrium between supply-demand. (2) the general level of profits should balance with the cost of transport. (3) it is essential to know the costs of loading and transit services. (4) the basis for fixing particular tariffs and profits taken together should give the general level of profits. (5) the profits from special tariffs represent the distribution of the general level of profits between the different items. (TRRL) [Spanish]

Ramirez, M ; National University of Colombia Monograph No Date, 35 p., 1 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 106931), Central Laboratory of Bridges & Highways, France, Ministry of Public Works, Spain; ORDER FROM: National University of Colombia, Facultad de Ingeniería, Prog de Investigaciones del Transp, Bogota, Colombia

42 302389 RAILWAYS INTO BUSWAYS WONT GO. A RE-EXAMINATION OF TWO CASE STUDIES. Reference is made to a 1976 publication entitled "Better Use of Rail Ways" which reported an evaluation of six case studies related to the conversion of existing rail links into general purpose roads. In this discussion paper the authors present a re-examination of two of the original six case studies in order to assess the validity of the assumptions and costings used in the 1976 study, and where found necessary to change them. The two cases described relate to the Crouch Valley line-a single track route linking Southminster and Wickford Station of the Southend to London main line; and the Colchester-Sudbury line on the Colchester-Liverpool Street main line. The economic evaluation and assessment of costs for each study is discussed, and traffic data are provided in a series of appendices. Economic rates of return are reported of 2.9 per cent and 1.6 per cent respectively, in contrast to values of 60 per cent and 30 per cent respectively quoted in the 1976 study. The reason for the marked contrast between the two findings is discussed, and on the basis of the new evidence the conclusion is reached that railway conversion into roads does not provide a general solution to the perennial problem of railway finance.

Cooper, JC Spaven, DL ; Polytechnic of Central London Monograph Mar. 1977, 52 p., 8 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 241842); ORDER FROM: Polytechnic of Central London, Transport Studies Group, 35 Marylebone Road, London NW1, England; P7903011

42 302733 ACCESSIBILITY TO EMPLOYMENT AND ANALYSIS AND MODELLING OF WORK TRIP LENGTHS IN SYDNEY. This thesis was submitted as partial requirement for the degree of Master of Engineering Science, School of Transport and Highways, University of New South Wales. It analyses journey-to-work trip lengths of workers in Sydney. The analysis involves the investigation of trip lengths and factors influencing trip lengths such as accessibility to employment and residential distance from the central business district (CBD), as well as the calibration of gravity models for journey-to-work. The analysis is based on the employment data extracted from the 1971 census of population and housing-the journey-to-work tabulation for Sydney. Trip lengths and accessibility to employment are investigated at the sub-regional (zonal) and the regional scale. The analysis has indicated that in Sydney male workers tend to travel further afield than female workers and that employment accessibility for males is about twice as high as that for females. (TRRL)

Chirachavala, T ; New South Wales University, Australia Thesis Dec. 1978, 141 p., Figs., Tabs., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239639), Australian Road Research Board

42 302751 CHOICE OF TRAVEL MODE FOR THE JOURNEY TO WORK: A DISAGGREGATE MODEL FOR SYDNEY. This thesis was submitted as partial requirement for the degree of Bachelor of Commerce (Honours), Department of Economics, University of New South Wales. The demand for the various methods of travelling and the factors influencing that demand are examined in this thesis. The various types of models available for this purpose are discussed together with the variables that are important in influencing demand. The estimation techniques available are also discussed. A survey of the literature on modal choice modelling is presented. A disaggregate modal choice model for the journey to work is estimated by discriminant analysis. Using this estimated model, predictions are made as to the effects of various policy changes which could be introduced by the transport authorities. The reaction to most of these policies are found to be relatively inelastic, a result which is in agreement with most other studies of this kind. (TRRL)

Freeland, BA ; New South Wales University, Australia THESIS Nov. 1976, 79 p., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239271), Australian Road Research Board

42 302924 RURAL ACCESSIBILITY: THE ROLE OF THE MOTOR CAR. Rising car ownership in rural Britain has greatly improved the accessibility enjoyed by some residents, while worsening that of others by undermining public transport and village services such as shops and pubs. Disadvantaged groups within the community are identified: they include many women, the elderly and the young. Still higher levels of car ownership are to be expected and this resource can, to some extent, be harnessed as a community resource. But devoting the bulk of available resources to road building and maintenance implies social inequities and a rigorous evaluation procedure embracing the full range of policy options is urgently needed. /Author/TRRL/

Moseley, MJ *Highway Engineer* Vol. 26 No. 6, June 1979, p 18, 1 Fig., 1 Tab., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241864)

42 302928 TRANSPORT AND LAND USE-A NORDIC PROJECT. The Nordic countries of Sweden, Norway, Finland and Denmark are co-operating in a research project, Nordkolt, implemented to evaluate imaginable future public transport systems adapted to different types of Nordic Towns, making allowance for the requirements of traffic development, environment and traffic safety. The whole project is described as being divided into three stages (1) survey of research and analytical work-available as well as in operation-and a start on problem analysis. (2) accomplishment of the problem analysis and elaboration of solutions and consequential analysis models. (3) theoretical testing of the results in eight Nordic towns. The author discusses the results obtained so far from studies in the eight towns based on three traffic situations. One involves heavily increased car traffic, the other reduced car traffic and heavily increased public transport, while the third presupposes some increase of public transport with virtually unchanged car traffic. It is suggested that the results could have important consequences for land-use planning in general. A list of the 18 reports published so far is appended. /TRRL/

Hvidtfeldt, H *Building Research and Practice* Vol. 6 No. 4, July 1978, pp 236-243, 1 Tab., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241876)

42 302937 TRANSPORTATION MODELS. The following papers were among those presented at the seminar: Car Ownership and Availability--the Agressive Driver Keeps the Traffic Flowing? (Race, JPA); The GLTS Car Ownership Forecasting Model (Sanders, MB and Smith, JER); The Distribution of Household Car Ownership (Downes, JD); Modelling Regional and National Levels of Car Ownership (Button, KJ, Fowkes, AS and Pearman, AD); Cost Influences on Car Ownership and Use (Daly, AJ); An Analysis of Household Transport Expenditures: 1971 to 1975 (Mogridge, MJH); The Generalised Cost Dilemma (Grey, A). Structure of Reliability and Assignment. Driver Route choice (Outram, VE and Thompson, E); Error and Uncertainty in Transport Models (Gilbert, D and Jessop, A); The Sensitivity of a Transport Model: Methods of Presentation and Planning Implications (Mason, AC, Bonsall, PW, Champernowne, AF and Wilson, AG); The Integration of Disaggregate Models with Existing Aggregate Models (Le Clercq, F and Ruijgrok, CJ); A Travel Time Model for Assignment Purposes (Bovy, PHL and Jansen, GRM); and, Regional Public Transportation Planning and Methods of Forecasting (Roulet, JP). (TRRL)

Planning and Transport Res and Computation Co Ltd No. P153, No Date, 209 p., Figs., Tabs., Refs.; Proceedings of Seminar G. PTRC, Summer Annual Meeting at University of Warwick, June 27-30, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 232256)

42 302951 SPATIAL TRAVEL PATTERNS AND PUBLIC TRANSPORTATION IN LOS ANGELES. Three origin-destination matrices of inter-zonal person trips for a section of the Los Angeles metropolitan region are analyzed using principal component analysis. The matrices represent total person trips, journey-to-work trips, and shopping trips. This allows for the identifica-

tion of a number of sub-regional travel fields or functional regions within the area. The composition of and interrelationships between these fields and the spatial coincidence of fields defined for different travel purposes are compared with existing and proposed public transit facilities. (TRRL) Clayton, C (California University, Santa Barbara) *Transportation Planning and Technology* Vol. 5 No. 3, 1979, pp 139-150, 7 Fig., 1 Tab., 47 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242190)

42 302955 TRANSPORTATION MODELS. PROCEEDINGS OF SEMINAR G. PTRC SUMMER ANNUAL MEETING UNIVERSITY OF WARWICK, JUNE 27-30, 1977. The following papers were among those presented at the seminar: Modelling public transport and accessibility-an integrated fares policy for transport in Greater London (Glaister, S and Lewis, D); Public transportation and accessibility in rural areas (Jensen, OH); Short-term planning model for passenger transport by train (Andersen, PJ). Models with limited data-modelling urban transport policies and its application to Belfast (Wallis, IP); Modelling without surveys (Evans, S and Mackinder, IH). Practical aspects of model theory. Calibration of gravity models from grouped data (Gunn, H); Convergence of gravity model balancing operations (Murchland, JD). (TRRL)

Planning and Transport Res and Computation Co Ltd P 153, No Date, pp 210-312, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 232257)

42 302963 (I) BACKGROUND TO THE OXFORDSHIRE COUNTY COUNCIL PUBLIC PASSENGER TRANSPORT PLAN. (II) DRAFT OXFORDSHIRE COUNTY COUNCIL PUBLIC PASSENGER TRANSPORT PLAN 1979/84. These two documents provide a complete account of the Oxfordshire County Council's public transport policies and proposals and the background to them. The background document discusses the Transport Act, 1978 in relation to public passenger transport services; national trends in public transport over the past 25 years; summarises government policy by particular reference to the 1977 Transport Policy White Paper; and discusses trends in Oxfordshire and the question of need for public transport- all these being factors which are stated to have influenced the council's attitudes. The draft transport plan provides a national view of prospects for public transport in the next decade, relates to transport strategy in the structure plan, presents the Council's policies and proposals for the next five years in the context of its wider land use and transport policies and covers the matters specified in the Transport Act, 1978. A series of appendices provides data on transport strategy; concessionary fares schemes; commercial stage services, supported services, express services and British rail services. (TRRL)

Oxfordshire County Council Monograph Dec. 1978, 32 p., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 242100)

42 302982 EAST SUSSEX COUNTY COUNCIL PUBLIC TRANSPORT PLAN APRIL 1979. An introductory chapter (1) reviews the Transport Act of 1978 and the Council's response to the Act, and describes the organisation of public transport in East Sussex. Four further

chapters deal with: (2) the existing situation; (3) consideration of problems and development of policies; (4) policies; and (5) implementation of policies. Three appendices contain: (1) an inventory of services; (2) interim guidelines in determining appropriate levels of service; and (3) a report of consultations, which is under separate cover. (TRRL)

East Sussex County Council Monograph Apr. 1979, 75 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 242050)

42 303006 IMPACTS OF TELECOMMUNICATIONS ON PLANNING AND TRANSPORT. This report contains chapters on the following subjects: (1) Telecommunications technology: Current trends (Smith, R); (2) Residential telecommunication applications: A general review (Short, J); (3) Research on the differences between telecommunication and face-to-face communication in business and government (Christie, B and Elton, M); (4) The spatial impact of telecommunication (Clark, D); (5) Implications for transport (Tyler, M); (6) Telecommunication and office location (Goddard, J and Pye, R); (7) Telephones in a welfare state (Gregory, P); (8) Service provision via local communication centres (Edwards, M). (TRRL)

Department of the Environment, England, Department of Transport, England Monograph Res Rpt. 24, July 1978, 276 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 242347)

42 303055 METROPOLITAN ADELAIDE PUBLIC TRANSPORT PATRONAGE STUDY: TRAIN AND TRAM SURVEYS. The south Australian Department of Transport commissioned Alan M Voorhees and Partners Pty Ltd to undertake a survey of levels of patronage on public transport in metropolitan Adelaide, including metropolitan rail services, s.t.a. Metropolitan radial and rail feeder bus services, and the Glenelg Tram services. This report consists of some 13 separate volumes: volume 1. Train and tram survey: summary report; volume 2. Noarlunga centre line: train report; volume 3. Noarlunga centre line: station report; volume 4. Outer harbour line: train report; volume 5. Outer harbour line: station report; volume 6. North gawler line: train report; volume 7. North gawler line: station report; volume 8. Bridgewater line: train report; volume 9. Bridgewater line: station report; volume 10. Adelaide Station barrier counts; volume 11. Glenelg tram line: tram report; volume 12. Glenelg tram line: stop report; volume 13. Glenelg tram: barrier counts. /TRRL/

Voorhees (Alan M) and Partners Pty Limited Monograph 1978, n.p., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 239259), Australian Road Research Board

42 303282 43RD INTERNATIONAL CONGRESS-HELSINKI 1979. TRAFFIC EVALUATION METHODS. The members of the International Union of Public Transport were surveyed via questionnaires as to the different methods of estimating passenger traffic currently in use. The methods ranged from exhaustive counts (which require large staffs or numerous automatic devices) to statistical methods based solely on sample surveys of passengers and using elaborate and accurate statistical processes. As a

result of this survey, the authors come to several conclusions. To ensure accuracy, traffic data should be expressed in terms of journeys made rather than journeys paid, i.e. it is desirable to dissociate the statistical data from those obtained from revenue accounting. While exhaustive counting is not a panacea and may involve errors despite adjustments that may be made, counting, even if partial, can nevertheless be used, provided it is properly corrected, complemented and integrated into a carefully elaborated evaluation process. Statistical methods also produce acceptable accuracy, at least at network level (about 2 percent executed). Therefore, the choice between counting and statistical methods must not be made in isolation. The study leading to this choice should take into account other factors, in particular the transit organization's objectives as regards control of passengers and level of service.

Frenois, M (Transexel, France) Sutton, D (Regie Autonome des Transports Parisiens, France) ; International Union of Public Transport Vol. 5B 1979, pp 3-36, Figs., Tabs., Photos., Apps.; 43rd International Congress-Helsinki, Finland, 10-15 June 1979.

42 303296 PUBLIC TRANSPORTATION POLICY MAKING IN FRANCE AS AN IMPLEMENTATION PROBLEM. Public transportation policy is analyzed as the output of a complex social system of interdependencies and power relationships linking the central state bodies to various economic and political organizations. The interest groups structure the system by controlling the implementation process. The system works because of cheating-violating the public regulations, but the interest groups need state regulation to protect their privileges. The paper demonstrates the importance of the implementation sequence of public policy, particularly in terms of its effects on the understanding of the definition of alternative solutions. We will concentrate on the way in which an ensemble of "system effects," induced by governmental action conditions both the perception of the problem to which this action is supposedly responding, and the elaboration of decisions to solve the problem. The method employed will be that of suggesting a form of analysis which will discern those fields of force and interaction processes with which decision makers, in this case public authorities, are confronted. The method employed should thus be useful in understanding the process of decision making. (Author)

Dupuy, F (Centrede Sociologie des Organisations, France) Thoenig, JC (European Institute for Business Admin, France) *Policy Science* 1979, pp 1-18

42 303483 AN APPRAISAL OF AUSTRALIAN URBAN TRANSPORT STUDY DATA-HOME INTERVIEW SURVEY DATA. Some 28 large-scale home interview travel surveys of Australian cities have been conducted in the past 20 years as part of a traditional transportation study, or a follow-up or up-date of such a study. All of these surveys (HISS) are included in this project report apart from that of Darwin which was carried out prior to Cyclone Tracy. The project identified the seven major stages of an HIS-(a) establish sample frame; (b) design sampling procedures; (c) design checks for sample representativeness; (d) design questionnaire; (e) define each data item; (f) design coding proce-

dure; and (g) decide how to incorporate the spatial dimension-and at each stage the approaches of each his were compared and critically analysed from the point of view of internal consistency. Before proceeding with these analyses an attempt was made to ascertain a clear statement of the objectives underlying each his. Unfortunately, clear objectives were rarely to be found, resulting in an unsatisfactorily large degree of internal inconsistency. Also before the stage-by-stage review, the past, existing and potential uses of his data were discussed. It is shown that potential uses include-(1) estimation of individual choice models of travel demand; (2) investigation into the 'activity pattern' view of travel demand; and (3) identification of public transport market segments. (TRRL)

Dumble, PL ; Australian Road Research Board Monograph Intern RptAIR 289-8, July 1979, 133 p., 6 Fig., 30 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239326), Australian Road Research Board

42 303489 ATTAINMENT AND UTILIZATION OF INFRASTRUCTURE FACILITIES [Erreichbarkeit und Nutzung von Infrastruktur Einrichtungen]. The correlation between demographic factors, car ownership and the use of municipal transport facilities are shown and empirically examined. An analysis of interviews reveals that users from various social groups travel different distances in order to make use of the available municipal facilities. Furthermore it is shown how, by transport systems (particularly that of the private car) the catchment area of a facility can be fundamentally increased and better used. In the end, however, this great advantage can be a disadvantage for those population groups who have no transport system at their disposal, since they are almost excluded from using the services because of the greater distances involved. As a result the empirical analysis shows the essential significance of transport systems for the use of a municipal infrastructure. (TRRL) [German]

Holzappel, H (Technical University of Berlin, West Germany) *Internationales Verkehrswesen* Vol. 29 No. 38, Nov. 1977, pp 362-370, 3 Fig., 2 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 308320), Federal Institute of Road Research, West Germany; ORDER FROM:

42 303539 URBAN TRANSPORT PLANNING: THE CHANGING EMPHASIS. This paper traces the major events and issues that have influenced the environment of transport planning, and the implications for method. The central themes are the move from a "consensus" model of society to a "conflict" model, the influence of budget constraint and sources of finance, the misplaced emphasis on "transport systems management", and the need for change in the disciplinary mix of professional planners in transport institutions. The paper concludes with some speculations on the future directions of method in transport planning. (Author/TRRL)

Hensher, DA (Macquaire University, Australia) *Search* Vol. 10 No. 1/2, Jan. 1979, pp 42-48, 2 Fig., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239296), Australian Road Research Board

42 303562 TRANSPORT STUDY FOR THE XII COMMONWEALTH GAMES. The study was prepared for the Metropolitan Transit Au-

thority. The prime objective of this study was to develop an appropriate transport strategy, embracing all land transport modes, for the 1982 Commonwealth Games. The study examined a broad range of options for transporting spectators, competitors, officials and VIP's to and from the events. The major physical components of the strategy include a series of peripheral car parks located to intercept motorists approaching the main venue from all directions, shuttle bus services operating between the car parks and the main stadium, special rail services with shuttle bus services, closure of major roads in the vicinity of the main stadium to give bus movements priority and protect the surrounding areas from a massive influx of vehicles parking on-street, provision of bus priority treatments on major approach routes, and the control of traffic at major intersections surrounding the site to allow only accredited vehicles (such as buses, taxis, residents' vehicles, VIP's etc) to pass. The operational components of the strategy anticipate the rail system being used to its maximum capacity, and the encouragement of high levels of car occupancy. (TRRL)

Voorhees (Alan M) and Partners Party Limited Monograph Dec. 1978, n.p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 239214), Australian Road Research Board

42 303829 PUBLIC TRANSPORT-EFFICIENCY AND EQUITY. This paper was presented at session 11-local government 1. It discusses basic public transport planning questions within a new-town context where land use is a major variable. The setting is Albury-Wodonga and the paper presents an historical record of public transport planning on that project. Three major aspects of planning are dealt with, namely, land use relationships, public transport system planning and public transport administration. The paper, as the title suggests, concentrates on efficiency and distributional evaluation commentary. (TRRL)

Nairn, RJ (Nairn (RJ) and Partners Proprietary Limited) *Australian Road Research Board Conference Proc* Vol. 9 No. 2, 1979, pp 32-40, 4 Fig., 4 Tab., 7 Ref.; Proceedings from the Ninth Australian Road Research Board Conference, Brisbane, 21-25 August 1978; ACKNOWLEDGMENT: TRRL (IRRD 239362), Australian Road Research Board

42 303918 REALITY OF COORDINATING TRANSPORTATION SERVICES: MAJOR ISSUES. The experiences of several communities in coordinating transportation services at the local level are analyzed, and a realistic assessment of both the potentials that can be realized through coordination and the barriers that participating agencies might face is urged. Key implementation variables--accurate data collection both before and during coordination efforts, resource assessment and coordination problems, organizational and institutional issues, and statutory and regulatory factors--are discussed. It is concluded that it is unwarranted to believe that simply coordinating social-service-agency and other providers' transportation services will solve the problems of resource utilization and cost. Policymakers must clearly identify three factors before beginning coordination attempts: realistic start-up costs, a realistic time frame, and realistic operational costs for coordinated systems. (Author)

Cutler, DA (Ecosometrics, Incorporated) *Transportation Research Board Special Report No. 186*, 1979, pp 52-55, 4 Ref.; This paper appeared in TRB publication Special Report No. 186: Paratransit, 1979.; ORDER FROM: TRB Publications Off

42 303939 ESTIMATING THE EFFECTS OF ALTERNATIVE LEVELS OF SERVICE ON RURAL TRANSIT RIDERSHIP. This paper deals with the need to assess public response to alternative levels of service and travel flexibility on proposed rural transportation systems. A public opinion survey was conducted in rural Otsego County, New York, among 254 households, 30 of which had no telephones. The survey presented three public transportation options (fixed route, dial-a-bus, and mobility club) and asked questions about possible use of such services at different fare and service levels. The survey questionnaire was designed to minimize noncommitment bias and responses were separated on the basis of automobile availability to minimize the need for adjustment for noncommitment. Adjustment for noncommitment was necessary for the group that had an automobile available. This adjustment was based on the proportion of transit trips made by the automobile-available group on the existing dial-a-bus system (as determined by an on-board survey), which operates in Oneonta, the county's largest city. Estimates of potential ridership were made for each transit option at different fare levels, service levels, and travel-flexibility levels. Although it is not suggested that the demand estimates developed for Otsego County are transferable to other areas, the relative changes in demand resulting from changing fare, service, and travel-flexibility levels should be generally useful.

Ugolik, WR Knighton, RC (New York State Department of Transportation) *Transportation Research Record* Vol. N No. 18, 1979, pp 34-39, 4 Tab., 10 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

42 304684 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MA., ON NOVEMBER 16-17, 1978. VOLUME IV: SERVICE AND METHODS DEMONSTRATIONS WORKSHOPS. The document is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Service and Methods Demonstrations. Part I deals with pricing policy innovations and includes discussions of the general objectives of the program, where the emphasis in this program ought to be placed from the viewpoint of the transit operating industry, and the evaluation of this pricing policy innovation program. Part II, conventional transit and paratransit service innovations, includes discussions of conventional transit service demonstrations and the paratransit demonstration program. This volume contains five resource papers which can be found summarized in Volume I of this work along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-4, Nov. 1978, 56 p.; See also volume 3, PB-300988,

and Volume 5, PB-300990.; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300989/1ST

42 304687 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MA., ON NOVEMBER 16-17, 1978. VOLUME VII: TRANSIT MANAGEMENT WORKSHOPS. The document is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshops on Transit Management. Part I deals with management systems developments and includes discussions of transit operations and maintenance management support, automated scheduling of transit services, and development of the skills and techniques required by the transit operating industry. Part II, human resources development, includes discussions of human resources development programs, the national study for the validation of a selection test battery for bus operators, and areport by the AFL-CIO Appalachian Council on their transit employee training project. This volume contains six resource papers which can be found summarized in Volume I of this multi-volume work along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-7, Nov. 1978, 123 p.; See also Volume 6, PB-300991, and Volume 8, PB-300993.; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300992/5ST

42 304689 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MA., ON NOVEMBER 16-17, 1978. VOLUME IX: URBAN TRANSPORTATION PLANNING WORKSHOP. The document is a compilation of material that was presented at the Third UMTA R&D Priorities Conference Workshop on Urban Transportation Planning. It includes discussions of the needs and problems of the transit operating industry in planning for urban transportation and research in transportation planning methods. This volume contains three resource papers which can be found summarized in Volume I of this report along with summaries of other workshop sessions. Volume I also includes the proceedings of the general sessions and a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-9, Nov. 1978, 30 p.; See also Volume 8, PB-300993.; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300994/1ST

42 304720 TRANSIT CORRIDOR ANALYSIS-A MANUAL SKETCH PLANNING TECHNIQUE. This is a user's handbook. It describes a sketch planning technique for quick first evaluations of urban transportation planning proposals—a manual technique which does not require computers. It presents the technique's computational steps, which rely heavily on graphic aids, in an orderly manner and minute detail. The technique is useful in the analysis of

short and long range plans for urban line-haul transit systems. The manual technique does not provide a single, definitive solution, but it can provide, for each system, alternative measures of demand, performance (cost and travel times), and impact to help local decision making. The technique has three modular phases: demand estimate, cost analysis, and impact analysis. It is also modular within the phases, since the user is free at many points to substitute his own data or analytical techniques and to substitute local estimates for the default values supplied. This book has four divisions. The introduction describes the purposes and uses of the technique. The second chapter, an overview, discusses general parameters and assumptions, and identifies those situations in which the technique can be applied. The third chapter describes the method and computation procedures and gives examples of each step of the procedures as applied to a sample problem. The appendices contain nomographs and blank work sheets which can, at the user's option, be used to make some of the calculations.

Carter, MM Watkins, RH O'Doherty, JD Iwabuchi, M Schultz, GW; Comsis Corporation, Urban Mass Transportation Administration, (UMTA-MD-06-0046) Final Rpt. UMTA-MD-06-0046-79-1, Apr. 1979, 207 p.; Prepared in cooperation with De Leuw, Cather and Co., Washington, DC., Voorhees (Alan M.) and Associates, Inc., McLean, VA., and Pratt (R. H.) Associates, Inc., Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301378/6ST

42 304794 SERVICE AND METHODS DEMONSTRATION PROGRAM. EXECUTIVE SUMMARY. The objectives of the program are to: (1) provide more efficient and effective public transportation service; (2) bring about the use of local regulatory and pricing authority to encourage ridesharing and transit use; (3) develop a mix of innovative transit service models that appeal to a wide range of user groups; (4) integrate the use of private and public providers into a comprehensive set of public transportation services; (5) develop information to assist local, state, and Federal policy formulation; (6) guide an improved level of local response to UMTA regulations concerning transportation system management (TSM), elderly and handicapped, and Alternatives Analysis. This Executive Summary contains a summary of the contents of the Service and Methods Demonstration Program Annual Report for fiscal year 1978.

Spear, BD Casey, R Kendall, D Ott, M Page, E Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0049) Ann Rpt. UMTA-MA-06-004907907, Aug. 1979, 43 p.; See also report dated July 78, PB-292008.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-106222

42 305402 THREE POINT PROGRAM TO REDUCE FUEL CONSUMPTION, TRAFFIC CONGESTION, AND AIR POLLUTION-STATUS REPORT (CONNECTICUT). The report presents information concerning the Three Point Program to reduce fuel consumption, traffic congestion, and air pollution. The three points of the program are as follows: Foster carpooling and charter express bus service (bus pooling) in private industry through the use of the Depart-

ment's Computer consultation services; Construct additional interchange parking facilities to facilitate carpooling; and Develop additional express commuter bus service between suburban areas and the central business districts of Connecticut cities.

Connecticut Dept. of Transportation, Wethersfield., Div. of Mass Transit Planning. July 1975, 22p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301224/2ST

42 305443 URBAN TRANSPORTATION: INTERMODAL CONSIDERATION AND EVALUATION OF SHORT DISTANCE TRANSPORT TECHNIQUES. The project is divided into four parts: (1) Requirements of Short-Distance Transport Systems; (2) Inventory; (3) Assessment and Comparison; and (4) Conclusions. Different groups of people have different requirements with regard to short-distance transport systems. The study examines the various requirements from the points of view of passengers, town and traffic planning, community/environment, and public transport operators. In each of the areas discussed, judgement criteria can be defined for the various requirements. The inventory is based on three elements: (1) brief system descriptions; (2) description of existing transport systems and their future development; and (3) description of new transport systems. Questionnaires for system data have been developed and annexed to the section containing the system descriptions. The section dealing with the description of existing short-distance transport systems and their future development covers rapid transit railways, tramways, motor buses as well as the system groups dual-mode and dial-a-bus; the difference between the latter two bus systems and the conventional bus consisting, in the first case, in an additional technical component (track-guidance), in the second case, in the operating concept (possibility of ordering or calling a bus). The assessment and comparison of short-distance transport systems can be effected by means of formalised assessment methods or by verbal comparison. Section 1 of chapter 3 outlines the three assessment approaches: (1) cost-benefit analysis; (2) cost-effectiveness analysis, and (3) multi-attribute utility analysis. The chapter "conclusions" describes cost developments of transport systems.

NATO Committee on the Challenges of Modern Society NATO/CCMS-57, Oct. 1976, 375 p.; Report on CCMS: Urban Transportation Pilot Study.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-102999

42 305444 URBAN TRAVEL FORECASTING. More often than not, today's urban transportation planner is being asked to determine the consequences of not making a certain transportation investment rather than to determine what investments need to be made to meet the otherwise unconstrained demand for transport services. By simplifying and achieving a degree of standardization in travel estimation procedures, benefits could accrue to the user nations in the form of time and cost savings as well as broadening the spectrum of conditions under which the forecasting procedure can be expected to operate. The first benefit could result from the application of a less sophisticated, and therefore less costly, forecasting procedure. The latter benefit could

result in a cross fertilization of knowledge regarding the consequences of various policy decisions. North American cities can be characterized as relatively low in density, high in auto ownership, and low to moderate in public transit usage. European cities, on the other hand, are generally higher in density, lower in auto ownership, and demonstrate a correspondingly higher transit usage. Under these circumstances, the desirability of a generalized simple and efficient forecasting procedure, suitable for application to a broad range of conditions has become greatly heightened.

NATO Committee on the Challenges of Modern Society CCMS-87, June 1978, 175 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-103005

42 305451 RECENT DEVELOPMENTS IN URBAN TRANSPORTATION. This is a follow up report that incorporates a summary of developments in American cities during 1975-1977 and developments in the participating countries since the initial reports were issued. The following topics are discussed: urban travel forecasting; demand systems (dial-a-ride) evaluation; bus priority systems; urban goods movements; and Short distance transport techniques.

NATO Com on the Challenges of Modern Society CCMS-82, June 1978, 79 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-103963

42 305683 MISSISSIPPI STATEWIDE PUBLIC TRANSPORTATION STUDY. The study identifies rural and urban public transportation needs and presents recommendations for better needs assessments, coordination of resources and management of federal, state and regional transportation programs.

Van Sichel, K Heathington, KW ; Hensley-Schmidt, Incorporated, Mississippi State Highway Department, Urban Mass Transportation Administration Final Rpt. June 1978, 172 p.; Sponsored in part by Urban Mass Transportation Administration, Washington, DC., and Mississippi State Highway Dept., Jackson.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-107212

42 305743 REPORT ON THE POTENTIAL FOR INTEGRATING RAIL SERVICE PROVIDED BY THE NATIONAL RAILROAD PASSENGER CORPORATION WITH OTHER MODES. The report is in response to Section 17 of the Amtrak Improvement Act of 1974 which directed the Secretary of Transportation to conduct a study "on the potential for integrating rail service provided by the National Railroad Passenger Corporation (Amtrak) with other modes of transportation including buses, with particular attention to the needs of rural areas." Relevant aspects of Amtrak and the intercity bus systems are examined to indicate the potential for integration growing out of the characteristic, performance, economic, social, and institutional arrangements of these two modes. Several significant areas of difficulty in developing an integrated system are uncovered; not the least of which is the costs to both modes which would result. The number of bus or rail passengers who would probably respond to the integrated rail-bus system is minimal based upon the concentration of populations within the appropriate concentric isotime zones required to get to the

railroad station. The length of time of access to the station may be only a small fraction of the total travel time or the passengers will not use the integrated rail-bus system.

Federal Railroad Administration Cong Rpt. FRA/RFA-1/76/05, May 1976, 185 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-116999, DOTL NTIS

42 305825 MASS TRANSIT METRICATION: A RECOMMENDED POLICY AND METRIC CONVERSION PLAN FOR UMTA. The study was undertaken in order to develop for the Urban Mass Transportation Administration (UMTA) a recommended policy and comprehensive plan for the orderly conversion to the uses of the International System of Units, or the metric system. This report suggests some actions which the Urban Mass Transportation Administration, the American Public Transit Association, and the Department of Transportation can take to best fill the perceived needs of members of the mass transit industry, and at the same time, use the proven techniques learned by those who have successfully converted to the metric system. This report includes a listing of recommendations to UMTA for the accomplishment of these actions. In particular, this report recommends the use of metric units on new designs based on the Cumulative Cost approach. It also details the metrication activities of some organizations and their problems and successes. With those companies which have already begun implementation of the metric system, it was found that engineering standards exist for virtually all the needs of the organizations impacted by UMTA.

Automated Management Systems, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-IT-06-0209-79-1, July 1979, 130 p.; Grant DOT-UT-80015; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125008

42 307697 MICHIGAN STATEWIDE TRANSPORTATION MODELING SYSTEM, VOLUME XIII-A. MULTI-MODAL MOBILITY AND ACCESSIBILITY ANALYSIS, STATEWIDE RESEARCH AND DEVELOPMENT. This volume documents an analysis procedure which enables one to measure the accessibility of selected groups of the population to travel modes such as rail, bus and air. The process utilizes existing tools created for use with the statewide highway model, adjusting the analysis procedure so as to better deal with and resolve such multimodal transportation issues as improvement of public mobility and goods movement, abandonment of stations or lines, etc. In view of the growing concern for improved public transportation and freight service, such procedures should be of special interest to transportation planners. /Author/

Newell, JA *Statewide Transportation Analysis and Research* Monog Ser Vol XIII-A, Nov. 1974, 26 p., 14 Fig.; ACKNOWLEDGMENT: Michigan Department of Transportation; ORDER FROM: Michigan Department of Transportation, 425 West Ottawa, P.O. Box 30050, Bureau of Transp Planning, Lansing, Michigan, 48909

42 307909 THE PLANNING OF RURAL PUBLIC TRANSPORT [Planering foer kollektiv landsbygdstrafik]. This report is a study on the structure of commuter traffic in Uppsala County.

Its purpose is to obtain material to be used as a basis for effective planning of (1) bus-tours for commuter traffic to and from work, (2) the connecting of an area and a working place through bus connections, (3) commuter traffic during energy crisis. A densely populated area was used as a basis for the study, and its connections with densely and sparsely populated areas as well as the connections within the areas themselves are described in the form of maps and tables. Also, the material is classified according to the commuters' branches of industry and their choices of transportation. In November 1975, of 18000 commuters only 12% used public transport. The explanation is thought to be that most bus schedules were not adapted to the commuter traffic, and the bus fares were too high. Thus, by using employers' enquiries the time of this traffic to and from work was mapped in order to determine bus-tours according to the commuters' need. By re-arranging the bus schedules the traffic output in Uppsala County increased by 35%. Through co-ordination this improvement could be obtained by only 5% increase of the resources in the form of buses and drivers. Preliminary estimations show that the total number of rural bus-tours has increased 50% during one year. If only commuter traffic is taken into account, the increase is even greater. (TRRL) [Swedish]

Transportnaemnden Monograph 1979, 51 p., 7 Fig., 12 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 242545), National Swedish Road & Traffic Research Institute

42 307967 TRANSIT CORRIDOR ANALYSIS-A MANUAL SKETCH PLANNING TECHNIQUE. The development of the manual sketch planning technique was undertaken for UMTA as part of its Software Systems Development Program (SSDP). This handbook is a revised version of the May 1976 draft final report. Modifications have been made to the transit impedance of nomographs based on experience gained through testing of the procedures. Additionally, the cost calculations have been updated to reflect unit costs as reported in the July 1977 release of the Characteristics of Urban Transportation Systems (CUTS) manual. The technique, in its final form, will become a module of the Urban Transportation Planning System (UTPS). Thus, it will be a useful addition to the set of planning tools now available. This user's handbook describes a sketch planning technique for quick first evaluations of urban transportation planning proposals--a manual technique which does not require computers--and presents the technique's computational steps, which rely heavily on graphic aids in an orderly manner and minute detail. The manual technique is useful in the analysis of short and long range plans for urban line-haul transit systems. The technique does not provide a single, definitive solution, but it can provide for each system, alternative measures of demand, performance (cost and travel times) and impact to help local decision making. The technique has three modular phases: demand estimates; cost analysis; and impact analysis. It is also modular within the phases, since the user is free at many points to substitute his or her own data or analytical techniques and to substitute local estimates for the default values supplied. This manual has four divisions. The introduction describes the purposes and uses of the technique. The second chapter, an overview, discusses gen-

eral parameters and assumptions and identifies those situations in which the technique can be applied. The third chapter describes the method and computation procedures and gives examples of each step of the procedures as applied to a sample problem. The appendices contain nomographs and blank work sheets which can, at the user's option, be used to make some of the calculations.

Carter, MM Watkins, RH O'Doherty, JD Iwabuchi, M Schultz, GW Hinkle, JJ ; COMSIS Corporation, De Leuw, Cather and Company, Urban Mass Transportation Administration, Voorhees (Alan M) and Associates, Incorporated, Pratt (RH) Associates, Incorporated, (MD-06-0046) Final Rpt. UMTA-MD-06-0046-79-1, Apr. 1979, 207 p.; ORDER FROM: NTIS; PB-301378/AS

42 307972 CLASSIFICATION OF URBAN AREAS FOR TRAVEL FORECASTING. The common practice of classifying cities into large, medium, and small population sizes, while appealing at first sight, is not adequate for travel forecasting. Two large cities with similar population sizes, for example, may turn out to have drastically different urban structures, thus generating totally different travel patterns. A more refined classification scheme involving both urban size and structure is therefore discussed in this paper. Person-trip-hours-of-travel--as determined by the product of trip frequency and trip duration--is used as a classification criterion, since trip frequency measures the rate of trip-making while trip duration indicates the length of the journey. According to this scheme, a city is either identified as large/multinucleated, large/core-concentrated, medium/multinucleated, or medium/core-concentrated. The validity of such a taxonomy is tested and proven by the data compiled from over 50% of the cities in the United States.

Chan, Y (Pennsylvania State University, University Park) Perl, J *ASCE Journal of Transportation Engineering* Vol. 105 No. 5, Sept. 1979, pp 513-524, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 307983 SOME EFFECTS ON AUSTRALIAN URBAN TRANSPORT OF STRUCTURAL ECONOMIC CHANGE. This paper briefly reviews the existing Australian situation in respect of urban person and freight transport. It identifies those aspects likely to be sensitive to structural economic change and related changes. The extent of such sensitivity is discussed, using such empirical evidence as is available. (TRRL)

Ogden, KW ; Monash University, Australia, (0156 - 2126) Monograph Working Pap No. 79/6, May 1979, 39 p., 2 Fig., 7 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239334)

42 307994 SWEDEN'S STATE OF THE ART REPORT TO THE INTERNATIONAL COLLABORATIVE STUDY ON FACTORS AFFECTING PUBLIC TRANSPORT PATRONAGE. The aim of this report is to collect and evaluate Swedish experiences from studies of factors affecting public transport patronage and to analyse factors affecting travel patterns and modal choice in urban areas. Development trends in urban areas and domestic travel are described together with a general framework

of factors affecting travel consumption in a 40-year context. Four different methods of analysing travel behaviour are discussed and aggregated and disaggregated models are compared. Results from Swedish cross-sectional studies are presented. An analysis of different factors such as modal choice and demand elasticities is performed. This analysis comprises disaggregate studies using the logit model and studies based on aggregate data (a car ownership model and a transportation market-equilibrium mode-TRAMA). The interdependence between urban structure and travel pattern is analysed by means of three different sensitivity studies. The first of these studies uses the Ic-S-model, based on a combined cross-sectional and time-series data set. The two following sensitivity studies utilize the TRAMA-model as a tool for evaluating travel pattern in different urban structures. /TRRL/

Algers, S Hansson, A Tegner, G Widert, S ; Swedish Council for Building Research, (91-540-3053-6) Monograph DOC D7:1979, Mar. 1977, 73 p., 10 Fig., Tabs., 25 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239000), National Swedish Road & Traffic Research Institute

42 308012 URBAN TRANSPORT POLICY. Is it possible to spell out an urban transport policy for Australian cities in general or for the individual capital cities and metropolitan areas? Drawing on experience in South Australia, this paper describes the complexity of urban transport policy formulation and coordination, the significance of other factors of urban planning and development to transport, and the impact of statewide and national transport on the city. Current policy tools such as regulation and subsidy will increasingly be complemented or supplemented by measures influencing the demand for transport, some of which may not be popular. /TRRL/

Scrafton, D (South Australia Department of Transport) *Search* Vol. 10 No. 1/2, Jan. 1979, pp 14-20, 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239298), Australian Road Research Board

42 308014 USE OF CARS FOR SUBURBAN WORK TRIPS. During July, August and September, 1978, The National Roads and Motorists' Association (N.R.M.A.) carried out a work trip survey in five industrial areas of Sydney--South Sydney, Botany, Bankstown, Auburn and Warringah. Almost ninety percent of the respondents travelled to and from work by motor vehicle and only 8 percent used public transport. Only 28 percent of drivers carried any passengers and less than 2% of the respondents were involved in a car pool. Restriction of personal freedom was seen as the major disadvantage of car pools and disadvantages of car pools were far more strongly supported than their advantages. The major reasons given for using a motor vehicle were 'quicker by motor vehicle', convenience' and 'no direct public transport'. The major reason given to effect a change to public transport was to make public transport more accessible. 86.5 percent of the respondents gave valid reasons for driving to work (use car during day, or no direct transport, etc). It is therefore concluded that A large majority of the suburban workforce travel to work by car and they mostly have valid reasons for so doing. There appears to be little opportunity for reducing the demand for road space by improving existing public transport (TRRL)

Cox, RG Fleming, DM ;

National Roads and Motorists Association
Monograph Nov. 1978, 38 p., 24 Tab., 4 Ref.;
ACKNOWLEDGMENT: TRRL (IRRD 239286)

42 308039 RESOLVES OF THE ASPHEN CONFERENCE ON FUTURE URBAN TRANSPORTATION. This consensus statement from the Aspen Conference, which attempted to develop a statement of direction of policy and action, includes a description of the current scenario, the factors which will shape future urban transportation, and specific recommendations for public and private sector policy and action. The conference was organized around seven subject areas: mobility and accessibility, energy, environment, safety, social issues, transportation economics and the roles of major actors. Problems, opportunities, and some inevitabilities related to the above aspects are covered, and conference recommendations are presented. Among the resolves highlighted are the following: energy conservation efforts alone will not suffice and commitment must be made to the development of alternative fuels; prices of domestic crude oil and retail motor fuel should be deregulated and special programs should be developed to offset the economic effects; a cooperative study of the health effects of pollutants from mobile and stationary sources and current standards should be reviewed; specialized transportation services and subsidy programs for the special problems of the elderly and handicapped should be pursued; federal and state programs supporting urban transportation should be revised to be more receptive to different forms of local and metropolitan government organization; and national goals should be adopted to guide future transportation and urban land development.

Transport and Road Research Laboratory June 1979, 16 p., Photos.; This is the proceedings of a conference held at the Aspen Institute for Humanistic Studies, Aspen, Colorado, June 3-7, 1979. Sponsored by the American Planning Association, Transportation Planning Division.; ORDER FROM: Metro Area Planning Department, City Hall-10th Floor, 455 North Main Street, Wichita, Kansas, 67202

42 308084 SPECIFICATIONS FOR A NEW LONG-RANGE URBAN TRANSPORTATION PLANNING PROCESS. This paper asserts the continuing need for a long-range component to urban transportation planning, citing particularly the relationships between short-and long-range planning and the dangers of a single-minded concentration on short-range planning. However, the nature of the long-range planning procedure that is required is substantively different from that of most extant approaches. Some of the specific requirements and capabilities of a new procedure are described, and existing procedures are compared against these. In the latter part of the paper, some of the elements of a new long-range planning procedure are characterized. It is suggested that the procedure be built around a scenario approach to confronting and bounding future uncertainty. Second, the need to incorporate financial forecasting in the process is laid out and related to the scenario concept. Third, the need for travel-and impact-forecasting procedures is recognized and a set of input, output and operating requirements for such procedures are specified. It is suggested that improved sketch-planning tools may fit the

requirements to a large extent. It is also suggested that some procedures or models in the process should be "synthetic" models, not needing calibration for each new application. Finally, a number of requirements are specified for the display and evaluation of planning proposals from this procedure. A major emphasis is placed here on transparency of the process and responsiveness to direct intervention by the decision-maker. (Transportation)

Schofer, JOL Stopher, PR (Northeastern University) *Transportation (Netherlands)* Vol. 8 No. 3, Sept. 1979, pp 199-218, Refs.

42 308093 MARKET OPPORTUNITY ANALYSIS FOR SHORT-RANGE PUBLIC TRANSPORTATION PLANNING: ECONOMIC, ENERGY, AND ENVIRONMENTAL IMPACTS. Environmental assessments of alternative public transportation proposals are required by federal regulations developed in response to the 1969 National Environmental Protection Act. Therefore, impact analysis will be specially interested in this report. Transit marketers, planners, and engineers, at state and local levels, will also find how impact analysis interrelates with policy, marketing, and engineering--the three primary activities of short-range public transportation planning. The report is oriented mainly to small-and medium-sized urban areas. It recommends that analyses be based on expected market utilization instead of theoretical system capacities. Information is provided for both the Engineering Data Base and the Service Design sections of the model. The findings described in the report will assist the analyst in structuring information to permit an analysis of various public transportation service alternatives in meeting specified objectives, even though objectives may be conflicting. /Author/

Wegmann, FJ Bonilla, CR Bell, TL Dewhirst, D Sovchen, CA Heathington, KW (Tennessee University, Knoxville) *NCHRP Report* No. 210, Oct. 1979, 45 p., 7 Fig., Tabs., Refs., 2 App.; Research sponsored by American Association of State Highway and Transportation officials in cooperation with the Federal Highway Administration. Also available from NTIS as PB80-141468.; ORDER FROM: TRB Publications Off

42 308094 MARKET OPPORTUNITY ANALYSIS FOR SHORT-RANGE PUBLIC TRANSPORTATION PLANNING: TRANSPORTATION SERVICES FOR THE TRANSPORTATION DISADVANTAGED. This report addresses issues arising from provision of transportation services to the transportation disadvantaged in response to recent legislation and regulations. Social and economic impacts are substantial. Recommendations are developed on the premise that existing legislation and regulations are susceptible to change. Through an elucidation of the issues and alternative courses of action, this report should help in the future selection of more efficient, economical, and socially acceptable approaches. (Author)

Hood, TC Bell, TL Sovchen, CA Heathington, KW (Tennessee University, Knoxville) *NCHRP Report* No. 209, Oct. 1979, 52 p., Figs., Tabs., Refs., 3 App.; Research sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration. Also available from NTIS as PB80-143308.;

ORDER FROM: TRB Publications Off

42 308095 MARKET OPPORTUNITY ANALYSIS FOR SHORT-RANGE PUBLIC TRANSPORTATION PLANNING: TRANSPORTATION SERVICES FOR THE ALTERNATIVE SERVICE CONCEPTS. This report contains a general procedure to match desirable service attributes resulting from a market segmentation study with alternative service concepts to determine which alternative services are appropriate for a local area. In addition, key legal, regulatory, and institutional issues of the model involved in the provision of the alternatives are incorporated into the discussion. The purpose of this report is to encourage local planners to consider the full range of alternative public transportation services available to an urban area. "Public transportation," as used herein, includes all forms of intraurban passenger transportation that are available to the public, even if they are not considered common carriers. Public transportation, as defined here, includes private, public, and nonprofit systems. The public transportation system may move masses of people or only one person at a time. Rail systems have been excluded because they are generally beyond the scope of short-term planning considerations. /Author/ 308094EEBAPC1000000

Wegmann, FJ Bell, TL Chatterjee, A Heathington, KW Heathington, KW (Tennessee University, Knoxville) *NCHRP Report* No. 208, Oct. 1979, 52 p., Figs., Tabs., Refs., 3 App.; Research sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration. Also available from NTIS as No. PB80-141450.; ORDER FROM: TRB Publications Off

42 308097 MARKET OPPORTUNITY ANALYSIS FOR SHORT-RANGE PUBLIC TRANSPORTATION PLANNING: GOALS AND POLICY DEVELOPMENT INSTITUTIONAL CONSTRAINTS, AND ALTERNATIVE ORGANIZATIONAL ARRANGEMENTS. This report concerns the rationale and procedural steps necessary to develop workable goals for urban public transportation. Without such direction, little guidance is given to the decision-maker as to what markets to concentrate on and how to measure systemwide performance. The report addresses the task of determining goals and policies as well as the issues involved in preparing a goal/policy statement for public transportation in an urban community. The information developed should serve as a guide for planners responsible for coordinating goal/policy development activities in an urban community. This report also addresses critical institutional issues that transportation planners and decision-makers must face when attempting to provide new or improved public transportation services. Various federal, state, and local regulatory and institutional patterns have been developed for the provision of urban public transportation services. A thorough understanding of these issues is necessary in order to involve both public and private operators in the provision of public transportation services. A heavy emphasis on existing labor provisions in the supply of public transportation services and the opportunities for new private and minority firms to begin public transportation services has been

developed as an integral part of this report. The report provides information for which policy decisions can be made regarding appropriate organizational arrangements for providing public transportation services. A central concept stressed is that, with a market-oriented public transportation system management approach, the organizational structure must be tailored to the needs of the local area's needs political environment. /Author/

Cravens, DW McGhee, JL Mundy, RA (Tennessee University, Knoxville) Wickham, DQ (Wickham, DQ) Davis, FW, Jr Byrne, GE Heathington, KW Wegmann, FJ (Tennessee University, Knoxville) *NCHRP Report* No. 211, Oct. 1979, 161 p., Figs., Tabs., Refs., Apps.; Research sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration. Also available from NTIS as PB80-141443.; ORDER FROM: TRB Publications Off

42 308102 THE NO-ACTION ALTERNATIVE: IMPACT ASSESSMENT GUIDELINES. These guidelines will be of special interest to Agency administrators, project managers, and impact analysis responsible for project-level planning and impact assessment; the guidelines are applicable to both highway and transit planning. The guidelines define the transportation planning and impact assessment process showing how the no-action alternative can provide a benchmark for assessment of impacts and evaluation of alternatives. The guidelines address the issues of: (1) legal requirements governing no-action alternatives; (2) the role of the no-action alternative in transportation planning; (3) definition of no-action, minor (TSM), and major alternatives; (4) social, economic, and environmental impact assessment techniques for the no-action alternative; and (5) use of the no-action alternative in project evaluation. Although the guidelines are oriented toward transportation planning, many of the principles and procedures can be readily applied to the evaluation of other types of development projects. /Author/

Lane, JS Grenzeback, LR Martin, TJ Lockwood, SC (Crane (David A) and Partners/DACP, Incorporated) *NCHRP Report* No. 217, Dec. 1979, 174 p., Figs., Tabs., Refs., Apps.; Research Sponsored by the American Association of State Highway and Transportation Officials in cooperation with the Federal Highway Administration.; ORDER FROM: TRB Publications Off

42 308113 SERVICE AND METHODS DEMONSTRATION PROGRAM ANNUAL REPORT: EXECUTIVE SUMMARY. The Urban Mass Transportation Administration (UMTA) Service and Methods Demonstration (SMD) Program was established in 1974 to provide a consistent and comprehensive framework within which innovative transportation management techniques and transit services could be developed, demonstrated and evaluated, and the resultant findings disseminated in a timely manner to transportation planners, policymakers, and transit operators. The program focuses on strategies that involve the imaginative use of traffic management, pricing and marketing techniques, transit service variations, and existing technology to produce improvements which require relatively low levels of capital investment, and which can be

implemented in a short time frame. The objectives of the SMD program are to: 1) provide more efficient and effective public transportation service; 2) bring about the use of local regulatory and pricing authority to encourage ridesharing and transit use; 3) develop a mix of innovative transit service models that appeal to a wide range of user groups; 4) integrate the services; 5) develop information to assist local, state, and Federal policy formulation; and (6) guide an improved level of local response to UMTA regulations concerning transportation system management (TSM), elderly and handicapped, and Alternatives Analysis. This Executive Summary contains a summary of the contents of the Service and Methods Demonstration Program Annual Report for fiscal year 1978. Program activities and accomplishments discussed in the Annual Report are reviewed, including findings and insights from current demonstration projects, descriptions of future projects, and support activities in the areas of evaluation methodology and information dissemination. (UMTA)

Spear, BD ; Transportation Systems Center, Urban Mass Transportation Administration, (DTS-243) Annual Rpt UMTA-MA-06-0049-79-7, Aug. 1979, 43 p.; Contract MA-06-0049; ORDER FROM: NTIS; PB80-106222

42 308630 PUBLIC TRANSPORT PLANS (1) FAIL 'NEEDS' TEST. The transport act 1968 requires non-metropolitan county councils to produce public transport plans stating the needs for public transport in their areas. This first article in the series discusses the concept of transport 'needs' and the means by which they are determined. Distinctions are drawn between mobility and access, also between assessment of needs and the means for satisfying them. Basic needs, where the emphasis is on the characteristic of the individual, and general need where the emphasis is on the characteristics of the transport and land use systems, are considered. The principal discussion is of the assessment of basic accessibility needs, and the author discusses the role of the individual, the elected member of local government and the professional officer who advises the council and implements its policies, in this assessment. The criteria upon which judgements are made, i.e. felt needs and normative needs, are considered. For parts 2, 3 and 4 of the series see TRIS Nos. 308631-33. (TRRL)

Holder, A *Surveyor - Public Authority Technology* Vol. 154 No. 4551, Aug. 1979, pp 7-9, 2 Phot., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244157)

42 308631 PUBLIC TRANSPORT PLANS (2)-AN EFFECTIVE PLANNING DISCIPLINE. Progress made by local authorities in policy development for the provision of co-ordinated and efficient public transport is considered. Reference is made to the value and purpose of annual Public Transport Plans (PTP's) considering the work and cost involved, the planning previously undertaken by local authorities, and their assessment of transport needs and how they may be met. The results of a survey into the effectiveness of PTP's in their first year are presented and analysed. It appears that policies have been affected little, although more comprehensive assessment of transport needs have been made. Instead of an annual plan, a three or five

yearly review of public transport is suggested with discussions of the document in the intervening years. The establishment of local authority transport units responsible for meeting the various public transport needs is recommended. For articles 1, 3 and 4 in this series see TRIS Nos 308630, 308632-33. (TRRL)

Winfield, R (Dyfed County Council) *Surveyor - Public Authority Technology* Vol. 154 No. 4552, Sept. 1979, pp 26-28, 1 Fig., 2 Phot., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244158)

42 308645 PUBLIC TRANSPORTATION PLANNING, OPERATIONS AND MANAGEMENT. This book is presented in five parts which include a total of 35 chapters. The first part covers the historical development of public transportation in the U.S. The chapters (the development of public transportation in the city; the decline of transit; the decision-making environment) are in chronological order and tie the actual events to causes and effects. The second part (systems and technologies) exposes readers to the attributes of the various modes used presently to provide public transportation service and shows how the modes interrelate. Part II (comparing transit modes) concentrates on the factors to be considered in alternative analyses studies of transportation systems. Part IV (planning public transportation systems) covers the vital planning area, including the historical development of planning, significant current issues regarding the planning process, the newest planning tool-the TSM, planning for small systems as found in rural areas, and how system planning for public transportation differs from transportation planning per se. The fifth part deals with the management and operation of public transit systems. Part VI (policy considerations) goes into the specifics of various factors that influence public transit services and provides a good perspective of the factors to consider when establishing goals. Part VII looks at the future from several viewpoints including the improvement of existing facilities as well as new technology.

Gray, GE, Editor (California Department of Transportation) Hoel, LA, Editor (Virginia University); Prentice-Hall, Incorporated 1979, 749 p., Figs., Tabs.

42 308681 CURRENT TRANSPORT ISSUES. In the context of a lack of defined transport objectives and of society's changing perception of its needs, the identification of issues is considered a practical way to cover transport in the future. Rather than attempt to cover the range of issues facing all transport modes providing national services, the paper summarises issues functionally: financial and economic; technological and modal; social; environmental and energy; developmental; institutional and organisational. Examples discussed are mainly from Australian domestic transport, with others from West European and North American practice. /TRRL/

Scrafton, D *Chartered Institute of Transport Journal* Vol. 38 No. 13, Nov. 1979, p 391; ACKNOWLEDGMENT: TRRL (IRRD 244022)

42 309134 DEVELOPING TECHNIQUES FOR URBAN TRANSPORT PROJECT EVALUATION. The paper describes the conventional cost-benefit analysis as applied to urban transport project appraisal and focuses on areas where the existence of limitations have caused this

method of analysis to be criticised. It is concluded that cost-benefit analysis is the soundest theoretical urban transport investment evaluation procedure, since it enables the analyst to compare a wide variety of effects based on their resource cost which is determined as far as practical, from the market place. However, to overcome recent criticism, this method of analysis should be supplemented with information concerning those inputs not included or badly treated in conventional cost-benefit analysis. The supplementary information required for a particular project will depend upon the specific circumstances of the investment, and could include such aspects as a planning balance sheet, goals achievement matrix, cost-effectiveness analysis, financial analysis or levels of service indices. The application of the supplementary analysis indicated above would give a satisfactory appraisal of an urban transport improvement program. (TRRL)

Moss, GJ (Department of Transport, Australia); Institution of Engineers, Australia Conf Paper 1979, pp 137-141, 1 Fig., 13 Ref.; Paper presented at Transportation Conference, Adelaide, 14-16 November, 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239409), Australian Road Research Board

42 309525 INCREASING TRANSIT'S SHARE OF THE REGIONAL SHOPPING CENTER TRAVEL MARKET: AN INITIAL INVESTIGATION. This report examines the explosive growth of the shopping center during the last 23 years as well as factors influencing travel to large regional malls, and the current trends that will affect regional malls in the future. The focus herein is on large shopping malls (ranging in size from 800,000-2,000,000 square feet of gross leasable area; having 4,000-15,000 auto parking spaces; and located 6-20 miles from "downtown" of the central city). The objectives of this study are to (1) examine current approaches to providing transit service to these malls, and (2) develop recommendations for gaining a larger share of this travel market for public transit. The results of 27 case studies in 18 U.S. and one Canadian City are presented. They describe what transit service is being provided, how and why it is being used (or ignored) at these 27 regional malls. Nine case studies describe innovative transit projects that are still in the planning stage. The case studies were written primarily for transit operators and should be of interest to others—urban planners, traffic engineers, mall developers and operators, architects, and both transit system and retailer marketing people. Recommendations are presented that would assist U.S. transit agencies in gaining a ten percent share of this huge (6-7 billion trips annually) travel market in the 1980's. The authors state that to achieve said objective, private/public sector cooperation is needed as well as experimentation with innovative transit provision techniques, development of improved analysis and planning methods, and basic data gathering efforts. (FHWA)

Schneider, JB Held, JL Smith, SP Saito, DS Cotterall, KE; Washington University, Seattle, Urban Mass Transportation Administration, (WA-11-0006) 1 UMTA-WA-11-0006-80-0, 1979, 229 p., Refs.; This report provides conclusions and recommendations (Near-Term/Long-Term Strategies for improving transit service to regional malls) and a list of references.; ORDER FROM: NTIS; PB-80131360

42 309533 REGIONAL PUBLIC TRANSPORT SCHEMES [Les schemas regionaux de transport collectif]. Regional public transport schemes are defined as reports outlining the medium-term trend of a number of proposals concerning the reorganization of and determining the level of service objectives for regional public transport services. Each element of the scheme is analyzed, and a description is given of the setting up of a regional scheme and of the role of pilot regions. A part of the article deals with the preliminary steps to take and the difficulties to solve when establishing a regional plan. (TRRL) [French]

Promotion Transports No. 172, Feb. 1978, pp 6-9, 2 Fig. ACKNOWLEDGMENT: TRRL (IRRD 105518), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

42 309585 EFFECTS OF MEASURES IN TRAFFIC-A PRACTICAL PLANNING TOOL FOR AN ACTIVE TRAFFIC POLICY [Effekter av atgaerder inom trafikken-Ett praktiskt planeringsinstrument foer en aktiv trafikpolitik]. This report describes some models, describing the behaviour of the road-user in different choice situations. These models are based on modern behavioural science and the parameters of the models have been decided through studies of real behaviour of individuals. The models, called logit-models, describe the probability of choosing a certain alternative. Some other areas of use are also presented. Two examples of application are shown: (1) parking fees in business districts and (2) measures within public transport -no bus charges. (TRRL) [Swedish]

Colliander, J *Vag-Och Vattenbyggaren* Vol. 25 No. 5/6, 1979, pp 53-54, 3 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 243196), National Swedish Road & Traffic Research Institute

42 309633 DEVELOPMENT OF FORECASTING MODELS FOR PASSENGER TRANSPORT IN URBAN AREAS [Entwicklung von Prognosemodellen fuer den Staedtischen Personenverkehr]. A conservative, generally useable traffic model was adapted for practical use in Hungarian cities. The model is restrictive, so that limited car park availability in the city centre means that a section of the private transport is transferred to public transport. The traffic event is a result of a prescribed city structure (if-then-forecast). Feedback regarding land use must be made available apart from the model. The author gives all theoretical formulae. Forecasts from the available data are clearly illustrated in diagrams. Theoretical proposals for solutions are shown, which may not, however, be practical in all cases. This paper demonstrates that traffic planning in Hungary has reached the same standard as in Western Europe. (TRRL) [German]

Monigl, J; Innsbruck University, Austria Monograph No. 11, 1978, 52 p., 17 Fig., 7 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 309024)

42 309671 ACCESSIBILITY AND BEHAVIOUR IN TWENTY AREAS OF MELBOURNE. Relationships are examined between (1) accessibility to local services (e.g. schools, shopping, public open space), (2) accessibility to metropolitan-scale services (e.g. employment, Tertiary education), and (3) residents' behavio-

ral responses to different levels of these accessibilities. Twenty case study areas in Melbourne are considered, representative of the range of residential areas occurring in the metropolitan area. Speculations are advanced on the social effects of present transport arrangements, of transport restrictions (e.g. due to the "energy crisis"), of ageing of the population, of population movements and of the value placed on accessibility. It is concluded (1) that the passenger transport system exhibits serious failures in the equitable distribution of opportunities and (2) that the secondary or "social ecological" effects of transport related changes are likely to be the most socially significant in the medium and long terms. The paper reports results of arb project 268, social impact of transport related changes; further analysis is expected to yield more detailed conclusions. (TRRL)

King, R (Melbourne University, Australia); Australian Road Research Board Monograph AIR 268-3, Aug. 1979, 92p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239510)

42 309753 TRANSPORT NEEDS FOR URBAN COMMUNITIES: TRANSPORT PLANNING [Besoins de transports pour les communautes urbaines; la planification des transports de personnes]. The research group for "Transport Needs for Urban Communities" has been set up to study urban transport planning methods based on a realistic assessment of community transport needs rather than on measured or estimated demand. The paper discusses successively certain urban transport fundamental parameters which influence the need for the transport of people; the traditional planning procedure for urban transport as well as an indication of the institutional background in which it must function; planning objectives and their hierarchical character; the identification of transport needs and the best way of effecting such determination; the evaluation of different possible systems of transport. A final chapter contains certain conclusions and recommendations of the group. [French]

Organization for Economic Cooperation and Devel Monograph Dec. 1977, 111p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 105569), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

42 309875 EXPERIENCE IN TRAVEL DEMAND SYNTHESIS IN URBAN AREAS OF QUEENSLAND. This paper was presented at Session 29-Transport Planning Case Studies. Over the last five years synthesis techniques have been used in Queensland for urban travel demand estimation. The applications ranged from a regional strategy study to traffic investigations in a small urban area. The use of these techniques results in considerable cost savings in field surveys. The paper indicates that these techniques can be used successfully for assessment of operational deficiencies, but problems exist when questions such as distributional equity with respect to incidence of transport costs, wish to be examined (a). (TRRL)

Golding, S Freeman, BR (Queensland Main Roads Department, Australia) *Australian Road Research Board Conference Proc* Preceding Vol. 9 No. 6, 1979, pp 206-214, 2 Fig., 10 Tab., 20 Ref.

Proceedings from the Ninth Australian Road Research Board Conference, Brisbane, August 21-25, 1978.; ACKNOWLEDGMENT: TRRL (IRRD

239563)

42 309881 THE REVOLUTION IN TRANSPORTATION ANALYSIS AND POLICY. This article, one from an issue devoted to "Economics: Progress and Prospects", describes the effects of transportation regulation on all segments of transport with special emphasis on railroads. It demonstrates the lagging interest in transportation economics into the 1950s and then portrays a revived attention to this subject as railroad fortunes declined in the face of competition from unregulated competitors and as a result of the absence of adequate return on investment. The topics include Penn Central collapse, the 3R and 4R Acts, subsidy action and state rail plans, rail cost behavior, the trucking industry, the air transport industry, shifting modal shares, Amtrak, urban transportation, the Canadian experience, and 1979 prospects.

Due, JF (Illinois University, Urbana) *American Behavioral Scientist* Vol. 23 No. 3, Jan. 1980, pp 353-382, Refs.; ORDER FROM: Sage Publications, Incorporated, 275 South Beverly Drive, Beverly Hills, California, 90212

42 309908 TRANSIT IN THE 1980'S: A NEW DIRECTION. This report is a summary of the technical work that was carried out under the auspices of the Transit Policy Committee, and includes recommendations for the preferred policy direction for transit in metropolitan Toronto. Topics studied include financing of transit operations, transit and land use, regional transportation policy, level of service, fare structure, parking policy, surface transit improvements, auto disincentives, transit capital programme, energy and transit. (TRRL)

Pill, J ; Toronto Transit Commission Monograph Oct. 1979, 126 p., 14 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 244523), Roads and Transportation Association of Canada; ORDER FROM: Toronto Transit Commission, 1900 Yonge Street, Toronto, Ontario, Canada

42 309923 PROFILE OF A PTE: TYNE AND WEAR. In this profile an attempt is made to examine the progress of the Tyne and Wear Passenger Transport Executive during the ten years of its existence since it was established by the 1968 Transport Act. The original principles followed in setting up the various PTE's are discussed. Trends in car ownership are considered and it is pointed out that the predicted growth in car ownership, particularly as regards multi-car ownership by households, has not materialised. This has been coupled with the change in public opinion against major road construction. The Tyne and Wear Metro rapid transit system is briefly discussed-particularly its relationship with the other forms of public transport. An orderly progression towards standardised fare scales demonstrates the successful bus service integration in the area. The PTE's general policy on bus services has been to maintain attractive trunk frequencies through all areas, where applicable planned with eventual translation to metro.

Harris, M *Modern Transport* No. 4, 1979, pp 248-254, 4 Tab., 11 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 243597); ORDER FROM: Allan (Ian) Limited, Terminal House, Shepperton TW17 8AS, Middlesex, England

42 309967 TRANSPORTATION PLANNING POLICY AND ANALYSIS. This work attempts to correlate transport policy with an analysis of transport planning, covering important areas such as financial management of transport, urban transport and an evaluation of transport proposals. Also the fundamental changes which have come about in transport policy are examined, especially governmental transport policy. The book also discusses the repercussions of computerization, the use of mathematical techniques and the systems planning approach introduced during the sixties.

Starkie, DM ; Pergamon Press Limited UIC Cat. 01 N 189, 1976, 147 p., Figs., Tabs.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Pergamon Press Limited, Headington Hill Hall, Oxford OX3 0BW, England

42 309992 DETERMINING INTERMEDIATE ORIGIN-DESTINATION MATRICES FOR THE ANALYSIS OF COMPOSITE MODE TRIPS. The problem of determining intermediate origin-destination matrices for composite mode trips that involve a trip by private car to a parking facility and the continuation of the trip to the destination either by walking or by a transit mode is considered. The intermediate origin-destination matrices relate to each component of the composite mode trip: a matrix from the trip origins to intermediate destinations which are parking lots and a matrix from the parking lots to the final destinations. The approach proposed to solve this problem is to modify the entropy based trip distribution models to consider inequality constraints related to parking lot capacities.

Florian, M (Montreal University, Canada) *Los, M Transportation Research. Part B: Methodological* Vol. 13B No. 2, June 1979, pp 91-103, 22 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 310035 PLANNING GUIDELINES FOR PUBLIC TRANSPORT INTERCHANGES. Report was prepared for the Director General of Transport, South Australia, and sets out guidelines for the location, planning and evaluation of public transport interchanges with particular emphasis of application in Metropolitan Adelaide. It raises some of the issues which should be taken into account when considering the location, design and justification of the public transport interchange. It is important that broad strategic and location issues should be settled before detailed implementation planning proceeds too far. On the other hand, both strategic issues and detailed design issues are of importance in economic justification. The operation of one mode of public transport in one section of the city cannot be considered in isolation, nor can the location of an interchange-it is not an integral part of a total urban system. The cross influence of various public transport routes in a corridor or sector of Adelaide, through-running bus operations, and the degree of commitment to feeder/express modes of operation will all influence the location, design and justification of interchanges.

Nairn (RJ) and Partners Proprietary Limited Monograph Apr. 1979, 83p, 36 Fig., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 239526), Australian Road Research Board

42 310039 THE PREDICTIVE ACCURACY OF BRITISH TRANSPORT STUDIES-A FEASIBILITY STUDY. Transport studies have been undertaken in this country for over fifteen years. During that time much criticism has been levelled against them, and yet to date there has been no serious attempt to evaluate their predictive accuracy. This report describes a feasibility study to investigate whether it would be practicable to examine the predictive accuracy of early British studies by comparing forecasts made in them with current information. The study has several parts. A desk study and review of literature identifies the main weaknesses and potential sources of error in the transport planning process. The main part, a review of past studies in a sample of local authorities, reveals that in most study areas recent transport data are available which might be used for reappraising the earlier study. Discussions with the local authorities indicate that though the models appear to perform satisfactorily in the forecast situation, the studies were generally very inaccurate in their predictions of growth in population, employment and real incomes. Finally, the report discusses methods and indicators that might be used to assess the predictive accuracy of past studies and concludes that a full study is both feasible and worthwhile. (a) (TRRL)

MacKinder, IH (Local Government Operational Research Unit) ; Transport and Road Research Laboratory Monograph SR483, 1979, 26 p., 2 Tab., 43 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244400)

42 310047 PUBLIC TRANSPORT PLANS-A CHALLENGE. CONFERENCE ONE. PROCEEDINGS OF CONFERENCE HELD ON 10 MAY 1979 AT WOLFSON COLLEGE, OXFORD. The four papers presented at the conference are reported. The first paper concerns transport "needs" and their determination. How "needs" are assessed is discussed and the roles played by individuals, local government elected members and professional officers are considered. The second paper compares attitudes adopted towards the preparation of public transport plans, and criteria applied to determine "need", by various shire counties. Paper three contains notes on case studies in urban public transport, including a regression model of change in annual bus patronage. The final paper presents case studies in rural public transport-the approach adopted in Dyfed. Details are given of the transport survey, the results of the analysis and their implementation. Notes on public transport legislation are included in appendices. (TRRL)

Jones, M, Editor White, P, Editor ; Oxford Polytechnic, England Monograph Vol. 1 1979, 55 p., 1 Fig., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244417)

42 310075 SEMINAR 1979. URBAN TRANSPORT AND THE ENVIRONMENT, 10-12 JULY 1979. 1. BACKGROUND REPORTS. The following reports were presented at the Seminar: pedestrians and cyclists (Taylor, M); Traffic in Residential Areas (Bendixson, T and Simkowitz, H); Para Transit: The European Approach (Rather, A); Para transit in the United States (Bautz, J); Regulations and Incentives (Pearce, B); The Influence of Pricing on Travel behaviour and modal choice (Bhatt, K); Pricing: Economic measures for the coordination of Pri-

vate and Public Urban Passenger Transport (Baum, H and Kentner, W); Financing: Subsidisation of Urban Public Transport (Webster, FV and Bly, PH); Energy (Simkowitz, H); Land Use (Simkowitz, H, Kissling, C and May, A); Costs and Benefits of Motor Vehicles (Bouladon, G). (TRRL)

Organization for Economic Cooperation and Devel Monograph 1979, 319 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 244717)

42 310085 AN INITIAL APPRAISAL OF AUSTRALIAN HOME INTERVIEW SURVEY TRAVEL DATA. This paper was presented at session 26-transport planning techniques 1. Transportation studies have been conducted in most large Australian cities. During these studies information about the travel patterns of individuals was sought by means of a home interview survey (his). This paper is devoted to assessing aspects of home interview surveys, including the aims behind them, how they have been changing over time and whether the scope and type of data collected is consistent with these aims. It is found that in many cases consistency is not present, resulting in the collection of inappropriately defined data and in a restricted ability to compare travel behaviour from city to city. It is also found that much more socio-economic data have been amassed than have ever been utilised. It is suggested that these data, despite their inconsistencies, provide an excellent and cheap base upon which to research many aspects and theories of individual travel behaviour, collection of in appropriately defined data and in a paper suggests that thorough analyses of existing data could well lead to a vast reduction in future travel survey requirements. Finally, the evolution of home interview surveys is traced and future evolution speculated upon. A bibliography of transportation studies is included for completeness. (a) (TRRL)

Dumble, PL *Australian Road Research Board Conference Proc* Vol. 9 No. 6, 1979, pp 89-111, 1 Fig., 14 Tab., Refs.; Proceedings from the Ninth Australian Road Research Board Conference, Brisbane, 21-25 August 1978.; ACKNOWLEDGMENT: TRRL (IRRD 239562), Australian Road Research Board

42 310108 THE MANAGEMENT OF URBAN CORRIDOR ROADING STUDIES. This paper was presented at Session 26-Transport Planning Techniques 1. This paper briefly describes the basic management of selected examples of urban corridor roading studies in Melbourne, and discusses some of the lessons to be learned from them. Based on experience in these and other studies, various considerations relating to organisation and management of these types of studies are summarised. The information in the paper should be of use in the design of similar types of studies elsewhere (a.) (TRRL)

Underwood, RT (Victoria Country Roads Board, Australia) *Australian Road Research Board Conference Proc* Vol. 9 No. 6, 1979, pp 71-78, 5 Fig., 1 Tab., Refs.; Proceedings from the Ninth Australian Road Research Board Conference, Brisbane, 21-25 August 1978.; ACKNOWLEDGMENT: TRRL (IRRD 239574), Australian Road Research Board

42 310130 NEW USES FOR OLD TRAVEL DATA. The basic requirement for good planning is reliable information. As planning emphasizes change, previous information is often discarded. In the case of travel data this abandonment is premature. This paper demonstrates that existing travel data are still extremely valuable for at least three distinguishable, and increasingly important, planning tasks. First, for the prediction of how individuals will react to specific policies, such as rising fuel prices or lower public transport fares, i.e. For travel demand modelling using individual choice models. It is shown that these models can be satisfactorily estimated using home interview survey data. The technique can be improved by market segmentation based on socio-economic characteristics or on the data itself, by using the travel section to partition the travellers into sets who really have a travel choice. Second, for the analysis of the existing urban public transport systems' performance, i.e. Who is using public transport, when and for what purposes. Third, for the analysis of individual's activity patterns and how these vary with the socio-economic and demographic characteristics of the individual (A). (TRRL)

Dumble, PL *Australian Road Research* Vol. 9 No. 3, Sept. 1979, pp 30-38, 1 Fig., 5 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239521), Australian Road Research Board

42 310157 USE OF ACCESSIBILITY IN METROPOLITAN STRATEGIC PLANNING. This paper was presented at Session 29-Transport Planning Case Studies. The conceptual and experimental development of a relationship between accessibility and density, together with utility measures which can be derived from it, is summarised. This relationship and its utility measures can be used to illustrate or describe aspects of the transport-traffic-land use system, to examine the suitability of development proposals in terms of efficiency and equity and to evaluate alternative transport proposals. Examples are presented and discussed. Finally, by a suitable combination of transport supply, travel demand and Examples are presented and discussed. Finally, by an equilibrium in the transport-traffic-land use system can be determined both before and after some disturbance to the system. The utility measures allow the value of the disturbance to be assessed. A radically different approach to the transportation planning process is therefore suggested and this is discussed, using work done in Canberra as an example (TRRL)

Davidson, KB (National Capital Development Commission, Australia) *Australian Road Research Board Conference Proc* Vol. 9 No. 6, 1979, pp 198-205, 5 Fig., 1 Tab., 9 Ref.; Proceedings from the Ninth Australian Road Research Board Conference, Brisbane, 21-25 August 1978.; ACKNOWLEDGMENT: TRRL (IRRD 239561), Australian Road Research Board

42 310183 ANNUAL CONFERENCE PRE-PRINTS-ADMINISTRATION WORKSHOPS, 1979. The following papers are to be presented at the conference: Highway expenditures and trends in Canada during the 1970'S (Barton, R); The (r) evolution of a regional roads program for greater Vancouver (Hamilton, GD, Glover, RS and Spaeth, JD); Introduction of financial analysis and assessment within Ministry of Transportation and Communications, Ontario

(Freeman, JR and Porter, RG); Intermunicipal transit cost-sharing (Fortin, G); Merivale transit centre-an energy-efficient garage (Newgard, PJ); Energy conservation in passenger transportation sector (Parviainen, JA); An analysis of the potential for part-time labour in urban transit (Moore, IR); Transit Policies in the 80's (Shortreed, JA); Canadian transit services, demand and subsidies in an international context (Frayne, A). (TRRL)

Roads and Transportation Association of Canada Monograph 1979, 176p, 34 Fig., 25 Tab., 56 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244434), Roads and Transportation Association of Canada

42 310187 ANNUAL CONFERENCE PRE-PRINTS-PLANNING TECHNICAL SESSION AND WORKSHOPS, 1979. (Continued from IRRD Abstract No 244441). Dynamics of passenger transportation in western Canada (Wallace, JB, Platts, JB and Kohn, H); Urban modelling in Canada (Hayto, SA and Sims, LS); Moving potash from Saskatchewan (Clark, GA); A study of consolidated building receiver demonstration (Bhattacharyya, SK); Urban goods movement research: Canadian experience in the seventies (Wood, WG, Suen, L and Ebrahim, A); The development and application of an improved multi-nomial logit mode choice model (Saunders, DR and Ranniste, P); Simulation of a binary choice logit model for the Ottawa-Hull area (Hanna, HN, Khan, AM and Shallal, LA). (TRRL)

Roads and Transportation Association of Canada Monograph 1979, 324p, 31 Fig., 58 Tab., 4 Phot., 115 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244442), Roads and Transportation Association of Canada

42 310265 DARLINGTON URBAN STRUCTURE PLAN. This plan is presented in three parts. Part 1 describes the structure of the plan, dealing with its purpose, preparation, choice of policies and public consultation. Part 2 deals with the strategy of the plan regarding housing, population, employment, inner area sites, transport, the major centre, and the rural area. Part 3 outlines the policies and proposals affecting these and other aspects of the planning commitment including shopping and commerce, recreation, financial resources, minerals, physical environment, monitoring and review. (TRRL)

Durham County Council, England Monograph 1979, 55p, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 244488)

42 310277 MULTI-VARIABLE MODELS OF CAR OWNERSHIP. This paper reports two modelling exercises which used individual household choice models to investigate the effects of various household characteristics and public transport factors on car ownership levels within the broad constraints of conventional cross-sectional analysis. The data used to estimate the models were collected as disaggregate travel demand modelling data sets, using direct interview techniques, and comprised the results of 2253 interviews in Canberra in 1975 (a city of high affluence and car ownership) and 4400 interviews in Adelaide in 1977 (a less homogeneous, less affluent population than Canberra). Analysis results are presented in tabulated form and discussed in relation to the variables intro-

duced into the models such as household, trip, personal and locational characteristics. The performance of the Canberra and Adelaide models is compared, and it was found, for example, that household structure variables (size, workers) have a highly significant effect on car ownership. The conclusions drawn from this study include the suggestion that multi-variable models yield much better explanations of the factors affecting car ownership choices than do simple income-based models. (TRRL)

Hutchinson, MJ *Traffic Engineering and Control* Vol. 20 No. 8/9, Aug. 1979, pp 399-403, 7 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244354)

42 310278 THE NATIONAL BUS COMPANY "MAP" MARKET ANALYSIS PROJECT. Reference is made to social factors which have influenced the demand for bus services, and further decrease in the demand due to necessity for higher fares. The need for operational efficiency and use of public transport subsidies is stated. The National Bus Company policy of applying market analysis techniques to relate bus services to passenger demand, with rationalization of cross-subsidy and revenue support policies, is explained. A general outline of the "MAP" procedure is presented and illustrated, and its major tasks to be carried out at bus company level are summarised. A description is given of the data acquisition process by on-bus surveys, and an explanation follows of the bus system design procedure. The possible need of local authority traffic management schemes is discussed, and procedural details included for implementing revised bus services. (TRRL)

Barrett, B (National Bus Company) Buchanan, M (Colin Buchanan and Partners) *Traffic Engineering and Control* Vol. 20 No. 10, Oct. 1979, pp 471-474, 1 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 244375)

42 310388 AN APPROPRIATE APPROACH TO TRANSPORT PLANNING. The article compares the features of transport planning in developed countries with that in developing countries. In the developed world transportation studies are often held up due to changes in policy while such planning work in the third world countries tends to concentrate on practical achievement. A feature of third world transport is the prevalence of paratransit which offers flexibility, accessibility and relative low cost. In contrast, paratransit is excluded in the West and in Britain particularly by rigid licensing designed to protect established operators but thereby eliminating initiative in type of vehicle operated and route flexibility. In Britain transport planning has turned from road system development to support for public transport and environmental management so causing uncertainty about the role of transport planning. The article discusses the contribution and responsibility of the transport planner although it is considered that sometimes complexity is confused with correctness. Approaches to transport planning in the madras region are described where it is suggested that lessons might be learnt by planners in the West. (TRRL)

Parker, B *Built Environment* Vol. 5 No. 2, 1979, pp 125-135, 12 Phot., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243333)

42 310406 AN EMPIRICAL ANALYSIS OF BEHAVIOURAL INTENTIONS OF SINGLE-OCCUPANT AUTO DRIVERS TO SHIFT TO HIGH OCCUPANCY VEHICLES. The emphasis in transportation planning has recently changed from long-range, high-capital investments to short-term, low-cost transportation system improvements. The development of incentives for bus riding and carpooling, particularly for the work trip, plays a major role in this resource management process. This study is specifically designed to uncover factors which influence the intentions of the single-occupant auto commuters to switch to buses and carpools and to suggest operating policies consistent with the intent to encourage the use of high-occupancy vehicles. The single-occupant auto commuters are segmented into several potential ridesharing markets on the basis of their expressed intention to take a bus or a carpool if certain transportation system modifications were effected. Three groups of switchers are identified: those who are positively oriented towards taking a bus, those who would only switch to a carpool, and those who would consider either of the ridesharing modes. Bus convenience is the most important variable associated with the shift intention. Perceptions of carpool comfort do not appear to be important, rather, perceptions of carpool schedule flexibility, cost, safety and a short wait in traffic are prime factors associated with potential carpool shifting. Additional models involving mode satisfaction are reviewed and policies which enhance bus convenience and minimize waiting in traffic for carpools are suggested to recruit the potential ridesharers. (a) (TRRL)

Tischer, ML (Federal Highway Administration) Dobson, R (Charles River Associates, Incorporated) *Transportation Research. Part A: General SERIAL* Vol. 13A No. 3, June 1979, pp 143-158, 6 Fig., 8 Tab., 28 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243489)

42 310476 A THEORETICAL AND EMPIRICAL MODEL OF TRIP CHAINING BEHAVIOR. This paper addresses the theoretical and empirical issues involved in modeling complex travel patterns. Existing models have the shortcoming of not representing the interdependencies among trip links in trip chains with multiple non-home stops. A theoretical model based on utility theory and explicitly accounting for the trade-offs involved in the choice of multiple-stop chains is developed. Using this theoretical model, utility maximizing conditions for a household's choice of a daily travel pattern are derived. The optimum travel pattern is described in terms of the number of chairs (tours) traveled on a given day and in terms of the number of stops (sojourns) made on each of those chains. For a given household, the form of the optimum pattern is a function of the transportation expenditures (time, cost) required to reach potential destinations. Constraints on the conditions of optimality due to the limited and discrete nature of travel pattern alternatives are also considered. Parameters of the general utility function were estimated empirically using actual travel data derived from a home interview survey taken in Washington, DC. The multinomial logit model is used to relate utility scores for the alternative travel patterns to choice probabilities. The resulting parameter estimates agree with theoretical expectations and with empirical results obtained in other studies. In

order to demonstrate the empirical and theoretical implications of the model, forecasts for various transportation policies (e.g., gasoline price increases, transit fare reductions), as made by this model and by other less complex models, are compared. The results of these comparisons indicate the need for expanding the scope of existing travel forecasting models to explicit considerations of trip chaining behavior. (Author/TRRL)

Adler, T (Dartmouth College) Ben-akiva, M (Massachusetts Institute of Technology) *Transportation Research. Part B: Methodological* Vol. 13B No. 3, Sept. 1979, pp 243-257, 5 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 243501)

42 310556 TRAVEL DEMAND. MODELS AND CALCULATION METHODS BASED ON ELASTICITIES [Resetterfragan. Modeller och berakningsmetoder baserade paa elasticitetstal]. There are basically two methods of analyzing how different factors affect travelling by public transport: (1) elasticity values, which means the value that specifies the sensitivity of travel demand to changes in a factor, (2) demand functions, which means total connections between the demand for journeys and the different factors that affect the demand. The second method is more used because of its simplicity. In this report the available knowledge of elasticities for public transport in built-up areas is summarized. The report partly deals with elasticities for changes in the fare level and partly with elasticities for changes in the offer (the service level). There is also a survey of the results that have been obtained in different foreign investigations. (TRRL) [Swedish]

Transportforskningsdelegaten Monograph May 1979, 56p, 1 Fig., 7 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 244107), National Swedish Road & Traffic Research Institute

42 310564 MANAGING TRANSPORT. MANAGING OF TRANSPORT SYSTEMS TO IMPROVE THE URBAN ENVIRONMENT. The experience of selected cities; Beasanccon (France), Brussels (Belgium), Geneva (Switzerland), Gothenburg (Sweden), Groningen (the Netherlands), London (United Kingdom), Madison (United States), Nagoya (Japan), Nottingham (United Kingdom), Ottawa (Canada), Paris (France) and Singapore which have implemented management-orientated transport policies is summarized, and the impact of these policies on transport system efficiency and urban environment, particularly air quality, noise, accidents, congestion, land use, and management of urban public space is assessed. Their implementation is also the object of careful evaluation. The second chapter of the report deals with the impact of such management-orientated transport policies on national concerns in the sectors of environment, energy, employment, inner city revitalization and financing. Subsequent chapters are devoted to edited versions of the case studies on which the opening chapter is based. (TRRL)

Organization for Economic Cooperation and Development, (92-64-11895-0) Monograph 1979, 299 p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243339)

42 310569 THE URBAN TRANSPORT SEMINAR IN TOKYO—STEPS TO PROGRESS. The author reports on an international training seminar on urban transport held in Tokyo from the 23rd to the 28th of October, 1978. This seminar was held as the result of a request made by the Southeast Asian Agency for Regional Transport and Communications Development (SEATAC) to the Japanese government, and was attended by experts on urban transport administration from SEATAC, Indonesia, Malaysia, the Philippines and some 60 Japanese specialists who attended as observers. The papers presented on the first two days of the seminar are listed and the major themes briefly discussed. Over the remaining four days the delegates went on inspection tours of Japanese cities. (TRRL)

Ogawa, H (Ministry of Construction, Japan) *Wheel Extended* Vol. 8 No. 4, 1979, pp 2-6, 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 244341)

42 310613 WORK-TRIP MODE-CHOICE MODELS FOR SOUTH AFRICA. This paper describes a number of individual-choice models of work-trip mode-choice, calibrated in the course of a bus study in two communities of Metropolitan Johannesburg. First, it is found to be useful to reduce the alternative set from eight modes to four modes, without loss of estimation power. Second, a number of alternative specifications of costs and times are examined, from which the chosen model is selected as one containing five such variables. In addition, a variable of car competition is found to add significantly to the explanatory power of the model. Finally, recently-documented procedures are applied to the selected model specification to pool the results of two random subsamples and to correct the choice-based biases in the alternative-specific constants. It is found that the coefficients of the South African model fall well within the range of coefficients determined in the U. S.

Stopher, PR (Northwestern University, Evanston) Wilmot, CG *ASCE Journal of Transportation Engineering* Vol. 105 No. 6, Nov. 1979, pp 595-608, 25 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 310695 EQUILIBRIUM TRIP ASSIGNMENT: ADVANTAGES AND IMPLICATIONS FOR PRACTICE. During the past 10 years the problem of assignment of vehicles to large, congested urban transportation networks according to the principle of equal travel times has been solved and an efficient, convergent computer algorithm devised. Although the algorithm is available in the Urban Transportation Planning System, many practitioners continue to use the heuristic trip-assignment algorithms devised in the early 1960s. As in many other cases, this slow implementation of a new, improved algorithm appears to come from (a) a lack of understanding of its basic concepts, (b) an unfamiliarity with the computer program for applying the algorithm, and (c) a lack of evidence concerning the new algorithm's performance in large-scale applications. These three issues are addressed in this paper. Based on the experience with its implementation on a large network, it is recommended that equilibrium trip assignment should always be used instead of iterative assignment. Better results, as judged by the criterion of equalizing travel times for alternative paths be-

tween each origin-destination pair, will always be obtained with the equilibrium algorithm for any given amount of computational effort. Which method best replicates the observed vehicle flows may depend on the detail of the network, the adequacy of the capacity-restraint functions, and the time period of the assignment (24 h or peak period). (Author)

Eash, RW (Chicago Area Transportation Study) Janson, BN Boyce, DE (Illinois University, Urbana) *Transportation Research Record* No. 728, 1979, pp 1-8, 4 Fig., 6 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310697 VALIDATION AND APPLICATION OF AN EQUILIBRIUM-BASED TWO-MODE URBAN TRANSPORTATION PLANNING METHOD (EMME). The purpose of this paper is to report on the validation and application of the two-mode urban transportation planning technique called EMME. This method may be characterized as an integrated two-mode traffic equilibrium method. Roughly speaking, this method combines a zonal aggregate-demand model with an equilibrium-type road assignment and a transit-assignment method. We describe the validation and application of the model by using data from the city of Winnipeg, Manitoba, Canada. (Authors)

Florian, M Chapleau, R Nguyen, S Achim, C James-Lefebvre, L Galarneau, S Lefebvre, J Fisk, C (Montreal University, Canada) *Transportation Research Record* No. 728, 1979, pp 14-23, 4 Fig., 5 Tab., 10 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310699 DISCRETE MULTIVARIATE MODEL OF WORK-TRIP MODE CHOICE. This paper applies discrete multivariate analysis to the specification and estimation of factors that govern work-trip mode choice. Where large data sets are available, this technique is found to have two important advantages over conditional logit analysis: Better model specification is facilitated and parameters can typically be estimated at sharply lower cost. The study focuses on the mode-choice behavior of 9880 Washington, D.C., area households that made work trips in 1968. Perhaps the most striking result is that in-vehicle travel time seems to have a nonlinear impact on the mode-choice logit (log-odds of drive alone versus bus), which has potentially important consequences for policy. For the range in which bus is faster than automobile, changes in bus (or automobile) in-vehicle travel time have the well-known results reported by other studies. But for the interval within which driving is faster than bus, decreases in bus in-vehicle travel time that fall short of making the bus mode absolutely faster than driving will, if our estimates are correct, fail to increase ridership significantly. (Author)

Segal, D (Oberlin College) *Transportation Research Record* No. 728, 1979, pp 30-35, 2 Fig., 3 Tab., 11 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310705 SAMPLING VEHICLE KILOMETERS OF TRAVEL. This paper develops sampling procedures for estimating vehicle kilometers of travel on urban streets. It shows how simple and stratified random sampling techniques can be applied to estimate sample-size requirements for estimating freeway, arterial-collector, and local-street vehicle kilometers of travel. The paper also presents and provides ranges in the parameters associated with the variations in traffic volumes in space and time. These estimates are then used as part of a practical, operational procedure. (Authors)

Levinson, HS (Smith (Wilbur) and Associates) Roark, AL (Commissioner of Environmental Protection) Guhn, JS (Federal Highway Administration) *Transportation Research Record* No. 728, 1979, pp 65-72, 4 Fig., 5 Tab., 7 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310706 EMPIRICAL COMPARISON OF VARIOUS FORMS OF ECONOMIC TRAVEL DEMAND MODELS (ABRIDGMENT). This study examines some of the popular demand equations available for assessing future conditions of intercity travel demands and in knowing the passenger's response to a fare hike. Planners need to be able to forecast correctly how a reduction in air fare would affect the passenger demand for airlines and other competing modes such as rails and buses. These demand equations are designed to satisfy three basic properties: homogeneity, summability, and symmetry. The five demand models discussed in this paper are: a double-log demand model, an inequality-constrained double-log demand model, a weighted Stone model, the Rotterdam system of demand equations, and a homogeneous translog demand model. The results of the study indicate that demand equations that are imposed by the homogeneity, summability, and symmetry conditions provide more stable results on the compensated cross elasticities than those equations that do not have such conditions imposed. In general, the market cross elasticities—the traditional means of assessing travel demand—are very unstable; and they vary depending on the choice of functional forms, even when we impose the three basic conditions on their demand equations.

Liew, CK Liew, CJ (Oklahoma University) *Transportation Research Record* No. 728, 1979, pp 72-76, 2 Tab., 14 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310707 ESTIMATION OF DEMAND FOR PUBLIC TRANSPORTATION (ABRIDGMENT). This paper describes the mode-split model used by the Chicago Area Transportation Study, which was first used in mid-1973 for the evaluation of the 1995 regional transportation plan. It was concluded that the model possesses some highly desirable attributes such as: its compatibility with the conventional transportation process, its permission of application of disaggregate mode-choice models, and its provision of a detailed description of the access and egress transit service and a realistic account of its effect on transit ridership. The method for describing the service is flexible enough to support analyses of non-standard service, such as di-

al-a-ride. The model is fully operational and had been proven applicable for analyses of large-scale regional problems as well as for small-scale, subregional projects, including transportation system management strategies; and the resources required for data preparation and analysis are reasonable.

Gur, Y (Urban Systems, Incorporated) Kopec, D Lowe, E Ryan, E Vyas, A (Chicago Area Transportation Study) *Transportation Research Record* No. 728, 1979, pp 76-79, 1 Fig., 2 Tab., 9 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310708 SECOND ROLE OF THE WORK TRIP-VISITING NONWORK DESTINATIONS (ABRIDGMENT). This paper reviews findings of home interview origin-destination data collected from the Fresno-Clovis area, California in 1971 regarding additional roles of the work trip. It was found on a typical weekday that approximately one-third of the households in which the head is employed visit one or more nonwork destinations as part of a trip to or from the workplace. Although these findings seem to deviate from conventional wisdom, it is pointed out that the travel patterns found in Fresno are consistent with those found in studies of other cities conducted by Ginn and Horowitz. This shift from conventional work trip travel patterns—the sole function being to get people to and from the workplace—is explained by an emphasis on using transportation policy to help achieve air pollution goals and energy conservation goals. An understanding of the extent to which and the reasons why household members use workplace-related trips to visit nonwork destinations seems essential for effective transportation planning.

Oster, CV, Jr (Harvard University) *Transportation Research Record* No. 728, 1979, pp 79-82, 1 Tab., 5 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310709 GENERALIZED ATTRIBUTES AND SHOPPING TRIP BEHAVIOR. Attitudinal data obtained from an impact travel survey of the San Francisco area was analyzed to determine the composition of generalized attributes that identify an individual's cognitive structure of shopping behavior. Once it was determined (by employing two measures of factorability) that factor analysis was an appropriate analytical tool, the data (stratified by residence and trip destination) were factor analyzed. The results indicate that each population's cognitive structure is unique, although in all cases a common set of generalized attributes was found to be important. For the respective populations, an index of satisfaction was developed for each of the generalized attributes. The index was used to investigate the relation between a population's cognitive structure and its socioeconomic profile. Based on tests of independence and gamma measures of association, the following attributes were significantly related to a population's satisfaction relative to alternative attributes of the shopping excursion: travel, mode, length of residence at current address, and age distribution. Among the implications of the analysis is that a

set of attributes exists, independent of residence or trip destination, that should be incorporated into travel-demand models if shopping travel behavior is to be forecast accurately. Moreover, the extent of travel incurred in a shopping journey appears to significantly affect an individual's attitude structure of shopping activities. (Author)

McCarthy, PS (Purdue University) *Transportation Research Record* No. 728, 1979, pp 82-89, 1 Fig., 6 Tab., 20 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

42 310736 DEMAND-ESTIMATING MODEL FOR TRANSIT ROUTE AND SYSTEM PLANNING IN SMALL URBAN AREAS. A simplified model for directly estimating transit route and system patronage for small urban areas is presented. A category approach is used to determine basic transit trip generation by automobile-ownership classification. The basic rate is then modified by a series of adjustment relations for trip length, walking distance, and service frequency to arrive at an estimate of patronage for the service alternative under study. The model can be manually applied and used to assess new service, extension of existing service, or improvements in the existing level of service. (Author)

Golenberg, M (SG Associates, Incorporated) Pernaw, S (Voorhees (Alan M) and Associates, Incorporated) *Transportation Research Record* No. 730, 1979, pp 14-23, 19 Fig., 7 Ref.; This paper appeared in Transportation Research Record No. 730, Issues in Transportation Planning for Small and Medium-Sized Communities.; ORDER FROM: TRB Publications Off

42 310758 THE FUTURE OF THE AUTOMOBILE IN CANADA. An attempt is made to provide information, stimulate discussion and provide a basis for possible actions by government on important areas related to the evolution, ownership, and use of the automobile and its inter-relationships with other modes. The various chapters of the publication cover the growth and use of the automobile and its connection with urbanization, future energy, technology, materials and non-transport alternatives for 1975-2000, the future of the automobile and transit in an urban context, the automobiles' current role, cost-effectiveness and energy productivity for inter-city trips as compared with other modes, safety, and the environment.

Ministry of Supply and Services, Canada Apr. 1979, 62p, Figs., Tabs., 33 Ref., 5 App.; ORDER FROM: Canadian Government Publishing Center, Ministry of Supply and Services, Canada, Hull, Quebec, Canada

42 310759 TRANSPORTATION PROJECT EVALUATION AND PRIORITY PROGRAMMING: TECHNIQUES AND CRITERIA-ANNOTATED BIBLIOGRAPHY. This state-of-the-art paper presents a broad survey of the techniques used to program transportation improvements. Evaluation methodologies used to develop sufficiency ratings are listed, and the criteria for priority setting are examined. The following groups of criteria are detailed: needs parameter, physical criteria, fiscal criteria, impact analysis, technological suitability, and urban transportation performance. New federal requirements for transportation improvement program

(TIP) for metropolitan areas have necessitated a considerable reorientation in the formulation of the types of criteria used in transportation programming. Emphasis is now being placed on less capital intensive projects and on analyzing trade-off among modes. Transportation officials are becoming increasingly aware of performance of transportation systems in providing service, and there is a growing trend among states in using system performance indicators to allocate transit funds among regions. It can be expected that as resource constraints become increasingly severe because of inflation and revenue shortfalls, Performance criteria involving system efficiency and productivity will become more and more important in transportation decision-making.

Sinha, KC *Transportation Research Circular* No. 213, Jan. 1980, pp 8-35; This paper appeared in Transportation Research Circular No. 213, Bibliography on Project Evaluation and Priority Criteria.; ORDER FROM: TRB Publications Off

42 310876 A SURVEY OF FERRY PASSENGERS. The Paper reports on a particular survey carried out on the passenger ferry services of the Brisbane River, Australia. Further details of the work are given in another paper by Pretty and Grigg referenced below. The project team was required, among other things, to find out the origins and destinations of passengers and their access and egress modes. There are 11 regular services for passengers (two carry motor vehicles as well) plying the Brisbane River for up to 18 hours a day, six or seven days a week. In a typical week in 1975 there were nearly 40,000 passengers, so the task of carrying out a comprehensive survey was a formidable one. A technique is described for obtaining nearly a 100 per cent return rate for a day's operations on a public transport service.

Pretty, RL (Queensland University, Australia) *Traffic Engineering and Control* Vol. 20 No. 10, Oct. 1979, pp 484-485, 2 Ref.; See also Pretty, R.L. and T.J. Grigg. "Passenger Transport on the Brisbane River." Institution of Engineers of Australia, Queensland Div. Tech. Papers, 19 (26) November 1978, pp 21-27.; ORDER FROM: ESL

42 311079 TRANSPORTATION PLANNING FOR RURAL AMERICA. Transportation planning for rural areas is important in view of the fossil fuel shortage and its impact on the transportation of goods and services in low density areas. A systematic planning process must first determine the limits of the problem area, as well as the objectives of the people in the designated system Physical constraints (river, rail crossings, etc.) and legal requirements must also be defined. Possible economic and political resources to support alternative solutions should be investigated, and the decision maker and the decisions to be made should be identified. Aspects of planning which are stressed are continuity, flexibility, simplicity, and the reduction of intermodal conflict points. A primary purpose of planning is to relate service to maximum demand, which involves plotting maximum demand and the minimum resistance to it. This book discusses the wise use of land, planning for pedestrians, bicycles, pedal cars and mopeds, and planning for transit (routing, marketing and management). Problems related to the highway and parking in small urban areas are also discussed. The three

phases of plan implementation, citizen participation/public relations, developing a continuing planning program, and evaluation alternatives are also covered.

Markve, K ; Upper Great Plains Transportation Institute TES 5, Dec. 1979, 139 p., Figs., Tabs., Refs., Apps.

42 311145 CONSISTENCY OF ORIGIN-DESTINATION (O-D) CHARACTERISTICS THROUGH TIME. The report summarizes data from selected cities and examines the data to the fullest meaningful extent with respect to its limitations. A review of literature on land use and urban transportation indicates that travel patterns have changed substantially during the past few decades in American and European cities. This investigation attempts to summarize the changes in travel patterns as measured in two points in time for several urban areas in the United States, Canada, and Britain.

ITE Journal Vol. 49 No. 10, Oct. 1979, pp 32-39, 24 Ref. ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 311166 REVISED CROSS-IMPACT METHOD AND ITS APPLICATIONS TO THE FORECAST OF URBAN TRANSPORTATION TECHNOLOGY. The urban transportation system of Japan today faces many difficulties such as slow-down of effective vehicle speed, increase in transportation and transit costs, and deterioration of environment by pollutants and exploitation of lands. Both new technological developments and effective policies, among which strong impacts are to be anticipated, are prerequisites for coping with these difficulties. The authors envisage scenarios for the future urban transportation system of Japan by a revised cross-impact method, an attempt to take explicitly into account impacts among separate future technologies. It comprises the estimation of probability of occurrence of each technological event, degrees of impacts among events, and revision of occurrence probabilities of events by Monte Carlo simulation, taking the mutual impacts into account.

Kaya, Y (Tokyo University, Japan) Ishikawa, M Mori, S *Technological Forecasting and Social Change* Vol. 14 No. 3, Aug. 1979, pp 243-257, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 311172 STUDY OF THE POTENTIAL TRANSIT MARKET FOR WORK AND SCHOOL TRIPS IN THE WAYNE STATE UNIVERSITY AREA. The objective of the study described is to look at the travel behavior of workers and students in regards to their daily work and school trips. The main emphasis of the study was to investigate user attitudes towards the energy crisis and the effects of increased gasoline prices on travel behavior. The study focused upon workers and students in the New Center Area, Wayne State University main campus and the Medical Center in Detroit, Michigan.

Cynecki, MJ (Wayne State University) *ITE Journal* Vol. 48 No. 9, Sept. 1979, pp 12-20, 13 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 311181 TRAFFIC-ASSIGNMENT TECHNIQUES FOR SMALLER CITIES. The primary purpose of the research was to determine which of the heuristic assignment techniques currently available to transportation planners in the United States provides the most accurate results for small and medium-sized cities and to assess the potential for future applications of equilibrium assignment techniques. A number of all-or-nothing, multipath, and capacity-restrained assignment techniques were applied to highway networks for Fond du Lac and Madison, Wisc., using common trip tables. Using the percentage of root mean squared error as the primary accuracy measure/percentage of the accuracy of the assignments in the order of increasing accuracy was all-or-nothing, multipath, and capacity-restrained. The accuracy of the capacity-restrained assignments appeared to be more sensitive to the assumptions made in computing the peak-hour assigned volumes and capacities than to differences in the capacity-restraint techniques. An equilibrium assignment for Winnipeg, Manitoba, Canada, was slightly less accurate than the most accurate assignment for Madison. A technique for assessing the behavioral validity of equilibrium assignments is proposed.

Smith, RL, Jr (Wisconsin University, Madison) Brennan, TS *ASCE Journal of Transportation Engineering* Vol. 106 No. 1, Jan. 1980, pp 85-98, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 311201 TRANSPORTATION PLANNING FOR SMALL AND MEDIUM-SIZED COMMUNITIES. PROCEEDINGS OF A WORKSHOP. The proceedings are reported of a conference that was convened to provide for the exchange of experiences among practitioners of transportation planning for cities of fewer than 200,000 people, to provide guidance for transportation policies and programs, to foster the development of future activities in this area, and to provide a document that will reflect the proceedings of the conference and serve as a basic resource for practitioners, administrators, and policymakers. Forty four papers were presented in five areas: transit operations planning; traffic planning and operations, surveillance and socio-economic forecasting, and systems planning and plan implementation. The keynote address was on the federal perspective of planning for transportation in small and medium-sized communities which set the theme for the conference. Papers concerning the products of the transportation planning process from the state perspective and the appropriate level of planning effort in smaller cities provided the impetus for the workshops. The latter began by considering issues and levels of effort pertinent to the functional workshop area. Resource papers aided workshop deliberations. The second half of the conference was allocated to workshop activities on techniques. Plenary sessions followed each workshop session.

Transportation Research Board Special Report No. 187, 1980, 100 p., Figs., Refs. Proceedings of a workshop sponsored by UMTA and FHWA and conducted by TRB, 3-6 December 1978, Sarasota, Florida. For individual papers see HRIS 311202-311244.; ORDER FROM: TRB Publications Off

42 311203 TRANSPORTATION PLANNING IN SMALL AND MEDIUM-SIZED COMMUNITIES: GREATER FLEXIBILITY, IMPROVED COMMUNICATION, AND SIMPLIFIED REQUIREMENTS. The urban transportation planning process formalized in the early 1960s has become increasingly diversified in the 1970s. Recently, special attention has been focused on the planning needs, requirements, and processes for small and medium-sized communities. Because of the need to develop processes and techniques that will provide adequate guidance to transportation decision makers, the Federal Highway Administration has sponsored the development of series of manuals that address state and local concerns while being mutually supportive. The emphasis of transportation planning for small and medium-sized urban areas is focused on three precepts: (a) greater flexibility in organizational and administrative arrangements; (b) improved communication between the decision maker, the planner, and the general public; and (c) simplification of the administrative planning requirements as well as of the procedures. The role at the federal level will be to improve the planning of transportation systems by facilitating activities that respond to local goals and concerns. (Author)

Hassell, JS, Jr (Federal Highway Administration) *Transportation Research Board Special Report* No. 187, 1980, pp 3-5, 1 Ref.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311204 WHAT SHOULD WE BE TRYING TO DO IN THE TRANSPORTATION PLANNING PROCESS? This paper presents many of the issues and concerns surrounding the transportation planning process and products from a state perspective. The uniqueness of each urban area, including the small and medium-sized ones, dictates a process that is responsive to local needs and products that address the important issues. The regulations formulated at various governmental levels must work to the advantage of the local area; therefore, latitude must be an integral component implicit in this regulation. The long-range planning process cannot be ignored, but its de-emphasis may be required to effectively facilitate short-range programs. A survey of local public officials in Illinois has reaffirmed the need to simplify the administrative requirements of the planning process and increase its flexibility by allowing local transportation decision makers to define its direction. The enthusiasm for data and an ongoing data base is not valid in many instances. Suggestions are made as to the critical data elements needed to prepare most alternatives and analyses. The vitality of the transportation planning process rests with the effective union of local decision makers and transportation planners. Local determination and a responsible program that reflects local goals and priorities is the mandate of the transportation planning process. (Author)

Dees, DC (Illinois Department of Transportation) *Transportation Research Board Special Report* No. 187, 1980, pp 5-9; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop spon-

sored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311205 APPROPRIATE LEVEL OF EFFORT FOR PLANNING FOR SMALL AND MEDIUM-SIZED COMMUNITIES. Because of the need for a responsive local transportation planning process, the transportation planner is faced with the need to ascertain the appropriate level of effort. A uniform, highly structured study design is not appropriate in all cases nor is it always effective. This paper is an attempt to define the role of transportation planning in relation to the local general plan, thereby providing guidance for the integration of planning activities, elements, and products into an administrative process. Guidelines for the appropriate level of professional effort for transportation planning for small and medium-sized cities are given as a function of the growth characteristics and general transportation planning activities of the urban areas. (Author)

Stover, VG (Texas A&M University) *Transportation Research Board Special Report* No. 187, 1980, pp 9-11; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311206 ACHIEVING A BALANCE BETWEEN LONG-RANGE AND SHORT-RANGE PLANNING AT AN APPROPRIATE LEVEL OF EFFORT. Increasing concern is being focused on the need for an improved planning rationale for smaller (generally fewer than 200000 population) urbanized areas. It is also necessary to provide officials at federal, state, and local levels with a clearer picture of the appropriate balance between short-and long-range planning for such areas. This paper presents a process for identifying and considering relevant factors that affect transportation planning and describes the planning activities that would result from these factors and the relationship between long-and short-range planning activities. (Authors)

Fleet, C Schoener, G Kane, A (Federal Highway Administration) *Transportation Research Board Special Report* No. 187, 1980, pp 11-16, 2 Fig., 1 Tab.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311208 TRANSPORTATION AND TRANSIT PLANNING FOR SMALL AND MEDIUM-SIZED URBAN AREAS. Many of the factors that affect the planning of smaller transit systems also affect the successful operation of those systems. For example, the availability of qualified personnel in the area will affect both planning and management--there is often very little real expertise readily accessible to smaller cities. In terms of funding, operating aid to cities has only recently been appropriated, and smaller local governments are usually quite ignorant as to

what funds are actually available. Tradition plays an important part in that transit historically has been considered a private enterprise operated for profit. It is difficult for the public, and public officials, to consider transit as a service in the sense that libraries, police, and fire protection are services. Yet unlike most other municipal services, mass transportation has a direct competitor, the private automobile. Also unlike libraries or fire protection, public transit requires levying a charge each time it is used. Skillful management and marketing is particularly necessary in smaller urban areas to overcome public misgivings. Although the planning and provision of highways in these areas are apt to be handled quite effectively, transit is in many instances still handled badly. And this will continue until local planning and management can be upgraded and stronger local support can be developed. (Author)

Smerk, GM (Indiana University, Bloomington) *Transportation Research Board Special Report* No. 187, 1980, pp 18-21; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311209 TECHNIQUES. The scope of this session workshop included an examination of all aspects of public transportation planning, implementation, and operation in small urban areas. Specifically, three issues were addressed: Identification of the categories of techniques that are useful in the planning, implementation, and operation of public transit in small urban areas; Assessment of the available techniques in the three areas and of the availability of these techniques; and Assessment of the marginal improvements that may be needed to improve these existing techniques. (Authors)

Gray, GE (California Department of Transportation) Levinsohn, DM (Environmental Protection Agency) *Transportation Research Board Special Report* No. 187, 1980, p 21; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311211 FORECASTING TRANSIT RIDERSHIP IN SMALLER COMMUNITIES. As the attention being given to transit planning for smaller communities increases, more accurate ridership forecasts are being required. In smaller areas, basic data for these forecasts remain scarce, but a number of successful techniques have been designed to overcome this lack of original data. Among the techniques developed for use by small cities and rural areas in Florida is a first-cut, sketch-planning estimate that roughly forecasts the annual numbers of riders, vehicles, and equipment kilometers. This technique can also be used to estimate capital costs and yearly operating costs. If, on the basis of the initial forecasts, a community decides to pursue a transit plan, additional ridership forecasts will be necessary. Particularly for fixed-route systems, the latent-demand and direct-demand forecasting techniques can be very useful. These two techniques and the results of the initial survey can provide a

cost-effective basis that local officials can use in deciding on the most appropriate transit plan for their area. (Author)

Corradino, JC (Schimpeler-Corradino Associates) *Transportation Research Board Special Report* No. 187, 1980, pp 24-29, 4 Fig., 2 Tab., 2 Ref.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311212 ESTIMATING TRANSIT DEMAND, FLEET SIZE, AND COSTS FOR SMALL COMMUNITIES. Forecasting transit demand and estimating costs for transit systems in smaller communities is very difficult. The Ready Reckoner approach developed in 1974 has been used successfully in smaller urban and suburban areas throughout Canada. This approach can be used to estimate potential demand, system size, and cost parameters. It is a shortcut estimating tool intended primarily as assistance to policymakers in deciding whether or not more detailed analyses and feasibility studies are warranted rather than as a substitute for those necessary calculations. (Author)

Atkinson, W (Lea (ND) and Associates, Limited) *Transportation Research Board Special Report* No. 187, 1980, pp 29-334, Fig.; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311215 TRAFFIC OPERATIONS AND PLANNING. ISSUES. This paper contains definitions of and recommendations for the problem areas of the Traffic Operations and Planning Workshop. The scope and objectives of the workshop were defined as issues and problems related to traffic planning and operations in small and medium-sized communities and as recommendations related to improving the practice of traffic planning and the management of traffic operations. Five problem areas requiring attention were mentioned: a need for the traffic operations and planning process to be responsive to local needs; a need to bridge the credibility gap that traffic professionals have with local elected officials; insufficient money available at the local level for traffic planning and for traffic operation improvements; a need for system performance measures; and defects in the traffic planning process.

Jones, RK (Arkansas State Highway & Transportation Department) Grayson, D (Automobile Club of Southern California) Edwards, J (Traffic Planning Associates) Phillips, C (Federal Highway Administration) *Transportation Research Board Special Report* No. 187, 1980, pp 41-42; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311217 TRAFFIC ENGINEERING SERVICES FOR SMALL POLITICAL JURISDICTIONS. When does a city need traffic engineering assistance? Is this need a function of population size or of number of traffic accidents? All communities regardless of size have traffic problems. This paper discusses methods that have been used to provide traffic engineering services in smaller communities, specifically the approximately 5670 U.S. jurisdictions having populations in the 2500 to 50000 range. These methods were surveyed during a study of the off-system highway network of local undesignated roads and streets in cities and counties having populations of fewer than 40000. One state and at least two local jurisdictions in each of the Federal Highway Administration regions were visited. The locations were selected after evaluation of responses to a questionnaire mailed to each state and a nationwide sample of 1350 cities and counties fitting the population criterion. The conclusions and recommendations resulting from this study are provided in this paper. (Author)

Franklin, JD (Department of Public Works, Wisconsin) *Transportation Research Board Special Report No. 187, 1980, pp 44-45*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311219 SURVEILLANCE AND SOCIO-ECONOMIC FORECASTING. This paper contains discussion of issues in urban transportation planning identified in papers presented at the Workshop on Surveillance and Socioeconomic Forecasting. Also, it contains questions that resulted from the discussion; and it contains ideas that were presented in response to the questions. The discussion centered on three subjects: the need to identify the unique problems of smaller urbanized areas and to develop planning programs to evaluate those needs; the importance of timely information for decision makers on the potential consequences of official actions; and the middleman role that metropolitan planning organizations (MPO's) are experiencing in the long-established relationships between the state and local governments. Some of the questions that followed the discussion included: is the planning currently under way really a complex process?; what should the planning process accomplish?; what are the issues in the process?; and what are the important characteristics of an area that determine the level of effort needed? Those questions brought about the following ideas: the current planning process is not complex when subdivided into long-range and short-range projections; the process should be sensitive to the needs of local elected officials, should focus on realistic solutions, should consider projects that stimulate economic growth, and should address long-range issues on a sketch basis; the issues in the process are both technical and administrative; and the key characteristic of a smaller urbanized area that controls the types of planning and the degree of detail needed is the quality of the existing street and highway system.

McDonnell, JJ (Federal Highway Administration) *Transportation Research Board Special Report No. 187, 1980, pp 51-52*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized

Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311220 ISSUES AND LEVELS OF EFFORT. This paper lists the objectives and issues of the Workshop on Surveillance and Socioeconomic Forecasting. Particular emphasis was given to the frequency, level of detail, and geographic systems of data and forecast. The objectives are: identification of the transportation and land use problems faced by small and medium-sized communities; evaluation of the types of data that should be collected to identify these problems; identification of the frequency and costs of collecting these data; identification and evaluation of secondary-source data and geographic systems used in its forecasting process needed for both short-range and long-range planning. The issues are: how much of the data collected in the past has been useful?; what types of data should be collected now for problem identification and short-range and long-range planning?; are any of the data-collection procedures used in long-range systems planning useful for corridor or project planning purposes?; should any data be collected to satisfy the needs of local elected officials that is not needed for technical planning purposes?; how can models be simplified to require less-detailed and less-expensive data collection?; and what staff levels and type of staff are needed to ensure proper data collection, analysis, and forecasting?

Shiatte, KW (New York State Department of Transportation) *Transportation Research Board Special Report No. 187, 1980, p 52*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311221 SURVEILLANCE AND SOCIO-ECONOMIC FORECASTING. Data collection in smaller urban areas can be minimized through the use of secondary sources. Quite a bit of work can often be accomplished with minimal data acquisition. To establish a surveillance or monitoring program, one must first establish an inventory of basic information that includes such data as travel counts, routes and schedules of the public transportation system, maps, numbers of employees, and characteristics of the population. The monitoring effort should, in turn, be based on sound procedures and methodologies that are inexpensive and provide quick turn-around information. Census data can often be very useful. Data items to be forecast should be limited to those actually required for systems analysis. In many instances, the issues that emerge in smaller urban areas are not very different from those in larger areas. The difference is that, in smaller areas, there is often more reliance on secondary data sources. If more work is needed in any area, it may be in educating local officials not to be afraid of the kinds of borrowed information that can save them money and be quite valuable for their planning efforts. (Author)

Sosslau, AB (Comsis Corporation) *Transportation Research Board Special Report No. 187, 1980, pp 53-55*; This paper appeared in TRB Special Report 187, Transportation Planning for Small

and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311224 COMMERCIAL DATA SOURCES FOR TRANSPORTATION PLANNING. There is no universal best source of data for transportation planning. In many instances, commercial data are less expensive, more current, and more quickly available than government data. Furthermore, commercial data sources are unaffected by government paperwork-reduction programs that are affecting many data-collection projects. Although there are still problems in using commercial data sources, they are of the same relative magnitude as those of public sources. Commercial data have been used with some success in compiling household, employment, and trip information. In particular, R.L. Polk and Dun and Bradstreet data have already seen considerable use in urban transportation planning. As commercial data sources become more competitive, transportation planners in small and medium-sized communities would be well advised to consider this information in deciding on the means of creating and maintaining data files. (Author)

Stuart, RC (Virginia Polytechnic Institute & State University) *Transportation Research Board Special Report No. 187, 1980, pp 59-62*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311225 IOWA URBAN TRANSPORTATION AREA: TRAFFIC-COUNTING PROGRAM. An overview of the traffic-counting program for urban areas in Iowa is presented. The Iowa Department of Transportation has an extensive program that covers 15 urban areas in the state that have populations of 25000 or more. The types of traffic data collected, the problems and difficulties encountered in collection and processing, and the varied uses that are made of the data reviewed. Preliminary results of the Sioux City counting program are included. (Author)

Studer, RD (Iowa Department of Transportation) *Transportation Research Board Special Report No. 187, 1980, pp 62-65*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311228 FORECASTING GROWTH PARAMETERS IN SMALLER URBAN AREAS. In considering the data needed for forecasting growth parameters for use in transportation planning in smaller urban areas, it is important to realize that certain aspects of the future are incapable of prediction under any circumstance. More socioeconomic data will not eliminate this problem. However, other aspects of the future are not only predictable but determinable if adequate public policy tools are used, and they should be sought through an evaluation of alternative plans

and implementation of the preferred plan. The socioeconomic data needed for this are different from and more modest than those needed for detailed forecasting. (Author)

Roberts, TH (Roberts and Eichler Associates) *Transportation Research Board Special Report No. 187, 1980, pp 71-72*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311229 SYSTEM PLANNING. This paper contains a list of and discussion of the objectives and issues introduced at the Workshop on System Planning. The objectives were defined as: identification of the transportation and land-use problems faced by small and medium-sized communities that have growth potential; evaluation of the level of analysis that is necessary to address these problems; identification of procedures and techniques appropriate for system planning in small and medium-sized communities; evaluation of those procedures and techniques in terms of technical validity, response time, and cost-effectiveness; and development of recommendations relative to system planning. The issues are: should the transportation planning process be continued?; is it necessary to apply the traditional four-step procedure (i.e., trip generation, trip distribution, mode choice, and traffic assignment) or can a conceptual system planning approach be used?; how much effort should be devoted to long-range planning and to short-range planning?; and is it necessary to evaluate a variety of alternative land-use and transportation plans? The workshop participants concluded that the transportation planning process must be continued; however, it must effectively support the concerns of local decision makers, address the problems of the individual local community, and be responsive by providing the necessary information in a timely fashion. It was also concluded that traditional modeling procedures need not be used for system planning in small and medium-sized communities. It was noted that the time frame for appropriate and effective planning will vary from area to area; therefore, the amount of effort devoted to long-range planning versus that devoted to the short-range should be a function of the growth potential of the area and the nature of the problems to be analyzed. Finally, it was determined that there is no need to invest research money in developing new procedures or techniques; because the procedures and techniques are available. What is needed is a planner who has the ability to apply the techniques creatively.

Bates, EG, Jr (Gordon Faye and Associates) Schoener, GE (Federal Highway Administration) *Transportation Research Board Special Report No. 187, 1980, pp 74-75*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311230 SYSTEM PLANNING "DO'S AND DON'TS" FOR SMALL CITIES. Some critical points for system planning for small and medi-

um-sized communities are discussed--(a) don't overorganize, (b) don't overdocument, (c) don't be too sophisticated, (d) don't demand stereotyped analyses, (e) don't impede transportation with too many social programs, and (f) don't overregulate. It is emphasized that the need for planning in urban areas is not less in smaller areas but the procedures used in satisfying the needs are different. (Author)

Wilson, PL (Texas State Department of Highways & Public Transp) *Transportation Research Board Special Report No. 187, 1980, pp 75-77*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311231 TRANSPORTATION ACTION PROGRAM. The development of transportation plans and programs that are responsive to community needs is a strong advocate position. This paper presents an approach used in Arizona that, although not new, may be useful in many other areas. This transportation action program is discussed as an approach to the identification of transportation issues and problems (real and perceived) in a small or medium-sized urban area. (Author)

Lowe, AB (Arizona Department of Transportation) *Transportation Research Board Special Report No. 187, 1980, pp 77-78, 1 Tab*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311232 AN EXPLANATION OF WHY SYNTHETIC TRANSPORTATION STUDIES WORK (ABRIDGMENT). Although various validation studies have shown that synthetic urban-transportation-study techniques can achieve acceptable results when compared with conventional traffic assignments and ground counts, two questions have been frequently raised: does this favorable comparison indicate that the trip matrix developed by synthetic procedures reflects actual travel patterns?, and how sensitive is the assignment to the input data? This paper discusses a sensitivity analysis that used data from an urban transportation study in Tyler, Texas to help answer those questions. Four matrices were assigned to the same network and compared--the first three of which were assignment matrices and the last being the existing trip matrix: a stochastic trip matrix constrained only to the number of trips in the study area; a stochastic trip matrix constrained only to the number of trips in the study area; a stochastic trip matrix constrained to total trips, trip-length frequency, and trip ends at each external station; and the fully modeled trip matrix. Analysis of the results from the assignment indicates that, as long as an accurate trip-length frequency is used in generating the trip matrix, the assigned vehicle kilometers of travel will very closely match the counted vehicle kilometers of travel, even when the distribution of zonal trip ends is unrealistic. It

was concluded that acceptable assignment results can be expected if the following conditions are satisfied: the correct mean trip length is used, the total number of trips in the study area is correct, and a reasonable approximation of the geographical distribution of trip ends is achieved.

Stover, VG (Texas A&M University) *Transportation Research Board Special Report No. 187, 1980, pp 78-79, 1 Tab., 3 Ref.*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311233 A SIMPLIFIED TECHNIQUE FOR TRANSPORTATION PLANNING. Simplified techniques for transportation planning developed for several small urbanized areas in Texas are used to point out the need to design procedures that satisfy the requirements of the particular area. This approach has resulted in varying levels of effort for small urban area studies. These range from a comprehensive analysis of existing travel patterns and a manual forecast of travel to an analysis of existing travel patterns and the use of traditional models for forecasting traffic. In the studies described in this paper, primary emphasis is on solving current traffic problems and providing local planners and engineers with the information they want. The procedures are not necessarily cheaper or simpler than traditional ones but were designed to produce a specific product. The importance of developing procedures and techniques that provide useful and meaningful information to decision makers is emphasized. (Author)

Waggoner, JH (Texas State Department of Highways & Public Transp) *Transportation Research Board Special Report No. 187, 1980, pp 80-81*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311234 APPLICATION OF MANUAL TECHNIQUES FOR TRAVEL-DEMAND ESTIMATION. Manual techniques can be valuable in many aspects of transportation planning, especially for small and medium-sized cities. To effectively use these techniques, the planner must be aware of the procedures, assumptions, and, consequently, the utility of the outcome. The use of sensitivity surfaces often facilitates the planning product. This paper describes the use of manual techniques for travel-demand estimation through two scenarios, a site analysis in Boise, Idaho, and a corridor analysis in Columbus, Ohio. The quick-response advantage of manual techniques is emphasized. (Author)

Carter, MM (Comsis Corporation) *Transportation Research Board Special Report No. 187, 1980, pp 81-83, 1 Ref.*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311235 DWELLING-UNIT TO PARKING-STALL TRIP-GENERATION ANALYSIS (ABRIDGMENT). This report briefly summarizes a simplified method for relating zonal dwelling-unit and zonal parking-stall data to trip generation. This method has been used successfully by the Kansas Department of Transportation in studies in El Dorado, Dodge City, and Arkansas City. The results have proved surprisingly accurate in simulating existing conditions in small cities in Kansas and have required a minimum amount of time and money for data collection and tabulation.

Landman, ED (Kansas Department of Transportation) *Transportation Research Board Special Report No. 187, 1980, p 84*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311236 SIMPLIFIED PROCEDURE FOR ESTIMATING FUTURE TRIP GENERATION (ABRIDGMENT). This procedure (which assumes that existing socioeconomic data are already completed) involves the following steps: develop the control total for the number of trip productions (P's) and attractions (A's) by purpose; add new developments by zone, that are known to be coming; divide the study area into developed area and undeveloped area; for developed areas, determine growth potential for each zone, adjust potential by using appropriate factors, and apply the factors directly to the existing P's and A's according to purpose; for undeveloped areas, flag zones that will be developed by target year according to percentage developed; apply average trip rate per developed unit according to purpose; add the total P's and A's compare with the control total, and adjust as necessary; and continue the distribution. The procedure makes the following assumptions: newly developed areas will be similar in characteristics to the typical existing developed areas, and the error in trip rates is probably less than that introduced by a zone-by-zone 20-year forecast.

Waggoner, JH (Texas State Department of Highways & Public Transp) *Transportation Research Board Special Report No. 187, 1980, pp 84-85*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311238 ISSUES AND LEVELS OF EFFORT. This paper contains the issues and research needs discussed at the Workshop on Plan Implementation. The participants identified thirty general problem areas related to transportation plan implementation in small and medium-sized communities. Of those issues, ten were cited as being of high-priority: poor overall management and coordination of the planning, programming, and implementation processes; areawide transportation planning that fails to address the broader needs of local decision makers; not making the best use of available staff resources; lack of appropriate attention to local regulatory powers for plan implementation; the

administrative burden on transportation planning and programming; lack of continuing information process for local decision makers; lack of planning support from local decision makers; transportation plans and programs that have been too far off target; and inability to protect financial resources. The one research need that was specifically recommended for further study relates to the problems and difficulties in planning for an uncertain future. Another need mentioned, which was not fully defined, was to establish appropriate levels of effort for transportation planning and programming in small and medium-sized urban areas.

Granum, JO Wilson, BB (Wisconsin Department of Transportation) *Transportation Research Board Special Report No. 187, 1980, pp 87-89*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311239 ORGANIZATION STRUCTURE FOR PLAN IMPLEMENTATION. In addressing transportation planning for urban areas in the 5000 to 2000000 population range, it must be recognized that there is no single organizational structure universally suitable to administering transportation programs. In Tennessee, the A-95 organization is a major issue. This paper discusses the organizational structure that has been developed in Tennessee to implement the planning and programming of transportation systems. In this structure, the roles of state and local agencies and officials have been integrated. (Author)

Wilson, WH (Tennessee Department of Transportation) *Transportation Research Board Special Report No. 187, 1980, pp 89-91*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311240 TRANSPORTATION PLANNERS AND LOCAL ELECTED DECISION MAKERS (ABRIDGMENT). This paper discusses the perspective of a city manager toward transportation planning. Discussion includes: various backgrounds of elected decision makers, the various areas of understanding involved in the local decision making process, the different levels of responsibility involved in the process, and the various relationships between transportation plans and planners and decision makers. It was concluded that the most important levels of responsibility for elected decision makers usually involve land use and zoning. Thus, it behooves transportation planners to work more effectively with local elected decision makers to improve the transportation planning and programming process.

Lykes, JE, Jr (Garland City Manager, Texas) *Transportation Research Board Special Report No. 187, 1980, p91*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.;

ORDER FROM: TRB Publications Off

42 311241 IMPLEMENTATION OF TRANSPORTATION PLANS (PARAPHRASED REMARKS FROM RD MORGAN). This paper discusses the various constraints to plan implementation. The plan itself may be a constraint; because sometimes planners recommend plans that have no reasonable chance of implementation. Finances specifically, reduced state and local revenues--are frequent constraints to plan implementation. Lack of political support at both the state and local level is a constraint, due to a credibility gap in the planning process with local decision makers. Lack of public support is also a constraint; because plans are not responsive to citizen problems, and there is not enough of public involvement. Lack of appropriate attention to local regulatory powers can be a constraint. Administrative burdens are also a common barrier. Other constraints mentioned include the lack of a continual information process for decision makers and the lack of support for them.

Transportation Research Board Special Report No. 187, 1980, p 92 This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311242 TECHNIQUES. This paper details the issues and recommendations discussed at the Workshop on Plan Implementation. The principal issues were identified as: poor management of the planning and implementation process at all levels--planners, decision makers, and state and federal agencies; transportation planning that fails to address the broad needs of local decision makers and planners who do not provide information about the effects of transportation on other programs (such as social service, health, and education) in which decision makers are involved; and the quality of effort being more important than the quantity. The following recommendations were developed to deal with those issues: the emphasis of the planning process on long-range planning must give issues; local participants must be involved in identification of issues and problems in order to make the process responsive to local needs; communication between planners and decision makers must be improved; and reasonable levels of planning effort must be established.

Fleet, CR (Federal Highway Administration) *Transportation Research Board Special Report No. 187, 1980, p 93*; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

42 311292 TAKING A TRANSFER TO MASS TRANSIT. Since the early 1970's California has been in the midst of a revolutionary shift in transportation policy. From an almost exclusive emphasis on the private automobile, the state has begun to support mass transit. In 1972, the sales tax was extended to gasoline, with most of the

revenues going to mass transit. A voter initiative in 1974 allowed up to 25 percent of the state's highway fund to be used for mass transit. A law passed in 1979 in response to the gasoline crisis allocated \$30 million for transit development over the next three years. Along with expanding and improving existing services, the allocation will aid the development of intercity and commuter rail service as well as of light-rail and rapid transit projects in several cities. However, because of the need to compromise with entrenched interest groups, this policy change should not be seen, as a shift from the automobile to mass transit but rather as an incremental adjustment to the status quo (dictated by political considerations) to form a multimodal system with the automobile still dominant. Furthermore, there still has not been the throughgoing appraisal of future transportation needs that the author feels is required, and which would include deciding how much of the highly valued goal of mobility is really necessary.

Anderson, W *Cry California* Vol. 14 No. 4, 1979, pp 9-12

42 311302 HIGHWAY SKETCH PLANNING: CAPM THE COMMUNITY AGGREGATE PLANNING MODEL (CAPM) USERS' GUIDE. This report is an introduction to the Community Aggregate Planning Model (CAPM), and its potential uses. CAPM has recently been incorporated as a module of the Urban Transportation Planning System (UTPS) package of computer programs, and is a computerized transportation sketch planning model, which permits fast and inexpensive preliminary screening of highway improvement alternatives. It is useful in a number of sketch planning applications, such as the analysis of urban development patterns, alternative system investments, air quality, and energy consumption. This report incorporates two documents: the CAPM Users' Guide and the CAPM Program Writeup. The Writeup is included in this report as an Appendix. Together, these documents provide information of the program's capabilities, limitations, data needs, potential applications, and computer requirements. Both are now available on the UTPS tape. Included in this report are discussions of input requirements and output reports. Also presented is a fairly detailed description of the assumptions and algorithms upon which the model is based. The final section gives a number of coding examples which illustrate the use of CAPM in the analysis of various planning problems. (UMTA)

Ryan, JM ; Federal Highway Administration, Urban Mass Transportation Administration, (UPM-20-79) Final Rpt. UMTA-UPM-20-79-2, Apr. 1979, 146p; ORDER FROM: NTIS; PB80-131923

42 311713 ACCESSIBILITY MEASURES AND THEIR SUITABILITY FOR USE IN TRIP GENERATION MODELS. Accessibility measures which have been used in a number of previous studies are reviewed and their applicability for use in trip generation modelling appraised. The paper then outlines the ideal requirements of accessibility, measures for use in trip production modelling work and then proceeds to define a number of private transport, public transport and 'all modes' (private and public) accessibility measures. These are then tested using data collected in Middlesbrough, and the 'best' measures

together with the improvement in the explanatory power of the trip production models by the introduction of the accessibility measures, determined. (a) (TRRL)

Leake, GR (Leeds University, England) Huzayyin, A (Cairo University, Egypt) *Traffic Engineering and Control* Vol. 20 No. 12, Dec. 1979, pp 566-572, 2 Fig., 1 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244891)

42 312112 UTILITY MAXIMIZATION, DEMAND SYSTEMS, AND FUNCTIONAL FORM IN TRANSPORT DEMAND ANALYSIS. The basic theory of utility maximization and its use in the generation of demand systems which significantly reduce the parameter space within which the researcher must work is examined. For a specific utility representation it is shown how a particularly popular demand system known as the linear expenditure system (LES) is derived and a generalization known as the S-branch system is examined.

Johnson, LW (Macquarie University, Australia) *Transportation Planning and Technology* Vol. 5 No. 4, 1979, pp 247-255, 39 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 312140 FORECASTING URBAN TRAVEL DEMAND FOR QUICK POLICY ANALYSIS WITH DISAGGREGATE CHOICE MODELS: A MONTE CARLO SIMULATION APPROACH. A spatial aggregation methodology based on continuous mathematical functions is employed in urban passenger travel demand prediction. The approach derives aggregate travel demand from disaggregate choice models in the form of multi-dimensional integrals which are solved by Monte Carlo simulation. Approximate empirical relationships are developed to examine the statistical properties of biases and random errors in Monte Carlo prediction. The methodology has been used in developing a comprehensive urban travel demand prediction model suitable for policy-sensitive sketch planning.

Watanatada, T (International Bank for Reconstruction & Development) Ben-Akiva, M *Transportation Research. Part A: General* Vol. 13A No. 4, Aug. 1979, pp 241-248, 25 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 312141 PLANNING OF URBAN TRANSPORT SYSTEMS IN THE SOVIET UNION: A POLICY ANALYSIS. Urban transportation systems in the Soviet Union, goals and objectives of Soviet transportation planning, and problems and policies associated with the planning are discussed.

White, PM (Birmingham University, England) *Transportation Research. Part A: General* Vol. 13A No. 4, Aug. 1979, pp 231-240, 34 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 312645 URBAN CONSORTIUM FOR TECHNOLOGY INITIATIVES, 1978 [Annual rept]. An overview of the Urban Consortium for Technology's role in applying science and technology to solve urban problems, with emphasis on the achievements in 1978 are presented. The organization of the Urban Consortium is described and its 1978 committees and member jurisdictions listed. The sixfold objectives of the Consortium are to: seek new research resources,

continue refining agenda building strategies, accelerate development of quality products, communicate the Consortium's purpose and results, arouse Federal recognition of urban science and technology needs, and promote private sector recognition of urban needs. Highlights of the 1978 Consortium work program include procurement of funding for task forces in Energy and Human Resources, examination of neighborhood resource allocation strategies, a study of the use of tax incentives and regulatory controls to promote neighborhood maintenance and revitalization, community energy management plans, fire and safety disaster preparedness projects, studies of urban management, finances and personnel problems, and development of informational materials on urban transportation subjects. Expectations and the outlook for future activities of the Consortium are discussed.

Parker, JK ; Public Technology, Incorporated, National Science Foundation Annl Rpt. NSF/RA-780653, 1978, 17p; Grant NSF-ISP78-12729; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-107840

42 312646 THE URBAN TRAVEL DEMAND FORECASTING PROJECT FINAL REPORT SERIES, VOLUME X. POLICY ANALYSIS OF A TRANSPORTATION CORRIDOR [Final rept]. The Urban Transportation Corridor Policy Analysis is one of the three practical applications of disaggregate travel demand models conducted as part of the Urban Travel Demand Forecasting Project. The policy study found that disaggregate travel demand models together with a synthesized sample of households are a very convenient and cost-effective way to predict demand for travel and for analyzing the consequences of alternative plans by market segments. Parametric transportation service models can be utilized together with the disaggregate travel demand models, and equilibrium of demand and service can be accomplished at low costs. The computational procedure employed in the study was that of approximating fixed points of a mapping. The costs of alternative transportation modes are a very complex problem for analysis. The analyses and calculations made show that substantial subsidies and cross-subsidies are made to and within the passenger transportation industry. The policy analysis of alternative plans in the I-580 corridor showed that a designated lane for high occupancy vehicles (HOV) improves the linehaul speeds in most cases even when it means reducing the capacity for single occupant cars. HOV lanes and express bus service were found to confer benefits mostly to the well-to-do suburbanites.

Talvitie, AP ; California University, Berkeley, National Science Foundation, Sloan (Alfred P) Foundation Final Rpt. UCB-ITS-RR-78-5, NSF/RA-780636, Mar. 1978, 312p; Grant NSF-APR74-20392; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-108210

42 312869 URBAN TRAVEL DEMAND FORECASTING PROJECT, FINAL REPORT SERIES, VOLUME I: OVERVIEW AND SUMMARY. The project has been carried out to provide transportation engineers and planners with information necessary to select and policy-oriented travel demand models which were developed from observations on individual households. Emphasis focused on refining and testing

methods for applying models and determining the limits of their validity. Consideration has been given to all aspects of a transportation planning effort from survey and network data collection, through model specifications, calibration and validation, to issues of aggregation and policy forecasting as well as policy applications on region-wide, corridor, and local areas. Each phase has been explored at two levels: specific studies in each aspect of the project, and assessment of the merits and limitations of the methodologies employed with suggested preferable strategies for planning. The project focused on the introduction of rail rapid transit service (BART) in the San Francisco Bay Area.

McFadden, DL Reid, FA Talvitie, AP Johnson, MA ; California University, Berkeley, National Science Foundation Final Rpt. UCB-ITS-RR-79-6, NSF/RA-790256, June 1979, 106p; Grant NSF-GI-43740; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125016

42 312870 URBAN TRAVEL DEMAND FORECASTING PROJECT, FINAL REPORT SERIES, VOLUME IV: QUAIL 4.0 USER'S MANUAL. Instructions for using the QUAIL special computer program are detailed. QUAIL is the acronym for Qualitative, Intermittent, and Limited Dependent Variable Statistical Program employed to analyze statistical models involving non-continuous dependent variables and to manipulate storage of associated arrays of data. QUAIL is written in Fortran IV and is designed so that most errors in command statements are detected before data is recorded or results are compiled. Running a QUAIL program involves two steps--The QUAIL compiler scans the program for syntax errors and also creates a list of variables used but not created by the program; and the interpreter performs indicated operations, automatically loading any needed permanent variables from QUAIL tape or disk files. The manual describes selection of subsamples, the IDCASE/IDALT structure, manipulation of variables, input and output of variables, QUAIL files, stop, end, list, MACROS in QUAIL, advanced features in DIMEN and SMPL, logit estimation, other statistical procedures, matrix operations and QUAIL statements.

Berkman, J Brownstone, D ; California University, Berkeley, National Science Foundation Final Rpt. UCB-ITS-RR-79-8, NSF/RA-790257, June 1979, 162p; Grant NSF-GI-43740; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125024

42 313231 INCREASING THE PRODUCTIVITY OF URBAN EXPRESSWAYS: COMBINING TSM (TRANSPORTATION SYSTEMS MANAGEMENT) TECHNIQUES AND TRANSIT IMPROVEMENTS. This is the second phase of a two-part study, which summarizes an analysis of Transportation Systems Management (TSM) and other low capital cost techniques to increase the productivity of urban expressways and streets in dense, built-up areas. Using CORSIM, a variant of the TASSIM land-use transportation model, this analysis examines the benefits and costs of implementing alternative combinations of TSM techniques and transit improvement policies. Of the composite policies tested, expressway ramp metering with an average delay of nine minutes, assuming an improved bus transit sys-

tem charges \$0.7 per mile, is the most feasible cost-effective option.

Kain, JF Fauth, GR ; Harvard University, Urban Mass Transportation Administration, (UMTA-MA-11-0031) Final Rpt. UMTA-MA-11-0031-80-1, Oct. 1979, 95p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-150568

42 313250 POTENTIAL CHANGE STRATEGIES IN URBAN TRANSPORTATION: AN OVERVIEW AND TENTATIVE APPRAISAL. The aim of the study is to identify innovations in the urban transportation system which combine in high degree political feasibility and cost-effectiveness with respect to the most significant problems of urban transportation in the United States.

Altshuler, A Womack, J Pucher, J ; Massachusetts Institute of Technology, Department of Transportation Final Rpt. DOT/RSPA/DPB/50-79/8, Dec. 1979, 77p; Contract DOT-OS-50240; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-155278

42 313513 PASSENGER TRAVEL FORECASTING. Contents: Equilibrium trip assignment--advantages and implications for practice; Equilibration properties of logit models; Validation and application of an equilibrium-based two-mode urban transportation planning method; Confidence intervals for choice probabilities of the multinomial logit model; Discrete multivariate model of work-trip mode choice; Small-area trip-distribution model; Disaggregate travel models--how strong are the foundations; Choice of access mode to intercity terminals; Use of the gravity model for pedestrian travel distribution; Population segmentation in urban recreation choices; Sampling vehicle kilometers of travel; Empirical comparison of various forms of economic travel demand models; Estimation of demand for public transportation; Second role of the work trip--visiting nonwork destinations; Generalized attributes and shopping trip behavior.

Eash, RW Janson, BN Boyce, DE Anas, A Florian, M ; Transportation Research Board, Washington, DC. TRB/TRR-728, ISBN-0-309-02981-3, 1979, 97p; Library of Congress catalog card no. 80-607015. Also pub. as ISSN-0361-1981. Paper copy also available from Transportation Research Board, 2101 Constitution Ave. NW., Washington, DC. 20418; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-142672

42 313522 ISSUES IN TRANSPORTATION PLANNING FOR SMALL AND MEDIUM-SIZED COMMUNITIES. ;Contents: Estimation of trip tables from observed link volumes; Equilibration of supply and demand in designing bus routes for small urban areas; Demand-estimating model for transit route and system planning in small urban areas; Simulation of travel patterns for small urban areas; Framework for transferring travel-characteristics of small urban areas; Land-use-allocation model for small and medium-sized cities.

Turnquist, M Gur, Y Hobeika, AG Chu, C Golenberg, M ; Transportation Research Board, Washington, DC. TRB/TRR-730, ISBN-0-309-02984-8, 1979, 38p; Library of Congress catalog card no. 80-10611. Also pub. as

ISSN-0361-1981.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-147846

42 313621 LOGIT ANALYSIS OF RAPID TRANSIT ACCESS CHOICES. EXECUTIVE SUMMARY. The study examined the suitability of applying the program ULOGIT of the UTPS Package of Urban Transportation Planning Programs to forecast rapid transit access mode choices. This research provides a systematic methodology for analyzing and predicting rapid transit access mode travel behavior. Available data from the Parkham Express bus service in Richmond, Virginia, the Bay Area Rapid Transit (BART) System, and the Lindenwold Line are used. These data are critically evaluated so as to provide the needed information for modeling access mode choices; a survey procedure is designed to obtain complete descriptive information for access mode choice analysis in the future. In addition to model development, this study identifies and clarifies important practical considerations and issues associated with logit models of rapid transit access mode.

Korf, JL Demetsky, MJ Hoel, LA ; Virginia University, Urban Mass Transportation Administration, (UMTA-VA-11-0005) Final Rpt. UVA/529100/CE79101ES, UMTA-VA-11-0005-80-1, June 1979, 8 p.; See also PB80-159411.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-159403

42 313622 LOGIT ANALYSIS OF RAPID TRANSIT ACCESS CHOICES. The study examines the suitability of applying the program ULOGIT of the UTPS Package of Urban Transportation Planning Programs to forecast rapid transit access mode choices. Strategies and issues associated with logit modeling of submodal choices are examined and a specific modeling approach for this study is selected. The travel data are interpreted to develop descriptive aggregate measures of access mode supply characteristics so that only feasible access mode choices are used in developing the models. Also, rapid transit stations and access points are classified into groups to test hypotheses regarding the specification of service needs for station location types. Results show that models for classified station groups have coefficients that differ from each other, and from a model calibrated with data for all stations in a group.

Korf, JL Demetsky, MJ Hoel, LA ; Virginia University, Urban Mass Transportation Administration, (UMTA-VA-11-0005) Final Rpt. UVA/529100/CE79/101, UMTA-VA-11-0005-80-2, June 1979, 173 p.; See also PB80-159403.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-159411

42 313628 BARRIERS TO THE DIFFUSION OF INNOVATION IN THE TRANSIT INDUSTRY. The report is designed to establish an understanding of the problems facing the transit community today regarding innovation and its potential for improving transit performance. The report examines in detail twelve major barriers to diffusion of innovation, the impacts of these barriers on one another, and their effects on various classes of innovation.

Smith, IP Einstein, N ; Smith and Howard Associates, Incorporated, Office of the Secretary of Transportation Final Rpt. DOT-I-80-5, June 1979, 127 p.; Prepared in cooperation with ATE

Management and Service CO., Arlington, VA.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-161508, DOTL NTIS

42 313630 PROCEEDINGS OF THE UMTA R AND D PRIORITIES CONFERENCE (3RD) HELD AT CAMBRIDGE, MASSACHUSETTS ON NOVEMBER 16-17, 1978. VOLUME I. PROCEEDINGS OF GENERAL SESSIONS AND SUMMARIZED REPORTS OF WORKSHOPS. This is a compilation of material that was presented at the Third Urban Mass Transportation Administration Research and Development Priorities Conference. It contains proceedings of the General Sessions and summarized reports of the eight Workshop Sessions as well as a listing of conference participants.

American Public Transit Association, Urban Mass Transportation Administration, (UMTA-DC-06-0157) UMTA-DC-06-0157-79-1, Nov. 1978, 71p; See also Volume 2, PB-300987, and report dated March 77, PB-266158; Contract DOT-UT-70026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-161532

42 313880 EVALUATION OF THE STATE IMPLEMENTATION PLAN REVISION SUBMITTED BY NEW YORK STATE IN FULFILLMENT OF THE MOYNIHAN-HOLTZMAN AMENDMENT. The objective of the study is to assist the U.S. Environmental Protection Agency in reviewing and evaluating the Submission by the State of New York in response to the Moynihan-Holtzman Amendment of the 1977 Clean Air Act. The Moynihan-Holtzman Amendment specifies that any alternative to bridge tolls in the State Implementation Plan must include comprehensive plans to 'establish, expand, or improve public transportation measures to meet basic transportation needs as expeditiously as practicable'. The submission is critically examined from various viewpoints- philosophical, technical, and sociological. A frame of reference for the evaluation was constructed based on four pertinent areas--industry-wide transit performance measures and standards, local public perceptions and priorities, local transit operator and planning agencies' projects and budgets, and comparable metropolitan transit system performance and budget data.

Kornhauser (Alain L) and Associates, Environmental Protection Agency Final Rpt. EPA-902/4-79-004, Sept. 1979, 189p; Contract EPA-68-NY-0001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-150279

42 313930 TRAVEL HABITS AND PATTERNS. VOLUME 2. 1974-FEBRUARY, 1980 (CITATIONS FROM THE NTIS DATA BASE). The bibliography is a compilation of references on U.S. travel patterns and habits covering mostly urban areas and their variety of transportation modes. The references deal with modal choices, energy use and energy conservation, transit rider behavior, ridesharing, car pool usage, paratransit and commuter services, work travel patterns, travel demand models, and forecasting. The bibliography also contains references on the travel patterns and travel habits of the elderly and handicapped persons. (This updated bibliography contains 249 abstracts, 48 of which are new entries to the previous edition.)

Kenton, E ;

National Technical Information Service Mar. 1980, 256p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-806284

42 314054 THE UMTA RAIL MODERNIZATION PROGRAM: EVALUATION OF THE IMPACTS OF SECTION 3 CAPITAL GRANTS FOR RAIL REHABILITATION AND MODERNIZATION, 1965-1977. The report is an evaluation of the Urban Mass Transportation Administration grants for the modernization of existing rail systems. From the beginning of the Section 3 Capital Grant Program through May 31, 1977, Section 3 grant approvals amounted to approximately \$6.2 billion. Of this total, \$1.7 billion, or 28 percent was approved for the rehabilitation, replacement and upgrading of existing rail systems. The report contains an inventory of rail modernization projects by type, mode (rapid rail, light rail, and commuter rail), and city. Impacts of these funds are analyzed by examining several specific projects in detail. In addition to the examination of project impacts, the process used by two transit operators (NYCTA and PATH) to secure rail modernization funds and to select and implement projects is discussed.

Bennett, J ; Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, (UMTA-IT-06-0118) Final Rpt. UMTA-IT-06-0118-80-1, May 1979, 282 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-178775

42 314216 TWO ESTIMATION METHODS FOR SINGLY CONSTRAINED SPATIAL DISTRIBUTION MODELS. Distribution models used the description of spatial phenomena like residential and shopping interactions are examined. A singly constrained distribution model is considered which can be used for the description of several relationships, such as home-shop interactions. Those interactions are influenced by several factors, e.g., attraction and distance variables. The influence of explanatory variables finds expression in the accessory parameters. The estimation of the values of these parameters, and the testing of their significance is called calibration. The two best known estimation procedures, i.e., the maximum likelihood and the least squares method are considered. For the singly constrained trip distribution model the linear least squares method is used directly after a special logarithmic transformation without taking into account additivity constraints and without an iterative procedure. The maximum likelihood method is also shown from a statistical point of view, to have useful properties.

Vanest, J Vansettin, J TNO-78/PS/41, Feb. 1978, 23p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N80-23219/2

42 314281 ADOPTION AND UTILIZATION OF URBAN TECHNOLOGY: A DECISION-MAKING STUDY. CASE STUDIES OF INNOVATION IN SYRACUSE, NEW YORK. PART 5. The report describes and analyzes the efforts made by a number of urban agencies to adopt and implement innovative strategies in delivering public services and solving local problems. The case studies include the following agencies and services: Syracuse Campus Plan, The Syracuse Fire Department, Housing, Syracuse

Police Department, Solid Waste Management, Syracuse Dial-A-Bus, Property Assessment, and Cable TV.

Lambright, WH Teich, AH Carroll, JD Beardsley, M Dorsey, T ; Syracuse University Research Corporation, National Science Foundation Final Rpt. SRC-TR-77-513-PT-5, NSF/PRA-7519704/5, Sept. 1977, 512p; Grant NSF-PRA75-19704; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-180029

42 314331 DEMANDS AND NEEDS OF FUTURE TRANSPORTATION: SURFACE TRANSPORTATION. 1964-FEBRUARY, 1980 (CITATIONS FROM THE NTIS DATA BASE). This bibliography is divided into four sections, Urban, Rail, Marine, and General studies. The urban transportation section contains citations which cover such topics as passenger demand forecasting, future system requirements, needs for new types of transportation modes, planning to reduce future demand, and predictions of usage and feasibility of rapid transit railways, buses, taxicabs, and automobiles. The abstracts of rail transportation studies cover freight forecasting, future passenger usage, and revenue predictions. The last two sections, marine and general, cite reports on the future of the U.S. shipping industry and general freight and passenger projections. (This updated bibliography contains 460 abstracts, 30 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service June 1980, 458p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-811300

42 314384 DELAWARE RIVER PORT AUTHORITY TRANSIT IMPROVEMENT PROGRAM. VOLUME III. PLANNING FOR IMPROVED SOUTH JERSEY COMMUTER SERVICE. This three-volume study contains the eleven regional transportation-related technical studies conducted by the DRPA, and sponsored by UMTA in coordination with the Delaware Valley Regional Planning Commission. Volume III contains the following reports: (1) Ridership and Revenue Study--Woodcrest/Philadelphia International Airport Rail Commuter Service (III); (2) Ridership and Revenue Study--Woodcrest/Atlantic City Rail Commuter Service (IV); (3) Ridership and Revenue Study--Woodcrest/Ocean City/Cape May Rail Commuter Service (XI); (4) Appendix A--Statement Supporting Revision of DRPA FY 1974 Unified Work Program; and (5) Appendix B--Unified Work Program, UMTA Project No. IT-09-0032, Revised Scope of Services DRPA Projects. This report evaluates the rail commuter service in Southern New Jersey in terms of ridership, revenues, and capital and operating costs.

Delaware Valley Regional Planning Commission, Philadelphia, PA.*Urban Mass Transportation, Administration, Washington, DC., (UMTA-IT-09-0032) UMTA-IT-09-0032-80-3, Apr. 1978, 257p; Prepared by Delaware River Port Authority, Camden, NJ. *See also Volume 2, PB80-186182. *Available Microfiche only because of poor quality; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-186190

42 314534 TRANSPORT STUDIES GROUP UNIVERSITY COLLEGE LONDON PROGRESS REPORT 1979. The report outlines the activities of the group in 1979 and briefly

describes each research project. A list of thirty four new publications, conference papers and theses is included. Research projects are as follows: (a) transport policy and planning: effects of changes in land use on travel by public transport; trends in patterns of work trips in selected areas in London; change and adaptation in rural communities; further developments in the continuous modelling of commuter travel patterns in cities; standard errors of the estimated values in calibrated full and partial trip matrices; numerical calculation of the effects of a barrier on traffic intensity in a city: energy and transport. (b) public transport: a simple model for a radial bus route. (c) traffic management and control: modelling of area-wide traffic management and control; traffic signal calculations in relation to junction layout capacity and delay; the capacity of a signal-controlled junction where there is priority for buses; delay to a single vehicle crossing a two-lane traffic stream; simulation of delay to vehicles queueing to cross one or more lanes of traffic having priority; speeds and headways of vehicles on rural roads. (d) road safety: area-wide application of inexpensive countermeasures against urban road accidents; supplementing state 19 accident data with injury data from the hospital in-patient enquiry; susceptibility to injury in road accidents; analysis of road accident data allowing for variation in grading of injury severity; safety of medium sized goods vehicles; reference manual on road safety; the protection afforded by seat belts.

Allsop, RE (University College, London) *Traffic Engineering and Control* Vol. 21 No. 2, Feb. 1980, pp 71-75, 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246139)

42 314538 AN URBAN WORKING STUDY-AN EXAMPLE FROM MELBOURNE, AUSTRALIA. This paper describes an urban corridor study carried out in Melbourne, Australia. The object of the study was to examine present and likely future transport, drainage and recreation problems in the corridor, and to recommend a course of action to overcome these problems. The study considered a wide range of engineering, economic, sociological and environmental factors, involved a number of authorities all with interests in the corridor, and included an extensive community participation programme. (a) (TRRL)

Underwood, RT (County Roads Board, Victoria, Australia) *Highway Engineer* Vol. 27 No. 2, Feb. 1980, pp 2-7, Fig., Phot., Ref.; ACKNOWLEDGMENT: TRRL (8003TR111E)

42 314547 NEW DEVELOPMENTS IN MODELLING TRAVEL DEMAND AND URBAN SYSTEMS. SOME RESULTS OF RECENT DUTCH RESEARCH. This book presents the results of recent research carried out in the Netherlands on the modelling of travel demand and urban systems. It contains the papers that were presented at the fifth Dutch Transportation Planning Research Colloquium, held in the Hague, 607 April, 1978. To a certain extent these papers reflect the main current research efforts in the Netherlands in the field of quantitative transportation analysis and its counterpart in spatial planning. (TRRL) IRRD abstracts nos 245564 to 245578.

Jansen Bovy (Delft University of Technology, Netherlands) Vany (Research Center for Physical

Plng Tno, Netherlands) Leny (Public Works, Netherlands) ; Saxon House, Teakfield Limited Monograph 1979, 403p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 245563), Institute for Road Safety Research

42 314610 MIDTOWN CIRCULATION PLAN--MIDTOWN MANHATTAN CIRCULATION AND SURFACE TRANSIT STUDY. The Midtown Circulation and Surface Transit Study was initiated in order to reduce congestion and thereby improve air quality, pedestrian and vehicular safety, and surface transit service and to enhance the urban environment in midtown Manhattan. The goal of the study was to develop and demonstrate low-capital cost, surface transit and other circulation improvements to relieve congestion resulting from the intense competition for street space in midtown. The objective of this report is to recommend a comprehensive circulation plan for midtown based on the findings of previously completed project tasks and the overall policy concepts as expressed by the project goals and objectives. In response to this objective, strategies are recommended herein for increasing the efficiency of the surface transportation system through improvements to the operational and physical elements of that system. It is concluded that low-cost capital improvement techniques such as exclusive bus lanes, turn restrictions, signal time revisions and parking restrictions, can be used in midtown to improve the efficiency of the surface transportation system. Since buses accommodate 48 percent of all midtown surface person miles traveled (PMT) it is also concluded that improvements to surface transit operations represent a primary method for increasing total system efficiency. Furthermore, to improve system efficiency to an optimum level given existing demand, a hierarchy of street use should be established. The strategies outlined above and described more fully in the body of this report are considered an incremental step in achieving such a street use hierarchy. (Author)

Edwards and Kelcey June 1979, 35 p., 5 Fig., 3 Tab.; Prepared for New York City Department of Transportation and New York Department of City Planning.

42 314612 TRANSPORTATION, TECHNOLOGY, AND SOCIETY: FUTURE OPTIONS. This book contains the proceedings of a conference on the future of the American transportation system. The paper presented concern further trends in the nation's transportation system, possible changes in the system and the technological means needed to effect those changes. The authors are representatives of government and industry, as well as academic. The papers are grouped under several headings: Technology and Society, The Automobile and the Future of Society, Urban Transit and Future Planning, The Future Expansion of Freight Movement and Future Technology in Air Transportation.

Karaska, GJ Gertler, JB ; Clark University Press, (0-914206-16-8) Oct. 1978, 135p, Figs., Tabs.

42 314728 DECISION THEORY. TRANSPORTATION PLANNING AND THE EVALUATION PROCESS. Transportation studies typically include a cost-benefit analysis of alternative plans or options before making recommendations. Although it is recognised that there are

many uncertainties about the future, little is done to deal with them other than a sensitivity analysis of the conclusions to variation in the values used in the cost-benefit analysis. Decision theory provides a formal mechanism for handling uncertainty by determining the probability of different demand states occurring, and, by explicitly introducing decision criteria, evaluating performance in each demand state. The article describes how techniques derived from decision theory can be usefully incorporated into the evaluation structure so as to improve the decision process. Two examples are provided to demonstrate the application of these procedures. The first discusses the planning strategies for inter-city travel in the Windsor-Guebec city corridor. Five alternatives are evaluated. The second example is based on a commuter rail transit line in the Lake-Shore corridor of Toronto. (TRRL)

Khan, AM (Carleton University, Canada) Poulton, MC (British Columbia University, Canada) *Logistics and Transportation Review* Vol. 15 No. 5, 1979, pp 437-451, 7 Fig., 2 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 245587)

42 314800 APPLIED NETWORK OPTIMIZATION. This is a detailed treatment of network optimization problems in transport and urban and regional planning. Most of the book is devoted to the problems of network design for road, rail and air transport, pipeline and waste water systems and urban public transport. More specifically, network flow problems like traffic assignment and vehicle routing for school buses and waste collection are discussed. (Pergamon Press)

Mandl, C ; Academic Press Incorporated 1980, 176p; ACKNOWLEDGMENT: Maxwell Scientific International

42 315083 MOVEMENT IN CITIES: SPATIAL PERSPECTIVES ON URBAN TRAVEL AND TRANSPORT. The book describes and analyses urban travel in terms of the purpose, distance and frequency of journeys and the modes and routes used. It draws its material from numerous surveys of transport in British towns, with occasional reference to the US, Australia and other countries. The authors seek to elucidate the interrelations between the location of activities and the patterns of transport supply and use within towns. There is an introduction to the techniques of urban transport analysis and modelling and a discussion of the transport technology of the future.

Daniels, PW Warnes, AM ; Pergamon Press, Incorporated, (0 416 80140 4) 1980, 400p; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

42 315158 DELAWARE RIVER PORT AUTHORITY TRANSIT IMPROVEMENT PROGRAM. VOLUME I: PLANNING FOR PATCO EXTENSION AND IMPROVEMENT. TECHNICAL STUDY. The Delaware River Port Authority (DRPA) has been engaged, since June 1970 in progressing a comprehensive Mass Transit Study which was directed toward developing specific recommendations regarding the DRPA Mass Transportation Development Program. This three-volume study contains the eleven regional transportation-related technical studies conducted by the DRPA, and sponsored

by UMTA in coordination with the Delaware Valley Regional Planning Commission. Volume I, this report, contains the following project/final reports: 1) continuation of DRPA Transit Planning Program (I); 2) Justification of PATCO Extensions and Improvements (V); 3) Master Plan of Public Transportation Improvements for the DRPA Area of Responsibility (VI); 4) Relocation Program (VII); and 5) Advanced Land Acquisition Program (VIII). This report describes the work done to develop the governing criteria and basic design for continuation of public transportation planning activities by DRPA. It also analyzes the Consultants Rail Expansion Program in terms of regional implementation; least cost versus acceptable levels of service; support of land-use objectives and policies; and beneficial effects on social problems of mobility, poverty, and segregation. The Consultants' program recommended a total program of 32 miles of additions to the existing rapid transit system: a 14-mile extension from Broadway Station in Camden to the Interstate Route 295-New Jersey Route 38 Interchange in Mt. Laurel Township, and an 18-mile extension from Division Street in Camden to Glassboro.

Delaware River Port Authority, Delaware Valley Regional Planning Commission, Urban Mass Transportation Administration UMTA-IT-08-0032-80-1, Apr. 1978, 196 p.; See also Volume 2, PB80-186182. Report available in microfiche only.; ORDER FROM: NTIS; PB80-186174

42 315160 DELAWARE RIVER PORT AUTHORITY TRANSIT IMPROVEMENT PROGRAM. VOLUME III: PLANNING FOR IMPROVED SOUTH JERSEY COMMUTER SERVICE. The Delaware River Port Authority (DRPA) has been engaged, since June 1970 in progressing a comprehensive Mass Transit Study which was directed toward developing specific recommendations regarding the DRPA Mass Transportation Development Program. This three-volume study contains the eleven regional transportation-related technical studies conducted by the DRPA, and sponsored by UMTA in coordination with the Delaware Valley Regional Planning Commission. Volume III, this report, contains the following project/final reports: 1) Ridership and Revenue Study: Woodcrest/Philadelphia International Airport Rail Commuter Service (III); 2) Ridership and Revenue Study: Woodcrest/Atlantic City Rail Commuter Service (IV); 3) Ridership and Revenue Study: Woodcrest/Ocean City/Cape May Rail Commuter Service (XI); 4) Appendix A: Statement Supporting Revision of DRPA FY 1974 Unified Work Program; and 5) Appendix B: Unified Work Program, UMTA Project No. IT-09-0032, Revised Scope of Services DRPA Projects. This report evaluates the rail commuter service in Southern New Jersey in terms of ridership, revenues, and capital and operating costs. Some systems examined herein would have utilized existing Pennsylvania-Reading Seashore Lines and Penn Central trackage and the tracks of the planned Center City-Airport High Speed Line.

Delaware River Port Authority, Delaware Valley Regional Planning Commission, Urban Mass Transportation Administration UMTA-IT-09-0032-80-3, Apr. 1978, 257 p.; See also Volume 2, PB80-186182. Report is available in

microfiche only.; ORDER FROM: NTIS; PB80-186190

42 315198 UNDERGROUND RAILWAY OR FEEDER BUS? SOCIAL ECONOMIC METHODS FOR ALTERNATIVE PUBLIC TRANSPORT INVESTMENTS [Tunnelbana eller matarbus? samhaellsekonomiska metoder vid alternativa kollertivtrafikinvesteringar]. The purpose of this report is to try to find a method to compare different investments in public transportation, and judge which alternative is most urgent from a social cost-benefit point of view. Experiences from other methods are used and attention is paid to all factors significant for the social cost-benefit evaluation. The method is formed as an example, and applied on a possible development of skarpnaecksfaeltet. Two different alternatives are compared, an extension of the underground railway and A feeder bus line. Calculations for two different levels of development were made. These correspond to two and three storey buildings respectively. During the work certain assumptions and simplifications were made. Because of this the result may not be looked upon as a correct numerical ground for decisions, but primarily as an illustration of the method. The factors which partly or not at all could be valued in money, were estimated by using a simple scale (0-) for the purpose. The two alternatives were compared with respect to noise, air pollution, changes in environment and nature, public security, possibilities for different groups to use the transport mode, punctuality, information, heating and ventilation, tidiness and comfort at stations and stops. Of these alternatives the bus seems to be most favourable. The valuation of the qualitative factors will be determined for the final decision. If the assumptions are changed, for instance by increasing the number of passengers, the underground alternative will be cheaper and more favourable compared with the bus. (TRRL) [Swedish]

Sterner, A Tengblad, G ; Royal Institute of Technology, Sweden Monograph Exam. 1977:3, 1977, 132p, 10 Fig., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 246648), National Swedish Road & Traffic Research Institute

42 315332 STATE TRANSPORTATION ISSUES AND ACTIONS. The second Conference on Statewide Transportation Planning and Programming, conducted by the Transportation Research Board at the request of the U.S. Department of Transportation and its modal administrations, sought to do the following: 1. Identify the challenges that will be faced by the states, now and in the next 20 years, particularly in the areas of the economy, energy, urban policy, and changes in transportation systems; 2. Report on the best available planning techniques and on research for new ones; 3. Recommend the optimum role for state departments of transportation in multimodal statewide transportation planning; 4. Identify techniques for optimum programming of scarce state resources, for example, between modes and categorical programs; 5. Discuss the proper content of a state transportation plan; and 6. Discuss ways of increasing the effectiveness of state departments of transportation in implementing state transportation plans. The conference, held April 29-May 2, 1979, in Warrenton, Virginia, attracted more than 100 participants,

representing various local, state, and federal governments, associations, consulting firms, and universities. This report contains the proceedings of the conference. Part 1 summarizes the meeting's highlights. Recommendations by participants are noted in Part 2. Part 3 contains the resource papers prepared for conference participants, along with reports of other presentations made during the meeting. Part 4 summarizes the workshop discussions on the various aspects of implementing statewide transportation plans and on the key elements of such plans. The participants and their affiliations are listed in Part 5. (Author)

Transportation Research Board Special Report No. 189, 1980, 109p, Figs., Tabs., Refs. ORDER FROM: TRB Publications Off

42 315391 TRANSPORTATION SYSTEM MANAGEMENT: PROTOTYPE PLANNING STUDY, PORTLAND. This report documents the project in Portland and is designed to provide a summary of the procedures utilized in Portland to systematically develop a regionwide program for TSM delineated on a small area basis. The TSM process includes a statement of goals and objectives, evaluation of existing conditions, a set of proposed actions and justification for inclusion of those actions in the area's Transportation Improvement Program. The author states that the process described herein represents a good model for the way in which comprehensive, systematic TSM planning can be carried out. The approach described should be adaptable without major change to other urban areas. (UMTA)

Spanovich, G ; Metropolitan Service Department Final Rpt. UMTA-IT-09-0068-79-1, Nov. 1979, 114 p; ORDER FROM: NTIS

42 316376 A REVIEW OF CANADIAN URBAN PASSENGER MODE CHOICE MODELS. This paper reviews modal split models developed in seven Canadian cities during the last ten years, with the aim of reporting on model design, input data requirements, output and the impact of modal structure and assumptions on transit planning. To establish the functional and structural relationships between the mode choice model and the remaining three steps of the transportation planning process, brief descriptions of the trip generation, distribution and assignment steps are provided. In addition, wherever mode choice model description supplied by individual cities contains explicit modal split formulae, estimates of direct and cross point elasticities are derived.

Department of Transport, Canada Monograph TP2202, May 1978, 55 p., 15 Fig., 13 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247239), Roads and Transportation Association of Canada; ORDER FROM: Department of Transport, Canada, Urban Transportation Research Branch, Montreal, Quebec H3A 2R3, Canada

42 316511 CENTRAL AND LOCAL GOVERNMENT URBAN, SUBURBAN AND INTERURBAN HIGHWAY PASSENGER TRANSPORT, NUMBER OF VEHICLE-KILOMETRES, TRAMCAR-KILOMETRES AND WAGON KILOMETRES, NUMBER OF VEHICLE-HOURS, PROCEEDS OF PASSENGER TRAFFIC 1970-78 [Statlig kommunal buss-och spårvaegstrafik, antal vagnkilometer och vagttimmar, persontrafikintaecker 1970-1978]. This report concerns the statistics of transport and communication. The first table presents urban, suburban and interurban highway passenger transport 1970-1978 and the second table presents local government passenger transport by bus 1970-1978 (only local government companies in 1970). The chart shows the number of vehicle-kilometres of all central and local government passenger transport by bus, underground and tramcar 1970-1978. (TRRL) [Swedish]

Statistiska Centralbyraan, (0082-0334) Monograph Meddel 1979:21, Dec. 1979, 9p, 1 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 246637), National Swedish Road & Traffic Research Institute

42 316551 MODELING PARK 'N RIDE AND KISS 'N RIDE AS SUBMODAL CHOICES. The logit modeling methodology is applied to include transit access mode choices in conjunction with the automobile vs. transit travel choice decision. The practical problems that arise when the choice set expands beyond two alternatives are identified and addressed. It is shown that if choice sets and homogeneous market segments are properly defined, the models can be transferred among different urban areas even though the urban areas exhibit different aggregate characteristics.

Demetsky, MJ (Virginia University) Korf, JL *Transportation (Netherlands)* Vol. 8 No. 4, Dec. 1979, pp 409-426, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 316585 COMPARING GUIDEWAY TRANSIT IMPLEMENTATION PLANS, INCLUDING THE IMPACT ON ROAD TRAFFIC. A methodology for comparing phased implementation plans for a new fixed guideway transit system in an urban area is presented. Four assumptions are made: (1) the guideway system replaces existing or planned bus service, (2) superior service on the new system results in increased ridership when compared to buses; (3) presence of the guideway facility redirects outward urban growth resulting in additional ridership, and (4) conversely, the absence of any action on the new guideway facility reinforces a diffuse urban growth pattern that creates an irreversible loss of transit ridership. The economic comparison of alternative plans includes total as well as "relative" inflation of principal cost components. A key feature of the proposed methodology is including in the comparisons the costs of private automobile mileage that could have been replaced by transit. These costs are expressed as "fuel" and "all other" automobile costs; favorable transit system implementation schedules can then be identified as a function of parametrically assumed values for these two unit costs. A hypothetical example demonstrates the proposed method. (Author/TRRL)

Lenard, M (Mitre Corporation) *Transportation Planning and Technology* Vol. 6 No. 1, 1980, pp 33-34, 5 Fig., 2 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247499); ORDER FROM: ESL

42 316661 ALTERNATIVE METHODOLOGIES FOR MEASURING TRANSIT BENEFITS-ABRIDGEMENT. In this analysis of alternative methodologies for measuring transit benefits, it is argued that the cost-savings approach that is commonly employed has restrictive limitations, which may be too restrictive for this approach to be practical. The rarely used method of estimating benefits directly from the demand functions is also pursued. Although measuring transit benefits by finding areas under transit demand curves does not have the limitations of the cost-savings approach, demand curves, themselves, are difficult to estimate. However, this paper has developed algorithms for measuring such areas that require minimal and easily obtained data. The required data are fare, fare elasticity, number of trips, and revenue.

Becker, AJ (Tidewater Transportation District Commission, Va) Talley, WK (Old Dominion University) *Transportation Research Record* No. 735, 1979, pp 15-17, 1 Fig., 2 Ref.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

42 316662 DEVELOPMENT OF TRANSIT DISTRICT BOUNDARIES FOR AN AREA-WIDE SMALL BUS PROGRAM-ABRIDGEMENT. The development of transit district service-area criteria by using travel demands for existing services was found appropriate in this study area as well as in other areas in the state of Michigan. The service-area concept produced a total of 62 possible transit districts within the study area that are likely to support a small bus program. The priority ranking procedure used in this study considered community values and is considered extremely significant in the analysis process. The data base used for this study, although 10 years old, proved a valid basis for analysis, since limited tests indicated that association economic and travel patterns in the study area followed similar trends. The priority analysis performed in this study will be updated continually as current trip and other data become available.

Datta, TK (Wayne State University) Litvin, DM (Goodell-Grivas, Incorporated) *Transportation Research Record* No. 735, 1979, pp 17-19, 2 Fig., 1 Tab.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

42 316753 LIGHT RAIL TRANSIT IN VANCOUVER-COSTS, POTENTIAL AND ALTERNATIVES. While some indicate that Light Rail Transit is the easy answer to the transit problems of major metropolitan areas, some urban transit experts are far from convinced. This study raises a number of important questions--questions which should be addressed by policy makers in any city before they undertake a major expenditure for urban transit.

Poulton, MC, Editor; British Columbia University, Canada 1980, 143 p.; ORDER FROM: British Columbia University, Canada, Center for Transportation Studies, Vancouver V6T 1W5, British

Columbia, Canada

42 316791 NATIONAL POLICIES FOR MASS TRANSIT IN COLUMBIA [Politica nacional de transporte masivo en Columbia]. Columbia is a country of cities with almost 25 million inhabitants. Planning is underway to build mass transit systems in four principal urban centers: Bogota, the capital; Medellin; Cali; and Barranquilla. Because of this activity, a national policy for mass transit is needed to take into account the technical and financial help required for specific urban transit projects. For this reason a report has been assembled by the Colombian Road Association to study international precedents on similar development. It includes a brief analysis of world population growth, Latin American growth, and Colombian growth, with emphasis on concentration of population in the cities. Activities of the United States Urban Mass Transportation Administration (UMTA) is used as an example. The author includes a dissertation on Colombia's change from an exporter to an importer of fuel, and describes the construction of the subway system in Bogota. (Author) [Spanish]

Maldonado, FR (Columbian Road Association); International Road Federation Conf Paper Vol. 2 3 Volumes, 1980, n.p.; Presented at the IRF Inter American Regional Meeting, Buenos Aires, 5-9 May 1980. Papers can be obtained in original language only. For individual papers see also TRIS 316755-316799.; ACKNOWLEDGMENT: International Road Federation; ORDER FROM: International Road Federation, 1023 Washington Building, Washington, D.C., 20005

42 316794 METROPOLITAN TRAFFIC ACCESS [Acceso del transito metropolitano (ensayo)]. The author describes the access system from the suburbs of Buenos Aires into the city center, evaluating the volume of traffic and subdividing it for peak periods into the three flow generators of the North, West, and South. He lists Buenos Aires' first priority in solving its traffic congestion flow as the modernization of interurban railroad services because of its ability to move large numbers of people. He also recommends establishment of regular helicopter services for commuters, which he maintains would be faster and less costly than the provision of toll highways. Five helicopters would be used in the North, four in the West, and three in the South. The author urges official organizations to study this advanced transportation concept in depth and establish its economic feasibility. (Author) [Spanish]

Vic, MJA; International Road Federation Conf Paper Vol. 1 3 Volumes, 1980, n.p.; Presented at the IRF Inter American Regional Meeting, Buenos Aires, 5-9 May 1980. Papers can be obtained in original language only. For individual papers see also TRIS 316755-316799.; ACKNOWLEDGMENT: International Road Federation; ORDER FROM: International Road Federation, 1023 Washington Building, Washington, D.C., 20005

42 316882 THE CHANGING CONTEXT OF URBAN TRANSPORTATION PLANNING. This paper proposes a doctrine of maximum flexibility combined with minimum fixed commitment in urban transportation planning. This suggests a greater emphasis on comprehensive traffic management with a lesser emphasis on

highway construction. A more flexible approach involving joint working by professionals and politicians is advocated and it is argued that land use planning and transportation planning seem to be moving further apart, implying that extra resources may have to be expended to alleviate the effects of this breakdown.(a) (TRRL)

Collins, MS (Norwich, City of, England) *Highway Engineer* Vol. 27 No. 3, Mar. 1980, pp 11-19, 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246850)

42 316982 URBAN TRANSPORT PROPOSALS. This paper describes and comments on recent government proposals affecting the transport sector in New Zealand. Proposed changes at regional level in the coordination and planning of transport, include the establishment of urban transport authorities to plan and implement transport services and facilities. The article discusses the financial and administrative implications of these proposals with regard to the existing public transport infrastructure. (TRRL)

Foster, J (Ministry of Works and Development, New Zealand) *New Zealand Engineering* Vol. 35 No. 1, Jan. 1980, pp 7-9; ACKNOWLEDGMENT: TRRL (IRRD 246821)

42 317006 EVOLVING IMAGE OF LONG-RANGE TRANSPORTATION PLANNING. Problems discussed are associated with factors undermining long-range planning, emerging functions of long-range planning, relating planning to decision making, subregional focusing of plans and reorganizing planning agencies.

Schulz, DF (Southeast Wisconsin Regional Planning Commission) Schofer, JL Pedersen, NJ *Traffic Quarterly* Vol. 33 No. 3, July 1979, pp 443-457, 20 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 317017 POLICIES AND PROCEDURES FOR TRANSIT SERVICE DEVELOPMENT. The objectives of the programs described fall under one or more of three headings: providing adequate mobility to persons without ready access to private automobiles; attracting private automobile users to higher-occupancy public transportation services as a means of reducing congestion, air pollution, and energy consumption associated with private automobile travel; and making selected locations in metropolitan areas more readily accessible for shopping, business, and other activities.

Kirby, RF (Urban Institute) Green, MA *Traffic Quarterly* Vol. 33 No. 3, July 1979, pp 413-427, 20 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 317193 URBAN TRANSPORT IN COLOMBIA: PROBLEMS AND SOLUTIONS [EL TRANSPORTE URBANO EN COLOMBIA: PROBLEMAS Y SOLUCIONES]. Urban development and the growth of motorized transport are the causes of social, economic and ecological problems which cannot be ignored. With a view to solving urban transport problems a review is made of the political measures (town planning, economic and technological measures) which must be taken. A comparative study of different public transport systems is conducted in order to select those which are best adapted to the Colombian environment. (TRRL) [Spanish]

Latorre, E ;

Ministerio de Obras Publicas y Transporte 1978, 5p, 1 Tab.; XIV Congreso Nacional de Colombia; ACKNOWLEDGMENT: TRRL (7903LT012E), Central Laboratory of Bridges & Highways, France, Ministry of Public Works, Spain

42 317195 BETTER TRANSPORT IN YOUR TOWN [Aprovechamiento de subproductos en la construcción de carreteras]. The use of waste products in road construction is a people responsible for the production of a global transport policy. It presents, in an exhaustive fashion, in six parts, the various elements of urban transport: (1) urban journeys in the historic, economic and social context; (2) conception of a transport policy, comprising an inventory of the components of such a policy (urban and transport planning-traffic plans-promotion of public transport- parking policy-transport and town planning-extension of urban transport to rural areas; (3) quality of service, (TRRL) operations: road network-pedestrians-cyclists-public transport-private cars-parking-goods deliveries- rapid urban networks; equipment operations: fixed equipment, rolling stock, control equipment); (5) implementation and management, with an examination of the institutional problems; (6) economic and financial problems. The whole work presents ideas, procedures and practice and contains numerous recommendations arising from experience in this field. [Spanish]

Normas de Ensayo y Metodos de Construccion Monograph July 1978, 6p, 2 Fig., 3 Phot. ACKNOWLEDGMENT: TRRL (IRRD 108697), Central Laboratory of Bridges & Highways, France, Ministry of Public Works, Spain; ORDER FROM: T882

42 317339 PROCEEDINGS OF A SEMINAR ON A POLICY ANALYSIS FOR URBAN AND REGIONAL PLANNING HELD ON 10-11 JULY 1978 DURING THE PIRC SUMMER ANNUAL MEETING AT THE UNIVERSITY OF WARWICK, ENGLAND. These proceedings contain the following papers: Forecasting Financial Resources in Regional Planning (Raine, JW and Baxter, RS); Issues in Integrating Central and Local Government Programmes: A Central Perspective (Footitt, JR); The Integration of Central and Local Government Programmes: The Local Authority Perspective (Barras, R, Geary, K and Penn, R); Issues in Integrating Central and Local Government Programmes: Discussion Notes (Walters, IS); Effective policy Choices in regional Planning (Hughes, GT); Urban Policy in Oxford City 1972 to 76: Political and Administrative Aspects of Policy Integration (Thomas, MJ); A Federal Urban Policy: Myth or Reality? (Wells, LJ); The Use and Development of Population Projections in Forward Planning (Bird, RA and Girling, PD); Integrating Population and Employment Forecasts at National and Sub-National Levels (Weinstein, ETA and Baxter, RRS); Inter-Relationships Between Migration, the Labour Market and Housing Need: a Case Study of Kreis Unna, the Ruhr, West Germany (Korte, H); Integrating Forecasts for Strategic Planning and Resource Programming: The Approach Developed in the Grampian Region (Cockhead, P); The Policy Implications of housing Forecasts (Grey, A); Housing Investment Programmes and Strategies: Theory and Practice (Cox, TM); A Computer-Based Frame-

work for Policy Analysis in Physical Planning (Smedley, BS). [DEUTSCH, ENGLISH]

PTRC Education and Research Services Limited Monograph P159, No Date, 164p, Figs., Tabs., Refs.; In cooperation with Transport Research and Computation (International) Company Limited.; ACKNOWLEDGMENT: TRRL (IRRD 247012)

42 317340 PROCEEDINGS OF SEMINAR K ON TRANSPORTATION PLANNING PRACTICE HELD ON MONDAY 10 AND TUESDAY 11 JULY 1978 DURING THE PIRC SUMMER ANNUAL MEETING AND THE UNIVERSITY OF WARWICK. These proceedings contain the following papers: An Experience of Transportation Planning at a Regional Level in Provence (De Saint Laurent, BB); Transportation Planning Practice at a Regional Level in the North of France (Hellecou, JP); Determining Efficient Levels of Investment in Rural Trunk Roads (Starkie, DNM); Nordkolt: Aspects of A Study of Future Passenger Transport in Nordic Urban Areas (Sylvén, E and Nielsen, J); Planning for Public Transport's Secondary Sector (Baker, RC); Rural Public Transport- Who Pays, Who Benefits? (Harman, RG); Allocation of Funds to Public Transport Investment and Operating Support (White, PR); Relating Actions to Intentions: a Planning Approach Based on the Use of an Issue-Framework (Headicar, PG and Coper, JSL); Combining the Economic and Non-Economic Costs and Benefits of Transport Policies: an Empirical Approach (Rogers, K); Utility Analysis for making Highway Maintenance Decisions when Capital is Limited (Ledbetter, W and Lytton, RRL); A Review of Highway Maintenance in the Transportation Planning Context (Martin, BV and Jennings, JD). (TRRL)

PTRC Education and Research Services Limited Monograph P167, No Date, 137p, Figs., Tabs., Refs.; In cooperation with Planning and Transport Research and Computation (International) Company Limited.; ACKNOWLEDGMENT: TRRL (IRRD 247011)

42 318078 TRAVEL TIME STUDIES FOR SURFACE TRANSPORTATION, 1964-FEBRUARY, 1980 (CITATIONS FROM THE NTIS DATA BASE). Reports are cited on the transportation time as regards surface systems. Data are presented on shuttles, delays, bus and automobile usage, networks, queuing, walking, journey to work, planning, and human factors. Mathematical models and computer applications are included. References are to central city, urban, rural, and interstate movements of passengers. (This updated bibliography contains 259 abstracts, 40 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Apr. 1980, 266p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-807985

42 318184 THE DEVELOPMENT OF SERVICE STANDARDS AND OPERATING GUIDELINES FOR THE DELAWARE AUTHORITY FOR REGIONAL TRANSIT. TASK B OF THE DART PLANNING PROGRAM. The service standards project is one aspect of the Delaware Authority for Regional Transit (DART) planning program in order to increase DART's patronage, improve DART's

operational efficiency, and increase the regional transit accessibility with the Wilmington urbanized area. Although these standards and guidelines are intended initially for application only to DART operations, they have been developed in such a way as to allow their application in any portion of the New Castle County, Delaware-Cecil County, Maryland-Salem County, New Jersey SMSA. This report presents an introduction and background of transit performance measurement, a detailed description of the transit service standards and operating guidelines proposed for adoption by DART, and an assessment of the degree to which DART's current operations are in compliance with the suggested standards and basic planning guidelines. In addition, a preliminary estimate of the costs required to have DART's service meet these proposed standards and guidelines is included.

Wilmington Metro Area Planning Coordinating County, Urban Mass Transportation Administration, (UMTA-IT-09-0061) Final Rpt. UMTA-IT-09-0061-80-1, Nov. 1979, 194p; Prepared by Barton-Aschman Associates, Inc., Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-196322

42 318783 MULTIMODAL TRANSPORTATION PLANNING, 1972-JUNE, 1980 (A BIBLIOGRAPHY WITH ABSTRACTS). The bibliography presents many aspects of transportation planning-passenger and freight-for urban areas and intercity corridors. Multimodal systems, planning and programming, transportation models, forecasting and management is covered. This includes work travel patterns, trip generation, urban transportation demand, modal choice, and travel forecasting models. Urban and intercity freight transportation as regards modal choice, planning and intermodal systems, including intermodal consolidation terminals is also included. (This updated bibliography contains 102 abstracts, 15 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service July 1980, 109p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-812795

42 318800 REMOTE SENSING APPLIED TO URBAN AND REGIONAL PLANNING, 1964-JULY, 1980 (CITATIONS FROM THE NTIS DATA BASE). Urban and regional planning using aerial photography and satellite remote sensing methods is discussed. Abstracts cover the use of remote sensing in land use mapping, traffic surveys and urban transportation planning, and taking inventories of natural resources for urban planning. Abstracts dealing with land use and residential quality associated with and acting as an influence on health and physical well-being are included. (This updated bibliography contains 69 citations, 4 of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service Aug. 1980, 74p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-813116

42 318904 REVIEW AND COMPILATION OF DEMAND FORECASTING EXPERIENCES: AN AGGREGATION OF ESTIMATION PROCEDURES. It has long been recognized that there is a need in urban transportation planning for the development of a "fast

response" procedure which would allow the determination of passenger travel on an urban areawide level. This report attempts to fill this critical knowledge gap, relying heavily on the historical performance of the various elements of the urban transport planning process developed over the past two decades. Demand-forecasting experiences were collected from over 60 percent of the urban areas in the U.S. cities were classified into four cells, based on their population size and urban structure. The delineation of the proper classification scheme was based on a statistical analysis on the base travel pattern of the various cities including their socioeconomic tabulations of demand elasticities, which are reported in conjunction with the base conditions under which they were obtained. In order to analyze the travel impacts of transportation system implementation, a detailed method of approximating the aggregate urban area total system supply curve is also presented. The city classification scheme, the tabulation of elasticities and the representation of an urban transportation system are verified through a limited number of case studies. Finally, the applications of the parameters and equations tabulated in this report are demonstrated via a step-by-step user-oriented procedure.

Chan, Y ; Pennsylvania Transportation Institute, Department of Transportation DOT-P-30-80-25, Aug. 1979, 340p; Contract DOT-OS-60146; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-206998

42 319365 FOUR YEARS LATER THE STATUS AND PROSPECTS OF TSM. TSM is a short-range element of a regional transportation planning process that addresses ways to improve overall transportation system performance through various low-capital or no-capital management actions. Such actions can be intramodal (e.g., improved transit scheduling techniques, bikeway or pedestrian facilities, express bus operations), intermodal (e.g., bus priorities on streets, parking restrictions, relocation of bus stops that impede traffic flow), or extramodal (e.g., staggered work hours, pricing strategies to discourage long-term parking, employer incentives for ride sharing). The heart of TSM is a concept in which the urban transportation system is a single entity and federal funds are transportation resources. The goal of TSM is to increase the systemwide efficiency of people and goods movement without significant new infrastructure investment, rather than to simply accommodate increasing vehicle travel. Ideally, TSM is regional in scope, goal-oriented, and intermodal and has its principal leadership and coordination provided through the MPO. In practice, such strategic approaches are rare; TSM is most commonly of a tactical nature involving site-specific actions that have marginal effects on systemwide performance. The recent corridor-study approaches, however, are a potential way to reconcile the practical advantages of tactical TSM with a basic thrust toward strategic planning, particularly to achieve air quality and energy-conservation goals. (Author)

Lee, DA (American Transit Association) Meyer, MD (Massachusetts Institute of Technology) *Transportation Research Board Special Report* No. 190, 1980, pp 12-15, 10 Ref.; This paper appeared in *Transportation Research Board Special Report No. 190: Transportation System Management in 1980*; ORDER FROM: TRB Publications Off

42 319368 INSTITUTIONAL DIMENSION OF TRANSPORTATION SYSTEM MANAGEMENT: A BOTTOMS-UP APPROACH. A number of arguments are made in this paper: 1. The TSM plans developed by MPOs have disappointed federal reviewers and rule makers. 2. The federal view of TSM is at variance with the planning practices and decision processes of metropolitan areas. 3. Successful TSM planning does not require an elaborate areawide process based on textbook-style systems planning. 4. The key to successful TSM planning is the people involved: their expertise, their access to the political process, and their sensitivity to community values and needs. 5. MPOs can foster TSM by subvention of planning funds and procurement of project design from action agencies. 6. TSM cannot deliver consequential energy savings or pollutant reductions; therefore, the planning process for TSM should not be structured around these objectives. 7. TSM should be coordinated with long-range planning, but this can be accomplished by adjusting long-range investment plans in light of local-level TSM accomplishments. 8. The number of regions and corridors that face trade-offs between rail transit and exclusive bus lanes is limited. The TSM process should not be structured around these exceptional cases but rather around the routine requirements of traffic management, parking management, and traffic mitigation. 9. Given the TSM measures most likely to be effective and command community support, the institutional objectives of TSM should be to (a) upgrade the traffic-operations expertise of transit agencies and state highway departments, (b) engage major employers in traffic mitigation (ride sharing, parking management, and work-hour rescheduling), (c) allow local communities to develop plans to protect neighborhoods and pedestrian areas from traffic intrusion, and (d) cultivate a concern with traffic mitigation in local land use planning and the environmental impact report process. 10. These objectives can be most effectively accomplished if MPOs procure planning from action agencies, rather than develop TSM plans at the systems level. (Author)

Jones, DW, Jr (California University, Berkeley) *Transportation Research Board Special Report* No. 190, 1980, pp 25-27, 8 Ref.; This paper appeared in *Transportation Research Board Special Report No. 190: Transportation System Management in 1980*; ORDER FROM: TRB Publications Off

42 319370 NEGLECTED HIGH-ACHIEVEMENT TSM ACTIONS. The purpose of this paper is to discuss ways in which the implementation of high-achievement TSM actions (e.g. ride sharing, staggered hours, parking management, high occupancy vehicle incentives, improved public transit scheduling, pricing) that have been neglected can be promoted. These strategies have not been implemented widely because of a lack of a constituency, the need for extensive interagency coordination, competition with capital projects, political sensitivity, and funding difficulties. However, there are a number of success stories that could be disseminated to serve as models for other metropolitan areas, with emphasis on the impressive energy effectiveness of these projects. Additional time and effort to assess economic and social effects is necessary to respond to political

and public concerns. State and federal legislatures should be made more aware of the benefits of these actions through more-effective contact or by direct lobbying. Federal leverage could also be used through categorical funding programs, added inducements in existing programs, specific TSM project goals or targets in each urbanized area, regulatory changes, or offers of technical assistance.

Morin, DA (Federal Highway Administration) *Transportation Research Board Special Report* No. 190, 1980, pp 36-39, 14 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 190: *Transportation System Management in 1980*; ORDER FROM: TRB Publications Off

42 319372 ISSUES IN TSM METHODOLOGY. Several issues--(a) assembly of aggregated impacts of areawide TSM action for use by local elected officials, (b) evaluation of possible TSM strategies against major capital alternatives, (c) relationship between long-and short-range planning for TSM, and (d) incorporation of TSM actions in the urban transportation planning process--can be at least partially resolved through simplifications inherent in TSM. On the other hand, development of a truly integrated multimodal TSM process is not likely to occur until a pressing need appears that justifies the additional complexity involved. (Author)

Gilbert, AK (Transpo Group) *Transportation Research Board Special Report* No. 190, 1980, pp 53-57, 5 Fig., 2 Tab., 5 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 190: *Transportation System Management in 1980*; ORDER FROM: TRB Publications Off

42 319378 TRANSPORTATION REGULATIONS IN AN URBAN ECONOMY: A DYNAMIC MODEL OF THEIR IMPACTS (ABRIDGMENT). An effort to assess the various economic impacts of vehicle restrictions and transit incentives in an urban setting by using a dynamic, interactive simulation model is discussed. The Manhattan central business district (CBD) serves as a focus for the modeling effort. The transportation actions studied are strategies proposed for the local transportation control plan, as required for New York City and most urban areas under the Clean Air Act of 1970. Changes to the CBD business sector (volume of business and employment), the transportation sector (vehicle volumes and mode splits) and the residential sector are studied. The model, which uses the Dynamo structure, is dependent on key simplifying assumptions joined in a feedback relationship in such a way that the effects on one sector influence changes in another. The model finds that the traffic-reduction strategies accomplish their goals only at the expense of economic well-being and that transit inducements alone have the snowballing effect of increasing business and vehicle activity in the CBD. However, combining vehicle-restraint policies with transit inducements can relieve congestion, primarily through modal shifts rather than reduced customer activity, so that the economic consequences are less onerous. (Author)

Crowell, WH Bloch, AJ *Transportation Research Record* No. 747, 1980, pp 19-23, 2 Fig., 2 Tab., 8 Ref.; This paper appeared in *TRB Research Record* No. 747, *Economic and Social Aspects of Transportation*.

ORDER FROM: TRB Publications Off

42 319419 NORTH DAKOTA STATE TRANSPORT PLAN. The initial goal of this report is to create an awareness within the state relative to the condition of the state's passenger transportation "system". Included in this discussion is an identification of the transportation services presently available in North Dakota, an analysis of the state's role in the provision of these services, and a comparison of existing services and actual citizen travel needs. Within this broad framework, a general overview of the state's passenger transportation "system" is presented and problem areas identified. Recommendations for action based upon the problems will be developed. The overall goal of this effort is the establishment of a means to develop a more efficient and effective passenger transportation system for North Dakota's transportation deprived citizens. The suggested recommendations for action, which are accompanied by cost estimates for implementation, are divided into two broad categories. The first category involves primarily policy enactments and policy changes. The overall intent of these policies is to establish state-level goals and objectives relative to the provision of transportation services within the state, which will in-turn give direction to future state actions related to passengers transportation services and the administration of transportation programs. The second category involves legislative action. These recommendations are designed to both strengthen existing transportation services and to encourage and assist in the development of new and expanded services. Their enactment is directly related to the informal acceptance of the policy recommendations.

North Dakota Highway Department 1980, 82p; ORDER FROM: North Dakota Highway Department, State Highway Building, Capitol Grounds, Bismarck, North Dakota, 58505

42 319568 TERTIARY PUBLIC TRANSPORT AND PUBLIC TRANSPORT PLANNING. The components discussed are the ambulance services, social service transport, education transport and voluntary transport. Works' buses are excluded. The paper shows that tertiary public transport is a small, but significant part of public transport, investigates planning methodology and discusses the practical role of tertiary services in county public transport plans. Although the relative number of trips by tertiary public transport is low, it attracts high levels of public expenditure and can offer large benefits to people who have no alternative means of transport. The author suggests that its efficiency could be improved, and that better integration and coordination with public transport as a whole could be achieved. Results from several experimental schemes are examined, and suggestions are made for future research. (TRRL)

Bailey, JM ; Oxford University, England *Monograph* June 1979, 14p, 4 Tab., 18 Ref.; ACKNOWLEDGMENT: TRRL

42 319576 TRANSPORT RESEARCH AT THE UNIVERSITY OF LEEDS: REPORT FOR 1979. Progress is reported on the following projects: car ownership forecasting for discrete areas; integrated land use and transport modeling; location and commuting; mixed mode de-

mand forecasting; model mis-specification and its effects; a model for the evaluation of traffic management schemes; the estimation of origin-destination matrices from traffic counts; rhtm trip distribution investigation; analytical aspects of large traffic distribution models; inter-regional road freight distribution modelling; route flows from equilibrium assignment; expenditure of time and money on travel; car use; comparison of trip generation models; microsimulation of organised car-sharing schemes; car-sharing experiments and investigation of determinants of off-peak travel behaviour; work journey rescheduling; the impact of transport problems on inner city firms; the effects of traffic management on retailing activities; local transport finance; management objectives and methods of finance for rail passenger services; a comparative study of the performance of Western Europe rail systems; choice of mode for bulk freight; the demand for inter-city business travel: environmental capacity in national parks; attitudes of passengers to bus services; bus and crew scheduling; traffic flow data collection using aerial photographs; land-use transportation systems and energy conservation; switched reluctance motor drive for battery powered vehicles; fuel cells. Details of other activities, of staff, sponsors and references to papers published are listed. (TRRL)

Kirby, HR (Leeds University, England) *Traffic Engineering and Control* Vol. 21 No. 3, Mar. 1980, pp129-133, 77 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247267)

42 319621 ORDINAL DATA ANALYSIS IN URBAN AND REGIONAL PLANNING. Modern spatial data analysis is often hampered by the lack of reliable quantitative information. Many variables and attributes are only measureable or measured on an ordinal or qualitative scale. Consequently, it is necessary to pay more attention to qualitative information systems and to a methodology that places less heavy demands on the quality of data. The purpose of this paper is to contribute to this new way of data management by paying more attention to a promising type of analysis, known as ordinal geometric scaling. The attractive feature of this approach is the ability to extract quantitative, cardinal information from ordinal data, without violating the ordinal characteristics of these data. This is extensively illustrated in this paper by means of three different empirical applications. First of all it is shown that ordinal geometric scaling is very appropriate to come to zonal or regional accessibility measures. In addition it is outlined that this type of scaling is extremely useful for a financial assessment of rather complex regional plans. The intriguing nature of this approach is also illustrated by means of a qualitative multicriteria evaluation of four different urbanization policies for the western part of the Netherlands. (TRRL)

Voogd, JH ; Delft University of Technology, Netherlands *Monograph* Memo.1979-01, Apr. 1979, 19p, 5 Fig., 5 Tab., 28 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (IRRD 247459), TRRL

42 319639 PROJECT MANAGEMENT--PULLING IT ALL TOGETHER. The project management organization and relationships for the Metropolitan Atlanta Rapid Transit Authority and its General Engineering Consultant are reviewed in summary form. No new innovative

managerial techniques are developed. Primary organizational mechanisms which provided for control and coordination during the first billion dollar phase of the rapid rail system are examined. Several important project decisions are presented to illustrate the framework for decision making on complex public projects.

Lammie, JL (Parsons Brinckerhoff/Tudor) Shah, DP *ASCE Journal of Transportation Engineering* Vol. 106 No. 4, July 1980, pp 437-451; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 319642 HOW EFFECTIVE HAS URBAN TRANSPORTATION PLANNING BEEN? The problems of how to plan effectively, where should the emphasis be placed, how may public participation be integrated, and what will be necessary to coordinate the efforts of the various planning organizations as the future challenges of planning are discussed.

Hassell, JS *Traffic Quarterly* Vol. 34 No. 1, Jan. 1980, pp 5-20, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 319967 PLANNING AND BUILDING METROS IN 15 SOVIET CITIES. Most Soviet cities with populations over 1 million already possess or are building metros. Standardization and pooling of engineering skills and resources in planning, building operation are being achieved through central control by the Ministry of Railways.

Shelkov, BA *Railway Gazette International* Vol. 136 No. 4, Apr. 1980, pp 299-302, 1 Tab., 5 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

42 322031 COORDINATION OF URBAN TRANSIT SERVICES: THE GERMAN MODEL. In the Federal Republic of Germany, the need for coordination and integration of transport services has been seen as a pre-condition to improving public transportation. A major step in this direction has been the institution of the Transport Federation (Verkehrsverbund). The paper discusses the operation of the Hamburg Transit Federation and considers a number of factors which have created a favorable climate for the development of public transportation in Germany.

Dunn, JA, Jr (Rutgers University, New Brunswick) *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 33-43, 27 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322036 ENHANCING THE DEVELOPMENTAL IMPACT OF RAIL TRANSIT. A number of forces currently at work in the United States that are fostering the rebirth of urban rail transportation are discussed. It is stressed that in order to maximize the beneficial economic and developmental impact of future rail investment, certain procedures and techniques must be employed in the planning, design, and implementation of rail systems. The paper offers a set of guidelines and principles for transportation and land use policy makers.

Priest, DE (Urban Land Institute) *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 45-55, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322037 FEDERAL RAIL TRANSIT POLICY: RHETORIC OR REALITY? Almost two years ago the U. S. Department of Transportation issued a formal statement of policy on rail transit. The aim of the policy was to articulate more clearly some of the basic principles and philosophy which would guide Federal participation in urban rail transit investment. The paper examines the principal tenets of the policy and assesses its influence on local rail transit development.

Orski, CK *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 57-65, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322076 PUBLIC TRANSPORT PLAN 1980/1. This is the second of the public transport plans which the County Council is required to prepare under the provisions of the Transport Act 1978. The report mentions the major changes in circumstances since the publication of the Public Transport Plan 1979/80: increase in the price of fuel and new transport bill which are likely to affect public transport demands. The existing public transport services are reviewed (bus, rail and express coach services, taxi, and private hire cars, education transport, works buses, social and welfare transport). The accessibility to the public transport network is discussed together with the concessionary and reduced fares schemes financed by district councils. Public transport policies are considered as regards their objectives, basic fabric exercise, rail services, experimental operations, publicity, developing areas, efficiency and reliability of bus and coach services, bus shelters, and coordination of public transport provision. (TRRL) (TRRL)

Lee, NW ; Avon County Council, England Monograph No Date, 52p, Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 248413)

42 322077 PUBLIC TRANSPORT PLANNING. WHY USAGE PATTERNS AND CONSUMER NEEDS ARE NOT NECESSARILY SYNONYMOUS. A criticism is made of the progress made in public transport planning following the 1968 transport act (which gives discretionary power to shire counties to subsidise socially desirable bus services) and the introduction of the transport policies and programmes (tpp) in 1974 and public transport plans (ptp) in 1978. Despite the large amount of published literature consuming many man-hours, in the author's opinion little expertise has been developed. Some of the achievements of the policies are discussed, e.g the formalization of transport coordination within a planning structure, together with failings and diversions. Criticism is made of the euphoria that has often surrounded the introduction of 'alternative transport'-community buses, dial-a-ride, social car schemes, rutex for which in practice the low operation cost belies a far higher subsidy per passenger than almost all conventional bus routes in most counties. It is felt that the outstanding issue in public transport planning is the clarification of "need" and a clear lead in accessibility planning coordinating decisions of key village policy, school closures etc with transport planning. (TRRL) (TRRL)

Kilvington, R (Loughborough University of Technology, England) *Planner* Vol. 66 No. 2, Mar. 1980, pp40-41, 4 Phot., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 248715)

42 322228 ISSUES IN THE EVALUATION OF METROPOLITAN TRANSPORTATION ALTERNATIVES. This paper was prepared as part of a study by the Urban Institute to improve the cost-estimation methods and evaluation procedures for the Urban Mass Transportation Administration alternatives analysis process. Several important issues related to evaluation of alternatives are discussed. They include problems and advantages of several analytical evaluation techniques such as cost-benefit analysis, cost-effectiveness analysis, and project scoring. Issues in evaluating user benefits are also discussed. Much of the complexity in the evaluation of alternatives comes from the different interests or groups that must be involved and the differences between the federal and local viewpoints. This paper is not a handbook on evaluation and assumes a basic knowledge of analytical evaluation techniques. (AUTHOR)

Cheslow, MD *Transportation Research Record* No. 751, 1980, pp 1-8, 2 Ref.; ORDER FROM: TRB Publications Off

42 322230 GENERATING ALTERNATIVES FOR ALTERNATIVES ANALYSIS. Alternatives analysis is the planning process mandated by the Urban Mass Transportation Administration for the assessment of major transit investments. The alternatives analysis process is a means of ensuring comparability between rapid transit planning studies across the nation. Up to now, the focus of attention has been on the results or products of the process. Interest has centered on the selection of a recommended alternative and its costs and impacts. This paper examines an earlier stage in the planning process that has critical importance in the validity of alternatives analysis studies. The basic concern is with the ways that alternatives are derived and described. If alternatives are the central feature of the process, we should know more about what they are and where they come from. The investigation reviews a group of alternatives analysis reports to establish the state of the art in generating alternatives for major transit studies. Ten potential inputs to alternatives generation are identified. In addition, the paper assesses the use of specific techniques or methodologies for the generation of alternatives. Specifications for alternatives and the properties of alternative sets are reviewed. The paper includes an examination of the ways that transportation system management and baseline alternatives have been defined and used in past studies. Conclusions on the state of the art in alternatives generation and its expression in alternatives analysis studies are presented as the results of the investigation. (Author)

Herald, WS *Transportation Research Record* No. 751, 1980, pp 17-27, 2 Fig., 2 Tab., 19 Ref.; This paper appeared in *Transportation Research Record* No. 751, *Transportation System Analysis and Planning* 1980.; ORDER FROM: TRB Publications Off

42 322235 DEVELOPMENT OF YEAR-2000 ALTERNATIVE TRANSPORTATION PLANS FOR THE DELAWARE VALLEY REGION. This paper discusses the concept and methodology used to develop long-range alternative transportation plans for the Delaware Valley Region. Four year-2000 alternative plans, including the no-build alternative, were formulated for simulation and evaluation. After a comprehensive

evaluation of these alternatives, one of them will be selected and modified to be the year-2000 transportation plan. The alternatives were developed to achieve a set of regional goals prepared to deal with transportation issues and problems. The regional development pattern, travel demand and system deficiencies, short-range plans and programs, financial resources, administrative and legal requirements, and governmental and citizen recommendations were the major criteria considered in the formulation of the alternative plans. The alternatives were developed through an open two-way communication process between the staff of the Delaware Valley Regional Planning Commission and the various governmental agencies and private citizens involved in transportation planning. This process, which resulted in economical, feasible, practical and implementable alternatives, could be applied successfully to any urban region in the country. (Author)

Zakaria, T *Transportation Research Record* No. 751, 1980, pp 44-49, 1 Fig., 1 Tab., 8 Ref.; This paper appeared in *Transportation Research Record* No. 751, *Transportation System Analysis and Planning* 1980.; ORDER FROM: TRB Publications Off

42 322282 INCREASING THE PRODUCTIVITY OF URBAN EXPRESSWAYS: COMBINING TSM TECHNIQUES AND TRANSIT IMPROVEMENTS. EXECUTIVE SUMMARY. This is the second phase of a two-part study, which summarizes an analysis of Transportation Systems Management (TSM) and other low capital cost techniques to increase the productivity of urban expressways and streets in dense, built-up areas. Using CORSIM, a variant of the TASSIM land-use transportation model, this analysis examines the benefits and costs of implementing alternative combinations of TSM techniques and transit improvement policies. In Volume I, the costs and benefits of implementing four alternative TSM policies in Boston's central area were estimated. This volume focuses on expressway management policies and transit improvements for Boston's southeast Corridor. Four TSM techniques: a contra-flow lane for buses; a concurrent-flow lane, ramp metering with bus priority, and automobile tolls, are considered in conjunction with five alternative transit systems offering different combinations of travel times and fares. Also, the impacts of a parking surcharge were simulated for all central area commuters, along with the various toll and metering policies. Of the composite policies tested, expressway ramp metering with an average delay of nine minutes, assuming an improved bus transit system charges \$0.7 per mile, is the most feasible cost-effective option. While other composite policies would yield larger net benefits, they have little hope of achieving public, bureaucratic, and political acceptance at the present time. (UMTA)

Kain, JF Fauth, GR ; Harvard University, Urban Mass Transportation Administration, (MA-11-0031) Final Rpt. UMTA-MA-11-0031-80-2, Oct. 1979, 13p; The Final Report: "Increasing the Productivity of Urban Expressways: Combining TSM Techniques and Transit Improvements" (PB 80-15-568) is also available from NTIS.; Contract MA11-0031; ORDER FROM: NTIS; PB80-181076

42 322303 CAPTIVITY AND CHOICE IN TRAVEL-BEHAVIOR MODELS. The correct calibration of individual-choice models and the correct prediction of choices from such models can only be achieved by restricting data sets to those individuals who have choices. This paper discusses the ideas of choice and captivity with respect to travel choices, and explores the effects on calibration and prediction of including captives in the data. It is shown that the inclusion of captives causes biases in the coefficients and predictions that cannot be removed a posteriori and that these biases have important policy implications for highway and transit planning. Hence, the restriction of data to choosers alone is important in both the development and the use of individual-choice models of travel behavior.

Stopher, PR (Schimpeler Corradino Associates) *ASCE Journal of Transportation Engineering* Vol. 106 No. 4, July 1980, pp 427-435, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322491 CHANGES IN THE FIELD OF TRANSPORT STUDIES. ESSAYS ON THE PROGRESS OF THEORY IN RELATION TO POLICY MAKING. An insight into the wide-ranging character of present-day transport economics is presented by the following essays: The spatial theory of the demand for freight transport-a survey (Blaauwens, GJ); Professor Tissot Van Patot: his approach to the theories of transport policy and spatial transport economics (Van Gent, HA and Kuyvenhoven, RA); Realism and the common transport policy of the EEC (Gwilliam, KM); Spatial development, developments in traffic and transportation, and changes in the transportation system (Hamerslag, R); Some remarks on technical change and transport (Heertje, A); Towards a national model for passenger transport policy (Holtgreffe, AAI); Optimum use of transport networks and its possible contribution to welfare maximization (Klaassen, LH); Transport policy in a self-management system: developments in Yugoslavia (Kolaric, V); Transport statistics in a changing transport process: the years ahead (Kuller, HC); Transport policy and politics (Kuypers, G); Psychology-aid or guide for travel demand analysis? (Michon, JA); Planning of railway transport and of land use: Experiences and perspectives in Italy (Santorio, F); Developments in the research of the European conference of Ministers of Transport (De Waele, A); Transport and location: An inquiry into principal evolutions (Winkelmann, W). (TRRL)

Kluwer Academic Publishers Group Monograph 1980, 216p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 247463), Institute for Road Safety Research

42 322494 CHOICE MODEL CALIBRATED ON CURRENT BEHAVIOUR PREDICTS PUBLIC RESPONSE TO NEW POLICIES. The standard approach to predicting public response to possible changes in transportation policy is to describe the changed environmental conditions in a scenario and ask individuals what their choice would be. These stated intentions tend to mislead policy makers in the absolute sense because of the varying degrees of overestimation. Sophisticated attribute choice models which are calibrated in terms of the stated intentions also tend to be weak predictors of actual public response to new policies. Empirical

research is presented in which a logit model that is calibrated using the attribute ratings of the alternatives under the new policy conditions described in the scenario in relation to current behavior rather than stated intentions provides highly accurate predictions of the actual public reaction to new policies. (a) (TRRL)

Gensch, DH (Wisconsin University, Madison) *Transportation Research. Part A: General* Vol. 14A No. 2, Apr. 1980, pp 137-142, 6 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247693)

42 322547 ESTIMATION OF ORIGIN-DESTINATION MATRICES FROM OBSERVED FLOWS: SIMPLE SYSTEMS. Many transport planning and management tasks require an estimate of the pattern of trip making represented in the form of an Origin-Destination Matrix. This report describes the theoretical foundation and the practical application of an estimation technique which utilizes only relatively easily obtainable traffic counts. The technique is applied to several practical examples: flights between cities, freeway flows, a commuter rail line, a subway route and two urban streets. In each case, estimates are compared to observed flows in order to afford the reader an impression of the estimation accuracy.

Hauer, E Shin, BT ; Toronto-York University Joint Program in Transp Res Rpt. 65, No Date, 62p; ORDER FROM: Toronto-York University Joint Program in Transp, 4700 Keele Street, Room 430 Osgoode Hall, Downsview, Ontario M3J 1P3, Canada

42 322808 URBAN PUBLIC TRANSPORT IN THE USSR [Les transports publics urbains en URSS]. In the Soviet Union, the development and operation of public transport is carried out on the basis of general plans. For towns of more than 250000 inhabitants, the official organisations prepare schemes which determine the urban transport modes, the use of which will permit them to accomplish effectively the transport of passengers, the layout of lines, the distribution of different services, the order of urgency and the importance of the work involved in restructuring and modernising the existing systems. The standards which are applied to the drawing up of schemes are designed for local conditions, but they respect the general principles such as: journey to work times should not exceed 40 minutes, the rate of loading at rush hour should be limited to five or six passengers per sq M of free surface. The creation of underground railways, trams, buses, trolley buses should be a function of the size of the towns. A brief description of automatic operation and of rolling stock is provided. [French]

Union Internationale des Transports Publics, Revue Vol. 27 No. 1, Jan. 1978, pp 25-29, 6 Tab., 6 Phot. ACKNOWLEDGMENT: TRRL (IRRD 109206); ORDER FROM: International Union of Public Transport, 19 Avenue de l'Uruguay, Brussels B-1050, Belgium

42 322820 METHOD OF DECIDING THE OPTIMAL SPECIFICATIONS OF TRANSIT SYSTEMS. The paper discusses a planning method to decide the optimal specifications of transit systems which fulfill the requirements of service levels within several boundary conditions, when the particular urban settings are given.

After the theoretical explanations of the model, a local urban center was selected and the method was applied to prove the usefulness of it under the existing urban conditions.

Ishii, T (Tokyo University, Japan) Tsukio, Y *Journal of Advanced Transportation* Vol. 13 No. 2, 1979, pp 19-43, 2 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322822 GUIDELINES FOR PUBLIC TRANSIT PLANNING FOR U. S. METROPOLITAN AREAS IN THE DECADE OF THE 1980'S. This paper suggests guidelines and raises issues concerning the suitability of various technologies and service concepts for meeting the transit needs of U. S. metropolitan areas in the decade of the 1980's. The paper begins with certain assumptions and conclusions that form the basis for suggested guidelines. These assumptions and conclusions were developed by projecting current trends for the ten year period.

Kieffer, JA *Journal of Advanced Transportation* Vol. 13 No. 3, 1979, pp 1-16; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322836 OBJECTIVE, METHODOLOGY, AND LOGIC OF THE FEASIBILITY STUDY FOR THE H-BAHN IN ERLANGEN. The paper defines the aims of the feasibility study by setting precise questions to be answered by the study. The available investigation methods which are possible within the limits of budget law in the Federal Republic of Germany and which result in a grant of funds for investment to the City of Erlangen, are explained. A suitable method is chosen from alternatives and the reasons for this choice are described.

Ilgmann, G *Journal of Advanced Transportation* Summer Vol. 13 No. 2, 1979, pp 85-93, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 322900 CANADIAN TRANSIT HANDBOOK. The twenty three chapters of this book are presented in five sections. The first section, Overview covers the history of transit and the general characteristics of the modes including the supporting way, vehicles, power supply, power distribution and control systems, and the different types of service provided. The second section-Demand-covers demand characteristics (spatial and temporal characteristics and socioeconomic variables of transit users), surveys, and demand models (urban transportation model system: trip rate, elasticity, and mode split models). The third section-Supply-discusses capacity (indicates design rates of flow that can be achieved with various technologies and types of services, costs (monetary costs associated with the provision of public transit as opposed to operating accounting costs, and a variety of measures of social costs), routes and networks, bus stops and terminals, and human factors in vehicle design. The fourth section-Operations-considers transportation systems management, the operation of a bus system, scheduling, monitoring and control, maintenance, fare policy and collection, marketing, and accounting. The fifth section-Institutional factors-considers labor relations, the organizational framework, the legal, institutional and financial framework, and techniques for modal conversion.

Soberman, RM, Editor Hazard, HA ; Toronto-York University Joint Program in Transp 1980, 767p, Figs., Tabs.

42 323353 YEAR 1990: TRANSIT RIDERSHIP FORECASTS. This study developed transit ridership forecasts for the year 1990. To this end, a separate paradigm was calibrated for each of the twenty-four transit systems investigated. The models relate transit usage rate, measured in annual trips per capita, to a number of causal parameters, including: fare, level of service, gross personal income, and residential and transit network densities. Transit ridership was derived by multiplying the forecast transit usage rate by projected population size. Forecasts of ridership and ridership rates generated were based on a number of alternative fare and level of service policies postulated for the period 1976-1990. Conclusions outlining the impact of these operating policies of ridership and ridership rates are presented.

Transport Canada Monograph NTP2204, Aug. 1979, 43p, 2 Fig., 11 Tab.; Prepared in Cooperation with Presage Research Limited.; ACKNOWLEDGMENT: TRRL (IRRD 249549), Roads and Transportation Association of Canada; ORDER FROM: Transport Canada, 1000 Sherbrooke Street, West, Surface Transport Admin, Montreal, Quebec H3A 2R3, Canada

42 324322 THE EFFECT OF AN INTERCITY PUBLIC TRANSPORT NETWORK ON BUS PATRONAGE. The influence of a regional bus service network structure is measured and expressed by the level-of-service variable, on bus ridership. Bus ridership on a regional level is found to be inelastic with regard to bus network structure, but it is elastic on certain corridors when analyzed on a city-pair basis. Bus patronage is more elastic with regard to service improvement for social-recreation trips than for work trips. Higher elasticities and a relatively greater number of generated bus trips are found in city-pair corridors characterized by average values of service levels. Thus, bus patronage elasticity changes asymptotically with the change in the level-of-service. Given the probabilistic nature of mode choice, recommendations concerning planning policy are subject to some degree of risk. Therefore, results indicating that a specific corridor is one in which the addition of a bus per day is likely to be justifiable do not ensure success in reality, but they do imply a relatively high probability of success when the corridor service is varied. The data used represent average daily flow of both bus and auto trips. The bus daily flow is based on a weekly sample, and therefore, it is possible that an increase in the level-of-service on a recommended corridor may be defensible only on certain days of the week. This possibility is more realistically investigated by experimenting with the recommended corridor than by a purely theoretical investigation.

Stern, E (Ben-Gurion University, Israel) Adams, RB *Logistics and Transportation Review* Vol. 16 No. 2, 1980, pp 109-127, 2 Fig., 4 Tab., Refs., 1 App.; ORDER FROM: British Columbia University, Canada, Faculty of Commerce, Vancouver V6T 1W5, British Columbia, Canada

42 324323 AN EVALUATION OF URBAN TRANSPORTATION SYSTEMS USING BEHAVIORAL MODELS AND CONSUMER SURPLUS. This paper explains a procedure for evaluating improvements in urban transportation systems and illustrates its application. The procedure

takes into account the interests of two groups: the system's users and its operators. It evaluates the change in marginal consumer surplus which results from improvements in the transportation system studied and compares this change in surplus to the marginal cost of the change. This yields a marginal benefit-cost ratio which can be used to measure the viability of the improvement. Data from the City of Calgary, the case study area, provided the necessary information for the analysis. The proposed improvements in that City's transportation system involve the introduction of Light Rail Transit (LRT) to complement the City's bus system and road network. The effect of the change in the system is evaluated, from 1982, when the LRT is expected to start the first phase of operation, to 2007. (Authors)

Sargious, MA Bee, CK (Calgary University, Canada) *Logistics and Transportation Review* Vol. 16 No. 2, 1980, pp 129-149, Figs., 21 Ref., 1 App.; ORDER FROM: British Columbia University, Canada, Faculty of Commerce, Vancouver V6T 1W5, British Columbia, Canada

42 324420 STUDY OF AGGREGATE BIMODAL URBAN TRAVEL SUPPLY, DEMAND AND NETWORK BEHAVIOR USING SIMULTANEOUS EQUATIONS WITH AUTOREGRESSIVE RESIDUALS. This paper emphasizes the existence of a difference among demand functions, which describe how consumers react, supply functions, which analyze the behavior of suppliers, and cost functions, which specify how prices and levels of service on a link or in a network vary with vehicle flows, ridership flows and other factors such as technology. Four aggregate demand, supply and cost models are formulated: each one regroups a subset of demand, supply and cost functions for two modes in Montreal, Quebec. A significant part of the analysis pertains to the study of a regulated transit supplier. The parameters of all models are estimated by at least two of four limited-information and full-information estimation techniques.

Gaudry, MJI (Montreal University, Canada) *Transportation Research. Part B: Methodological* Vol. 14B No. 1-2, Mar. 1980, pp 29-58, 34 Ref.

Transport Supply Models, Selected Papers from the International Symposium on Travel Supply Models, University of Montreal, Quebec, November 17-19, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 324877 POPULATION AND ECONOMIC DATA IN TRANSIT ANALYSIS. An investigation is made on the nature of impacts of public investment in a Light Rail Rapid Transit System in Buffalo, New York. In particular, the impact of the public investment is measured against population and employment declines that have occurred in the region in the last ten years. By assuming that the investment in rail is justified by more than the usual travel measures, associated redevelopment trends in the CBD, the focus of the transit development, are noted. While regional employment declines, service-oriented employment increases. This increase coupled with an increase in the number of women in the labor force, and increases in household income make private investment in the CBD more attractive. New construction, related to these trends (offices, hotels, retail space) has begun, reinforcing the transit decision.

Parker-Simon, K (State University of New York, Buffalo) Paaswell, RE *ASCE Journal of the Urban Plan and Develop Div* Vol. 106 No. 1, Nov. 1980, pp 43-58, 18 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 325226 EVALUATION OF THE ACCURACY OF PAST URBAN TRANSPORTATION FORECASTS. This report presents the results of the Technical Council Committee 6F13's efforts. Transportation studies from approximately 15 different metropolitan areas were examined to determine the availability of forecasting data for analyses. Comparisons were made of forecasts and observed travel demands realized on three major transportation facilities planned and constructed in the past 20 years.

ITE Journal Vol. 50 No. 2, Feb. 1980, pp 24-34, 14 Ref. ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 325873 MODAL SPLIT OF THE COMMUTER TRAFFIC IN THE MAJOR URBANIZED AREAS IN JAPAN. The features of modal split of transportation systems were analysed in major cities in Japan where populations were over 100000. By means of cross-analysis and multiple regression analysis the authors attempt to develop the relation between modal split and city characteristics such as population, amount of commercial activity, production activity, and income per capita. (TRRL)

Nishimura, T Hino, Y Tsuji, T *Memoirs of the Faculty of Engineering* Vol. 20 Dec. 1979, pp 177-182, 4 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 250298); ORDER FROM: Osaka City University, Japan, 459 Sugimotocho, Sumiyoshi-ku, Osaka, Japan

42 325883 SAN DIEGO LIGHT RAIL STORY. The paper discusses the San Diego project, which afforded a unique opportunity for implementation of a transit system with a minimum of capital investment. This opportunity was presented with the acquisition of the San Diego & Arizona Eastern Railway. The total escalated capital cost for the project will be under 5 million per mile. This project represented a relatively low-risk investment strategy due to availability of right-of-way and the reliance on proven materials, equipment and techniques. The system will provide a more reliable and higher-speed service than other transit alternatives in the corridor. The project had a finite budget at the outset, therefore the necessity to build within the budget was mandatory.

Coil, JA ; American Society of Civil Engineers 1980, pp 301-312; Proceedings of the Special Conference-Broadening Horizons, Transp and Dev Around the Pacific, Honolulu, Hawaii, July 21-23, 1980.; ACKNOWLEDGMENT: EI; ORDER FROM: ASCE

42 326298 TRAVEL MODEL DEVELOPMENT PROJECT : PHASE 2 FINAL REPORT. VOLUME 1: SUMMARY REPORT. The report is in three volumes that document the travel demand models developed in the Travel Model Development Project (TMDP). Volume 1: Summary Report is an overview of the entire system of disaggregate travel demand models. It includes a presentation of the conceptual basis for its structure, the interrelationships of the compo-

nent models, the three general mathematical forms of these models, and a summary of the two computer program packages developed to implement the models. Finally, the volume provides a brief description of the function, form and coefficients of each model.

Ben-Akiva, ME Ruiter, ER Albright, RL Weland, DR ; Cambridge Systematics, Incorporated, Metropolitan Transportation Commission 77015-VOL-1, June 1980, 140p; See also Volume 2, PB81-102154. Sponsored in part by Metropolitan Transportation Commission, Berkeley, CA. Also available in set of 3 reports PC E18, PB81-102139.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-102147

42 326299 TRAVEL MODEL DEVELOPMENT PROJECT: PHASE 2 FINAL REPORT. VOLUME 2: DETAILED MODEL DESCRIPTIONS. The report is in three volumes that document the travel demand models developed in the Travel Model Development Project (TMDP). Volume 2: Detailed Model Descriptions presents both a detailed description of the travel model development process, and the full details of this process as it applies separately to each of the 21 component models.

Ben-Akiva, ME Ruiter, ER Albright, RL Weland, DR ; Cambridge Systematics, Incorporated, Metropolitan Transportation Commission 77015-VOL-2, June 1980, 414p; See also Volume 1, PB81-102147 and Volume 3, PB81-102162. Sponsored in part by Metropolitan Transportation Commission, Berkeley, CA. Also available in set of 3 reports PC E18, PB81-102139.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-102154

42 326300 TRAVEL MODEL DEVELOPMENT PROJECT: PHASE 2 FINAL REPORT. VOLUME 3: MTCFCAST USERS' GUIDE. The report is in three volumes that document the travel demand models developed in the Travel Model Development Project (TMDP). Volume 3: MTCFCAST Users' Guide provides the information needed to exercise the complete set of models as they have been implemented in MTCFCAST, a computer package providing a zonal-level version of the models, with aggregation accomplished by market segmentation techniques. The volume presents an overview of MTCFCAST, user documentation for each of its programs, and information on the data sets that are created by the package and used to tie together the component programs.

Ben-Akiva, ME Ruiter, ER Albright, RL Weland, DR ; Cambridge Systematics, Incorporated, Metropolitan Transportation Commission 77015-VOL-3, June 1980, 406p; See also Volume 2, PB81-102154. Sponsored in part by Metropolitan Transportation Commission, Berkeley, CA. Also available in set of 3 reports PC E18, PB81-102139.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-102162

42 326477 THE IMPACT OF BART (BAY AREA RAPID TRANSIT) ON PUBLIC POLICY. The report summarizes the findings and conclusions of the Public Policy Project and presents policy implications for other metropolitan areas planning for rapid rail transit development. Impacts of BART on public policy actions and decision-making processes are assessed in four areas--organization, finance, land use and

transportation. These BART public policy impact findings are interpreted for each of three different types of communities--urban core, urban residential and suburban.

Graebner, LS Giles, PB Higgins, TJ Jonash, RS Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-07, Apr. 1979, 130p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001641. Prepared by Booz-Allen and Hamilton, Inc., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118119, DOTL NTIS

42 327758 EMERGING TRANSPORTATION PLANNING METHODS. The U.S. Department of Transportation has sponsored research on new transportation planning techniques for several years. A number of significant advances have been made both in manual and computer procedures. Many of the new techniques were developed at universities and have distinct advantages over traditional methods. In 1976 the Office of University Research organized and conducted a 4-day seminar to instruct transportation planners in the theory, utility, and application of emerging transportation planning techniques and to encourage their widespread use. Three basic subjects were chosen for indepth examination: (1) Transportation demand forecasting techniques; (2) Transportation evaluation methods; and (3) Transportation/land use interactions. This book contains six state-of-the-art presentations and three papers summarizing the workshop discussions and question-and-answer periods.

Brown, WF Dial, RB Gendell, DS Weiner, E ; Department of Transportation DOT-RSPA-DPB-50-78-2, Aug. 1978, 188p; Proceedings of the Seminar Held at Daytona Beach, Florida on December 5-9, 1976.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-119133

42 329636 POTENTIAL MOBILITY: A SIMULTANEOUS ROUTE AND ZONAL OUTPUT MEASURE. A measure of transit agency produced output that has characteristics amenable to disaggregate service analysis is introduced. Potential mobility is a simultaneous route and zonal output measure that has the ability to portray route outputs based on their spatial extent and the opportunities they serve, and zonal measures of transit service based on the characteristics of each route serving them.

Prosperi, DC (Illinois University, Urbana) *Traffic Quarterly* Vol. 34 No. 3, July 1980, pp 441-452, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

42 329733 EMCT. ROUND TABLE 47 (HAMBURG, 25 AND 26 JUNE 1979). SCOPE FOR RAILWAY TRANSPORT IN URBAN AREAS. A series of case studies of public transport in 14 European cities is followed by a summary of questionnaire answers given by the authors of the case studies. The cities did not include "agglomerations" of several million such as Paris and London with very special public transport problems but did include Amsterdam, Barcelona, Madrid, Brussels, Copenhagen, Hamburg, Lille, Liverpool, Milan, Munich, Naples, Newcastle, Oslo, and Vienna. Conclusions are drawn about

the role of rail transit in urban areas and a number of general principles are developed concerning typological description of an urban district; volume of traffic and modal split; form and organization of public transport (fares, service, parking); financing and maintenance of vehicles; and economics (operating costs, fares policy, and subsidy).

European Conference of Ministers of Transport 1980, 375p, Figs., Tabs.; ORDER FROM: Organization for Economic Cooperation and Development, Suite 1207, 1750 Pennsylvania Avenue, NW, Washington, D.C., 20006

42 329962 PLANNING SURFACE PUBLIC TRANSPORT: THE CASE OF CARACAS [Planificación de transporte público superficial: el caso de Caracas]. A wide summary is presented of the study of public transport in the city of Caracas, Venezuela, which has made possible the development of a series of methodologies for the evaluation of urban public transport systems. By means of a computer simulation of the existing transport system, and using models, an analysis has been made of the transport operations of the system. The models were calibrated and the operations evaluated. Results are presented of the passenger traffic assignments for different surface public transport systems, and an analysis is made of proposals for integrating the underground railway system with the surface system. The analysis of the operations makes it possible to isolate a series of schematic planning techniques for evaluating the characteristics of the system: structure of lines, speed of journeys, bus priority, speeds, demand and length of express lines, charts of the indices of behaviour of the network, results of detailed breakdown of seats, number of changes etc. The different stages of development of the projects which are presented for correcting the deficiencies in the service, are discussed. TRRL [Spanish]

Cajiao, J *Anales de Ingeniería* Vol. 136 No. 798, Apr. 1978, pp 43-51, 1 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 109619), Central Laboratory of Bridges & Highways, France, Ministry of Public Works, Spain; ORDER FROM: Sociedad Colombiana de Ingenieros, Carrera 4, No. 10-41, Bogotá, Colombia

42 329964 VICTORIAN TRANSPORT STUDY : LAND TRANSPORT IN VICTORIA- HISTORICAL BACKGROUND. Throughout the history of Victoria there has been a direct interdependence between transport and the social and economic development of the state. The railways played a very significant role in the development of the state for close on its first hundred years (and in the metropolitan area this role was reinforced by the tramways during the city's second 50 years or so). By the 1930s, the motor vehicle was growing in numbers and was beginning to effectively compete with the railways for people and goods movement. Regulation of transport was introduced to protect the railways. This regulation, and the Second World War and petrol rationing, safeguarded the railways during the 1930s and 1940s. However, since the early 1950s, the position of the railways (and other public transport) has steadily declined to the stage where many parts of the transport task can now be much more effectively and economically performed by the motor vehicle. This dominance of the motor vehicle has had, and will continue to

have, a marked effect on the development of the state. This background paper briefly reviews the history of land transportation in Victoria, in order to give some insight into the relationship between each of the transport modes, and between transport and state development (A). TRRL

Ministry of Transport, Victoria Monograph 1980, 32p, 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239926), Australian Road Research Board; ORDER FROM: Ministry of Transport, Victoria, 570 Bourke Street, Melbourne, Victoria, Australia

42 330169 RATIONALE FOR SELECTION OF LIGHT RAIL TRANSIT FOR PITTSBURGH'S SOUTH HILLS. A project to update the 70-year-old South Hills electric railway system in Allegheny County, Pennsylvania, was among the first such projects to be subjected to intense scrutiny as part of a federally mandated alternatives analysis. The rationale of the accepted solution is examined, and the technical process by which consensus was achieved is described. The data used was derived from the alternatives-analysis work of the consultants, from regional planning projections, and from the author's observations and experience in the area. The alternatives analysis did not include a final solution for the downtown Pittsburgh traffic problem, but the subsequent review process, based on good data, led to the conception and acceptance of the Sixth Avenue subway. (Author)

Tennyson, EL *Transportation Research Record* No. 760, 1980, pp 18-25, 3 Figs., 2 Tab., 2 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: Railroad Research Information Service, 2101 Constitution Avenue, NW, Washington, D.C., 20418

42 342935 TRANSPORTATION MODELS AND ANALYSIS. PROCEEDINGS OF SEMINAR P HELD AT THE PTRC SUMMER ANNUAL MEETING, UNIVERSITY OF WARWICK, ENGLAND, FROM 7-10 JULY 1980. The proceedings of seminar p contain the following papers: Some Theoretical Difficulties in Using Equilibrium Assignment in Signal-Controlled Road Networks (Heydecker, BG); Modelling Dynamic Junction Behaviour (Budd, AM and Mackenzie, J); The Effect of Spatial Detail on Equilibrium Assignment Results (Jansen, GRM and Bovy, PHL); Development and Application of a Park-and-Ride Model (le Clercq, F); Research on Household Car Ownership (Bates, JJ and Use of Motor Vehicles and its Application for Aggregate Forecasting (Ben-Akiva, M, Manski, CF and Sherman, L); Computing in Transport Planning in the 1980's: a US Perspective (Manheim, M, Gonzalez, S, Litinas, N and Salomon, I); Computing in Transport Planning in the 1980's: A British Perspective (Wootton, HJ); RHTM Trip Distribution Investigation (Kirby, HR, Gunn, HF, Murchland, JD and

Heydecker, BG Budd, AM MacKenzie, J Jansen, GRM Bovy, PHL Levy, PHLRM Bates, JJ Roberts, M Ben-Akiva, M Manski, CF Sherman, L Manheim, M Gonzalez, S Litinas, N Salomon, I Wootton, HJ Kirby, HR Gunn, HF Murchland, JD Whittaker, JC Case, DJ Catling, I Ashley, DJ Shewey, P Sheldon, RJ ; Planning and Transport Res and Computation Co Ltd, (0143-4365) Monograph P 198, 1980, 382p, Figs., Tabs.,

Refs.; ACKNOWLEDGMENT: TRRL (IRRD 256241); ORDER FROM: TRRL

42 342936 TRANSPORTATION MODELS AND ANALYSIS. PROCEEDINGS OF SEMINAR P HELD AT THE PTRC SUMMER ANNUAL MEETING, UNIVERSITY OF WARWICK, ENGLAND, FROM 7-10 JULY 1980. (Continued from TRIS 342936). Predictive Accuracy of British Transport Studies (Evans, SE and Mackinder, IH); Monitoring the Impacts of Transport Management Schemes on Travel Behaviour (Bowyer, DP); Life-Cycle Changes in Household Structure and Travel Characteristics (Downes, JD); Short-Run and Long-Run Effects of Gasoline Prices in Israel (Strauss, N and Ben-Yehoshua, H); Sensitivity of Car Use to Fuel Price: an Exploration Using the Lute Model (Bland, BH); Recent Advances in Activity-Travel Analysis (Clarke, MI, Dix, MC, Jones, PM and Heggie, IG); Time, Space and People's Behaviour Over Distance (Holzapfel, H); Defining Parameters of Activity Behaviour (Damm, D); Interrelationships Between Land Use and Works Transport in France (Gerardin, B); Interrelating Trip Generation, Residential Location and Urban Structure Through Statistical Analyses and Urban Economic Theory (Zahavi, Y, Golob, TF and Beckmann, MJ); Residential Location Preference Models Compensatory and Non-Compensatory Approaches (Young, W and Richardson, AJ). (TRRL)

Evans, SE MacKinder, IH Bowyer, DP Downes, JD Stauss, N Ben-Yehoshua, H Bland, BH Clarke, MI Dix, MC Jones, PM Heggie, IG Holzapfel, H Damm, D Gerardin, B Zahavi, Y Golob, TF Beckmann, MJ Young, W Richardson, AJ ; Planning and Transport Res and Computation Co Ltd, (0143-4365) Monograph P198, 1980, 382p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 256242); ORDER FROM: TRRL

42 342938 TRANSPORTATION PLANNING PRACTICE. PROCEEDINGS OF SEMINAR M HELD AT THE PTRC SUMMER ANNUAL MEETING, 7-10 JULY 1980, UNIVERSITY OF WARWICK, ENGLAND. The following papers were presented at the seminar: The Glasgow Rail Impact Study (Gentleman, H, Mitchell, CGB, Walmsley, DA, and Wicks, J); The Bay Area Rapid Transit System (Crowell, BN); The Evaluation of Road Safety Publicity (Coleman, L and Frankham, J); Walking-the Neglected Transport Mode (Hillman, M and Whalley, A); A Method for Assessing the Risks in Making Transportation Investments Due to Sampling and Modelling Errors (Ramsey, B and Openshaw, S); The Role of the Transportation Planners in the 1980's (Charnock, D and Wilson, CO); Communications in the 1980's Between Transportation Planners, Elected Representatives and the Public (Sharpe, D); Computing for Transportation Planning and Communications in the 1980's (Wootton, HJ); The Role of the Do-Nothing Alternative in the Evaluation of Transportation Projects (Lane, JS, Grenzeback, LR and Kingham, RI); Transportation Planning in North Staffordshire-Theory and Practice (Morrish, DW); Surpass-A Consumer Surplus Based Economic Assessment Technique (Goodwin, R). (TRRL)

Gentleman, H Mitchell, CGB Walmsley, DA Wicks, J Crowell, BN Coleman, L Frankham, J

Hillman, M Whalley, A Ramsey, B Openshaw, S Charnock, D Wilson, CO Sharpe, D Wootton, HJ Lane, JS Grenzeback, LR Kingham, RI Morrish, DW Goodwin, R ; Planning and Transport Res and Computation Co Ltd Monograph P 196, 1980, 125p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 256409); ORDER FROM: TRRL

43 041614 WE SHOULD OPEN UP THE HIGHWAY TRUST FUND NOW. Public transit has been plagued by deteriorating service and rising fares. More than 268 mass-transportation companies have gone out of business since 1954, and 20 more are on the brink of bankruptcy. The passengers now commute by car. The one quarter of our population that is too poor, too old, or too handicapped to own a car needs public transportation. At the root of the problem is the Highway Trust Fund, each time a new highway is opened, it produces an increase in the revenue for the Highway Trust Fund, which thus increases the money available for building highways. Cities are forced to use highway funds for highways, or lose them. Cities need the flexibility to plan their own transit expenditures. It is proposed that the Federal Highway Act be amended to allow cities to use their share of the Trust Fund money for bus or rail transit. The automobile contributes to the increasing energy shortage. Automobiles are responsible for at least 39 percent of our air pollution, and up to 80 percent in some cities. Balanced transportation is needed.

Dear, A *Reader's Digest* Vol. 102 No. 612, Apr. 1973, 4 pp; Due to its publication in a national magazine, this article may influence public opinion.; ACKNOWLEDGMENT: Reader's Digest; ORDER FROM: Reader's Digest Association, Incorporated, Pleasantville, New York, 10570 Repr PC

43 046274 AN ANALYSIS OF URBAN MASS TRANSIT SUBSIDIES. The paper analyzes possible rationales for public subsidies to transit firms and discusses the validity of each argument. An abstract model relating subsidy formulas to social goals is developed and used to analyze cost subsidies such as capital grants. Estimates of the cost of several subsidy formulas are also presented. (Author)

Peskin, HM ; Institute for Defense Analyses IDA/HQ-71-12831, Jan. 1973, 60 pp; IA DOT-OS-10017; ACKNOWLEDGMENT: NTIS (PB-219077/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-219077/5, DOTL NTIS

43 046704 TRANSIT'S NEED FOR ASSURED FEDERAL AID. Transit faces a serious financial crisis, and thus needs greater governmental aid, especially from the Federal government. The inability of the automobile to fulfill all travel demands makes transit a necessity for the survival of large-city downtown areas. For the ideal of a balanced transportation system, transit should be considered as a complement to the automobile, not a competitor. The Federal government recognized the need for assisting transit in capital improvement projects with the enactment in 1964 of the Urban Mass Transportation Assistance Act, but such aid thus far has been far from sufficient to meet the needs. States and local governments also are not providing aid to transit. Transit, however, still needs these two types of financial assistance, particularly by the Federal government: (1) Greater governmental funding on a guaranteed continuing basis for capital improvements; and (2) governmental aid for operating costs.

Cafferty, M *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE2, 9735, May 1973, pp 289-295; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

43 048144 AN ESTIMATE OF THE 1970 U.S. URBAN TRANSIT DEFICIT. The paper provides estimates of operating and total deficits incurred in 1970 by urban public transportation properties classified by urbanized area and mode. The operating deficit for all properties incurring such deficits in 1970 is estimated to be \$190 million. Of this amount, the bus deficit was \$109 million and the rail rapid transit deficit was \$81 million. The total deficit for 1970 is estimated to be \$450 million, exclusive of way and structure costs. The largest bus deficits were incurred in urban areas with populations of one to five million people; the largest rail rapid transit deficits were incurred in urban areas with populations over five million people.

Boyd, JH Wells, JD ; Institute for Defense Analyses Final Rpt P-960, June 1973, 33 pp; Contract DOT-OS-20019; ACKNOWLEDGMENT: NTIS (PB-222016/8); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222016/8

43 048145 PROJECT FARE (FINANCIAL ACCOUNTING AND REPORTING ELEMENTS) TASK III REPORT URBAN MASS TRANSPORTATION INDUSTRY REPORTING SYSTEM DESIGN. PART I: TASK SUMMARY. The report is the first volume in a four volume study which describes a reporting system which would be uniform for the urban mass transit industry. It contains a description of the performance of Task III, the third of four Tasks in project FARE (Uniform Financial Accounting and Reporting Elements. Part 1 covers the needs and objectives, methodology, general design, conclusions and recommendations, and concludes with a description of the plans of Task IV, the last sceduling of the series.

Harvey, DL Nagel, JW Van Lieshout, WT ; Andersen (Arthur) and Company Intrm Rpt Task 3, June 1973, 41 pp; Prepared in cooperation with Project FARE Industry Control Board and Wells Research Co. Paper copy also available from NTIS \$20.00/set of 4 reports as PB-222 041-SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-222042/4); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222042/4

43 048147 PROJECT FARE (FINANCIAL ACCOUNTING AND REPORTING ELEMENTS) TASK III REPORT. URBAN MASS TRANSPORTATION INDUSTRY REPORTING SYSTEM DESIGN. PART III: REPORTING SYSTEM FORMS. The report is the third volume in a four volume study which describes a uniform reporting system for the transit industry. It provides the forms for the work done in Part 2 with appropriate cross references. Included are asset reporting forms, liability reporting forms, capital reporting forms, expense reporting forms, and nonfinancial operating data reporting forms. Portions of this document are not fully legible.

Harvey, D Nagel, J Van Lieshout, W ; Andersen (Arthur) and Company Intrm Rpt Task 3, June 1973, 118 pp; Prepared in cooperation with Project FARE Industry Control Board and Wells Research Co. Paper copy also available from NTIS \$20.00/set of 4 reports as PB-222 041-SET.; Contract DOT-UT-20008; ACKNOWLEDGMENT: NTIS (PB-222044/0); ORDER FROM: NTIS, Repr PC, Microfiche; PB-222044/0

43 048172 WEST GERMANY TOPS EUROPEAN SPENDING. More money is being spent on rapid transit in the German Federal Republic than in any other European country. Within the next ten years most of the country's major cities will have U-Bahn systems operating or under construction. Construction of the Munich U-Bahn is continuing, following the opening of the first section in May last year (IRJ, May 1972, pp 18-21). In Hamburg, the last station of a new line is now under construction. And in Frankfurt a new 8.5-km tunnel is being built. Other cities now extending, building or planning U-Bahns include Nuremberg, Hanover, Stuttgart and Cologne.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 2 pp, 3 Fig ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

43 048175 FEDERAL AID WILL PROVIDE BOOST FOR US CITY TRANSIT. The United States' Urban Mass Transportation Administration (UMTA) is to get \$1000 million under President Nixon's 1973-74 fiscal budget. That's less than US transit advocates had been asking for, but an increase on the \$980 million now budgeted for fiscal 1972/73. In fact, UMTA's present year's budget--due to be spent by July--was also originally \$1000 million, but a \$20 million personal-rapid transit item has now been scrapped. The 1973-74 budget includes \$80 million for research, demonstration and development programs.

International Railway Journal Vol. 13 No. 4, Apr. 1973, 3 pp, 1 Fig ORDER FROM: Simmons-Boardman Publishing Corporation, 350 Broadway, New York, New York, 10013 Repr PC

43 050628 ECONOMIC AND FINANCIAL ASPECTS OF SUBURBAN LINE OPERATION [ASPECT ECONOMIQUE ET FINANCIER DE L'EXPLOITATION DES LIGNES DE BANLIEUE]. The author describes from the aspects stated the present situation and the obligations connected with the operation of Paris suburban lines. He then deals with the economic problems of passenger traffic in this area especially as a result of the use of the private car, how the financial equilibrium of public transport must be considered and how investment programmes are drawn up. He makes an assessment of suburban transport operations in a determined area where the SNCF is definitely providing a "public service" and of SNCF activities there, and explains how the "SNCF Paris Suburbs" traffic accounts are compiled; such traffic is also included in a special account for the Paris Transport Region. He then refers to financial compensation of the social or public service type. Finally he shows that the arrangements applied to suburban line operation are quite different from those applied to other SNCF activities. [French]

Fioc, A, Director, General Studies *Revue Generale des Chemins de Fer* Apr. 1973, pp 266-274, 2 Fig, Tabs; ACKNOWLEDGMENT: French National Railways; ORDER FROM: ESL, Repr PC, Microfilm

43 050859 COST COMPARISON OF BUSWAY AND RAILWAY RAPID TRANSIT. Costs of bus-on-busways and train rapid transit systems were compared at varying passenger capacities on hypothetical new routes using both

current and future vehicle equipment. The calculations indicated that fast transit service could currently be provided at comparable costs by either buses or trains at about 2,000 to 5,000 passengers per peak hour, based on equipment and facilities of recent design. Improved or enlarged designs of current bus and transit equipment tend to shift the bus-train equivalence or crossover region another 1,000 or 2,000 passengers per hour and to somewhat reduce the modal differences in costs between bus and train below that capacity. Above these capacities, rail systems provide lower total costs. The study concluded with a prognosis of future developments in transit and bus technology that will enhance the quality of service while affording some possibilities for cost reduction.

Miller, DR Goodwin, BC Hoffman, GA Holden, WHT (Daniel, Mann, Johnson and Mendenall/Kaiser Eng) Deen, TB, Discussor *Highway Research Record* No. 459, 1973, pp 1-12; ORDER FROM: Highway Research Board, 2101 Constitution Avenue, NW, Washington, D.C., 20418 Repr PC

43 051463 CONSEQUENCES OF SERVICE REDUCTION IN MUNICIPAL TRANSIT: SAN FRANCISCO'S MUNI. The "Muni", in an effort to reduce costs and meet its budgeted deficit, attempted to reduce service by ten to fifteen percent. From an analysis of the data which could be obtained, it appears that neither efficiency nor equity in the City would have been served by the proposed cutbacks. The analysis draws from a variety of sources and methods in exploring the interactions within the transportation system and within the city budget.

Lee, DB, Jr (California University, Berkeley) *Transportation* Vol. 2 No. 2, July 1973, pp 195-218, Refs; ACKNOWLEDGMENT: EI (EI 74 056267); ORDER FROM: ESL, Repr PC, Microfilm

43 051572 ALTERNATE FORMULAS FOR A FEDERAL OPERATING SUBSIDY PROGRAM FOR TRANSIT. The paper discusses the rationale for transit subsidies, and explores the implications of four simple transit-subsidy formulas. It reviews the several arguments that have been advanced to justify the subsidization of mass transit services; describes some of the many possible subsidy formulas for allocating funds under an operating subsidy program; and directs attention to four criteria that should be used in selecting a particular subsidy formula; efficacy, incentives for economic efficiency, distribution costs, and equity. Four simple transit-subsidy formulas are analyzed: subsidies proportional to urban populations, to transit revenue-passengers, to vehicle-miles of service, or to potential transit-riders.

Oi, WY ; Institute for Defense Analyses Final Rpt P-943, Nov. 1973, 140 pp; See also report dated Jan 73, PB-219 077.; ACKNOWLEDGMENT: NTIS (PB-225718/6); ORDER FROM: NTIS, Repr PC, Microfiche; PB-225718/6, DOTL NTIS

43 053724 WE MUST SUBSIDIZE MASS TRANSIT. This article states the case for subsidizing mass transit. It points out the financial problems of mass transit, the need for transit in urban areas, and the energy and environmental benefits to be realized from improved mass transit.

Ronan, WJ (Institute for Rapid Transit); Reader's Digest Association, Incorporated Apr. 1974, 3 pp; ORDER FROM: Reader's Digest Association, Incorporated, Pleasantville, New York, 10570 Repr PC

43 053733 CO-OPERATION OF PUBLIC TRANSPORT UNDERTAKINGS IN CITY REGIONS: PROBLEMS OF COST ACCOUNTS, TARIFFS AND REVENUE SHARING, FROM THE GERMAN FEDERAL RAILWAY'S POINT OF VIEW. It has taken a long time—a far too long time—before it has come to be generally recognised that the enormous efforts made by our generation in order to cope with the traffic problems in large conurbations can by no means be confined to measures for private transport but that, at present and in future, it is public transport which must form the backbone of the transport systems. In the course of the long process which our society has undergone in appreciating the value of well-organised local public transport systems, there is today again some reason to hope that it may, after all, still be possible to master the traffic problem in the large city regions.

Boecker, KH Pertzsch, HJ (German Federal Railway) *Rail International* No. 1, Jan. 1973, 15 pp; ORDER FROM: ESL, Repr PC, Microfilm

43 054345 FINANCING MASS TRANSIT: MOBILITY IS AMONG THE ASSETS. Federal and local roles in underwriting urban transportation systems are discussed. Mechanisms to subsidize capital cost, and output-related cost are analyzed. So far it has not been possible to devise a formula for giving out operating subsidies that are equitable, that will keep transit firms solvent and enable them to increase the mobility of city dwellers, that are efficient (in the economic sense of not leading to distortions in resource allocation), that will encourage innovation, and that can be administered at a reasonable cost. In curing the congestion problem, the issue is primarily resource allocation in the transportation sector. A program is needed to test service innovations to solve the mobility problem.

Miller, DR *Technology Review* Vol. 76 No. 2, Dec. 1973, pp 44-51; ORDER FROM: Massachusetts Institute of Technology, Cambridge, Massachusetts, 02139 Repr PC

43 054664 UTAP: "ONE HAND GIVETH, AND ONE HAND TAKETH AWAY". On February 13, 1974 the White House passed the Unified Transportation Assistance Program (UTAP). The program makes available \$2.5 billion per year in three appropriations. The first part (\$700 million) will be capital grants devoted to major mass transit projects. The second (\$700 million) would be available for either capital investment or operating subsidies at local option. The third part (\$1.1 billion in Highway Trust Fund money) would be available for urban highways, streets or mass transit capital projects at local option. However, critics of the bill are afraid that the following might happen: a) the \$700 million transit capital grants would go to mass transit projects in the same way that UMTA money was distributed. But UMTA would have provided \$1.2 billion in 1975. b) The \$700 million transit operating and/or capital costs would be used by politicians to meet operating deficits and

keep fares down. c) The \$1.1 billion Highway Trust Fund would probably be taken over largely by the highway lobby. Many transit people believe that there is a better way to hand out transit funds. However, most agree that it is a step in the right direction.

Railway Age Vol. 175 No. 5, Mar. 1974, 4 pp ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: XUM, Repr PC

43 054689 FINANCING TRANSIT: THE BOSTON EXPERIENCE. Operational and economic administrative experiences of a transit system are described. The history of the present Massachusetts Bay Transportation Authority is presented, and its operating expenses, which are the source of the major problems, are discussed in detail. A brief discussion of statutory issues and proposed legislation conclude the paper.

Cudahy, BJ *Highway Research Record* No. 476, 1973, pp 4-7; ORDER FROM: TRB, Repr PC

43 054690 ECONOMICS OF URBAN TRANSIT CAPITAL GRANTS. Four arguments support the restriction of federal grants to public transit: The transit industry is "capital poor"; a capital grant restricts the power of transit unions to dissipate most of the grant through wage gains; a capital grant limits the federal government's liability by avoiding an open-ended commitment such as an operating subsidy support for labor costs; and a capital grant is a highly visible means of showing federal concern for transit. Each of these arguments is shown to be without merit. The uneconomic incentives inherent in a capital subsidy suggest that, if the arguments for a federal subsidy to transit operations are accepted, the funds should be allocated as a generalized subsidy to transit service rather than restricted to capital expenses.

Tye, WB (Charles River Associates, Incorporated) *Highway Research Record* No. 476, 1973, pp 30-35, 7 Ref; ORDER FROM: TRB, Repr PC

43 057434 CAPITAL BUDGETING OF MASS TRANSPORTATION SYSTEMS IN LARGE CITIES OF DEVELOPING COUNTRIES. A general systems approach for the economic analysis and evaluation of mass transportation systems is outlined. In this approach, the case of a large city in a developing country, with several mass transportation corridors and alternatives is considered. A deterministic, single objective planning model developed by MIT in the USA for highway projects is reviewed, adjusted and extended to fit the case of multiple objective mass transit systems in developing countries.

Sargious, MA Salinas, JJ ; Systems Approaches to Developing Countries Symp Proceeding; ACKNOWLEDGMENT: EI (EIX740600696); ORDER FROM: ESL, Repr PC, Microfilm

43 072064 REPORT ON THE USE OF FINANCIAL AID FROM THE FEDERAL GOVERNMENT FOR IMPROVING TRANSPORTATION IN THE COMMUNITIES [Bericht ueber die Verwendung der Finanzhilfen des Bundes zur Verbesserung der Verkehrsverhaeltnisse in den Gemeinden]. Since 1967 the Federal Government has supported measures for improving transportation facilities in the communities by means of the tax change act

1966, guidelines 1967, the act on transportation financing in communities (GVFG) 1971 and the transportation financing act 1971. This report describes the amount of financial support given by the government from 1967-1972, and how it was distributed and used for public roads, public transportation and urban transportation research. [German]

Ministry of Transport, West Germany Mar. 1974, 25 pp, Figs., Tabs.; ACKNOWLEDGMENT: TSC

43 072561 OPERATING SUBSIDIES FOR URBAN MASS TRANSPORTATION. The principal issue is not whether urban mass transportation operations should be subsidized, but where the source of the subsidy should be. The author concludes that regardless of the method chosen, the problems of managing an operating subsidy should not be a barrier to the implementation of such a policy. Such subsidies seem vital so long as meeting pollution standards and conserving energy are matters of national importance. If these problems are brought under control, operating subsidies over a longer period may be justified if they are applied in an attempt to reach national workable objectives for urban mass transportation.

Smerk, GM (Indiana University, Bloomington) *Traffic Quarterly* Vol. 28 No. 4, Oct. 1974, pp 603-618, 28 Ref.; ORDER FROM: Eno Foundation for Transportation, Incorporated, P.O. Box 55, Saugatuck Station, Westport, Connecticut, 06880 Repr. PC

43 081950 A STUDY OF REVENUE MECHANISMS FOR FINANCING URBAN MASS TRANSPORTATION. The report covers the analysis of two revenue mechanisms for financing urban mass transportation, a transit fuel tax and an additional gasoline tax imposed in urban areas. The report includes analysis of the magnitude of revenues that could be raised, tax rates required to raise these revenues, tax incidence, potential impact on transit usage, and mechanisms for tax collection.

Department of Transportation Final Rpt. Feb. 1974, 100 pp; ACKNOWLEDGMENT: NTIS (PB-236005/SSL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236005/SSL, DOTL NTIS

43 084749 FINANCING OPERATING SUBSIDIES FOR URBAN MASS TRANSIT SYSTEMS: AN ANALYSIS OF STATE AND LOCAL TAX OPTIONS. The purpose of this report is to analyze the various taxing alternatives open to state and local governments when faced with the problem of covering deficits of their urban mass transit systems. The format of the study is to: (1) outline the financial condition of the urban mass transit industry; (2) present the issue of operating subsidies; (3) present data on the state and local government response; (4) analyze state and local taxes used and not used for financing subsidies; and (5) provide a brief outline of the Federal role in the issue. According to the author, the financial condition of the urban transit industry guarantees that operating deficits will continue and increase at progressive rates. The author finds that state governments rely mainly on retail sales taxes and specific excise taxes to meet operating deficits of the transit industry, while local governments rely mainly on

property taxes. By definition these taxes tend to fall primarily upon a class of persons that are supposed to benefit from an urban transit subsidy program. Alternatives to the present taxing mechanisms are presented. Conclusions and recommendations are furnished. A bibliography is included. /UMTA/

DeBeer, AM (George Washington University); Consortium of Universities, (DC-11-0003) UMTA-DC-11-0003-74-4, June 1974, 56 pp; Sponsored by Urban Mass Transportation Administration and American Transit Association.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239-634/AS

43 084985 OPERATING SUBSIDIES FOR BUSES-THE CASE OF CONNECTICUT. This study took root during the "Connecticut Bus Crisis" of 1972-73. At that time, a massive strike crippled the privately-owned public transportation in the state. Only by the granting of an interim State subsidy was bus service resumed. Numerous questions were left unresolved relating not only to the organization of any future subsidy but also to the reasons behind the apparent need for subsidy funds. This study addresses itself to these questions. The reasons underlying the failure of the bus companies to earn a profit deal both with declining demand and with the stifling effects of state regulation of the industry. Company cost control and management do not appear to be at fault. While demand is an important factor in the fall of profits, the decline of demand is not a general phenomenon. A number of routes are still fully capable of generating healthy profits. These findings suggest that subsidy and a relaxation of regulatory constraints are among the appropriate bus transit policies which could be pursued. Of course, there are a number of possible subsidy schemes which could be adopted. This study argues the merits and faults of many of them. Both reimbursement and formula-based subsidies are found wanting either because they introduce perverse incentives to bus operations or because they fail to indicate the extent of the need bus operators have for subsidy. The one subsidy scheme which offers both theoretical and practical appeal is a scheme whereby individual routes are auctioned off to bus operators by a public coordinating agency. This route-by-route bidding scheme exhibits many advantages and few, if any incorrigible faults. A strategy for implementation is given.

Yale University, Department of Transportation Final Rpt. DOT-TST-75-26, Aug. 1974, 141 pp, Tabs., 25 Ref.; Contract DOT-OS-40099; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-31760), NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-246760/3ST

43 090848 REVIEW AND BIBLIOGRAPHY OF SECONDARY IMPACTS OF MAJOR INVESTMENTS: HIGHWAYS, MASS TRANSIT, INTERCEPTOR SEWERS. The report presents a bibliography of secondary impacts of public investments in four sections: A review organized according to type of investment (highways, mass transit, wastewater) and to type of effect (economic, social, land use), including a brief summary of modeling techniques which may be used to analyze and project impacts; a condensation of the findings of 50 major studies; an annotated bibliography of 300 relevant studies; and classification of the literature by impact,

investment type, geographic area examined, type of study, and type of analytic technique used in assessing secondary impacts.

Environmental Impact Center, Incorporated, Council on Environmental Quality Final Rpt. June 1974, 282 pp; Contract EQC-317; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240827/6ST, DOTL NTIS

43 092298 A VALUE CAPTURE POLICY. No Abstract.

Rice Center for Community Design and Research, Department of Transportation Nov. 1974, 448p-in 4v; Set includes PB-244 101 thru PB-244 104.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244100-SET/ST, DOTL NTIS

43 092299 A VALUE CAPTURE POLICY. VOLUME I. INTRODUCTION. A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. The report is one of a set of 4. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions, employment opportunities and environmental impacts; and finance concerns as to forms and attributes of both capitalization and income realization as well as the total potential for new public and private revenue which can be produced by joint public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Sharpe, CP Callies, DL Montgomery, SN; Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/82, Nov. 1974, 101p; Paper copy also available in set of 4 reports as PB-244 100-SET, PC Contract DOT-OS-40007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244101/2ST, DOTL NTIS

43 092300 A VALUE CAPTURE POLICY. VOLUME II. LEGAL ELEMENT. A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. This report is one of a set of 4. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions,

employment opportunities and environmental impacts; and finance concerns as to forms and attributes of both capitalization and income realization as well as public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Sharpe, CP Callies, DL Montgomery, SN ; Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/83, Nov. 1974, 74p; Paper copy also available in set of 4 reports as PB-244 100-SET, Contract DOT-OS-40007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244102/0ST, DOTL NTIS

43 092301 A VALUE CAPTURE POLICY. VOLUME III. COMMUNITY ENHANCEMENT ELEMENT. A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. The report is one of a set of 4. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions, employment opportunities and environmental impacts; and finance concerns as to forms and attributes of both capitalization and income realization as well as the total potential for new public and private revenue which can be produced by joint public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Sharpe, CP Callies, DL Montgomery, SN ; Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/84, Nov. 1974, 118p; Paper copy also available in set of 4 reports as PB-244 100-SET, Contract DOT-OS-40007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244103/8ST, DOTL NTIS

43 092302 A VALUE CAPTURE POLICY. VOLUME IV. FINANCIAL ELEMENT. A case study in Houston, is examined from both a public and private viewpoint across three issue areas. These are: legal, community enhancement, and financial. This report is one of a set of 4 for the Department of Transportation. The four volumes consist of an introduction, (Volume 1) a legal element, (Volume 2) a community enhancement element, (Volume 3) and a financial element, (Volume 4). Contained in these four volumes is a description of the concept, evaluation of legal issues and precedents related to supplemental condemnation, monetary transfers, intergovernmental cooperation and air rights/sub-surface development; community design issues and examples related to mobility, social relationships, services impacts and provisions,

employment opportunities and environmental impacts; and finance concerns as to forms and attributes for both capitalization and income realization as well as the total potential for new public and private revenue which can be produced by joint public-private ventures in Value Capture Policy. In the case study example, 20% to 40% of the transit system's capital costs, including interest on borrowed capital, can be defrayed through Value Capture Policy.

Sharpe, CP Callies, DL Montgomery, SN ; Rice Center for Community Design and Research, Department of Transportation Tech. Rpt. DOT/TST-75/85, Nov. 1974, 155p; Paper copy also available in set of 4 reports as PB-244 100-SET, Contract DOT-OS-40007; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-255104/6ST, DOTL NTIS

43 095388 THE MUNICH TRANSPORT COMMUNITY-CONTRADICTION BETWEEN ECONOMIC THEORY AND POLITICAL ACTION? INVENTORY OF THE TRIAL YEAR AFTER THE OLYMPIC GAMES [Der Muenchner Verkehrsband-ein Widerspruch zwischen oekonomischem Denken und politischem Handeln? Bilanz des nacholympischen Bewaehrungsjahres]. The inventory for 1973 (after the 1972 Olympic Games) shows expenditure of 510 million DM against receipts of 212 million DM, hence the substantial deficit despite the increased traffic recorded during that year. Although some of the reasons behind this deficit do not originate with the community, one may well ask to what extent this massive tax burden is justified by social service obligations. Of course, there are tangible results, especially in terms of relief to road traffic and shorter travel times. Nevertheless, the community since 26 May 1974 has been reappraising the overall service pattern in order to better adapt it to requirements. [German]

Meyer, NL *Internationales Verkehrswesen* Vol. 26 No. 4, July 1974, pp 147-154, 3 Fig., 1 Tab.; ACKNOWLEDGMENT: International Railway Documentation, Selection of; ORDER FROM: Dr Arthur Tetzlaff Verlag, Niddastrasse 64, Frankfurt am Main, West Germany Repr. PC

43 095584 NATIONAL REQUIREMENTS FOR URBAN PUBLIC TRANSPORTATION FUNDS. The 1972 National Transportation Study was undertaken to assess the need and priorities for transportation capital funds for states and urban areas. This paper describes some of the results of that study with respect to urban public transportation. The results indicate that substantial funding is needed for urban public transportation in both the short and long term and that funding requirements vary widely between urban areas of different sizes and between urban areas of similar size. Capital funding requirements over time also vary. Major public transportation implementation programs peak in funding requirements midway in the programs. Operating costs as a proportion of total capital and operating costs are higher for existing public transportation systems than for new public transportation systems because existing systems are almost fully depreciated. Even with two-thirds federal funding for capital improvements, the state-local share of the 25-year cost to construct

and operate urban public transportation systems is likely to be substantial.

Weiner, E (Department of Transportation) *Transportation Research Record* No. 519, 1974, pp 1-9, 3 Fig., 8 Tab., 8 Ref.; ORDER FROM: TRB Publications Off

43 096672 TRANSPORTATION-PLANNING FOR THE FUTURE. The author discusses the effect of the reorganization of local government on transportation planning and makes special reference to the transport policy and programmes (TPP). It is pointed out that the single grant system enables all transportation elements to compete as equals for grant aid and that the local authorities are allowed greater independence. The discussion is illustrated with two figures: a simple flow chart illustrating the procedure required and a more detailed diagram showing the principal work areas of the transportation planning unit and the relationship of the unit to other bodies in each work area. An account is given of the work to be done which includes the development and testing of the transportation policies, the development of projects to implement these policies (involving feasibility studies and evaluation), the production of a project programme and monitoring. The advantages of integrating work areas are stressed together with a subdivision on a geographical basis. Separate sections should deal with planning for urban and rural areas. In conclusion the management of transport-based-sections are discussed and particular reference is made to the need for co-ordination, maximum delegation of responsibility, and sufficient flexibility of structure. /TRRL/

Cathcart, R *Surveyor - Public Authority Technology* Vol. 144 No. 4287, Aug. 1974, pp 31-33, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 210994S); ORDER FROM: IPC Building and Contract Journals, Limited, 32 Southwark Bridge, London SE1, England Repr. PC

43 096987 PRICING INVESTMENT DECISIONS AND SUBSIDIES IN TRANSPORT. This paper argues against transport subsidies, and suggests a policy, based on a modified form of long-run marginal cost pricing, that would enable transport undertakings to break even. Previous debate is summarized, which concluded that price should equal short-run marginal cost, and gave criteria for investment. The problems of indivisibilities and peak loading modify these rules, which were derived for electricity generation. The author discusses ways in which transport differs from other undertakings, including diversity, indivisibilities, joint costs, externalities, policy constraints, and the short-run marginal cost curve. Three arguments for subsidies are presented. Transport can be viewed as a public good, whose investment costs cannot be allocated. Or transport can be seen to produce increasing returns. Thirdly, one can hope that a reduction in price, by attracting motorists, can create a net benefit for public transport. The author refutes all these, and adds that subsidies make optimal investment difficult. Finally, the author argues that fares should cover the marginal cost of a new unit of investment, which may, however, in transport be quite divisible. Road pricing and investment in roads are needed, not subsidized public transport. /TRRL/

Morgan, EV ; Manchester University, England Sept. 1974, pp 240-258, 2 Fig., 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212255);

ORDER FROM: Manchester University, England, Department of Economics, Manchester, England

43 097287 NATIONAL REQUIREMENT FOR URBAN PUBLIC TRANSPORTATION FUNDS. The 1972 National Transportation Study was undertaken to assess the need and priorities for transportation capital funds for states and urban areas. This paper describes some of the results of that study with respect to urban public transportation. The results indicate that substantial funding is needed for urban public transportation in both the short and long term and that funding requirements vary widely between urban areas of different sizes and between urban areas of similar size. Capital funding requirements over time also vary. Major public transportation implementation programs peak in funding requirements midway in the programs. Operating costs as a proportion of total capital and operating costs are higher for existing public transportation systems than for new public transportation systems because existing systems are almost fully depreciated. Even with two-thirds federal funding for capital improvements, the state-local share of the 25-year cost to construct and operate urban public transportation systems is likely to be substantial.

Weiner, E (Department of Transportation) *Transportation Research Record* No. 519, 1974, pp 1-9, 3 Fig., 8 Tab., 8 Ref.; Report prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB Publications Off, Repr. PC

43 097654 STATES AND NEW MASS TRANSIT AID. The key provisions of the 1974 National Mass Transportation Assistance Act are explained with emphasis on the role that state government must play. Some speculation is offered as to how Federal mass transportation policy will affect state government in the near future. The attention of the Governor is mandated in choosing the designated recipient of formula funds or in being the designated recipient himself in certain situations. Where necessary, state government will have to provide the means, either through state grants or by providing additional local taxing authority, so that the maintenance of effort of operating support on the local level is continued, as well as meeting the critical need for the local match of the federal formula money.

Smerk, GM *State Government* Vol. 48 No. 2, Mar. 1975, pp 73-78

43 099242 WORKSHOP 1: THE GRANTOR'S ROLE. The purpose of Workshop 1, which viewed the evaluation of urban public transportation from the grantor's perspective, was to seek answers to the following questions: (1) What is the appropriate distribution of transportation resources among the various transport modes? (2) What is a rational and equitable basis for allocating (and distributing) transit resources among client groups? (3) What are the appropriate measures of performance for transit systems, i.e., what does a grantor use to judge good and bad performance among client transit systems? (4) What are the attitudinal and motivational factors that influence transit patronage and what is the proper (ethical) use of these factors? (5) How does one design a financial aid program that appropriately encourages (rewards) service and discour-

ages (penalizes) inefficiency and resource waste? This report of the proceedings of Workshop 1 identified the following research projects as being necessary for an adequate evaluation of urban public transportation: (1) classification of urban areas; (2) development of methodologies for assessing and evaluating alternative mobility systems in urban areas; (3) identification of rural transit needs and methods of meeting these needs; (4) public transit operational and managerial training needs; (5) motivational research needs related to modal choice decisions; (6) investigation of the feasibility of establishing a "Transportation Broker" through a case study; (7) development of appropriate roles for various levels of government; and (8) identification of potential for private sector to satisfy public transportation needs.

Gray, GE (California Department of Transportation) *Transportation Research Board Special Reports* No. 155, 1975, pp 37-38; ORDER FROM: TRB Publications Off, Orig. PC

43 099306 THE PUBLIC TRANSPORTATION INVESTMENT. The ways are examined in which transportation can contribute to the attainment of a number of national goals: namely, conservation of energy; the stabilization of the cost of living; the stabilization of employment; the productive utilization of land space resources; and the improvement of the environment. Comments are made on transportations increased use of energy. The importance of marketing and the inducement of riders to public transportation is discussed. Capital and maintenance cost savings realized in the Chicago metropolitan region as a result of public and private funding is discussed, and the opinion is expressed that the automobile and mass transit will increasingly become complementary. A program aimed at solving the existing challenges to mass transit should reach a funding level of \$6 billion annually by 1982. This amount would be needed by currently existing and planned transit systems to operate at optimum effectiveness in view of national goals.

Pikarsky, MJ (Northern Illinois Area Regional Transport Author) *Transit Journal* Vol. 1 No. 2, May 1975, pp 5-14, 26 Ref.

43 099493 MAKING THE MOST OF WHAT WE HAVE. Because of the demands being placed on available funds, construction of new transportation facilities is rare. It is suggested that a separate Transit Trust Fund be set aside for development of public transit facilities. In the meantime, the solution to the problem is to make the most of what is already in existence. This paper discusses, first, the capacity and demand of highway and transit facilities in Phoenix and second how these are being improved with available funds. Programs to balance the expedient with the long term are addressed.

Hall, EM, Deputy City Manager (Phoenix, City of, Arizona) *Transportation Research Board Special Reports* No. 153, 1975, pp 19-25; Presented at the 7th Summer Mtg. of TRB in cooperation with Florida DOT, Jacksonville, Fla., Aug. 5-7, 1974.; ORDER FROM: TRB Publications Off, Repr. PC

43 125568 PUBLIC FINANCING OF METROPOLITAN TRANSPORTATION [Il finanziamento pubblico dei trasporti nelle aree metropolitane]. This article is presented in three sections as follows: 1- economic and financial aspects of the urban public transport crisis, possible causes and proposals; 2-institutional aspects of the urban public transport crisis; Italian legislation regarding public transport and the principal rules of state financing; and 3-regional authority in matters of local public transport. /TRRL/ [Italian]

Magnani, I (Pavia University, Italy) *Automobilismo E Automobilismo Industriale* No. 7-8, July 1974, pp 73-121, 1 Fig., 6 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-212622)

43 127492 PRICING AND INVESTMENT IN TRANSPORTATION FACILITIES. The principal problem confronting Congress as it develops a public program is to ensure that the program does not treat the symptoms of inept pricing of existing facilities and the inappropriate economic organization of private industry that uses the public facilities. These conditions give rise to a political demand for excessive investment to deal with peak loads. Two principal examples are presented as illustration: airports and the building of roads. The pricing of runways and the allocation of runway space are discussed. To resolve the problems, a change should be made in the allocating runways. There is no reason why airports should be in the public sector of the economy. The "decartelization of the airline industry (by abolition of the Civil Aeronautics Board) would make it a competitive one which would reflect the varying user charges at varying hours of the day in differential fares. These changes would render the existing supply of airports adequate for several future decades and inhibit the proliferation of redundant airports (as in the case of Dulles Airport in Washington, D.C.). Several points are made with regard to the building of roads (especially freeways in urban areas and rail transit facilities in major cities), and the effort to review the transit industry. The pricing of roads, and the queuing on radial freeways and other radial routes in rush hours as a result of the nonprice rationing of roads are discussed. A consequence of the present organization of transit is that the industry is overly capital intensive. Capital grants are an incentive to build rail systems in major cities. A consequence of the Urban Mass Transportation Assistance Program is that it creates a demand for preservation of the Highway Trust Fund. Federal policy should be directed toward an effort to develop institutional arrangements for variable user charge on roads.

Hilton, GW (California University, Los Angeles) *Transportation Research Board Special Reports* No. 157, 1975, pp 45-50, 2 Ref.; Proceedings of a conference held March 23-26, 1975 at Orlando, Florida. See individual sections, HRIS #127487-#127495.; ORDER FROM: TRB Publications Off, Orig. PC

43 131701 A PROGRAM FOR SUB-ALLOCATING OPERATING ASSISTANCE FUNDS. The Delaware Valley Regional Planning Commission (DVRPC) formula is based on demand (annual revenue passenger miles), supply (annual revenue seat miles), and efficiency (annual revenue passenger miles divided by annual revenue seat miles) x annual revenue passengers.

The generalized formula was applied to the regionwide case and a boundary (state) case. They were then averaged and the resulting amounts served as the staff recommended apportionments of section 5 funds to operating entities in the Delaware valley. Data concerning public transportation operations trends are presented graphically with the intent of identifying the fiscal and operational realities faced by the local public transportation operators. As better data reporting systems are developed nationally, it is expected that the methodology will become nationally recognized for sub-apportionment of the Section 5 in metropolitan areas. An advantage of the formula is that operating entities compete against each other for subsidies. Greater patronage and a more efficient ratio of demand to supply should increase one operating entity's subsidy, all things being equal. The methodology commonly relies on data compiled by operating entities, and it is easily executed. The methodology does not require a detailed operating cost analysis of each mode and operating entity.

Pierce, IN Schwarzwald, J Brizell, EGú III Sergi, J (Delaware Valley Regional Planning Commission) *Transit Journal* Vol. 2 No. 1, Feb. 1976, pp 31-42, 2 Fig., 2 Tab.

43 134603 A FORMULA FOR SUB-ALLOCATING OPERATING ASSISTANCE FUNDS. The \$3.9 billion transit assistance program instituted after 1974 legislation requires that USDOT funds be apportioned by state and local officials for both operating and capital projects in urbanized areas. Urban funding is on the basis of population and population density without guidelines on distribution of the funds among operating entities. The public transportation operating entities serving Philadelphia, Pa. and Southern New Jersey and the interstate area at Trenton, N.J., were appraised by the Delaware Valley Regional Planning Commission and a general formula was constructed based on demand, supply and efficiency. A continuing effort to promote efficiency in public transit operations is essential. The formula and fund distribution to the entities are described. The methodology relies on data commonly compiled by operating agencies.

Pierce, IN Schwarzwald, J Brizell, EG, III Sergi, J *Urban Land Institute* Vol. 2 No. 1, Feb. 1976, pp 31-42, 2 Fig.; ORDER FROM: American Public Transit Association, 1100 17th Street, NW, Washington, D.C., 20036

43 136502 AIRLIE XII CONFERENCE HELD AT WARRENTON, VIRGINIA ON 29-31 JANUARY 1976. The Airlie conference highlights the financial requirements of the operating and capital programs of Metro. The following points were emphasized at the conference. Public transportation, while essential to our economic, social, and economical well-being, is a major cost and one that must be effectively managed. Rail construction costs must be kept as far as possible within the current estimate. Bus and rail operating programs must be managed so as to take advantage of every opportunity for increasing efficiency and reducing marginal service. Adequate funds are available to meet the full rail construction costs. To the extent that the full level of costs cannot be budgeted, effective budgetary alternatives must be identified without sacrificing our end program alternatives.

Washington Metropolitan Area Transit Authority WMATA-76/1, Jan. 1976, 147 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251299/4ST, DOTL NTIS

43 137669 A REVIEW OF PUBLIC TRANSPORT INVESTMENT PROPOSALS FOR AUSTRALIAN CAPITAL CITIES, 1974-75. The Bureau of Transport Economics in a June, 1972 report to the Australian Transport Advisory Council concluded that public transport fulfilled a vital function in capital cities, that current levels of capital expenditure were inadequate, and that public transport authorities could not finance an appropriate level of investment from current revenue sources. As a result of this report the government approved in principle a scheme to provide two thirds of the cost of improving urban public transport, and also invited alterations to those projects previously submitted to the BTE. This third report by the BTE contains the results of evaluations of 25 projects commencing in 1974-75 with a total cost of \$93.18 M, which had not previously been evaluated or which are substantially altered versions of those submitted in 1972 and 1973. The methods used in this study are similar to those used previously, with some refinements, and all of the projects had benefit-cost ratios greater than 1.0 at a 7 percent discount rate, but 4 projects yielded benefit-cost ratios less than 1.0 at a 10 percent discount rate. /TRRL/

Australian Government Publishing Service Monograph Apr. 1975, 189 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 218726)

43 138139 ASSESSING THE ARGUMENTS FOR URBAN TRANSIT OPERATING SUBSIDIES. Operating subsidies to urban transit have been growing rapidly in recent years. In the near future they will probably pay one-third or more of the industry's operating expenses. Proponents argue that operating subsidies are desirable because (a) they alleviate problems with existing automobile and land use patterns (such as congestion, air pollution, energy consumption, and urban sprawl); (b) they create a more egalitarian distribution of income and mobility; and (c) they permit public transit to be priced at its marginal cost. Unfortunately, many of the arguments of subsidy proponents are implausible. The most plausible argument is not that operating subsidies should be used indiscriminately, but that they should be used to support only particular types of public transportation service. Local transportation authorities currently do not restrict their fare reductions to the appropriate types of service, and they are not likely to do so in the future.

Gomez-Ibanez, JA (Harvard Business School) *Transportation Research Record* No. 573, 1976, pp 1-11, 14 Ref.; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

43 138140 FEDERAL TRANSIT OPERATING SUBSIDY OPTIONS. This paper reviews the political and historical background of transit operating subsidies. The issue discussed is not whether there should be operating subsidies, but rather which levels of government should provide them and in what fashion. Three arguments are reviewed: the fiscal, federal role, and pragmatic

arguments. The fiscal argument is that the operating deficits of transit authorities represent a local government fiscal program and should be treated as such. The federal role argument states that federal operating subsidies would lead to an inappropriate degree of federal involvement in local government decision making. The pragmatic argument is that it would be extremely difficult to use federal operating subsidies as an effective tool for improving urban transit operations and that the subsidies carry a real chance of being counterproductive. This paper examines four categories of operating subsidy options: no operating subsidies, the pipeline approach (unrestricted flow of funds to the transit industry), the block grant approach (exemplified by the transportation revenue sharing bill and the federal-aid urban highway program in the 1973 highway act), and the quid pro quo approach (a grant program whereby specific quid pro quos in the form of definite improvements or innovations in an urban area transit system are demanded in return for federal subsidies).

Beshers, EW (Department of Transportation) *Transportation Research Record* No. 573, 1976, pp 12-17; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

43 138141 TRANSIT OPERATING SUBSIDIES FROM THE LOCAL PERSPECTIVE. Passage of the National Mass Transportation Assistance Act of 1974 created a source of federal funding that can be used to offset transit operating deficits and improve transit operations, among other things. As a result, transit agencies are now able to turn their attention from the overall problem of balancing revenues with expenses to other issues in transit planning. A key problem that transit agencies and planners must now confront is the question of allocation of service among competing subsectors of the transit market. This paper describes some of the issues in service allocation and suggests that evaluating alternatives may be of primary importance in solving the problem. It is suggested that, within the overall framework of analysis of alternatives, some specific techniques need further development.

Miller, DR (Barton-Ascham Associates, Incorporated) *Transportation Research Record* No. 573, 1976, pp 18-20; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

43 138142 PROBLEMS AND POTENTIALS OF FEDERAL TRANSIT OPERATING SUBSIDIES. This paper addresses the problems caused by increasing escalation of transit subsidies in the face of long-term trends that are worsening transit finances and focuses attention on two issues: (a) the relationship between changes in the level of federal subsidy funding and the financial condition of the transit industry and (b) the question of why the transit industry is incurring deficits. It is emphasized that a long-run federal operating subsidy program should concentrate on understanding and controlling the transit deficit. Possible solutions to the industry's problems are offered. At the federal level the alternatives available are to (a) move the power to determine the level of deficit from local authorities to the federal government by having national fare and service standards; (b) determine precisely

what the federal subsidy is supposed to accomplish and focus the money directly toward these objectives rather than subsidize all transit service; (c) design the federal subsidy mechanism to encourage innovation and increased productivity; and (d) structure federal subsidy programs to increase fare box potential rather than penalize the fare box as a revenue source. Alternatives open at the state and local levels are to (a) penalize competitors to transit through taxes and controls; (b) encourage improvements in the productivity of transit in the off peak; (c) encourage more diversion of peak-hour transit demand to alternative modes; and (d) improve competitive advantage of transit through exclusive busways and lanes, priority in traffic, and so forth.

Tye, WB (Charles River Associates, Incorporated) *Transportation Research Record* No. 573, 1976, pp 21-29, 8 Ref.; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

43 138143 WHAT PRIZES WHEN ONE SUBSIDIZES? SOME LESSONS FROM THE PAST. This paper reviews past U.S. subsidy programs in both agriculture and transportation to establish facts about federal subsidies and apply these facts to current federal transportation subsidy programs. Two points are made. First, traditional transportation subsidies paid by the federal government have been justified in terms of national advantage. Based on this assumption, the case for federal subsidization of urban public transportation would be in extreme difficulty. This point primarily establishes reasons why urban transportation subsidies should not exist. There is, however, another approach, which leads to the second point that a new case for federal subsidization can be made strictly in terms of local advantage. An argument is presented for this new case.

Nelson, JR (Amherst College) *Transportation Research Record* No. 573, 1976, pp 30-36; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

43 138144 THE SUBSIDY ISSUE REDEFINED. The preceding papers made no mention of the portion of the population that is transit dependent—those people who rely on the existence of a decent transit system at a reasonable cost. A more rounded perspective on the issues is needed since public transit subsidies are a necessity to the maintenance of the urban organism. The choice for the present is not whether to subsidize public transportation but whether to have it at all. The answer is that it must be maintained for the transit dependent groups (i.e. urban poor, elderly, etc.), and it must be maintained at a price they can afford. The issue addressed here, and the one that most profitably could have been addressed in the previous papers, is how to design a subsidy program that will maximize the return on the investment.

Goldstein, H (District of Columbia Municipal Planning Office) *Transportation Research Record* No. 573, 1976, pp 37-39; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

43 139596 MASS TRANSPORTATION NEEDS AND FINANCING IN THE UNITED STATES. The U.S. Department of Transportation (1974) recently completed a comprehensive study of mass transportation needs and methods for financing these needs. Using information from the 1974 National Transportation Study, the study determined the level of capital and operating funds that would be required to implement the 1972-90 long-range plans and 1972-80 short-range programs of the states and urbanized areas. It then analyzed various funding mechanisms at state and local levels for financing their portions of these plans and programs. It was found that urban areas, in general, not only plan to stabilize transit fares in the face of rising costs, but also intend to put \$23.6 billion into capital investments through 1980 and an additional \$34.6 billion through 1990. Of the total \$58.2 billion in capital expenditures by 1990, 63% would be expanded by the nine largest urbanized areas; 27.8% by the New York area alone. Rail transit and commuter railroad costs would account for 90% of the nine largest urbanized areas. States and localities would be able to carry the financial burden of mass transportation improvements, even if the proposed 1980 programs were implemented in their entirety, given current levels of Federal assistance. However, there would have to be a substantial financial commitment from the states and localities and some hard decisions made by them about public expenditure priorities, fare policies, and taxation levels, and policies to discourage automobile usage. This underscores the need for careful review of their overall plans and programs by state and local officials before making financial commitments. /Author/

Weiner, E (Department of Transportation) *Transportation (Netherlands)* Vol. 5 No. 1, Mar. 1976, pp 93-110, 7 Fig., 3 Tab., 4 Ref.; ACKNOWLEDGMENT: ORDER FROM: ESL

43 139632 TRANSPORTATION EFFECTS IN FRANCE. This paper concentrates on 3 aspects of the relation between transportation and its environment in France: (a) means used to apportion the external losses and benefits of a transportation investment among the parties involved; (b) measures used to improve public transportation operations in major cities (an employer tax that rests on the premise that employers benefit from the existence of public transportation and should pay for it); and (c) the fact that transportation is a servant of other human activities. A strategic scheme is presented for relating regional planning to transportation. /Author/

L'Huilier, D (Aix-Marseille University, Paris) *Transportation Research Board Special Reports* No. 168, 1976, pp 15-19, 1 Fig., 1 Ref.; Proceedings of a conference held July 22-23, 1975, and sponsored by the Social, Economic, and Environmental Factors Section of the TRB and the School of Environment and Engineering of Cornell University.; ORDER FROM: TRB Publications Off

43 141061 CAPITAL AND OPERATING COSTS FOR THE REPLACEMENT AND EXPANSION OF THE CHICAGO RAPID TRANSIT SYSTEM. Construction, maintenance and operating costs are discussed under the following headings: total capital cost—construction, vehicles, support facilities, staging, difficult construction, right of acquisition, and demolition

of acquisition, and demolition of old facilities; annual operating and maintaining cost, and capital cost required to keep existing facilities open. Construction cost estimates for conventional 2-track rail rapid transit are expressed as per mile costs exclusive of stations. The construction types covered are tunnel, cut and cover, elevated, at-grade, and depressed. The vehicle cost is \$456,000 per rapid transit car. The annual operating costs are calculated on a per vehicle-mile basis and include vehicle maintenance, fuel and power, reserve for injuries and damages, labor-operators and trainmen, and fixed costs. The costs of keeping in operation the existing transit structures, stations and bus routes are also reviewed.

Permut, H Zimring, M ; Northeastern Illinois Regional Transportation Auth TR-75-02, Nov. 1975, 23 pp, 5 Tab.

43 142159 THE ECONOMIC USE OF SUBSIDIES FOR URBAN MASS TRANSPORTATION. The energy crisis and various urban problems stemming from auto congestion, pollution, and the cost of providing public highways have created enormous interest in revitalizing our urban mass transit systems. Currently much is being said and written regarding the efficacy of granting federal, state and/or local operating subsidies. In this article, the author reviews the transit industry's peak capacity problem, and questions the economic wisdom of providing operating subsidies, as some are now being provided, and how most will probably be administered in the near future. An alternative plan suggests the manner in which subsidies can eventually help the transit industry. The article concludes with an analysis of what research efforts are needed in many urban transit systems and how subsidies can be used to support such research. /TRRL/

Mundy, RA (Tennessee University, Knoxville) *Transportation (Netherlands) Analytic* Vol. 5 No. 2, June 1976, pp 123-133, 2 Fig., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-220924); Transportation (Netherlands); ORDER FROM: ESL

43 142349 REDISTRIBUTIVE EFFECTS OF PUBLIC TRANSIT: FRAMEWORK AND CASE STUDY. Study of the redistributive effects of public policy, i.e., who pays and who benefits, is often lacking in economic analysis. This paper stresses the importance of including a redistributive focus and presents a procedure for analyzing redistributive effects in public transit. The main redistributive effect studied is due to varying profitabilities of transit lines. Ceteris paribus, the users of profitable lines subsidize the users of unprofitable lines. To measure this effect requires that the costs and revenues of the transit system be allocated to the individual lines. The means of accomplishing this allocation are considered. The results can then be correlated with socioeconomic data of the users of each line. Along with this, variables that seem important in explaining the variance in line profitability can be tested. This framework is applied in a case study of the Chicago transit system. /Author/

Rock, SM (Illinois University, Chicago) *Transportation Research Record* No. 589, 1976, pp 1-7, 1 Fig., 3 Tab., 16 Ref.; ORDER FROM: TRB Publications Off

43 142351 CURRENT STATUS OF STATE-LEVEL SUPPORT FOR TRANSIT.

Data were gathered by means of questionnaires received from 49 states and personal interviews with state transit officials in 22 states concerning state programs for assisting local transit operations. Twenty-four states provide financial assistance for transit from state funds. Such support may be used for capital improvements, operating assistance, technical planning, or special projects. The states vary widely in the extent to which they participate in such programs. Most state funds are derived from general revenue sources, although some states have established a state transportation fund to finance transit assistance as well as programs for other modes. A few states use special tax sources that are earmarked for their transit programs. Four general methods of allocating funds among transit operations are in use: purchase of service agreements, formula allocations, the revenue generating base of a transit jurisdiction, and allocation on a first-come, first-served basis. Several forms of indirect assistance to local transit operators were also identified in the course of this research. /Author/

Carstens, RL Mercier, CR Kannel, EJ (Iowa State University, Ames) *Transportation Research Record* No. 589, 1976, pp 14-19, 3 Tab., 2 Ref.; ORDER FROM: TRB Publications Off

43 142352 TRANSIT DEFICITS: A PROJECTION FOR NEW YORK STATE.

This paper summarizes recent work at the New York State Department of Transportation on the future of transit operating deficits in the state. Transit cost projections are made for three inflation levels for each of 13 transit properties, which serve 95 percent of New York State riders. Based on 1964-1973 data, aggregate demand models relation ridership to fare and service levels are calibrated for each operation and are used to forecast ridership and revenues to 1980 under a series of fare and service assumptions. The analysis shows that (a) transit costs will about double during the 1974-1980 period, (b) fare elasticities for transit ridership are about 0.25 for large operations and 0.55 for smaller operations, (c) ridership will stabilize at about 2.0 billion riders annually if current fares and services are maintained, and (d) transit deficits (operating costs minus revenues) will rise from \$248 million in 1973 to \$1324 million by 1980. /Author/

Hartgen, DT Howe, SM (New York State Department of Transportation) *Transportation Research Record* No. 589, 1976, pp 20-24, 3 Fig., 3 Tab., 4 Ref.; ORDER FROM: TRB Publications Off

43 142353 ALTERNATIVE SUBSIDY TECHNIQUES FOR URBAN PUBLIC TRANSPORTATION.

Subsidies for urban public transportation can be paid directly to transportation providers for supplying certain specified services or directly to transportation users in the form of discount transportation vouchers. These two subsidy mechanisms can be referred to as provider-side subsidies and user-side subsidies respectively. This paper discusses the likely advantages and disadvantages of three approaches urban communities can take to subsidizing public transportation: provider-side subsidies alone; user-side subsidies alone; and combined provider-side and user-side subsidies. Provider-side sub-

sidies may be easier to administer than user-side subsidies, but they have often resulted in increased costs and in public dependence on a relatively small number of providers and services. User-side subsidies appear to offer more flexibility and efficiency; subsidized users can choose those providers and services that best meet their needs. The paper outlines a program of case studies and experiments designed to test hypotheses and fill major information gaps associated with these alternative subsidy approaches. /Author/

Kirby, RF McGillivray, RG (Urban Institute) *Transportation Research Record* No. 589, 1976, pp 25-29, 1 Tab., 9 Ref.; ORDER FROM: TRB Publications Off

43 142355 ANALYSIS OF STATE TRANSIT FUNDING METHODOLOGIES (ABIDGMENT).

State funding of transit, allocation criteria, allocation limitations, funding sources and alternative allocation methodologies are reviewed. Results of a survey of the allocation methods currently in use by 22 state departments of transportation indicates that almost every state surveyed uses state funds as matching funds for federal capital grants and to assist in the purchase of other transit property; very few states allocated funds for the evaluation or promotion of transit service; most states provided assistance to fixed-route transit systems; only a few states make funds available to jitney or taxi services, half of the states fund rail, and one-third fund demand responsive systems; publicly owned systems were most eligible for funds. The allocation methods currently in use indicate that they were probably initiated because of political acceptability rather than their effectiveness in addressing particular transportation objectives.

Blair, BO (IPC Transport Press Limited) McKelvey, DJ (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 589, 1976, pp 33-35, 1 Tab., 4 Ref.; ORDER FROM: TRB Publications Off

43 142356 PROCEDURES FOR FINANCIAL ANALYSIS OF TRANSIT OPERATING ASSISTANCE GRANT REQUESTS.

The increasing reliance of transit operations on financial support has caused funding agencies to begin to evaluate the operating expenses of transit operators seeking financial assistance. One possible evaluation approach involves comparing aggregate expenses estimates of individual transit properties with industry wide performance. This paper reports on the development of an evaluation framework that uses this approach. The evaluation technique is discussed, and specific administrative actions are illustrated in response to the operating expense performance of individual operators.

Underwood, WC (Pennsylvania Department of Transportation) Bennett, JC Holec, JM (Peat, Marwick, Mitchell and Company) *Transportation Research Record* No. 589, 1976, pp 36-40, 2 Fig., 1 Tab., 6 Ref.; ORDER FROM: TRB Publications Off

43 143926 EVALUATING REVENUE SOURCES FOR PUBLIC TRANSIT: A NEW FRONTIER FOR ENVIRONMENTAL PLANNERS.

The report identifies alternative sources of revenue for the support of public transportation and suggests a comprehensive

framework within which these alternative revenue sources may be evaluated. Particular attention is devoted to those sources of revenue (gasoline taxes, parking surcharges, congestion tolls, etc.) which positively impact on regional environmental and transportation planning objectives at the same time that they provide new revenue for transit support. The report draws on a limited number of existing studies to identify (1) the potential range of future revenue deficits facing U.S. transit operations; (2) the sources, amounts, and distribution of existing revenues going to support transit in the largest U.S. metropolitan areas; (3) alternative financing mechanisms available; (4) evaluation criteria which have previously been employed to select revenue sources for transit support; and (5) new criteria which could be employed to provide a more complete evaluation.

Shinn, R Conn, WD ; California University, Los Angeles, Urban Mass Transportation Administration, (UMTA-CA-11-0009) Res. Rpt. CAL-UT(7)-T-39, UMTA-CA-11-0009-75-5, Oct. 1975, 40 pp; Contract CA-11-0009; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-256225/4ST, DOTL NTIS

43 146461 LIFE CYCLE COST MODEL FOR COMPARING AGT AND CONVENTIONAL TRANSIT ALTERNATIVES.

Some recent cost comparisons of conventional and Automated Guideway Transit (AGT) have directly used data from experimental AGT systems. These results are biased in that comparisons are made between an immature AGT system and mature forms of conventional transit. In effect, the analysis has not captured the long term advantage of AGT, which results from the substitution of technology for labor. An operational computer model is described which make appropriate cost comparisons. It is a life-cycle cost model that time-phases costs, accounts for the time value of money, incorporates time phased efficiency gains and provides for the impact of relative and general inflation. The model has been tested with AIRTRANS data from the AIRTRANS Assessment Project. Results are illustrative only. Conclusions concerning AIRTRANS operation are not possible as the data used was preliminary and is already out of date with more recent data showing significant cost reductions.

Graver, CA Jenkins-Stark, JF ; General Research Corporation, Urban Mass Transportation Administration Final Rpt. CR-1-702, UMTA-CA-06-0090-76-1, Feb. 1976, 86 pp; (PC A05/MF A01); Contract DOT-UT-60044; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-259529/6ST, DOTL NTIS

43 146644 URBAN TRANSPORTATION FINANCE.

The papers in this Record include (a) description of the framework and case study of redistributive effects of public transit; (b) description of a cost-oriented methodology for short-range transportation planning by using the I 66/Metro corridor in Northern Virginia as an example; (c) report on current status of state-level support for transit based on questionnaire answers from 49 states and personal interviews with 22 state transit officials; (d) summary of recent work in the New York State Department of Transportation on the future of transit operating deficits in the state; (e) description of a program of case studies and experiments designed to test

hypotheses and fill major information gaps associated with alternative techniques for urban public transportation; (f) investigation of the nature of forward and backward fare elasticities of transit demand by various socioeconomic strata; (g) review of state funding methods that may result in efficient, effective, and equitable transit service; and (h) report on procedures for financial analysis of transit operating assistance grant requests.

Rock, SM ; Transportation Research Board, Washington, D.C. TRB/TRR-589, ISBN-0-309-02555-9, 1976, 46p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259557/7ST

43 147682 DESPERATE NEED TO SLASH CONSTRUCTION COSTS OF NEW SUBWAYS. Subways and subway stations cost far too much to build in the U.S. Whereas Londoners recently built 3-1/2 miles of subways and subway stations for only \$18 million, the Washington Metro is running \$50 to 60 million/mile. With costs like this, the U.S. simply cannot afford to build many miles of subways. Among ways to dramatically cut costs: (1) establish better contracting practices--e.g. having the consultant do a more thorough geotechnical investigation so subway contractors won't have to put large contingencies factors in their bids; (2) introduce new technologies such as slurry walls, secant pile walls, and precast concrete liners; (3) Remove the burden of risk from the shoulders of consultants, risks connected with the introduction of new technology; (4) More carefully study alternatives in the initial planning phases of a subway system--e.g. necessary for subway tunnels to be so large? Subway platforms need to be that long? Do stations have to be as large or as deep? Too much over-design? In sum: the U.S. DOT is unhappy with the designs of current subway systems; they are not as cost-effective as they could be. The U.S. must introduce technical and institutional innovations, as other countries have done, if costs are to be sharply reduced.

Dallaire, G *ASCE Civil Engineering* Vol. 46 No. 12, Dec. 1976, pp 37, 6 Fig., 3 Phot.; ACKNOWLEDGMENT: ASCE Civil Engineering; ORDER FROM: ESL

43 148256 DEVELOPMENT OF MULTI-MODAL COST ALLOCATION MODELS. Readily available operating and financial data for public transportation systems in Chicago urban area were used to construct multivariable cost allocation models for each of the region's eight commuter railroads and 10 major bus systems. A cost allocation model was also derived for the rapid transit operations of the Chicago Transit Authority. The cost allocation model is developed by assigning individual expense accounts to one of five transit system resources--vehicle (car) miles, vehicle hours, peak vehicle (car) needs, track miles and passenger revenue. By dividing the total cost allocated to each resource by the appropriate operating statistic, unit costs are computed for each resource. These unit costs represent the coefficients of the cost allocation model, which is then used to analyze the economics of the various transportation modes.

Cherwony, W (Simpson and Curtin Incorporated) McCollom, B ; American Society of Mechanical Engineers Conf Paper P&P-1, 1976, 9 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los

Angeles, California, July 18-23, 1976, see also RRIS 26 148247.; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

43 148258 COMPARISON OF THE CAPITAL COSTS OF BUILDING BART AND FREEWAY AND BUS ALTERNATIVE. The cost of building the Bay Area Rapid Transit (BART) system is compared to that of a hypothetical freeway and bus alternative. The alternative was developed by drawing from State Highway Department plans for freeways that parallel the BART system within the same approximate corridors. The ability of both systems in Fiscal Year 1978 to move the overall daily use of the freeways is considerably higher than that of BART. When BART reaches its design capacity it will have the ability to move significantly more people during the peak hour than will the highway alternative, but overall it still will not be used as fully as the highway system. The highway alternative, including the cost of cars and buses, costs slightly less than BART in constant 1972 dollars.

English, W (Metropolitan Transportation Commission, Berkeley); American Society of Mechanical Engineers Conf Paper P&P-24, 1976, 5 pp; Presented at the 4th Annual Intersociety Conference on Transportation, Los Angeles, California, July 18-23, 1976, see also RRIS 26 148247.; ACKNOWLEDGMENT: EI; ORDER FROM: ASME

43 149874 THE RATIONALE OF PUBLIC TRANSPORT. In 1972 public-transport subsidies by local authorities totalled 13 million English pounds; in 1974-75 they were estimated at 102 million. It was first announced in 1974 that the 1978-79 subsidy would be reduced to 50 million (at November 1973 prices) and in September 1975 further reductions were notified to county councils. The author discusses the influence that subsidies can have both on public transport facilities provided, the use of such facilities in relation to mobility and land use planning objectives, and the need that will arise for county councils to work towards the integration of their transport policies and programmes (tpps) into the structure plan, whereby consistency can be achieved between objectives for both planning strategy and transport policy. The implications behind the reductions in subsidies are discussed in the context of the link that is considered to exist between such subsidies and planning objectives which can be effected through public transport policy objectives. A summary of the arguments is: (1) subsidies should lead to increased use of public transport by allowing the operation of a better and/or cheaper service than would be the case on commercial grounds; (2) increased use of public transport can, in certain circumstances, lead to increased efficiency in resource allocation in the transport sector by obtaining a given level of benefits at a lower resource cost; (3) an improved level of public transport provision can result in increased mobility for certain members of the community; (4) both (2) and (3) can influence location decisions and affect land use planning policies. This article is presented as an attempt to offer guidance on which county councils can formulate policies and determine rationales for their subsidy policies. /TRRL/

Tyson, WJ *Town Planning Review* Vol. 47 N4, 7610, pp 315-324, 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 224147); ORDER FROM: Liverpool University Press, 123 Grove Street, Liverpool, England

43 150409 GOVERNMENT TRANSPORT POLICY AND TECHNOLOGICAL PROGRESS. Along with regulation, government involvement in advancement of transportation technology involves direct investment, promotion, subsidy, technological spinoff, taxation and welfare. Two facets of technology are involved: the rate at which new technology is developed and the rate at which it is applied in industries to which it is applicable. The most direct effects upon transport technology may be those which stem from governmental influences upon availability of funding. Two examples are examined: The stagnation of rail development through inadequate capital flow, and the near demise of public urban transportation in consequence of the multiplication of funding for highway purposes and its substantial denial for other transport modes. Both reflect a readiness to enlarge commitments within the sphere of governmental control and to ignore the effects of that policy upon the private sector or upon concerns of presumed local character. There was little foresight in appraising the likely consequences. Regulatory reform is also required, but not complete deregulation.

Williams, EW, Jr (Columbia University, New York) *Transportation Journal* Conf Paper Vol. 16 No. 2, Dec. 1976, pp 86-91; Presented at the Annual Meeting of the American Society of Traffic and Transportation, Inc., in New York City, August 1976.; ORDER FROM: ESL

43 151159 FORECASTING BUS TRANSIT OPERATING COSTS. The study deals with forecasting the cost of operating bus transit systems in U.S. cities. The primary objective is to develop a practical forecasting model for use by transit planners, i.e., a tool that will provide quantitative estimates (forecasts) of operating costs for any proposed bus transit system. The final product is a composite of several models, each of which forecasts a different component of operating cost. Total operating cost is found by simply summing the component forecasts. These models are based on data supplied by the American Public Transit Association, plus a direct industry survey, undertaken as part of the research effort. The four resource categories for which models are developed are driver labor, bus repair labor, fuel consumption, and oil consumption. A single model is developed for all other operating cost.

Wilson, HG ; Pennsylvania Transportation Institute, Pennsylvania State University, University Park, (UMTA-PA-11-0010) PTI-7524, UMTA-PA-11-0010-77-1, Nov. 1975, 163 pp; Prepared in cooperation with Pennsylvania State Univ., University Park, Dept. of Business Logistics.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-262634/9ST

43 151165 ESTIMATION OF THE OPERATING COST OF MASS TRANSIT SYSTEMS. A new model has been presented for estimating the operating cost of a proposed mass transit system in an intermediate to long-range planning

environment. The document is the final report on the development and implementation of scheduling, estimation and costing procedures for transportation planning. The project was sponsored by the Urban Mass Transportation Administration (UMTA) and has been closely related to the Urban Transportation Planning System (UTPS), a computer system developed by the Planning Methodology and Technical Support Division of UMTA to assist transportation planners in the analysis and costing of proposed transportation systems. The work presented was the outgrowth of the building of a cost model for UTPS based on actual vehicle schedules and accurate estimates of manpower requirements. This work includes a new cost model, procedures to form line schedules from UTPS input, vehicle schedules, and manpower estimates, and the development of computer program UCOST which is implemented within UTPS. The major goal of the work is the development of a cost model appropriate for long-range planning.

Bodin, LD Rosenfield, D ; State University of New York, Stony Brook, Urban Mass Transportation Administration, (UMTA-NY-11-0012) Final Rpt. WAHCUPS-UMTA-1-76, UMTA-NY-11-0012-77-1, Sept. 1976, 155 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262729/7ST, DOTL NTIS

43 153116 STATUS OF OHIO'S CAPITAL AND OPERATING NEEDS FOR PUBLIC TRANSPORTATION, FY 1976-1980. An attempt is made to document the extent and type of the financial needs of Ohio's urban public transportation systems and to compare these needs with available financial resources. Tables and figures are used to present the information which is categorized in 3 groups: large urbanized areas over 200,000; urbanized areas under 200,000; and nonurbanized areas. The report indicates that 2 of the urbanized areas in Ohio will utilize all of their allocated UMTA Section 5 funds for operating expenses. Large urbanized areas will utilize all of their allocated Section 5 funds to fulfill capital and operating needs and will require additional Section 3 funds. Small urban areas will underutilize their allocated funds by a significant amount. If UMTA were to limit the allowable operating subsidy to 50 percent of the allocated Section 5 funds, it would have adverse consequences on the ability of 7 out of 8 of Ohio's major urbanized areas to maintain planned transit service. Operations in 5 of these major areas are forecast to have inadequate local funds to carry out their proposed program based upon their present sources of non-fare box revenue.

Jackson, RD ; Ohio Department of Transportation Aug. 1976, 41 pp, 7 Fig., 20 Tab.; The preparation of this study was financed in part through a Technical Studies Grant from DOT, Urban Mass Transportation Administration.; Grant Proj. No. OH-09-8001

43 153264 OWNERSHIP OF URBAN TRANSPORT UTILITIES IN THE UNITED STATES. The ownership status of urban transportation utilities was determined by questionnaire for 334 of the U.S. cities that had 1970 populations in excess of 50,000. (Of the 395 cities in this size category, 61 did not respond.) Of the 334 cities which reported, 85 had no public transportation. Seventy-seven utilities were owned by the city, 69 by other governmental units, and 103 by private investors. /GMRL/

Throckmorton, HB (Tennessee Technological University) *Growth and Change* Vol. 7 No. 2, Apr. 1976, p 19; ACKNOWLEDGMENT:

43 154594 METROPOLITAN FISCAL ANALYSIS. VOLUME 6: TECHNICAL REPORT: LOCAL-STATE-FEDERAL FISCAL FLOWS AND FUNCTIONS IN THE NATIONAL CAPITAL REGION (BASIS FOR VOLUME 5). The report addresses costs related to two public services in the Washington metropolitan area: Transportation--metrobus and metrorail, and social services. Costs and benefits are also analyzed for recreation and cultural opportunities, emergency health services, and fire mutual aid.

Verburg, EA O'Donnell, S Brown, J Spallino, S Metropolitan Washington Council of Governments, Department of Housing and Urban Development Tech. Rpt. Dec. 1975, 293 pp; See also Volume 5, PB-262 685. Also available in set of 6 reports PC E13, PB-262 680-SET.; Grant HUD-CPA-03-39-1017; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262686/9ST, DOTL NTIS

43 154595 METROPOLITAN FISCAL ANALYSIS. VOLUME 5: OVERVIEW: LOCAL-STATE-FEDERAL FISCAL FLOWS AND FUNCTIONS IN THE NATIONAL CAPITAL REGION. The report summarizes a larger study which covers two major topics: local-state-federal fiscal flows in the Washington metropolitan area, and costs and benefits associated with non-resident use of local facilities and services. The first section of the report identifies the local-state-federal fiscal flows in the region and describes their concentrations, distributions, and comparative burdens. These fiscal flows are analyzed to determine how the region and its subdivisions are influenced by local-state-federal tax collections and outlays for local-serving facilities. Fiscal flows are compared with regard to local-state-federal sources and the three portions of the region. The second section of the report addresses costs related to two public services in the region: transportation--metrobus and metrorail, and social services. Costs and benefits are also analyzed for recreation and cultural opportunities, emergency health services, and fire mutual aid.

Verburg, EA ; Metropolitan Washington Council of Governments, Department of Housing and Urban Development Apr. 1975, 43 pp; See also Volume 4, PB-262 684. Also available in set of 6 reports PC E13, PB-262 680-SET.; Grant HUD-CPA-03-39-1017; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262685/1ST, DOTL NTIS

43 157191 CURRENT STATE PRACTICES IN TRANSIT FUNDING. In an effort toward refining a funding method which results in efficient, effective and equitable transit service, this paper focuses on the criteria and methods adopted by the states for allocation of funds. Twenty-two states responded to a questionnaire concerning state assistance for mass transit. The states identified the purpose, modes, recipients, allocation formulas, funding sources and other relevant information. The survey found that: states use state funds as match for federal capital grants and assist in the purchase of other transit property;

very few states have allocated state funds for the evaluation or promotion of mass transit service. The criteria for allocation of state funds vary considerably. The major distinction in funding is between that which is allocated to systems. Those of the latter type are primarily dependent upon whether the funds are intended for operating assistance or capital assistance. If states provide capital assistance to transportation systems, the proportion is usually 50 percent of the non-federal share. The allocation of funds for operating assistance is usually based upon the system's deficit or the systems performance. Very few states place requirements on the allocation of state funds. Seven different funding sources are identified and reviewed, and the goals and legislation governing funding are briefly discussed.

Bair, BO McKelvey, DJ ; Iowa University Tech Report No. 63, July 1975, 14 pp, 1 Tab., 13 Ref., 1 App.

43 157207 RAIL TRANSIT SYSTEM COST STUDY. The cost of constructing, operating and maintaining three kinds of urban rail systems: light rail, rapid rail and commuter rail, were assessed. Cost data from several North American and European transit authorities were collected and analyzed. These data, together with recent experience of the Consultant in several transit construction projects, served as the basis of the cost projections. Factors influencing appreciable cost variations in construction and operations were reviewed and included as criteria for cost projects. /Author/

Dyer, TK Hale, WK Ingalls, FA Whelan, RB ; Dyer (Thomas K), Incorporated, (DOT-TSC-UMTA-75-22) Final Rpt. UMTA-MA-06-0025076-3, Mar. 1977, 114 pp, 1 Fig., 13 Tab., 2 App.; Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-TSC-808; ACKNOWLEDGMENT.; ORDER FROM: NTIS; PB-254627/3ST, DOTL NTIS

43 157776 URBAN TRANSPORTATION FINANCING: THE PHOENIX PROGRAM. This article which notes that the challenge is to achieve the most for the taxpayer through a cost-effective and well-balanced total transportation program, discusses the administrative problems of using federal aid and describes the Phoenix program with its 2 basic components: the street and transit programs. The sum of the street and transit programs (the programs are summarized in tables) is \$42.7 million. The expenditures and sources of funds for the major 6-year street program are also summarized. The legislative endeavor extended over 9 years, and the support of the city councils and community, and the joint cooperative efforts of the state, counties and cities were major factors in the success of the program. It is noted that the competition for the limited funds for various programs makes it necessary to carefully justify requests for funds. There must be cost effective use of these limited funds. There is also the need for balanced funding for all programs. The continuation of the separate Highway Trust Fund, Aviation Fund, and an identified funded transit program at the federal level will best contribute to the development of the total transportation programs at all levels of government. The need is indicated for a public that is informed on transportation requirements.

Hall, EM (Phoenix, City of, Arizona) *Traffic Quarterly* Vol. 31 No. 2, Apr. 1977, pp 275-286, 4 Tab.; This article was taken from a panel

presentation on Transportation Financing given by the author at the Annual Meeting of District 6 of the Institute of Transportation Engineers, San Diego, July 19, 1976.

43 163568 TRANSPORTATION FINANCIAL NEEDS DURING THE NEXT DECADE (1978-1987). This report which focuses on the areas of major federal responsibilities and interest, includes individual modal reports for airports, highways, pipelines, public transit, railroads and waterways. The specific areas for which needs estimates have been made are outlined and the data sources are indicated. The needs estimates include some private sector investment requirements, particularly in the area of railroads and pipelines. The needs study also considered equipment requirements. The figures indicate that Federal support should be increased from the level of approximately \$13 billion in Fiscal Year 1977 to an average level of \$22 billion in the next decade. The total transportation needs figure, including all sources of funding, average to \$64.79 billion per year during the next decade.

American Transportation Advisory Council
May 1977, 38 pp, Tabs., Photos., Refs., 1 App.

43 164019 COSTS AND BENEFICIARIES OF ATLANTA MASS TRANSIT. Research is reported which was designed to determine the beneficiaries of mass transportation in the Atlanta Region, and the point is made that MARTA (Metropolitan Atlanta Rapid Transit Authority) should offer a wider range of transportation services and costs to a consuming public within a complex geographic area. Mass transportation's appeal is affected by costs, quality of service and competition with other modes. In order to decrease the inequity of time costs between the automobile and mass transit, it is clear that mass transit must approach the service level of the automobile. The potential for increased transit ridership is greatest for high income suburbanites. It is recommended that the diversion of automobile use to mass transit should be encouraged through higher parking fees or other auto restrictions during peak hours. Collector bus service on a reservation basis should be available to suburban residences to minimize the time costs of transit travel. Further recommendations regarding the costs of services to higher income riders, exclusive bus lanes, a regional train system, the dissemination of information on the costs of modal choices are also presented.

Farkas, ZA *Atlanta Economic Review* Vol. 27
No. 4, July 1977, pp 50-54, 1 Fig., 2 Tab., 27 Ref.

43 164336 THE TRANSPORTATION STRUCTURE SCHEME; LOST OPPORTUNITIES [HET STRUCTUURSCHEMA VERKEER EN VERVOER: GEMISTE KANSEN]. The author analyses the main and sub objectives of the transportation structure scheme and concludes that comparison of the various alternatives is almost impossible because of the unequal specification of costs. Public participation therefore will lose a lot of opportunities. Another point of criticism is that there is confusion between policy and objectives before the details of the alternatives are clearly outlined. It appears that expenditure on public transport will have to remain at the present level or may even have to decrease. /TRRL/ [Dutch]

Hupkes, G *Verkeerskunde Analytic* Vol. 28 No. 6, June 1977, pp 277-283, 6 Phot., 8 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV67004E), TRRL (IRRD 227379); ORDER FROM: PB12053

43 165814 SECTION 13(C): TO GRANT OR NOT TO GRANT. A discussion is presented on Section 13(c) of the Urban Mass Transportation Act of 1964. Section 13(c), the employee protection clause, requires a transit agency to assure that an employee's position will not worsen when a transit agency receives federal money. The Secretary of Labor also has the final say over any agreement or promise that the transit agency makes that employees will not be harmed by a federal grant. According to R. E. Patricelli, former UMTA Administrator, 13(c) has affected the process of awarding federal paratransit grants, and delayed the awarding of badly needed UMTA operating and capital assistance grants and fueled management-union hostilities. Remarks on 13(c) by local officials, transit executives and unions are presented. Recommendations by Mr. Patricelli and APTA include filing with the operating assistance grants a "negative declaration" that would have the transit agency agreeing that no employee would be harmed by the grant, and if they were, the situation would be corrected. There is uncertainty at present whether paratransit comes under 13(c), and concern with the possible complications that could arise if local transit competes with paratransit.

Crosby, T (Washington Star) *Mass Transit* Vol. 4 No. 5, May 1977, pp 10-13, 1 Phot.

43 166720 WHY URBAN SYSTEM FUNDS WERE SELDOM USED FOR MASS TRANSIT: FEDERAL HIGHWAY AND URBAN MASS TRANSPORTATION ADMINISTRATIONS, DEPARTMENT OF TRANSPORTATION [Report to the Congress]. The report discusses the reasons local communities seldom used Urban System highway funds for mass transit projects as authorized by the 1973 Highway Act, and contains several options which the Congress could take to provide additional incentives for using highway funds for mass transit projects.

General Accounting Office, Washington, D.C., Community and Economic Development Div. CED-77-49, Mar. 1977, 35p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-268967/7ST

43 166770 NEED TO RESOLVE METRO FUNDING: DEPARTMENT OF TRANSPORTATION, WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY. The report describes the problems facing the Congress, the Office of Management and Budget, the Department of Transportation, the Washington Metropolitan Area Transit Authority, and the local jurisdictions in funding the construction of the METRO subway system, bond interest costs, and bus and rail operating deficits.

General Accounting Office PSAD-77-123, June 1977, 44 pp; Report to the Congress.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS

43 169082 HINDRANCES TO COORDINATING TRANSPORTATION OF PEOPLE PARTICIPATING IN FEDERALLY FUNDED GRANT PROGRAMS, VOLUME I. GAO identified 114 Federal programs that provide financial assistance for the transportation of people. GAO did not identify any express statutory or regulatory restrictions that specifically prohibit coordination of transportation resources of these programs but did identify a number of hindrances to coordination. The most significant hindrance appears to be confusion at all government levels about the extent of transportation coordination federally funded projects may engage in. The Congress should reduce this confusion by endorsing transportation coordination when feasible, providing there is appropriate cost-sharing and cost and service accountability.

General Accounting Office CED-77-119-Vol-1, Oct. 1977, 158 pp; Volume II in RRIS 25 169081; RRIS Bulletin 7802.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272837/6ST

43 172352 INTERRELATIONSHIP BETWEEN PLANNING AND FUNDING. Improved transportation begins with transportation planning which incorporates available funding. This is illustrated by the problems facing the Texas Department of Highway and Public Transportation which were: increasing traffic volume, rising costs, and leveling off of revenue growth. In cooperation with a consultant firm, a complete analysis was made to find solutions to the immediate problems and evaluate the financial situation. A system-oriented program is being developed to establish a balanced system within a foreseeable time that can be funded and controlled. This approach to highway planning should result in maximum benefits from available funds and a highway program with a realistic, solid foundation. Effective transportation planning must include consideration of funding limitations and must be accomplished by the parties who have the authority and responsibility for implementation. /Author/

Goode, MG (Texas State Department of Highways & Public Transp) *ASCE Journal of Transportation Engineering* Proceeding Vol. 103 No. TE6, ASCE 13354, Nov. 1977, pp 703-709; This paper was presented at the April 25-29, 1977, ASCE Spring Convention Exhibit and Continuing Education Courses, held at Dallas, Texas (Preprint 2828).

43 175695 PUBLIC HEARING BEFORE BUS SUBSIDY PROGRAM STUDY COMMISSION, HELD AT JERSEY CITY, NEW JERSEY, ON FEBRUARY 28, 1977. The Bus Subsidy Program originated in 1969 as a temporary program to preserve existing bus service while a permanent master plan for bus transportation could be developed. The aid program has increased from \$530,000 during the program's first year to assist six bus carriers to a subsidy of approximately \$45 million for the last fiscal year, with assistance being granted to 31 carriers. This has been an increase of over 8,000 percent in only seven years. The resolution asserts that some non-subsidized bus owners are operating at a profit while offering better service at lower fares than subsidized carriers; and it has been alleged that subsidy money is being applied by companies to underwrite large executive salaries and insurance policies. There is also a lack of incentives and

other deficiencies inherent in the program. Recent audits by the Department of Transportation and reports by the Office of Fiscal Affairs have highlighted the problems and abuses in the program. The purpose of these hearings is to investigate the abuses, to examine the problems and inadequacies in a system that permits the unintended use of citizen's tax dollars. The Department of Transportation is presently in the process of evaluating consultants' reports on how to restructure New Jersey's bus system and as regards what measures should be taken to change the operation of the bus subsidy program. (Portions of this document are not fully legible)

New Jersey Department of Transportation 1977, 389 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-277347/1ST

43 176474 INTRODUCTION: THE URBAN TRANSPORTATION PROBLEM UPDATED.

The major urban transportation policy issue today is how to achieve efficient, workable urban public transportation. The financial straits of public transportation, the structural weaknesses in the urban transportation market, the lack of understanding of the complex urban transportation market, and the lack of any attempt to interrelate the various aspects of urban transportation are noted. Nonmarket influences which exert strong forces on the behavior and performance of the urban transportation market include those relating to financial relations between the various levels of government, and local financial planning for transportation services. A study was initiated to examine the long-term forces in the urban transportation market that generate chronic transit deficits and to evaluate alternative courses of action to improve economic efficiency and financial viability at the local level. This study in addition to focusing on financial difficulties and the causes of deficits, also attempted to identify alternative programs to assist cities to reduce their dependence on federal financial assistance, and develop a framework to assist different levels of government to evaluate transportation costs versus revenue. The study will also summarize the state of the art which will contribute to a better understanding of the options available. Two-to three-day workshops were conducted on 5 topics: urban transportation pricing alternatives; the economic regulation of urban public transportation; issues in labor relations; the effectiveness of marketing; and government responsibilities for financing urban transportation.

Halpern, IP (Department of Transportation) *Transportation Research Board Special Report* No. 181, 1978, pp 1-3, 1 Ref.; Introduction to Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176475 THE ROLE OF PRICE IN THE URBAN TRANSPORTATION MARKET. The concepts of industrial organization are used to

relate the characteristics of market structure and conduct in urban transportation to poor market performance. Particular emphasis is placed on price-cost distortions—a source of market failure. The performance of the urban transportation market is described, and the chief market imperfections are identified. These imperfections include: price cost distortions, economic regulations, labor work rules and collective bargaining, ineffectual transit management and marketing, and government programs which benefit private transportation. The reasons for advocating pricing of roads on a more economic basis are set forth. In addition to making it possible for the Transportation System Management program to perform at all levels that are consistent with its potential, better road pricing has other advantages: the costs of travel are made more explicit; gives a wider range of choice; prices are flexible; provides revenue, provides information on the value people place on types of services and on system charges. Anomalies in pricing urban transportation services are discussed.

Hedges, CA (Department of Transportation) *Transportation Research Board Special Report* No. 181, 1978, pp 10-13, 1 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176476 TRANSPORTATION PRICING PROGRAM OF THE URBAN MASS TRANSPORTATION ADMINISTRATION. This program

seeks to reduce severe traffic congestion in urban areas and to improve the environment by encouraging use of the public transportation system. The program promotes pricing strategies that directly improve the performance of the public transport system, i.e., speed, productivity, or reliability, and uses disincentives that discourage the use of low-occupancy modes of travel. Two general categories of demonstrations are being considered for implementation. The first, which consists of pricing measures that will discourage the use of low-occupancy vehicles, involves a supplementary license scheme that is used to charge low-occupancy vehicles for driving in highly congested areas. In the second category, pricing strategies are used as a means to achieve positive rider attitude and support toward the public transportation system, and to increase ridership and productivity. Included are demonstrations to investigate the major transit pricing issues ranging from pricing of various transit services for different user groups and mechanisms for prepayment of fares to the complete elimination of fares. Comments are made on the following demonstrations: fare-free transit, prepaid pass, congestion pricing, and demonstrations of price and service variations. UMTA plans to expand the congestion pricing effort and evaluate other alternatives. The question of parking charges will be reviewed, and an investigation will be made into corridor and spot pricing to deal with specific types of congestion problems.

Arrillaga, B (Urban Mass Transportation Administration) *Transportation Research Board Special Report* No. 181, 1978, pp 13-15; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176477 SUMMARY OF OBJECTIVES OF PRICING.

It is noted that analyses of urban transportation problems and pricing strategy have been only incidentally expressed in terms of space and their intimate relation with the rest of the urban system. There has been no mention of what a rigorous and socially responsible transportation pricing policy would require in governmental reorganization. Current urban systems analysis is largely unidirectional. There may be a need to coordinate pricing policy with a complementary land use strategy. Sophisticated land use planning should be able to ensure the availability of low-income housing sites for a lesser subsidy than that required to run a nearly empty, too-big transit system. The present discussions have made little or no mention of the impact that the slowing rate of population growth might have on congestion and the need for stern road pricing policies. Another trend that seems to have been missed is the rising shove of urban movement accounted for by recreation, social, and shipping trips. The discussions considered here have all focussed exclusively on the metropolitan area.

Thompson, W (Wayne State University and Northwestern University) *Transportation Research Board Special Report* No. 181, 1978, pp 16-17; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176483 SUMMARY OF EXPERIENCE WITH TRANSIT PRICING.

It is noted that although the major concern in deciding on transit service and fare levels should be with the direct transportation consequences, there are many other less direct considerations that may also legitimately influence pricing decisions. Five influences on pricing decisions are noted and discussed; Efficiency, from the theoretical microeconomist viewpoint; management and political considerations; analysis of the travel behavior of individuals through the development of cross-sectional disaggregate behavioral models of travel demand and modal or route choice and through the application of the techniques of attitudinal survey research; experimentation by transit agencies of new pricing and service initiatives; and, the

increasing use of the more sophisticated analysis of transit patrons' response to changes in fare and service levels. The author notes that analysis must explicitly take into account such complex facts as that demands responses to a whole package of service features; that it is impossible to have a major fare adjustment without also affecting service quality in some way, and that there are many factors external to the transit system that lead to variations in patronage across routes or through time. Unless we are able to turn our efforts to investigating cause and effect in a logically rigorous fashion, it is likely that our model of what happens when the transit system is changed will be purious.

Kemp, MA (Urban Institute) *Transportation Research Board Special Report* No. 181, 1978, pp 38-39, 5 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176485 TRANSIT AND PRICING POLICIES. The object of this paper is to present a personal view that pricing is not really a very important policy variable for transit and to present an approach to data collection for transit that permits monitoring and identifying the effects of policy changes. The recent trend towards heavy subsidies for transit systems has signaled a change in the underlying objective from one of economic efficiency to one of maximizing the number of users of transit, by time of day, within a reasonable level of subsidy. This shift in objective has resulted in a change in the methods of managing transit systems as well as in the nature of transit service operations. A transit demand model is needed as a policy tool to monitor the effects on ridership of policy changes in transit systems. The proposed model provides a framework for data collection that will ensure that the effects of policy changes can be detected. Feasibility studies to date indicate that the proposed model does provide a framework that is adequate to the task of measuring all the variables that affect transit ridership.

Shortreed, JH (Waterloo University, Canada) *Transportation Research Board Special Report* No. 181, 1978, pp 42-45, 2 Fig., 2 Tab.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176486 USING SALES TAX TO SUPPORT LOW-FARE PRICING OF TRANSIT SERVICES IN ATLANTA. The primary income source for the implementation of MARTA; \$2.1 billion transit development program is a 1 percent sales and use tax levied in the two county implementation district. To overcome the inequity of a regressive sales tax, a policy of maintaining low fares was established, and both sales tax and fare revenues were applied to meet development and operating costs. A survey of riders indicated that the increase in ridership was 30 percent taking into account new riders and additional old-rider trips versus continuing old-rider trips. Characteristics of ridership and public economy aspects are discussed. The Atlanta low-fare and sales tax transit pricing experience leads to two primary conclusions. First, low systemwide fares attract additional transit riders, significantly from previously nontransit market. Second, with a low fare, subsidy drawn from sales tax results in a progressive tax structure with desirable income-transfer effects. Survey data indicated that low fares attracted riders who then discovered the quality of transit service that was already available.

Bates, JW (Metropolitan Atlanta Rapid Transit Authority) *Transportation Research Board Special Report* No. 181, 1978, pp 45-49, 7 Tab.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176491 LEGAL CONSIDERATIONS IN URBAN TRANSPORTATION PRICING. This paper provides a checklist of the legal issues to be considered in reviewing pricing proposals. Four questions pose the basic legal issues that need to be considered before making a decision about implementing any pricing mechanism. Can the pricing technique be implemented as a regulatory measure under the police power in general or specific delegation of authority. Presuming there is authority to impose a pricing technique, is it a reasonable exercise of the police power? Does the pricing technique violate any constitutional principles (due process of law, equal protection of the laws, burden on interstate commerce, right to travel)? Can the pricing technique be implemented as a valid exercise of the taxing authority? Experience in the Washington metropolitan area with parking controls points out the need for strong interrelationship among technical, legal, and political analysis if any transportation measures are to be implemented.

Bosley, JJ Schaller, MB (Metropolitan Washington Council of Governments) *Transportation Research Board Special Report* No. 181, 1978, pp 57-61, 2 Ref.; This paper appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal

Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176492 TOWARD BETTER URBAN TRANSPORT PRICING: USING WHAT IS KNOWN AND EXPLORING WHAT IS NOT KNOWN. This paper is directed to some concerns raised about the possible effects of road pricing on income distribution and on the existing pattern of activities, sale volumes, land values, and employment in the central area, particularly over the long run. In the author's opinion, a properly designed and implemented pricing scheme, would, contrary to the fears that have been expressed, increase rather than decrease activity and employment in the central area. Also, as is not the case with the present, more instances, from the poor would benefit, in most instances, from the improved accessibility and lower fares resulting from more rational pricing of private and public transportation. Because of the great uncertainty over whether the possible benefits are worth the political risks required of those making the key decisions, if new approaches to pricing are initiated, federal support may be necessary to encourage a demonstration of a restraint scheme representing a major departure from past tradition with potential for large gains nationally. Initially, it might be advisable to have a fairly simple program rather than a very elaborate one, so as to avoid a situation where ends (e.g. greater efficiency, reduced travel times, improved environment quality) are confused with means (i.e. pricing). In some instances, physical restraints might prove more efficient than pricing schemes. The need is felt for research on the price and service elasticities of travel demand of much wider scope than the many local studies that have been done so far. There is also a need for new institutional approaches since, while planning and implementation can only be done at the local level, the type of basic research necessary to improve analytical tools and the dissemination of improved methodologies, information, and data can only be done at the federal level.

Kain, JF (Harvard University) *Transportation Research Board Special Report* No. 181, 1978, pp 62-63; This article appeared in *Transportation Research Board Special Report* No. 181, *Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176493 TOWARD IMPROVED URBAN TRANSPORT PRICING: SOME THOUGHTS ON NEXT STEPS. While improving the short-run economic efficiency of a transport system is often cited in the economic literature as reasons for shifts in pricing policy, in cities where major pricing shifts have occurred, the stated goals had much broader social policy implications than simple single-mode efficiency. Therefore, impacts of pricing ancillary from a

theoretical viewpoint may be of dominant importance in terms of policy acceptability. In terms of future research, greater emphasis should be placed on the identification and description of administrative difficulties, mode and route diversion, changes in peak timing and duration, and other descriptive measures, so that practitioners can better judge for themselves the net benefits of pricing schemes. However, no amount of paper research will satisfactorily answer certain questions (which are sources of great political risk) about possible effects on business viability, essential mobility, transport system disruption, and social welfare in general. A federally funded demonstration catch on. Existing transportation charges (e.g., transit fares, bridge tolls, gas taxes, parking fees, etc.) offer a more readily available way to increase the effectiveness of pricing instruments than do more radical new charges, although the disruptive effect of the latter can be minimized by their being introduced gradually. While urban transport pricing currently has little public support, it may become more acceptable if urban population and automobile use continue to increase. The federal government should plan for the contingency by continuing and extending its research on the wide range of effects implicit in urban transportation pricing changes.

Kulash, DJ (Faucett (Jack) Associates) *Transportation Research Board Special Report No. 181, 1978, pp 63-64*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176518 TRANSIT FINANCING TRENDS AND OUTLOOK. Recent trends in transit deficits and the forces behind the deficits are considered as well as the way federal, state and local government have responded to these trends in operating deficits. Comments are also made on future transit financing. It is noted that deficits are not completely self-generated; both past and future deficits are a result of public-policy choices concerning fares, levels of service, labor negotiations, and taxation. The momentum of current trends in rising costs, constant ridership, slowly rising fares, and gradually increasing levels of service will probably push deficits upward at a rate of about 15 percent/year, but this will vary greatly among types of cities. The probability that governments will take the initiative to reduce deficits through innovative types of service and new efficiency controls—rather than through service cutbacks—will be largely a function of the financial pressure on those cities and of their commitment to provide improved public transportation service in the face of that pressure.

Burbank, CJ (Urban Mass Transportation Administration) *Transportation Research Board Special Report No. 181, 1978, pp 201-203*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Gov-

ernment Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176519 OBJECTIVES OF PUBLIC TRANSPORTATION ASSISTANCE. Two aspects of transit programs are addressed; budgetary aspects, and questions raised by congress regarding the Urban Mass Transportation Administration (UMTA) programs. The ways in which the new budget process affects mass transit funding is discussed. The Congressional Budget Act of 1974 created budget committees, a congressional budget process, and the Congressional Budget Office (CBO). The Act makes it more difficult to get contract authority. A CBO report found that the distribution of UMTA was about 30 percent for assistance in purchasing buses and about 70 percent for rail systems. The level of emphasis on rail systems is indicated as an area of research that will determine how the UMTA program is evaluated. The question is asked whether rail systems can contribute to revitalization of the central-city areas. Areas are indicated in which research will help clarify some of the supposed benefits of transit programs.

Wheeler, P (Congressional Budget Office) *Transportation Research Board Special Report No. 181, 1978, pp 203-205, 2 Ref.*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176520 THE PROBLEM OF FUNDING TRANSIT. Careful analysis of the sources of funds and the justification for the various sources are urged. Whether the degree of social commission justifies the low-fare or no-fare financing arrangement for a transit authority is questioned, and the redistributive impacts of transit are discussed. The question of which levels of government are going to support public transportation is considered. Comments made by representatives from the Metropolitan Transportation Commission serving the nine counties of the San Francisco Bay area and the governors council on transportation (Richmond, Virginia) are presented.

Olson, D (United States House of Representatives) Giersch, L (Metropolitan Transportation Commission) Doom, I (Virginia Governor's Council on Transportation) Freeland, JR (Rockville, Maryland City Council) *Transportation Research Board Special Report No. 181, 1978, pp 205-208*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by

Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176525 FINDING REVENUE FOR URBAN TRANSPORTATION. Certain basic questions regarding alternative means of financing urban transportation are considered. These questions relate to: Who decides and how? What is to be financed? How much is needed? Where will the money come from? How is the program to be administered? The risks associated with certain answer are pointed out. A table is used to examine these and source subsidiary questions and how they have been answered in financing the interstate highway program, the capital program of the Bay Area Rapid Transit Systems, and the recent transit service program of the San Francisco Metropolitan Transportation Commission.

Dahms, LD (California Department of Transportation) *Transportation Research Board Special Report No. 181, 1978, pp 222-224, 1 Tab.*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176526 STUDY ON TRANSIT REVENUE SOURCES: PART 1. A project is currently underway that will produce a handbook for the Urban Mass Transportation Administration on local government financing for public transportation. The book which will cover both existing methods that have been applied in public transportation as well as some innovative methods, will have 6 major sections. The introduction will discuss types of financing problems and set forth the framework of legislative and organizational actions and traditions within which specific financing steps are considered. The next section, on public organization for transit financing, will discuss the relative importance of specific organizational structures and, to some extent, different local institutional settings for transit financing. A section will then deal with key local policies. The section on nonfare sources of funds will consist of a general catalogue of local government fund sources other than transit operations, including advertising and terminal concessions. State transit subsidy programs will be reviewed in a further section. Other sections will discuss financing for special-service clientele, focusing on the elderly and handicapped. The final section will be examine prototype institutions and review the possibilities for setting up plans and packages with major emphasis on operating assistance at the local level.

Rechel, RE (Institute of Public Administration) *Transportation Research Board Special Report No. 181, 1978, pp 224-225*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, La-

bor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176527 STUDY ON TRANSIT REVENUE

SOURCES: PART 2. The initial results are set forth of a study that was designed to assist local decision makers in indentifying the full range of transit financing techniques, more systematically assessing the pros and cons of each local case, and choosing among alternative courses of action. The report reviews innovative financing techniques, many of which entail joint development and the related notion of value capture, evaluates the financing potential, institutional feasibility, and apparent promise for widespread application in the transit field. The innovative financing techniques are grouped into 3 categories: land, taxes, assessments and charges; and public land acquisition. It appears that combination on innovative financing techniques could defray about 5 to 15 percent of the capital cost associated with certain fixed guideway facilities. The possible payoffs from innovative techniques include: broadening the financial base for transit establishing an equitable allocation of costs; and enhancing the cost, effective of transit involvement.

Witherspoon, R (Gladstone Associates) *Transportation Research Board Special Report No. 181, 1978, pp 225-227*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176528 CASE STUDIES ON INCREASING TRANSIT REVENUES: NORTHEASTERN ILLINOIS.

The Transportation Task Force was created to examine problems associated with developing and financing organizations that can meet expanding needs, and seeking a solution for legislative consideration. A wide variety of alternative revenue sources were seriously considered at various public hearings. They included: fares, fuel tax, sales tax, sales tax on gasoline, income tax, city contribution, parking tax, utility tax, and state lottery. The opinion is expressed that, regardless of the source of the funds, the presentation and improvement of the regions public transportation system would require sizable public funds. There is also agreement that Chicago's Regional Transit Authority (RTA) should have significant revenue collection powers and that these powers should be indigenous to the areas served. The key provisions of the RTA enabling act are discussed.

Nevel, WC (De Leuw, Cather and Company) *Transportation Research Board Special Report No. 181, 1978, pp 228-230*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It

contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176530 CASE STUDIES ON INCREASING TRANSIT REVENUES: SOUTHERN CALIFORNIA.

The Southern California Rapid Transit District (SCTRD) operated out of the fare box in 1969, state funds came in 1970, local support in 1973, and federal operating funds in 1975. State funding has been and continues to be the most important source to supplement the fare box. Almost all state funds are derived from a 9.25 percent sales tax. There funds qualify as the local share to meet federal matching requirements. The county of Los Angeles is the primary provider of operating funds from within the area served, but the actual source of the county funds is federal revenue sharing. The SCTRD's experience in improving transit revenue is briefly discussed, and figures are used to illustrate annual operating revenues by source in actual dollars and in constant dollars.

Woodhull, J (Southern California Rapid Transit District) *Transportation Research Board Special Report No. 181, 1978, pp 232-234, 2 Fig*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176531 CASE STUDIES ON INCREASING TRANSIT REVENUES: ATLANTA.

The options which were considered in Atlanta included a 1 percent payroll tax, a 0.5 percent sales tax or a 1 percent sales tax or a 1 percent income tax. The state legislature voted for a 1 percent sales tax and free fare. Transit in Atlanta needed a great deal of planning: a legal plan, a financial plan to raise the money, a transit design plan for the rapid transit and the bus systems, a political plan and an informational plan, and an urban design plan. It was recognized that there was an opportunity for value capture by the Metropolitan Atlanta Rapid Transit Authority (MARTA) as the rapid transit system is built. It is noted that urban design was the key to the building of the Atlanta transit system.

Hill, TW (Chicago Transit Authority) *Transportation Research Board Special Report No. 181, 1978, pp 234-235*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and

Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176532 CASE STUDIES ON INCREASING TRANSIT REVENUES: COLUMBUS.

The experience of the Central Ohio Transit Authority (COTA) is briefly outlined. The number of revenue kilometers, the expenses, and the degree of efficiency of the Columbus transit system are discussed. The state of Ohio has set up a program of capital and operating assistance by which the state will fund part of the local share. By weighted formula based on distance travelled annually and population, COTA can receive 13.1 percent of the total state package. A campaign was also planned that may succeed in getting the major share of a 0.5 percent sales tax for transit. This would permit capturing the full share of state and federal funds. In the two completed years of COTA's operation, average ridership increased 7 percent per year.

Reading, JE (Central Ohio Transit Authority) *Transportation Research Board Special Report No. 181, 1978, p 236*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176534 COST ALLOCATION, FORMS OF AID, AND FUND AND ADMINISTRATIVE STRUCTURES.

The Intergovernmental Relations Committee of the Transportation Research Board is in the process of building a consensus among its members on basic intergovernmental principles. In this process, it has developed a work sheet for helping to distinguish federal, state, areawide, and local transportation responsibilities. The work sheet provides for assignment by percentage of various planning, programming, and implementation responsibilities among the various units of federal, state, areawide, and local governments already involved in transportation and transportation-related programs. Changing the roles and relationships among the different levels of government and the different departments, agencies, and authorities at the same level is a highly controversial activity. Consolidating major grants, establishing effective intermodal departments of transportation, and further strengthening regional planning organizations will require thorough justification and take time and substantial adjustments in traditional practice. /Author/

Walker, DB (Advisory Commission on Intergovernmental Relations) *Transportation Research Board Special Report No. 181, 1978, pp 240-244, 3 Ref.*; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by

Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176535 COST ALLOCATION AND FUNDING STRUCTURE FOR TRANSIT. The experience in Minneapolis is briefly outlined. The development of metropolitan councils and semidependent districts is examined for the standpoint of general government. Comments are made on the planning and the decision-making mechanisms. The Rockville, Maryland representative notes that it is desirable to coordinate the different federal programs, including those in the heavily related areas of transportation, energy, and environment. The desirability of subsidizing mass transit is indicated. Gasoline taxes, parking charges and taxes and the need for a national, coordinated, consolidated, federal grant program is discussed. Guidelines for block grant legislation are suggested in a further paper. Transportation related programs in California and Pennsylvania are briefly noted. Brief comments are also made on the political and institutional problems in the area of financing mass transit.

Graven, DL (Holmes, Kircher and Graven) Potter, N (Montgomery County Council, Maryland) Rivard, LA (United States House of Representatives) Baurer, A (California State Senate) Miller, JH (Pennsylvania State University, University Park) Beshers, EW (Department of Transportation) Watt, PC (Metropolitan Transportation Commission) *Transportation Research Board Special Report* No. 181, 1978, pp 244-252; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176538 INCREASING TRANSIT REVENUES. The need is noted for a strategy to keep the existing flow of federal funding alive while finding new ways to tap local and state resources for the support of transit. Raising fares is one way to increase transit revenues but it involves public policy and political issues. The question of tax sources that can be used for transit purposes is also considered. Innovative forms of finance that appeared promising included a very limited application of tax-increment and special assessment funding. It is noted that some transit authorities have tapped sales tax for transit-purposes. Chicago and California imposed a retail sales tax on gasoline to finance transit. Transit decisions must consider what will work and what will not; i.e. it is often a contest between professional and political groups.

Dahms, LD (California Department of Transportation) *Transportation Research Board Special Report* No. 181, 1978, p 255; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic

Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176539 ALLOCATING TRANSIT COSTS AND FUNDS. It is noted that the manner in which transit costs should be allocated, and guidelines as to how much money should come from fares or from any other source are a function of local conditions. The issue pragmatic versus rational approaches to generating financial mechanisms is discussed, as well as the issue of block grants as a financing mechanism for mass transportation. The need is indicated for research concerning institutional arrangements and the financing mechanisms at the local level.

Mudge, RR (Congressional Budget Office) *Transportation Research Board Special Report* No. 181, 1978, p 256; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

43 176877 TOTAL DIRECT AND INDIRECT COSTS OF BART. This paper deals with the direct and indirect energy costs of BART system. These costs are categorized amongst: traction, station maintenance, construction, and impact energy. Energy Intensity comparison is made for several Electric Transit Systems (Philadelphia, Chicago, New York, Cleveland, Toronto). Major emphasis of the paper is upon the indirect energy cost (construction energy) which is nearly 50 percent of the overall energy utilized for the BART system. For a comprehensive energy comparison of a given transportation system, it is important to identify not only the operational energy but also the construction energy. The author also makes a note regarding the unavailability of good data for fair comparisons.

Healy, TJ (Santa Clara University) ; Energy Research and Development Administration CONF-760895, May 1977, pp 207-222; Eff of Energy Constraints on Transp Syst, Proc of the 3rd Natl Conf, Union College, Schenectady, New York, August 2-6, 1976.; ACKNOWLEDGMENT: Energy Research Abstracts; ORDER FROM: Energy Research and Development Administration, 20 Massachusetts Avenue, NW, Washington, D.C., 20590

43 176919 PAYING FOR PUBLIC TRANSPORT-THE ETERNAL TRIANGLE. The paper discusses three variables in public transport planning-level of subsidy, quality of service and level of fares-and their application in London transport, the aim of management being to find the optimum balance of these three elements. The level of subsidy for public transport is often a

political decision and is not necessarily at the optimum level for reasons of public expenditure. The question of quality of service is discussed from two aspects, efficiency and effectiveness. Efficiency is defined as minimizing the rate at which resources are consumed while effectiveness is the ability to carry out tasks within the overall objective. The choice of fare level structure is one where political policies sometimes determine fares either as a source of revenue or as a means of encouraging use of public transport. The author discusses these variables of public transport planning in relation to London transport's corporate aims and the duality of decision-making within the Greater London Council.

Robinson, K *Chartered Institute of Transport Journal* Vol. 38 No. 2, Jan. 1978, pp 35-38; ACKNOWLEDGMENT: TRRL (IRRD-231774); ORDER FROM: Chartered Institute of Transport, 80 Portland Place, London W1N 4DP, England

43 177144 TRANSPORTATION FINANCE: CHOICES IN A PERIOD OF CHANGE. The Congress has a unique opportunity in this session to reconsider the ways in which federal transportation programs are financed. There are several reasons for this: Some Congressional action is required soon since the Highway Trust Fund expires in 1979, and the Airport and Airway Trust Fund expires in 1980. The Carter Administration has proposed major new highway and transit legislation that takes some important first steps toward a unified trust fund for all transportation modes. Proposals for specialized trust funds are proliferating in response to demands by many modes of transportation for additional federal funds. In a reversal of the trend of recent decades, maintenance costs are becoming the dominant factor in highway spending. The magnitude of these maintenance costs and the degree to which they are assumed to be a responsibility of the federal government--as opposed to the state or local government--must be addressed. Largely because of the Energy Policy and Conservation Act of 1975 and other legislation now pending before the Congress, gasoline consumption is expected to decline. Thus, Highway Trust Fund revenues, which depend greatly on excise taxes on motor fuels, will grow much more slowly than in the past. Inflation will further erode the purchasing power of these revenues. This is also a significant problem for the states because their highway financing depends primarily on gasoline taxes. /Author/

United States Congress Mar. 1978, 35 pp, 2 Tab.; ORDER FROM: GPO

43 178514 USING EFFICIENCY INCENTIVES TO ALLOCATE TRANSIT-OPERATING DEFICITS. This article supports the notion of providing efficiency incentives within the process of allocating transit-operating deficits and identifies the particulars of such a system currently existing in Washington, D.C. Four traditional approaches to providing transit subsidies are noted. The most common procedure authorizes a uniform rate of dedicated taxation in the area served by the transit agency, the latter receiving the proceeds of the dedicated tax. The second and less common procedure uses operating and/or socioeconomic factors. A third type is employed when a multijurisdictional operator provides services outside the area of its charter. Fourth, several cases exist where the deficit is paid

out of general funds from a city or county budget. The Washington Area Metropolitan Transit Authority (WMATA) case study is discussed. A clear understanding of the necessity for combining various measures in developing an aggregate allocation formula emerged from the study. To induce higher levels of economic efficiency, deficit allocation should be based on separate cost and revenue allocations. A general series of steps to follow in undertaking separate allocations for a bus operation is presented. It is concluded that cities with large and increasing deficits, multijurisdictional transit service, substantial bus operations, and interjurisdictional disputes about service levels are prime candidates for a deficit allocation formula with built-in economic incentives.

Levine, HA (Banks (RL) and Associates, Incorporated) *Traffic Quarterly* Vol. 32 No. 1, Jan. 1978, pp 87-104, 6 Tab.; ACKNOWLEDGMENT:

43 178515 CAN HONOLULU MASS TRANSIT BE SELF-SUPPORTIVE? This article is based on an earlier study of feasible alternative modes for the city and county of Honolulu (CCH). This article presents a mathematical model for predicting ridership on the proposed fixed guideway transit system and analyses the system's costs and revenues. These findings are than compared to those of the CCH study report. The development of the model is explained, aggregate versus disaggregate approaches and projecting transit ridership are discussed. A discussion of variables such as price per transit ride, population, and personal income is included. The model proposed in this article maintains that, even at an average fare of 20 cents, the expected ridership will be far below that predicted in the CCH study. When factors such as limited accessibility, price sensitivity, and increased competition from highway services are considered, it is difficult to forecast a self-supportive fixed-guideway transit system. Furthermore, it is noted that there is good reason to believe that actual total costs of the rapid transit system will exceed the CCH report estimates and thereby reduce the possibility that the system will operate profitably.

Simkin, MG (Hawaii University) Yoshimura, M (Maui Community College) *Traffic Quarterly* Vol. 32 No. 1, Jan. 1978, pp 131-144, 1 Fig., 4 Tab.; ACKNOWLEDGMENT:

43 178712 SAVING COMMUTER RAIL IN INDIANA. The Northern Indiana Commuter Transportation District is working to enable the electric interurban commuter railroad to continue to offer service between Chicago, Illinois and South Bend, Indiana. While the railroad has successfully maintained its right-of-way, it is unable to purchase new rolling stock. In 1976, the South Shore filed a petition requesting permission to discontinue its passenger service. Studies were made which considered the issue of whether or not state matching funds, under Indiana's program to match UMTA grants should go to the South Shore if the railroad was about to go out of passenger business. The study found that continuation of service was the lowest cost of nine alternatives that were considered, and provided the most benefits for such factors as energy use, environment, safety, travel time, economic impact with the corridor, highway congestion and parking in Chicago's loop. It was found that much of

the problem associated with operating aid is in determining exactly what the deficit is that would have to be reimbursed by a combination of state, local and federal funds.

Smerk, GM (Indiana University, Bloomington) *Transit Journal* Vol. 4 No. 2, Apr. 1978, pp 51-56

43 178736 IMPACTS OF RURAL TRANSIT FUNDING OPTIONS. This paper summarizes a study undertaken to assist the Urban Mass Transportation Administration (UMTA) in programming non-urban transit funds available through the National Mass Transportation Act of 1974. The study produced estimates of the amount of transportation provided and probable assistance levels under a variety of possible funding options. It was found that the supply of rural transportation services available in the next few years will vary significantly according to the type and amount of financial assistance available from UMTA, that assumptions about the useful life-span of vehicles significantly affect overall costs and administrative burdens, and that the transit assistance program with the most benefit to rural areas would be flexible depending on local conditions and would include some assistance for operating costs. /Author/

Burkhardt, JE Lago, AM Ceglowski, KP Montoullieu, CF (Ecosometrics, Incorporated) *Transportation Research Record* No. 661, 1978, pp 7-14, 1 Fig., 5 Tab., 20 Ref.; This article appeared in the Transportation Research Record N661, Public Transportation in Rural and Suburban Areas.; ORDER FROM: TRB Publications Off

43 180252 ESTIMATING COST FUNCTIONS FOR RAIL RAPID TRANSIT PROPERTIES. Estimating the relations existing for transport modes between costs and productivity is an important factor when establishing price and investment policy for urban and suburban transport. The article discusses the use of an econometric method to establish the cost factors for urban/suburban transport companies.

Pozdena, RJ Merewitz, L *Transportation Research* Vol. 12 No. 2, Apr. 1978, pp 73-78, 4 Tab., Refs.; ACKNOWLEDGMENT: International Union of Railways, BD, Transportation Research; ORDER FROM: ESL

43 180494 URBAN TRANSPORTATION ECONOMICS: PROCEEDINGS OF FIVE WORKSHOPS ON PRICING ALTERNATIVES, ECONOMIC REGULATIONS, LABOR ISSUES, MARKETING, AND GOVERNMENT FINANCING RESPONSIBILITIES [Special rept]. The purpose of the study was to examine the long-term forces in the urban transportation market that generate chronic transit deficits and to evaluate alternative courses of action to improve economic efficiency and financial viability at the local level. The resulting report is designed to synthesize theory and practice to produce a practical working program for both those who plan and implement policy at the local level and those who develop and administer financial programs at the state and federal levels. Its purpose is to (1) focus attention on the financial difficulties that contribute to the deterioration of service for users of both public and private transportation in cities, (b) identify the underlying causes of present urban public transportation deficits, (c) identify alternative programs to assist cities to reduce their

dependence on federal financial assistance (especially for operating costs), (d) develop a common framework to assist the different levels of government to evaluate urban transportation costs versus revenues, and (e) provide a volume that will summarize the state of the art and contribute to a better understanding of the options available to local government and to public transportation operators to improve the financial viability of public transportation.

Transportation Research Board, Washington, D.C. Federal Highway Administration, Washington, D.C. Urban Mass Transportation Administration, Washington, D.C. Environmental Protection Agency, Washington, D.C. Federal Energy Administration, Washington, D.C. TRB/SR-181, 1978, 267p; Sponsored in part by Federal Highway Administration, Washington, D.C., Urban Mass Transportation Administration, Washington, D.C. Environmental Protection Agency, Washington, D.C. and Federal Energy Administration, Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279689/4ST

43 181336 THE DISTRIBUTION OF THE TAX BURDEN OF FINANCING BART'S CONSTRUCTION AND OPERATIONS. The 71-mile Bay Area Rapid Transit (BART) system is the first regional scale rapid transit system to open in the United States in over 50 years. This technical memorandum assesses the impacts of financing BART's \$1.5 billion capital expenditures and \$60 million annual operating expenditures on the tax burden of the region's residents. This memorandum identifies the sources of BART's capital financing and assigns the burden of each revenue source geographically and to incidence sectors. It documents the same analysis for the difference between regional transit expenditures with BART and those that would occur without BART. The equity of the BART financing plans is reviewed in the context of their impact on representative household types. The differences between financing expectation and the reality are reviewed, in addition to policy implications to the financing plan. (Color illustrations reproduced in black and white)

Grefe, R McDonald, A Westerfield, D Brecher, D Metropolitan Transportation Commission, McDonald and Grefe, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT-BIP-TM-30-7-77, Oct. 1977, 177 pp; Report on BART Impact Program. Prepared by McDonald and Grefe, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282990/1ST, DOTL NTIS

43 183014 ALTERNATIVE STRATEGIES FOR FEDERAL MASS TRANSIT ASSISTANCE. Since the early 1960's Congress has authorized various federal programs to improve mass transportation, approving more than \$16 billion in spending authority to support them. The most important federal programs are directed by the Urban Mass Transportation Administration (UMTA). The debate over new legislation authorizing and funding UMTA programs provides an opportunity to review existing efforts and to consider other federal strategies for

improving urban transportation. This paper attempts to provide a framework for examining possible alternative strategies for federal assistance and for evaluating the budgetary needs of UMTA. /SASI/

Wheeler, PK Mudge, RR (Congressional Budget Office) *Transportation Engineering* Vol. 48 May 1978, pp 20-25; ACKNOWLEDGMENT:

43 183105 THE GOLDEN RULE OF URBAN TRANSPORTATION INVESTMENT. The purpose of this paper is to find an optimal taxation rule for transportation investment in an ever growing urban economy. First we dynamize a standard circular-city model with identical residents by introducing population growth and transportation improvements over time. Assuming that utility functions are of a constant-elasticity form and transportation investment is financed by an income tax, we prove the existence, uniqueness and stability of a balanced growth equilibrium for each given tax rate. Then, an optimal tax rate is determined so as to maximize the balance growth equilibrium level of utility for every resident in the city. It is also shown that our simple rule remains valid in the case of two income classes. /GMRL/

Miyao, T (California University, Berkeley) *Journal of Urban Economics* Vol. 4 No. 4, Oct. 1977, pp 448-458; ACKNOWLEDGMENT:

43 183373 ALLOCATION OF FUNDS TO PUBLIC TRANSPORT INVESTMENT AND OPERATING SUPPORT. This paper reviews the present levels of operating support to, and public investment in, public transport systems in western Europe. All internal bus, tram and rail services are included, and estimates made for total support in Britain, Sweden, West Germany, the Netherlands and France. To make comparison meaningful, these are shown in relation to gdp and traffic carried. Support levels in Britain are below average, but by no means the lowest as sometimes assumed. Reasons for providing support are considered, including existence of financial burdens arising historically, assistance to particular groups of users, problems in price discrimination and inability of other modes' charges to reflect costs. The extent to which support payments may merely subsidise inefficiency is outlined. A distinction is drawn between "productive" efficiency, i.e. The resources used to provide a specified level of service and fare, and "allocative" efficiency, i.e. The extent to which resources are allocated so as to maximise traffic, etc. The extent for reducing support yet retaining the present general level of service and fare is considered. Means of raising finance for support are outlined, including relative roles of central and local government. The scope of local taxes being raised to meet local objectives is considered, notably in the French "versement transport". In conclusion, it is suggested that trunk inter-city services should cover all costs from fares, by a discriminatory pricing policy, but central government provide a basic support level for rural areas. In urban areas, practical limits exist to price discrimination, and the best policy may be "collective purchase" of facilities through a local tax. /Author/TRRL/

White, PR (Polytechnic of Central London, England) *Transportation (Netherlands)* Vol. 7 No. 2, June 1978, pp 225-242, 3 Tab., 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 234509), Transportation (Netherlands);

ORDER FROM: ESL

43 183624 THE COSTING OF BUS SERVICES IN ADELAIDE. The paper describes a study conducted in Adelaide to develop a method of estimating the cost of bus services for planning studies. The study was in four sections. First a set of unit cost rates was established which related to the resources deployed within the bus system. Second, a method was produced to ascertain the level of each resource needed to operate any given future bus service. Third, the marginal costs of extra buses operating for different periods of the day were developed and fourth, the average costs of the existing bus routes were determined. The method planned to maintain up-to-date cost rates and resource estimates is also described. /Author/TRRL/

Atack, MJ (Travers Morgan (R) Proprietary Limited) Keal, PD Starrs, MM (South Australia Department of Transport) ; Director General of Transport, Western Australia, (0313-6655) 1978, pp 327-46, 3 Fig., 7 Tab.; Australian Transport Research Forum. Fourth Annual Meeting, May 24-26, 1978, Perth, Forum Papers.; ACKNOWLEDGMENT: TRRL (IRRD-234177), Australian Road Research Board

43 183626 COLLECTION OF SCHOOL CHILDREN [Le ramassage scolaire]. The collection of school children is carried out by road public transport services (96%) and by railway (3%). This article investigates the importance of school children collection, its financing (65% subsidized by the government; the remaining 35% is supplied by the communities and the children's families). Tariffs are discussed together with the safety of the children for which regulations are now being prepared. /TRRL/ [French]

Morineau, C *Transport Environment Circulation* Mar. 1977, pp 34-40, 4 Tab., 2 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-105337), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

43 184586 SOURCES OF NON-FEDERAL SUPPORT FOR PUBLIC TRANSPORTATION PROGRAMS IN NON-URBANIZED AREAS. The purpose of this study was to find out the extent to which states and localities are spending nonfederal funds in support of public transportation in non-urbanized areas. A survey was administered to state officials in transportation or highway departments, to social service agencies of the state whose budgets include significant funding for client transportation, to ascertain current and projected expenditures. This report presents the results of a survey of twenty-five states, estimating the extent of nonfederal support for public transportation programs in rural areas. The survey found \$36 million dollars of state funds, and three million dollars of substate funds supporting public transportation in these areas. Based upon these figures, it is estimated that at least \$78 million are spent annually from nonfederal sources, and that the trend in such funding is upward. Passage by Congress of operating assistance programs for rural areas would enlarge the figure. The principal focus of nonfederal funding is to match social service based budgets used to enhance mobility of the transportation dependent in nonurbanized areas. Two dollars of "special service" transporta-

tion money is spent at the state level for every one dollar of "general service" public transportation in nonurbanized areas. /UMTA/

Kidder, AE ; North Carolina Agricultural and Technical State U, (NC-11-0004) UMTA-MC-11-0004-78-2, June 1978, 120 p.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-284410

43 185781 A TECHNOLOGY ASSESSMENT OF TRANSPORTATION SYSTEM INVESTMENTS. An abstract technology assessment format, capable of generic evaluation over a hierarchy of city sizes, shapes and modal transportation technology characteristics, using unit cost and impact data is presented. The formal analytic model used is Markovian decision theory. The analyst is not required to know or explore the historical data characteristics of the region in depth and can, therefore, rapidly examine sensitivities and boundaries of rational or optimal transportation investments. This examination may occur over a group of similar or different regions, and may draw significant conclusions about the mix of transportation technology investments most likely needed and capable of compatible operation.

Haefner, LE ; Washington University, Seattle NASA-CR-152154-2, Mar. 1978, 206 p.; Grant NSG-2170; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N78-28989/9ST

43 185842 NEED FOR MORE FEDERAL LEADERSHIP IN ADMINISTERING NONURBANIZED AREA PUBLIC TRANSIT ACTIVITIES. In 1974 the Congress authorized \$500 million for transit assistance in nonurbanized areas (less than 50,000 population) during fiscal years 1975 through 1980. According to state and local officials, demand for these funds, which are administered by the Urban Mass Transportation Administration, has been low because federal financial assistance for operating expenses is not available for nonurbanized areas, a clear federal policy is lacking for such areas, federal grant application procedures are complex, and some small towns are unaware of the federal financial assistance. Legislation is pending for operating assistance, but the Transportation Administration should provide specific policies and procedures for public transit assistance in nonurbanized areas. Transportation should also evaluate grant application procedures to determine how they can be simplified, and should evaluate whether current information dissemination methods are adequate.

General Accounting Office CED-78-134, July 1978, 19 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-283074/3ST

43 186632 SUBSIDIES, CAPITAL FORMATION, AND TECHNOLOGICAL CHANGE: MASS TRANSIT. VOLUME 2. This volume is one of seven case studies. The tools of microeconomic analysis are applied to assess the responsiveness of both the supplier and the user of the subsidized product or service. Particular attention is given to the effects of the subsidies on capital formation and technological change, but general efficiency effects are also considered. Because the bulk of the stimulus to technological change in the transit industry represents a secondary impact, the main focus of the study is on the ways in which the subsidies affect the demand for inputs into the provision of transit service.

Charles River Associates, Incorporated, National Bureau of Standards, (NBS 7700066) Final Rpt. CRA-302.07, NBS-GCR-ETIP-78-41, July 1977, 196 p.; Also available in set of 8 reports PC E19, PB-285 287-SET.; Contract NBS-6-35744; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285289/5ST

43 186634 SUBSIDIES, CAPITAL FORMATION, AND TECHNOLOGICAL CHANGE: LOCAL AIR TRANSPORT. VOLUME 7. The air transport system--air carriers, airports and airways--receives federal financial assistance through several federal programs. The total amount of funding is not a subsidy, since taxes are collected from system users, primarily in the form of fuel or passenger taxes. However, the portion of the funding which exceeds the taxes paid by users is a subsidy since this portion of the funding could have been used for other purposes and provides benefits in kind to users of the air system. These subsidies can change output levels, which can affect aircraft stock levels and consequently the level and possibly the rate of capital investment. This in turn can affect technological change. This study addresses the distribution of this subsidy among air transport user groups (general aviation, trunk and local carriers), and its impact, if any, on technological change.

Charles River Associates, Incorporated, National Bureau of Standards, (NBS 7700066) Final Rpt. CRA-302.17, NBS-GCR-ETIP-78-46, Jan. 1978, 171 p.; Also available in set of 8 reports PC E19, PB-285 287-SET.; Contract NBS-6-35744; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285294/5ST

43 186635 SUBSIDIES CAPITAL FORMATION, AND TECHNOLOGICAL CHANGE: SUMMARY AND CONCLUSIONS. VOLUME 8. The report is one of a series of eight volumes prepared for the Experimental Technology Incentives Program, National Bureau of Standards. The first seven volumes are case studies of the microeconomic impacts of subsidy programs in the following industries or segments of an industry: local service air transport, maritime transport, nuclear power, mass transit, health facilities, technical publishing, and municipal wastewater treatment facilities. Emphasis is placed on the impact of subsidies on technological change. The eighth volume provides a summary and analysis of the impact of the subsidies in the seven industries, and gives conclusions with respect to the differential effects of subsidy programs with different structures and methods of administration. It also provides operational guidelines for managers respecting the implementation and evaluation of subsidy programs when capital formation and technological change are either explicit objectives or important results of the programs.

Charles River Associates, Incorporated, National Bureau of Standards, (NBS 7700066) Final Rpt. CRA-302.19, NBS-GCR-ETIP-78-47, May 1978, 114 p.; Also available in set of 8 reports PC E19, PB-285 287-SET.; Contract NBS-6-35744; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285295/2ST

43 189671 WHO PAYS THE FARES? THE TRANSPORT SUBSIDY LABYRINTH. This paper examines some of the more common forms

of transport subsidy and the objectives behind their existence. It is stated that subsidies appear to fulfil few of the objectives advanced to justify them. An alternative approach to the subsidy problem is presented. /TRRL/

Transportation Systems Center Monograph 1977, 8 p.; 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 228670)

43 190111 TIPS ON APPLYING FOR SECTION 147 FUNDING FOR RURAL PUBLIC TRANSPORTATION SYSTEMS. This document has been prepared to assist those agencies and individuals preparing proposals for funding through the Rural Highway Public Transportation Demonstration Program or Section 147 of the Federal-Aid Highway Act of 1973. The contents are not to be considered all-inclusive or confining; they are only to aid those less familiar with preparing transportation funding proposals. North Carolina Agricultural and Technical State U 1978, 25 p.; ACKNOWLEDGMENT:

43 191361 THE IMPACT OF BART ON LOCAL GOVERNMENT EXPENDITURES, REVENUES AND FINANCIAL POLICIES. The working paper presents an assessment of BART's impact on local government expenditures, revenues and financial policies in the Bay Area. The paper includes a comparison of financial trends in Bay Area cities with California cities in general and findings and conclusions on BART's impact on local tax rate decisions, local expenditures and revenues and the financing of local capital improvement projects. A preliminary discussion of local financial policy implications is included.

Giles, PB Graebner, LS Jonash, RS ; Metropolitan Transportation Commission, Booz-Allen and Hamilton, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP/WP-31-8-77, Dec. 1977, 84 p.; Prepared by Booz, Allen and Hamilton, Inc., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291956/1ST, DOTL NTIS

43 193622 THE FEASIBILITY OF STATE-LEVEL MULTI-MODAL TRANSPORTATION TRUST FUNDS. Recent experience has shown that the slowdown in the growth of motor fuel tax revenues and rapid inflation in transportation construction and operations have created a serious challenge for states. The multi-modal trust fund would provide a method for expanding the fiscal base for transportation finance while increasing the flexibility that transportation planners have in their short-and long-term decision-making. This study analyzes the question of multi-modal trust funds in some detail. It presents and discusses the methodology and results of a survey of State Departments of Transportation regarding their present financial position and policy stances on both the concept of a multi-modal trust fund and a variety of other State and Federal Proposals for revising transportation financing and planning methods. Based on the thirty-six responses, the concept of such a trust fund was viewed favorably, but the problems that it might raise and the political battles that such a plan would face made its enactment

in most states highly unlikely. The respondents' views expressed strong support for the continuation of the Highway Trust Fund, but also that (a) a rapid completion of the Interstate Highway System was not a very high priority in many states, (b) greater flexibility in the use of Federal transportation assistance was needed, and (c) a stable, dependable source of Federal mass transit assistance received a strong mandate. This report provides conclusions regarding possible future policy changes in the transportation finance area, and raises some questions that deserve further attention. /UMTA/

Crowell, W ; Polytechnic Institute of New York, (NY-11-0014) Final Rpt. UMTA-NY-11-0014-79-1, Nov. 1978, 34 p.; Sponsored by the Urban Mass Transportation Administration. This report provides a list of references and the Transportation Trust Fund Questionnaire forms.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-292396/9ST

43 195057 CAPITAL GRANTS AND RECURRENT SUBSIDIES: A DILEMMA IN AMERICAN TRANSPORTATION POLICY. Transportation policy in America distinguishes between capital expenditures and recurrent operating and maintenance costs. Federal policy and resources encourage capital-intensive projects, but traditionally have left to state and local governments the responsibility for maintaining and operating the facilities built with federal support. This has led to consistent underestimation of operating costs in the decision process leading to capital expenditures, and to overcapitalization of transportation networks. Today, faced with recurrent costs which strain local resources, there is pressure to broaden federal participation in operations and maintenance, and legislation is beginning to weaken the traditional distinctions between capital and recurrent expenditures.

Wachs, M (California University, Los Angeles) Ortner, J (California University, Irvine) *Transportation (Netherlands)* Vol. 8 No. 1, Mar. 1979, pp 3-19, Refs.; ACKNOWLEDGMENT: Transportation (Netherlands); ORDER FROM: ESL

43 196038 FINANCING BAY AREA TRANSIT, POLICY STUDY AND RECOMMENDATIONS. SUMMARY. The Bay Area's transit system is among the nation's most sophisticated and complex. Meeting its future large-scale financing needs will depend not only on concerted and coordinated funding efforts, but also on transit finance policies designed to make the best possible use of transit funds available to the region. Therefore, the Council's policy recommendations focus on the need to combine transit financing efforts with development of a regional transit finance policy designed to coordinate and plan all financial aspects of transit administration and operation. The Council has identified five essential elements of a regional transit finance policy, and has organized its recommendations accordingly. They are: planning for long-term needs, establishing criteria for effective allocations, improving transit productivity and efficiency, encouraging private-sector participation in transit, and expanding financial support for transit. /Author/

Bay Area Council, Incorporated Sept. 1975, 19 p., 3 Fig.

43 196040 PUBLIC TRANSPORTATION FINANCE BIBLIOGRAPHY. This bibliography lists books, journal articles, papers and reports dealing with local finance of public transit in nonurbanized areas. Besides material referring to transit finance in general, it lists material referring specifically to air, sea, ground and rail transportation.

Pun, CF Pun, CL ; North Carolina Agricultural and Technical State U, (NC-11-0004) Apr. 1977, n.p.; Prepared as a part of the Local Finance of Public Transit in Non-urbanized Areas Study for the Urban Mass Transportation Administration.

43 196045 FINANCING PUBLIC TRANSIT IN NEW YORK STATE. The problem of how to pay for transit services and who should cover these costs are questions of both equity and economic efficiency. In the framework of today's fiscal environment, it is no longer logical to only consider the direct benefits of transit accruing to users. The secondary benefits received by non-user groups, such as property owners and employers, must also be taken into account to achieve an appropriate allocation of the transit cost burden. This wider view enables broad-based tax sources to be seriously considered. In New York State, such issues may be pivotal in determining the future of transit finance. A workshop was held on September 20-22, 1976 in Albany, New York in an attempt to deal with these very difficult issues. This document summarizes the major points of interest from the many long hours of intense, frequently heated, discussion that occurred during that time. Summaries of the three workshop panels are followed by the four research papers presented at the workshop. /Author/

Polytechnic Institute of New York Sept. 1976, 62 p., Figs., Tabs., Refs., 2 App.; Workshop Report from the sessions held September 20-22, 1976 in the Albany Hyatt House, Albany, New York. Workshop organized by the Polytechnic Institute of New York and the New York State Department of Transportation, and sponsored by the Urban Mass Transportation Administration.

43 196047 TRANSPORTATION FUNDING: PRIVATE SECTOR VIEWPOINTS--PART 2. This is a report on the second part of a two-part ENO Foundation conference on funding of transportation systems. This second session was concerned with the viewpoints on transportation funding held by the private sector, representing the air, highway, rail, transit, and water modes. The funding needs and sources of funding for each mode were considered.

Traffic Quarterly Apr. 1978, pp 223-262, 3 Fig., 3 Tab. From the Joint Conference ENO Foundation Board of Directors and Board of Consultants, October 26 and 27, 1977.

43 196526 INVESTMENT PLANNING IN LONDON TRANSPORT USING NON-FINANCIAL DECISION CRITERIA PART 1 AND PART 2. This article is in two parts: Part I deals first with the requirements of the investment planning process in a corporate context, and then introduces the background and framework for London Transport's investment planning. Particular attention is given to the derivation of an appropriate corporate objective and decision criterion, the formal adoption of "maximising passenger miles subject to budget constraint" is

explained and justified. Part II deals specifically with the preparation of investment plans in London Transport, and illustrates the use of the "programme approach" by the case of station modernisation. Finally the presentation of the 10 year investment plan is described.

Quarmby, DA (London Transport Executive) *Journal of Enterprise Management* Vol. 1 No. 1-2, 1978, p 31, 5 Fig., 3 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-240888); ORDER FROM: Pergamon Press, Incorporated, Headington Hill Hall, Oxford OX3 0BW, England

43 196585 FINANCIAL ANALYSIS METHODOLOGY FOR REGIONAL RAPID TRANSIT SYSTEM DEVELOPMENT. ABRIDGMENT. In planning large-scale transportation improvement projects, local, state, and federal governments all insist that a major consideration be the establishment of the financial workability of the proposed project. The financial commitments involved in such projects extend over long periods of time and can potentially impose untenable financial burdens on a community. It is therefore imperative that the financial requirements be identified early in the planning process. This requires an analysis over time of capital costs, operating and maintenance costs, revenues, and funds from local, state, and federal sources. Through such an analysis, the financial impact of various design parameters and policies, such as fare structures and levels, can be identified and evaluated. The computerized financial model described in this paper was developed for the metropolitan Dade County transportation improvement program--stage 1: rapid transit system. The costs presented here are for stage 1 (alternative), a 34.5-km (21.5-mile) conventional rail system. The financial model is being used in planning for the Dade County combined bus-rail transit system. This financial (or cash-flow) model was developed and is being used to assist in the financial analysis of various design parameters and alternatives and in the evaluation of policy decisions. The model provides a yearly analysis of capital-cost and operating-cost expenditures, capital-funding and operating-funding sources, operating revenues, and other funding sources. It also calculates the annual net cash flow and determines the extent of additional funding required. /Author/

Fuller, RV Rutherford, GS Schimpeler, CC (Schimpeler-Corradino, Associates) Unger, VE (Georgia Institute of Technology) *Transportation Research Record* No. 680, 1978, pp 16-18, 1 Fig. This paper appeared in TRB Research Record No. 680, Transportation Finance and Charges, Programming, and Costs.; ORDER FROM: TRB Publications Off

43 196587 TRANSPORTATION PROGRAMMING IN TODAY'S RAPIDLY CHANGING FISCAL ENVIRONMENT. Because of decreasing rates of revenue growth, increasing inflation, and growing maintenance and operating costs, revenues for transportation are insufficient to satisfy public expectations. This paper summarizes a discussion of how several states are altering the programming process to meet changing financial conditions. Maryland is emphasizing smaller, less costly highway projects, designing for current rather than future service needs, and planning more projects than can currently be funded.

Texas, on the other hand, has embarked on an \$11.8 billion 20-year highway construction program. Pennsylvania, concerned over abandonment of railroad branch lines, is providing subsidies for commuter rail lines. To allocate limited resources for airport development, Illinois has instituted a systematic project-selection process. At the local level, the New York Metropolitan Transportation Authority is putting heavy reliance on federal-aid funds. Uncertainty in these funds causes a problem in programming. In an effort to hold local subsidies down, capital funds have been used for transit operations. /Author/ Reed, MF, Jr (Highway Users Federation) *Transportation Research Record* No. 680, 1978, pp 20-22; This paper appeared in TRB Research Record No. 680, Transportation Finance and Charges, Programming, and Costs.; ORDER FROM: TRB Publications Off

43 196976 IRCA/UTC CONGRESS. SECTION 1: INVESTMENT POLICY FOR TRANSPORT. ROUTE INVESTMENTS WITHIN THE SCOPE OF THE NATIONAL TRANSPORT POLICY AS ILLUSTRATED IN THE FEDERAL REPUBLIC OF GERMANY. The German Federal Republic has a Coordinated Investment Program for Federal Transport Routes Planning which requires that funding for through and local roads, waterways, local transport agencies and the German Federal Railway be examined simultaneously and in long term with consideration for not only primary benefits but also secondary effects on environment, energy consumption and labor. Competitive distortions between modes that can be reduced or intensified by route investments will also be considered. Effects on DB from implementation of this planning process are discussed.

Hausler, U *Rail International* No. 3, Mar. 1979, pp 223-253, 4 Fig.; Presented at the Twenty-second Session of the IRCA, IRCA/UTC Congress, Stockholm, 7-12 May 1979.; ORDER FROM: ESL

43 197330 SUMMARY OF CAPITAL AND OPERATIONS AND MAINTENANCE COST EXPERIENCE OF AUTOMATED GUIDEWAY TRANSIT SYSTEMS. This report presents, in summary form, the cost data developed from recent assessments of ten Automated Guideway Transit (AGT) systems conducted by the U.S. Department of Transportation, Transportation Systems Center, SRI International, and N. D. Lea and Associates, Inc. The AGT systems discussed are: (1) Morgantown People Mover, Morgantown, West Virginia; (2) AIRTRANS, Dallas-Fort Worth Airport, Texas; (3) JETRAIL, Love Field, Dallas, Texas; (4) Cabinlift, Ziegenhain Hospital, West Germany; (5) Passenger Shuttle, Tampa Airport, Florida; (6) Satellite Transit, Seattle-Tacoma Airport, Washington; (7) Tunnel Train, Houston Airport, Texas; (8) ACT, Fairlane Town Center, Dearborn, Michigan; (9) WEDway People Mover, Disney World, Florida; and (10) UMI Tourister, King's Dominion, Ashland, Virginia. Both Capital and Operations & Maintenance Costs have been examined in the context of each system's operational characteristics. Descriptive information on each system, together with a summary of performance measures, is also included. The report presents unit cost data and cost trends, and discusses the initial phase of an ongoing program to provide useful

information to cities and other public agencies, as well as private organizations considering or planning AGT installations. The report also compares certain cost data for AGT systems with summary cost information for conventional transit modes. However, it is pointed out in the report, that in consideration of the limitations of the data available and the scope of this analysis, these comparisons should be treated with caution.

Cooke, FAF Elms, CP McGean, TJ Merritt, HW Lea (ND) and Associates, Incorporated, Urban Mass Transportation Administration Summ Rpt. UMTA-IT-06-0157-78-2, June 1978, 76 p.; Contract DOT-UT-70023; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294306/6ST

43 197896 FINANCING URBAN TRANSPORTATION. PART 2. LOCAL STUDIES (A BIBLIOGRAPHY WITH ABSTRACTS). The financing of urban transportation in local areas is documented. Although these studies may be of interest to a number of metropolitan localities, they were originally prepared to study the fiscal planning of transit and travel systems for specific areas. Cities covered include Atlanta, New York City, Washington, D. C., Philadelphia, Houston, Baltimore, San Francisco, Minneapolis, Milwaukee, and many smaller localities. Among the systems involved are rapid transit rail, bus, shared taxicab, dial-a-bus, dial-a-ride, and subway. Some attention is given to metropolitan airports. (This updated bibliography contains 184 abstracts, 8 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Bibliog. May 1979, 193 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0424/6ST

43 260808 FEDERAL-AID FOR SURFACE TRANSPORTATION IN 1984. In this presentation of an ideal rather than a practical view, Federal aid for surface transportation in 1984 is seen to be set in an environment of a completed Interstate Highway System exclusive of a Federal Highway Trust Fund or Federal taxes on fuel. Simplicity and flexibility will be the basic characteristics of the program. The element of simplicity is the Federal funding for only two program categories, rural and urban, both of national significance. Flexibility is achieved by using federal general funds for both highway and public transportation within a Federal/State relationship allowing each state to administer the Federal transportation program in cooperation with its local governments. Six issues basic to such a program are set forth and discussed. (1) The Interstate Highway program, should be completed as rapidly as possible. (2) The Federal Highway Trust Fund should be abolished and the Federal tax on fuel eliminated. (3) The Federal aid for Highways and Federal aid for public transportation should be merged and funded from Federal general funds. General fund financing will provide congress with greater flexibility in determining national transportation priorities in relation to other national priorities. (4) It is suggested that the program include only 2 categories: rural transportation and urban transportation. (5) Federal funding should provide for meeting transportation needs of national significance only. Needs which may be considered to be of national significance are those which relate to both defense and interstate commerce, and to transportation

research and development. Resources of the national government should also be available in coping with major disasters affecting transportation facilities. A critical examination is urged of present transportation programs to see if they serve national goals. (6) The Federal Transportation Program should provide the administration flexibility to allow each state to develop appropriate state/local relationships.

Datel, RJ (California Department of Transportation) ; Western Association of State Highway & Transp Off June 1974, 14 pp; The report was presented at the Western Association of State Highway Officials meeting in Portland, Oregon on June 6, 1974.

43 261489 LEGAL ASPECTS OF FINANCING TRANSPORTATION: HIGHWAYS, MASS TRANSIT, MOTOR VEHICLE PARKING, RAILWAY AID, AIRPORTS, WATER TRAFFIC AND PORTS. The Senate and House Conference Committee decisions to recognize the interdependence of transportation modes is discussed, and the observation is made that the principle has been recognized by the Federal Government that funds developed from one mode of transportation may be utilized on a local option basis for another mode more suitable for that area. The flexibility of funding sources it is felt, is here to stay. Aspects such as automobile parking, capital costs for new rail systems, mass transit, airport facilities and water traffic are covered.

Zarin, MS *Urban Lawyer* Vol. 6 N Mar. 1974, pp 272-380

43 261518 URBAN TRANSPORT: STUDIES IN ECONOMIC POLICY, CHAPTER 10: SUBSIDIES FOR URBAN TRANSPORT.

This paper, first published in 1971, identifies four main areas of justification for subsidies macro-economic objectives, improving economic efficiency, the intent to benefit a particular section of the community, and finance for innovation. The author concentrates on the second and third of these areas. Studies by Fitch, et al, and Vickery are used to illustrate the need for analysis of propositions for subsidy in cost-benefit terms. The economics of scale suggested by the study of public transport in U.S. cities by Mayer, Kain and Wohl are questioned. Estimates of the gains from the restraint of private car travel suggest that any cost-benefit appraisal of public transport subsidies will be critically affected by congestion levels. Measures of elasticity and cross elasticity of demand for travel by public transport are also needed for these analyses. The way in which subsidies should be negotiated and controlled is discussed for competitive and monopolistic industries. Experience with British Rail suggests that the system of control can at best narrow the unintended consequences of specific grant-aided systems. /TRRL/

Beesley, ME ; Butterworth and Company, Limited 1973, pp 287-353, 6 Fig., 4 Tab., 49 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208988)

43 262345 A STUDY OF ALTERNATIVE MEANS OF FINANCING FUTURE TRANSPORT NEEDS OF THE MILWAUKEE URBAN AREA. An examination is made of sources of revenue for financing future transport needs with an emphasis on the needs of the Milwaukee area. Revenue sources are evaluated on the basis of four criteria: how much revenue is provided by

the source; how well the source encourages people to conserve transportation resources; how equitably the sources allocates burdens; and the extent to which the source provides demand signals for the adjustment of the scale of the transport system. The study concludes that: (1) at the federal level the most effective source of revenue is the funding provision of the Urban Mass Transit Act; (2) at the state level the two most effective revenue sources are increases in the excise tax on gasoline, increases in vehicle registration fees; and (3) at the local level in two most effective sources of revenue are a surcharge on all-day parking and an ad valorem tax on automobiles registered in the Milwaukee urban area. /UMTA/

Tucker, T Schenker, E ; Wisconsin University, Milwaukee, (WI-11-0003) UMTA-WI-11-0003-73-1, Nov. 1973, 56 pp; Grant DOT-UT-254; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-227246/AS

43 262358 EVOLVING FEDERAL ROLE IN TRANSIT PLANNING. Federal support for transit has increased significantly in recent years. Of even greater significance is the growth of the capital grant program, which for the fiscal year ending June 1973, is in excess of \$860 million. In 1972 UMTA issued guidelines intended to spell the criteria by which grant requests are evaluated. Three categories of urban areas are recognized: those with under 250,000 population those with 250,000-1,000,000 and those with more than 1,000,000 population. Transit investments are directed to objectives which relate to mobility for nondrivers, congestion and land use patterns, and environmental conditions. Effort is being made to relate comprehensive regional planning, including transit planning, to those capital projects for which assistance is requested. Major policy and system recommendations, together with supporting technical documentation is expected to emerge from the planning process. The observation is made that the planning process is not comprehensive and that it has been confined, for the most part, to highway planning. The meager influence wielded by elected officials and the lengthiness and costliness of the process is commented on. The background to UMTA's evolving participation in the planning process is reviewed. The important factors in structuring UMTA's study program policies in a comprehensive framework are outlined. Transit planning must be integrated into a region's comprehensive and transportation planning network. Transit planning must be supported on a continuing basis. The importance of cooperative arrangements is emphasized and FHWA and UMTA efforts which encourage cooperation in planning are reviewed.

Premo, JC *Highway Research Record* No. 475, 1973, pp 1-4

43 265208 A STUDY OF URBAN MASS TRANSPORTATION NEEDS AND FINANCING. The report evaluates portions of the 1972 National Transportation Report pertaining to urban mass transportation and addresses specific subjects which include the refinement of urban mass transportation needs and determination of system operating and maintenance cost, the development of a program to accomplish the needs

of each urban area for public mass transportation, the determination and comparison of fare structures of all urban mass transportation systems and their relationships to operating and maintenance costs, and the analysis of the financing capabilities of the Federal, State, and local governments for meeting urban mass transportation needs. Urban mass transportation needs as reported in the state long-range plans are expressed in terms of (1) capital investments from 1972 to 1990, (2) level of service in 1990, (3) projected system ridership in 1990, and (4) annual operating and maintenance costs and operating deficits in 1990. The development of a program to meet the needs is discussed, and the major findings of the analysis of the mid-range implementation programs (the 1980 programs) of the states and urban areas are presented. The planned capital outlay in rail per resident of urbanized areas served by rail is five times as large as the corresponding figure for bus over the period 1972 to 1992. Historical trends in fare structures and levels have been analyzed and the average fare nationwide of 34 cents is projected by the states to remain constant through 1990 in terms of 1971 constant dollars. Current state and local mass transportation financing programs are largely a mixture of direct appropriations from general funds often to provide support for transit system operating deficits; compensation for reduced fare programs; and a limited number of instances of special taxes. Two elements are proposed to meet the estimated financial mid-term (1980) program requirements of states and local governments: (1) on the Federal level, UTAP, and (2) state and local urban transportation financing programs based on farebox revenues and general revenues or specially designated taxes. Actions which could reduce the financial burden are discussed.

Peat, Marwick, Mitchell and Company, Office of Policy, Plans and International Affairs DOT/TPI/10-77/04, July 1974, 154 pp, Tabs., 1 App.

Report of the Secretary of Transportation to the United States Congress pursuant to Section 138(a), Public Law 93-87, The Federal-Aid Highway Act of 1973.; Contract DOT-OS-40064; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265242/8ST, DOTL NTIS

43 265209 FEDERAL TRANSIT SUBSIDIES. The experience is studied and reported of the Urban Mass Transportation Assistance Program. The demonstration projects listed in UMTA's Directory of Research, Development and Demonstration Projects are discussed in detail. The legislative background to the program is reviewed and its purpose and statutory authority are examined. In a discussion of research, development and demonstration grants, aspects of the bus program (management and operations bus priority, automatic vehicle monitoring, demand-responsive systems, bus technology, service development and improvement), rail program (management and operations, service improvements, tunneling and environment, technology, and rail car design), new systems program, and technical planning and evaluation are covered. The capital grant program is reviewed in detail (converting existing systems to public ownership; bus program; rail program, new rolling stock, new systems; loan programs). Criteria for investment are considered (new criteria are set forth in a document, "Capital Grants for Urban Mass Transportation: Information for applicants") as

well as estimated investments and technical study grants. Training programs for management personnel are discussed together with the program of grants to colleges and universities for research and education. An evaluation of the overall experience of the Assistance Program states that the program has not been successful. Comments are made on the decline of the transit industry, the financial performance of transit enterprises, the failure to develop viable alternatives to existing transport through the demonstration program and the increase of traffic congestion and pollutant output by rapid transit systems. Proposals which have been made for revision of the financial arrangements are reviewed.

Hilton, GW (California University, Los Angeles) American Enterprise Inst for Public Policy Res June 1974, 117 pp, 8 Tab., Refs.; The Urban Mass Transportation Assistance Program.

43 272059 FINANCING PUBLIC TRANSPORTATION. Programs of the Urban Mass Transportation Administration which have been authorized by legislation as well as actions taken during the session of Congress in 1972 are outlined, and the points at issue in managing UMTA programs are reviewed in a background statement. The principal objectives for UMTA programs that have emerged from consultation study with state and local authorities are stated. These objectives relate to reinvigoration of public transportation to provide service that will attract new riders; the provision of better general service and developing special services to provide greater mobility; and the promotion of transit as a positive force in influencing and supporting desired development patterns in urban areas and in improving environmental conditions. The directions are outlined which are currently being advocated for the capital grant and the research, development and demonstration programs (with respect to the operating subsidy issue) so that some judgements may be formed about how things are being sorted out. To ensure fair distribution of program resources, applications will be grouped by size categories. The existing priority for projects intended to prevent cessation of service will continue. In addition, for cities in the medium and large categories, priority will be given projects designed to effect traffic congestion in conjunction with the FHWA's TOPICS program. The aggressive posture for management of the research and development and demonstration program adopted by UMTA is discussed. The achievement of operational objectives associated with service improvements through an operational subsidy program is described. The relation between UMTA and state agencies is considered in a review of the role of the states.

McMamus, RH (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 30-38; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB Publications Off

43 272063 FINANCING PUBLIC TRANSPORTATION (INTRODUCTORY REMARKS). Mechanisms for implementing an operating expense subsidy are needed for the continued existence of urban transit systems.

Issues addressed in the papers presented here (on the subject of financing public transport) involve the question of whether the federal government should also be concerned in the operating expense and how deeply it should be involved. All authors recognize the fact that local governments are in a cost-revenue squeeze but the position is taken (by one) that it would be economically wise that transit financing should compete with all the other local needs. Specific topics discussed in the papers include management postures associated with federal programs and their delivery systems; role of state and local governments in setting standards, funding and administering a subsidy program; effect of subsidies on the bargaining process with labor; deficiencies in present subsidy efforts; interrelation of the service cost and the quantity and quality of the service; and public versus private ownership.

Fisher, RJ (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, p 30; Appeared in Issues in Public Transportation, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

43 272077 IMPLEMENTATION OF PUBLIC TRANSPORTATION SYSTEMS. Under the provisions of the acts of 1964 and 1970, UMTA assists in the development of improved urban transportation systems through programs of financial aid for capital grants, research, development and demonstration projects and technical studies. Capital improvement grants are made to public bodies providing up to two-thirds the cost of new transit systems and modernization of existing transit equipment and facilities. Studies, tests, and demonstrations of new ideas, methods, systems and equipment for improved transportation planning are included in research, development and demonstration projects. Technical Studies grants are made to public bodies providing two-thirds of the cost for long-range transportation planning studies, short-range development programs, preliminary engineering activities and special studies. The greatest impact on regional transportation planning has been achieved through the technical studies program. Activities funded under this program are briefly outlined. Inclusions of project planning activities (plan refinement and preliminary engineering) under the UMTA planning program provides a unique opportunity for carrying the program from initial planning through detailed design to implementation. Short-range planning activities provide for the creation of a 5-year transit development program. A 5-year implementation program is outlined which consists of transit improvements (bus and rail) within the urban area and provides for the integration of capital, noncapital, and operational improvements that are consistent with the long-range comprehensive and transportation planning activities. Priority has been given in this program to the creation of a trial program for improved inter modal planning. In keeping with this, UMTA insists on the development of coordinated transportation programs before funds may be provided for long-range transportation activities in the region, UMTA's policy of making single grants to a regional planning agency to cover all long-range transportation activities, is considered of importance in providing the cooperation necessary to achieve meaningful intermodal planning.

Ettinger, J (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* Proceeding No. 144, 1974, pp 112-113

Appeared in *Issues in Public Transportation*, proceedings of a conference held by the Highway Research Board at Henniker, New Hampshire, July 9-14, 1972; ORDER FROM: TRB

43 300357 COST SHARING FOR INTER-MUNICIPAL TRANSIT. The development and testing of a method of dividing transit deficits between several municipalities served by a single, integrated, subsidized system is described. The method was developed for a group of municipalities on the South Shore of Montreal, served by a publicly owned bus commission. The costs of the transit service were analyzed by using a formula which takes account of vehicle hours, vehicle miles and vehicles in service at the peak period. This permitted allocation of costs to each municipality. Fare revenue, other revenues and expenses, and the Provincial subsidy were then incorporated in the formula to determine the contribution of each municipality to the deficit. The contribution per passenger was higher for municipalities with heavier traffic peaks. In tests of the suitability of various formulae in terms of equity and efficiency, it was found that the formula most closely reflecting the true distribution of costs was both most likely to encourage higher efficiency and the most equitable in terms of allocating subsidies to municipalities with the highest average incomes. /Author/

Fortin, G ; Canadian Surface Transportation Administration Summ Rpt. TP 1832, Feb. 1979, 20 p., 5 Tab.

43 300695 COSTS OF RURAL PUBLIC TRANSPORTATION SERVICES. Typical costs for rural transportation operations and the factors that influence such costs are examined. Until now, few hard data have been available for the purpose of describing rural transportation costs. The data used in this research are taken from applications for funding and actual operations performed under Section 147 of the Federal-Aid Highway Act of 1973, the Rural Highway Public Transportation Demonstration Program. The following aspects of rural transportation costs are investigated: (a) general cost ranges and what constitutes average and "good" costs, (b) factors that affect the cost of operations, and (c) the characteristics of the most economical and most expensive hypothetical system designs. /Author/

Burkhardt, JE (Ecosometrics, Incorporated) *Transportation Research Record* No. 696, 1978, pp 27-31, 7 Tab., 12 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

43 300696 NONFEDERAL FUNDS FOR PUBLIC TRANSPORTATION: SPECIAL REFERENCE TO NONURBAN AREAS. From a sample of 25 states, it was observed that only 3 percent of the nonfederal funds for public transportation that serve the general public are expended in nonurban areas. Furthermore, the extent of support for public transportation in rural areas varies widely; the more affluent states are more likely to support programs for the nonurban sectors. Thus, the more wealthy sections are likely to benefit from a federal support

program that requires substantial local contributions. Far more important from a dollar standpoint is the social service agency nonfederal support, which in many rural areas is the only source of funds for transportation, albeit client-oriented mobility. Evidently the need for mobility support for disadvantaged groups is recognized by state and local groups. However, there has been little coordination among social service funds for public transportation by state governments; congressional action to provide stronger incentives for such coordination would be advantageous. /Author/

Kidder, AE (North Carolina Agricultural and Technical State U) *Transportation Research Record* No. 696, 1978, pp 31-34, 4 Tab., 2 Ref.

This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

43 300699 FUNDING, INSURANCE, AND REGULATION DEVELOPMENTS IN OREGON. This paper identifies funding, insurance, and regulation as the three major problems confronting rural public transportation in Oregon. Solutions to these problems on the state, federal, and local levels are suggested, along with future national possibilities for reducing insurance difficulties. /Author/

Moore, DH (Oregon Department of Transportation) *Transportation Research Record* No. 696, 1978, pp 41-43; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

43 300700 JOINT FUNDING AND DEPRECIATION, ABRIDGMENT. The problem of depreciation and the use of depreciation accounts involving public investments are discussed. Depreciation is typically used by private enterprise as the basis for taking into account two major factors: the capital replacement cost of plant and equipment as a cost of operation, and conversion of this capital cost into an annualized expense that reduces income and in turn lowers the amount of taxable income. The requirement for accounting for depreciation takes a different format in publicly owned transit systems. The use of a depreciation account in transportation operations operating under non-profit or public agency funded projects is also discussed. Federal regulations relating to depreciation, and the FMC 74-4 entitled Cost Principles Applicable to Grants and Contracts with State and Local Governments are discussed. The OMB Circulars A-102 (formerly FMC 74-7) and A-110 which address the issue of cost sharing implied by the practice of transportation coordination are also covered.

Revis, JS (Institute of Public Administration) *Transportation Research Record* No. 696, 1978, pp 43-46, 1 Ref.; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

43 300716 ENGLAND'S TRANSPORT POLICIES AND PROGRAM SYSTEMS. The responsibility for transportation in England is shared between the central government represented by the Department of Transportation (DTp) and local authorities, primarily the 46 county councils. The DTp is responsible for a number of national transport grants and subsidies, for railways, and for the construction and maintenance of the 10060-km interurban highway

network including most of the motorways. Most other inland transportation programs are the responsibility of the counties. In general, the counties are responsible for policy, coordination, and financial support, while operating agencies provide the services. The responsibilities of the counties are collectively called "local transport" and they come within the transport policies and program (TPP) system. The DTp's main responsibility for local transport lies in the allocation of resources to counties. Much local transport finance comes from the rates or the block grant. The transport supplementary grant (TSG) is an additional grant which is paid by the DTp to counties at the rate of 70% of their proposed marginal expenditure on local transport above a threshold. In order to enable the DTp to decide on TSG borrowing approval, each county submits a comprehensive document called Transport Policies and Programs (TPP). The objectives of this TPP System are listed. Developments within the transport sector which have led to policy making changes are discussed. The planning process in the TPP system is briefly outlined. The way in which the system helps DTp in the allocation of resources is also described.

Evans, A (Bristol University, England) *Transportation Research News* No. 83, July 1979, pp 11-13, 1 Phot.; ORDER FROM: TRB Publications Off

43 300743 A HYPOTHETICAL CASE: VALUE CAPTURE/JOINT DEVELOPMENT TECHNIQUES TO REDUCE THE PUBLIC COSTS OF PUBLIC IMPROVEMENTS. This article illustrates the use of value capture/joint development techniques by applying them to the hypothetical case of a city of 1,500,000 which must together with certain affected suburban areas and the state, set about devising a method of raising the \$120,000,000 local share of the costs for a proposed fifteen-mile fixed-guideway rapid transit system. Among the considerations addressed are: the choice of government agency to run the system and the legal problems associated with acquiring land for transit stations and leasing to the private sector that portion of the land not needed for current operations.

Callies, DL *Urban Law Annual* Vol. 16 1979, pp 155-192; Reprinted from the Urban Law Annual, Volume 16 (1979).

43 301073 POTENTIAL FOR MULTIMODAL TRANSPORTATION TRUST FUNDS ON THE STATE LEVEL: A RECENT SURVEY. This paper presents the results of a recent study of the feasibility of multimodal transportation trust funds on the state level. Recent experience has shown that the slowdown in the growth of motor fuel tax revenues and rapid inflation in transportation construction and operations have created a serious challenge for states. The multimodal trust fund would provide a method that expands the fiscal base for transportation finance while it increases the flexibility for transportation planners in their short-and long-term decision making. The transportation departments of all 50 states were asked to respond to a survey of their present financial positions and policy stances on both the concept of a multimodal trust fund and a variety of other state and federal proposals for revising transportation financing and planning methods. Based on the 36 responses received at

the time this article was written, the concept of such a trust fund is viewed favorably, but the problems that it might raise and the political battles that such a plan would face make its enactment in most states highly unlikely. The respondents expressed strong support for the continuation of the Highway Trust Fund and noted that (a) rapid completion of the Interstate highway system is not a very high priority in many states and (b) greater flexibility in the use of federal transportation assistance is needed. The respondents gave a strong mandate to the need for a stable, dependable source of federal mass transit assistance. /Author/

Crowell, WH (Polytechnic Institute of New York) *Transportation Research Record* No. 698, 1979, pp 29-34, 4 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 698, Priority Programming, Finance, and Highway Investment Analysis.; ORDER FROM: TRB Publications Off

43 301274 TRANSPORTATION ECONOMIC ANALYSIS. The book is separated into six parts, each part appears a selected set of references pertaining to both classic and recent publications germane to the material in the preceding chapters. The remainder of Part I consists of eight chapters that discuss the economic analysis tools necessary for students as a basis for approaching problems and issues of transportation economics. Too often students either find themselves bored with review sessions on economic theory or discover that their prior training in economics has been inadequate (or both). To help alleviate some of these concerns, Part I is designed to provide an improved foundation for the student with a solid two-semester economic principles background (also including differential calculus). It also presents some new perspectives of the application of economic analyses to transportation for the more advanced student. Part II is a discussion of the major transportation industries in the United States. As indicated in the preface, the emphasis is on the structures of the motor trucking, railroad, and airline industries. The material in this part is intended to provide the reader with a sufficient understanding of the institutional (and particularly contemporary) features of the major transportation industries. Part III focuses on problems of urban transportation economics. No attempt is made in this part to discuss the wide body of material available in the general field of urban transportation. A tremendous amount of research has been conducted in the area of urban transportation, but mostly in the fields of urban and city planning, civil engineering, and regional science. The only attempt in this part is to synthesize the significant contributions that may be classified "urban transportation economics." In Part IV three chapters appear on intercity passenger transportation. Even though private automobile travel constitutes a large number of intercity trips, few data sets exist for examining the characteristics of this important segment of transportation. The emphasis then in this part is on intercity railroad and airline passenger service. In Part V is a series of chapters that discuss selected economic issues in commodity and freight transportation. Due to the general lack of empirical information on urban goods movements, most of the emphasis in this section is on the intercity and regional aspects of freight shipments. With an increasing significance at-

tached to the energy-related features of freight transportation, the material in this part deserves renewed and special attention. The final section of the book, Part VI, contains a set of interdependent analyses of selected topics in transportation economics. The principal intention of this part is to indicate certain areas of transportation in which statistical and econometric methods can be applied.

Kneafsey, JT (Massachusetts Institute of Technology) ; Heath Lexington Books, (0-669-93211-6) 1975, 448 p., Figs., Tabs., Apps.

43 301871 THE CONSERVATION SOCIETY. REVENUE SUPPORT FOR RURAL BUS SERVICES. The author gives the background to rural bus services and the decline in their patronage. The latter is attributed (1) to the 1972 local government act whereby county councils were given the duty to control and develop their local public transport system within the county and (2) to a declining in coverage due to a reduction in the number of local facilities and increasing centralization. According to a survey carried out in two areas of Norfolk in 1975, rural families spend approximately one-third the amount on local bus travel that urban ones do and make one-ninth the number of trips (the average trip length being considerably greater). Mention is made of innovative schemes (minibus, car sharing, post buses, bus clubs). It is suggested that policies should be improved in two respects: more real work should be put into thoroughly understanding and developing rural public transport and there is a need for increasing revenue support for operators. /TRRL/

Harman, R ; Conservation Society Monograph 1978/TWP4, 1978, 7 p.; ACKNOWLEDGMENT: TRRL (IRRD 241464)

43 302174 COST-REVENUE SQUEEZE IN AMERICAN PUBLIC TRANSIT. A review is presented of the history of financial difficulties in the transit industry and finds that they are not of recent vintage, nor are they simply attributable to the increasing popularity of the automobile. Case studies of four large transit operators are employed to illustrate recent patterns of cost escalation, effectiveness, and efficiency in public transportation. Broad conclusions are drawn regarding potential areas for improvement in transit subsidy policy.

Ortner, J (California University, Irvine) Wachs, M *Journal of the American Planning Association* Vol. 45 No. 1, Jan. 1979, pp 10-21, 24 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

43 302270 IMPACTS OF TRANSIT SUBSIDIES ON MODAL EFFICIENCY. This research examines the effects of Federal transportation programs on small urban areas. The research analyzed the impacts of financing procedures and constraints on the transportation systems of small urban areas. Examined the effectiveness of public transportation planning, and developed an allocation procedure for state transit assistance programs. A case study methodology was employed. Three cities (small-to-medium sized areas) in the state of Iowa were selected, namely: Cedar Rapids, Davenport, and Iowa City. To investigate the impacts of Federal transit subsidies on transit patronage through effects on fares, a comprehensive comparative

framework was designed that placed transit in context with its primary competition, the automobile. This framework makes an analogy between the urban passenger transportation system and a private enterprise, thus using this analogy to define costs and prices in a consistent manner. Some of the conclusions reported herein are: 1) Elimination of transit subsidies would have a large percentage impact on transit ridership but small impact on total travel, because of the relative dominance of the private auto for passenger transport; 2) Further increases in transit subsidy are likely to have only miniscule impacts on aggregate travel patterns and modal balance; and 3) Elimination of the highway subsidy would result in very large percentage increases in transit usage as well as significant reductions in vehicle miles of auto travel. There is little reason to believe that any other policy will have significant aggregate effects on modal efficiency.

Lee, DB, Jr ; Iowa University, Urban Mass Transportation Administration, (FR 20) Final Rpt. UMTA-IA-11-0001-79-1, Oct. 1978, 105 p.; IA-11-0001 ORDER FROM: NTIS; PB-300416

43 302273 AN ASSESSMENT OF INSTITUTIONAL BARRIERS WHICH PROHIBIT PARTICIPATION AND THE PROJECTED COST ASSISTANCE NECESSARY TO PROVIDE EQUAL OPPORTUNITY TO COMPETITIVE AND NEGOTIATED CONTRACTS IN UMTA FEDERALLY ASSISTED PROJECTS. This report provides an assessment of and recommendations for the removal of barriers to Minority Business Enterprise (MBE) participation in transit construction. Institutional barriers to MBE participation were reviewed in seven cities/sites (Houston, Albuquerque, Cleveland, Chicago, Detroit, Los Angeles, and Pueblo Test Center), and assistance mechanisms were identified and assessed in terms of their effectiveness in providing MBE access to transit construction projects. In addition, the report outlines a goal setting process that UMTA can apply to construction oriented projects. The research effort identified nine overt barriers that all MBEs are confronted with in the day-to-day operation of their businesses, namely: Management Capability; Knowledge of and Aspects of Financing; Access to Industry; Estimating Costs; Marketing Strategy; Access to all Markets/Mobility; Size of Dollar Volume; Access to Bonding; and Procurement Process. Access to the heavy construction industry was perceived as the most crucial barrier by MBEs, majority contractors, assistance mechanisms (Contractor Assistance Organizations), and financial institutions. Data collection techniques included on-site surveys, interviews, inspection tours, printed materials, and follow-up interviews. The author recommends the establishment of a Demonstration MBE Construction Unit as an UMTA-funded assistance mechanism which will have the responsibility of fully utilizing all of the administrative and programmatic tools available within UMTA, to achieve a goal of twelve percent of the transit construction award dollars on an annual basis. (UMTA)

TRAVENCA Development Corporation, Urban Mass Transportation Administration, (DC-06-0218) Final Rpt. UMTA-DC-06-0218-79-1, Mar. 1979, 103 p.; Appendixes herein are: TRAVENCA Focus Group Moderator's Topic Guide; Representative Sample of Data Collected

on Barriers; Analysis of Court Actions; Barrier #9-Procurement Process; Identification of Assistance Mechanisms; Bibliography; and Secondary Reference Materials Reviewed.; Contract DOT-UT-80026; ORDER FROM: NTIS; PB-300354

43 302335 INVESTMENT PLANNING AND CHECKS INTO RESULTS FOR SHORT DISTANCE PASSENGER TRAFFIC [Investition-splanung und Erfolgskontrolle im Personennahverkehr]. Since 1970 cost-benefit analyses have been carried out in Federal Germany to ensure that credit granted for transport in local communities is used properly. A standard method is to be used but it has some weak points and the article makes appropriate suggestions as to how to overcome these. Taking the example of the Munich and Stuttgart metropolitan railways, the authors show all the factors that should be taken into account in assessing all indirect costs and benefits. [German]

Willeke, R Zebisch, K-D *Zeitschrift fuer Verkehrswissenschaft* Vol. 50 No. 2, 1979, pp 71-97, 11 Tab.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Hellendoorn (A) Verlag, Stettiner Strasse 1, Postfach 78, 4442 Bentheim, West Germany

43 302570 THE SNCB AND INVESTMENTS IN TRANSPORT. A detailed theoretical study, based on recent statistics, is made of the situation in Belgium. Many of the aspects discussed are of a general character and have a wider application. Firstly there is a need for an overall view of transport infrastructure making it possible to assess the capabilities of each transport mode, forecast future demands and estimate the potential for meeting these demands. The infrastructure charges should be allocated to the users of each mode in order to judge their socio-economic benefits, their cost effectiveness and equalise conditions of competition between modes. The author concludes that where large national options are concerned, the final choice of investments are political. Political choices cannot be completely incorporated in cost-benefit studies. However, choice can be improved by classifying projects in degrees of socio-economic utility. It is considered essential that all investment projects are instigated and managed by a single state body. (TRRL)

Dems, RF *Rail International* No. 4, Apr. 1979, pp 345-349, 8 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 241696)

43 302929 TRANSPORT POLICIES AND PROGRAMME SUBMISSIONS FOR THE 1980/81 TSG SETTLEMENT. This circular describes the arrangements for the Transport Supplementary Grant (TSG) with reference to the government policy for transport since the publication of the white paper (CMMD 6836). Counties, who were given general guidance, formed their own views on the appropriate level of expenditure. Advice is given on the bus and underground programmes, also local British rail services. The use of market analysis to review fares and services is discussed. Bus priorities and staggered working hours are considered. Proposals involving new rail investment require discussions with the railway board and regional offices. Environmental aspects of local roads and traffic

management are discussed. Better facilities should be provided for cyclists wherever possible. Advice is given on policies affecting the operation of car parking facilities. Freight transport is mentioned, emphasising the environmental advantages of rail carriage, and road safety is discussed. An index for the appropriate parts of the earlier circular is included in an annex. /TRRL/

Her Majesty's Stationery Office Monograph Circular 4/79, Jan. 1979, 15 p.; Published for the Department of Transport, England.; ACKNOWLEDGMENT: TRRL (IRRD 241846)

43 303941 FORECASTING EXPERIMENTS FOR RURAL TRANSIT POLICYMAKERS (ABRIDGMENT). The paper addresses problems faced by transit managers and funding agencies. Such problems have been identified through the interaction of state and federal officials and during a review of rural transit systems in northern New England performed during the first part of 1978. Some of the first problems that transit managers face are in the initial application for funding and making plans based on socioeconomic and demographic characteristics of the service area. These problems are further complicated by the urgency with which funding agencies expect to see results in order to decide about funding continuation and budget approval, which ultimately results in system delay. The magnitude of this overall system delay depends on four individual delays, each of which is from four months to one year long. These delays have been identified during work on case studies of rural transit systems in northern New England: vehicle acquisition delay, schedule change delay, subsidy award delay, and ridership information delay. A simulation technique is used in the analysis of the effects of different policies on the development of a rural transit system. Results of policy experiments agree with the observed behavior of rural transit systems in northern New England. The technique is useful primarily as a quick turnaround policy-analysis tool. The technique has potential applications for policy analysis at two levels—the managerial level to help in project planning and operation and the fund allocation level to help in decisions about funding approval, funding allocation, and funding renewal.

Stephanedes, YJ (Minnesota University, Minneapolis) Adler, TJ (Dartmouth College) *Transportation Research Record* No. 718, 1979, pp 42-44, 2 Fig., 5 Ref.; This paper appeared in TRB Research Record No. 718, Bus and Rural Transit.; ORDER FROM: TRB Publications Off

43 303947 OPERATING ASSISTANCE FOR PUBLIC TRANSPORT SYSTEMS: A SURVEY OF STATE-LEVEL PROGRAMS. A survey of several state-level programs of operating assistance for public transportation systems was undertaken early in 1978 by the New York State Department of Transportation as part of its annual evaluation of the impact and effectiveness of its statewide aid program. Only three states did not respond, but they were subsequently determined not to have such programs. This paper describes existing programs in terms of eligible operations, local sponsorship, relationship to Urban Mass Transportation Administration funding programs, ability to use funds for capital purposes, sources of program funds, and the

scope of services assisted. Finally, it proposes a more in-depth review of the effectiveness of the programs designed to aid in policy development and implementation at both the state and the federal levels.

Politano, MR (Northern Virginia Transportation Commission) Keck, CA (New York State Department of Transportation) *Transportation Research Record* No. 719, 1979, pp 21-25, 1 Tab., 4 Ref.; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

43 304766 USAGE OF REVENUE SHARING FOR PUBLIC TRANSPORTATION IN RURAL AREAS. The purpose of the current study is to explore whether rural towns and counties use portions of their revenue sharing monies in support of public transit operations, or other forms of public transportation such as road construction and maintenance in contrast to public transit. This topic is of interest because the current demonstrations of public transportation programs in rural areas are supported principally out of federal demonstration funds of the U.S. Department of Transportation, Federal Highway Administration, and face the possibility of funding termination unless sufficient local financial support is forthcoming. The topic is additionally relevant to discussions of the impact of new legislation making broader federal assistance available to public transportation in nonurbanized areas. The latter funds are dependent upon the availability of local matching funds to undergird federally supported programs.

Kidder, AE ; North Carolina Agricultural and Technical State U, Department of Transportation, Department of Agriculture Final Rpt. DOT/I-79/3, July 1979, 31 p.; Sponsored in part by Department of Agriculture, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-107139

43 305231 PRIORITY PROGRAMMING, FINANCE, AND HIGHWAY INVESTMENT ANALYSIS. Contents: Application of the highway investment analysis package; New York State's approach to highway jurisdictional realignment; Subarea diagnostic and evaluative procedures for programming short-range transportation improvements; Priority programming for highway reconstruction; Determination of priorities for incremental development of the MARTA system; and Potential for multimodal transportation trust funds on the state level—a recent survey.

Batchelder, JH Lange, R Rodes, T Neumann, L Schneider, NR ; Transportation Research Board, Washington, DC. TRB/TRR-698, 1979, 41p; Library of Congress catalog card no. 79-18285. Microfiche copies only. Paper copy available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418, PCS3.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299900/IST

43 305351 ANALYSIS OF THE ALLOCATION FORMULA FOR FEDERAL MASS TRANSIT SUBSIDIES. The Federal Government grants funds to urban areas to subsidize mass transit operating expenses. These funds are allocated among areas on the basis of a congressionally determined formula. This report devel-

ops criteria by which alternative factors that might be included in such a formula can be evaluated and then evaluates many potential factors according to these criteria. GAO suggests one possible formula that satisfies these criteria reasonably well. GAO also discusses the influence of the structure of the subsidy program on the extent to which transit service is financed through farebox revenues.

General Accounting Office Cong Rpt. PAD-79-47, Oct. 1979, 82 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300968/5ST

43 305765 INNOVATIVE TRANSIT FINANCING. The report describes a number of methods of exploiting development opportunities around transit stations. Twelve techniques are discussed in the report: incentive zoning, special district zoning, dedications and exactions, official maps, dedicated property taxes, tax increment financing, special benefit assessments, service charges, selling or leasing air rights, leasing or selling supplemental property, developing air rights/supplemental property, and participation in property development. The report evaluates these specific financing techniques in terms of revenue yield, institutional feasibility and promise for application to the transit field. The analysis concluded that a combination of these innovative financing techniques could defray from five to fifteen percent of the capital costs associated with fixed guideway facilities. The most promising techniques typically involve joint development, the concept of value capture, and private investment on land around transit facilities.

Paulhus, N Yu, J Witherspoon, R Arnold, H ; Office of the Secretary of Transportation Final Rpt. DOT-I-79-10, Feb. 1979, 69p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-125537

43 308632 PUBLIC TRANSPORT PLANS (3)-LAYING COSTS 'ON THE LINE'. This article considers the restraints under which local authorities operate in the promotion of local rail passenger services, including the overall control exerted by central government on local authority expenditure. A summary is presented of the investment made by Durham County Council in local rail and bus transport. Reference is made to the difficulties of financing cross-boundary local rail services and the existence of similar inter-regional problems in France is noted. Details are given of the improvements made to the Darlington to Bishop Auckland branch line, particularly to the new station at Newton Aycliffe New Town. Feasibility studies are to be carried out for the restoration of passenger services between Newcastle and Consett and for siting stations along the route. The initial and running costs of such a project are considered. For articles 1, 2 and 4 in this series TRIS Nos 308630-1 & 308633. (TRRL)

Hamilton, TD Johnson, WB *Surveyor - Public Authority Technology* Vol. 154 No. 4553, Sept. 1979, pp 33-36, 1 Fig., 2 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244159)

43 308843 FINANCING TRANSIT-ALTERNATIVES FOR LOCAL GOVERNMENT. The theme of this book is how to think about transit financing. The most crucial question, at least for the largest cities, is whether to invest in new rail

transit systems, which not only cost unpredictably large amounts but also disrupt communities physically and politically while under construction. A second major consideration, which confronts all cities, is whether transit should be regarded as a consumer good like other utility services--to be paid for primarily by charges--or a public good--to be paid for by taxes. It is concluded that the financial pressures on transit agencies and services can be expected to continue and increase, regardless of the looming energy crisis. The principal resource still available to transit is greater financial and operating efficiency, which entails an increase in the quantity and quality of services rendered with a less than proportionate increase in real costs. Achieving efficiency is quite uncommon largely because transit regulation historically has concentrated on preserving existing schedules and fare structures, and on the overall financial condition of transit properties, rather than on developmental objectives and service improvements. Modern transit management, on the other hand, must continually scrutinize patronage and costs of each segment of transit service with the requirement that each segment justify itself by a favorable ratio of benefits and costs.

Institute of Public Administration, Urban Mass Transportation Administration, Department of Transportation Final Rpt. DOT-I-79-16, July 1979, 331 p., Figs., Tabs., Apps.; ORDER FROM: NTIS; PB80-129331

43 309026 TRANSIT ASSISTANCE ALLOCATION. Providing public transit operating assistance is a recently acquired function in many states in the United States. Little standardization in disbursement criteria exists, and the criteria used often have serious drawbacks. These drawbacks, both conceptual and practical, are examined and an alternative allocation procedure is suggested which considers large urban, small urban, and rural or regional transit systems separately. Within each of these categories, efficiency and need are balanced in allocating available funds to individual properties. The suggested procedure is applied to data from the state of Iowa, and the potential for its implementation in other states is assessed. (TRRL)

Forkenbrock, DJ Dueker, KJ (Iowa State University, Ames) *Transportation Research. Part A: General* Vol. 13A No. 5, Oct. 1979, pp 317-327, 7 Tab., 8 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244297); ORDER FROM:

43 309781 FINANCING: SUBSIDISATION OF URBAN PUBLIC TRANSPORT. Details are given of the ECMT Subsidisation Study conducted to investigate the current situation regarding subsidies and concessionary travel arrangements in member countries of ECMT, to compare objectives and practices, and to examine the likely effects of subsidies on the main factors affecting travel. Types of subsidy are classified into 2 categories: capital and operating. An analysis is presented of the objectives of subsidies: creation of a better and safer environment by achieving a modal split more favourable to public transport, creation of a more efficient, less costly and energy-saving solution to urban transport, preservation of existing form of towns, best use of existing public transport and services, maintenance of a viable public transport service for all

users, fulfilment of specific transport needs, prevention of a sense of "unfairness" felt by captive users. One part of the report is concerned mainly with how subsidies are raised and trends in subsidies. The remainder deals with the relation between subsidies and costs, fares, services, patronage and subsidy, trends in productivity, method of investigating the effect of subsidy, effect of subsidy on fares, service and patronage, effect of subsidy on productivity (e.g. indices of cost, effect on wages, indices of output per employee, (size of labour force). (TRRL)

Webster, FV Bly, PH (Transport and Road Research Laboratory) ; Organization for Economic Cooperation and Devel 1979, pp 169-220, 9 Fig., 9 Tab., 7 Ref.; Seminar on Urban Transport and the Environment, 10-12 July 1979; ACKNOWLEDGMENT: TRRL (IRRD 244718)

43 311182 TRANSIT OPERATING SUBSIDIES. This report summarizes relevant parts of the data by ITE Committee 6F7 and suggests appropriate conclusions regarding the state of the art of urban transit system financing in industrialized nations.

ITE Journal Vol. 49 No. 10, Oct. 1979, pp 40-48, 13 Ref. ACKNOWLEDGMENT: EI; ORDER FROM: ESL

43 311216 A TRAFFIC ENGINEER'S PERSPECTIVE ON FEDERAL TRANSPORTATION FUNDING PROGRAMS FOR URBAN AREAS. The perspective of the local traffic engineer is presented in terms of an assessment of federal urban transportation funding programs. This provides a viewpoint on how some cities have responded or are reacting to federal programs. Programs in Gainesville, Florida, are used as illustrations. (Author)

Burns, H (Traffic Engineering Department, Florida) *Transportation Research Board Special Report* No. 187, 1980, pp 42-43; This paper appeared in TRB Special Report 187, Transportation Planning for Small and Medium-Sized Communities, Proceedings of a Workshop sponsored by UMTA and FHWA, conducted by TRB, Sarasota, Florida, 3-6 December 1978.; ORDER FROM: TRB Publications Off

43 311376 TRANSPORT PRICING AND COST RECOVERY SEMINAR, CANBERRA, 17- 18 JULY 1979. PAPERS AND PROCEEDINGS. The seminar was conducted by the Commonwealth Department of Transport at the request of the CoOrdinating and General Transport Group of the Australian Transport Advisory Council. Papers presented include the following: 1) Comments on cost recovery (Hicks, SK, Stevenson, DG and Vance, JA); 2) Effect of pricing on operating budgets: deficits and cash flows (Pascoe, W); 3) Cost recovery in urban public transport (Scrafton, D and Starrs, M); 4) Efficient resource allocation: theory and practice in the transport industries (Kilsen, HM); 5) Pricing principles and cost recovery in transport (Mills, A); 6) Full cost recovery in one sector: Implications for users, workers, governments and managements (Joy, S); 7) Queensland. Department of transport-Direct and indirect (implied) subsidies in urban passenger transport; 8) Australia. Department of Transport Pricing and cost-recovery in transport-An overview drawing on seminar documents; 9) Australia. Bureau of

Transport economics-Transport pricing and cost recovery- The main issues.

Australian Road Research Board Monograph Nov. 1979, 265 p., Figs., Tabs., Refs.; Transport Pricing and Cost Recovery Seminar Canberra, 17-18 July, 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239604), Australian Road Research Board

43 312029 URBAN PUBLIC TRANSIT SUBSIDY LEVELS AND EFFECTS. The relationship between urban transit subsidy and other variables determining the transit system is explored in this report. Descriptive trends in subsidies, levels of service and productivity over several city population categories are discussed and outlined in graphical form for the period 1966 to 1976 in Canada. A number of selected case studies of Canadian urban transit operations are reviewed in some detail and the main conclusions arising out of the international and Canadian case study analyses are presented. (TRRL)

Transport Canada Research and Development Centre, Tee Consulting Services, Incorporated Monograph Mar. 1979, 103p, 18 Fig., 16 Tab., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 245448), Roads and Transportation Association of Canada

43 312260 EFFECTS OF FEDERAL TRANSPORTATION FUNDING POLICIES AND STRUCTURES: OVERVIEW. Several recent policy developments in highways, airports and transit were analyzed in this study of the effects of federal funding policies and structures on transportation investment. Six discrete transportation analyses (Mass transit; highway matching requirement and funding levels, preliminary model; statistical analysis of the impact of federal highway and on state allocation decisions; Appalachian Development Highway System; Analysis of State highway projects by federal aid system and type of work; airport development aid program) were performed and the resulting conclusions were used to suggest basic principles which were investigated through interviews. This overview report sets forth the implications of manipulations of matching ratios, allocation mechanisms, and categorical restrictions in federal aid programs. Recommendations regarding the specification of these funding structures are cast as a function of funding intent. The four intent categories used are: compelling national interest; regional development; aim of motivating the recipient to expand more of his own funds on the program; and provision of financial relief on this program to the recipient. This overview paper also reports on interviews with transportation professionals. The perceived effects of the 1978 Surface Transportation Act as regards funding parameters are noted and recommendations are made.

Porter, AL Park, CY Rees, LP Connolly, T Rao, S Larson, TD ; Georgia Institute of Technology, Pennsylvania State University, University Park, Department of Transportation Final Rpt. DOT-P-10-80-10, Dec. 1979, 86p, 8 Fig., 8 Tab., Apps.; Contract DOT-OS-70036; ORDER FROM: NTIS; PB80-197536

43 312262 FARE BOX AND PUBLIC REVENUE: HOW TO FINANCE PUBLIC TRANSPORTATION. To be effective, governmental funds for public transit services must be based on

sound approaches for providing and distributing subsidies. This report provides a review of the impacts of current capital and operating grants programs. Recommendations are made for a combination of provider-side subsidies and user-side subsidies. This funding option would emphasize the strengths of both subsidies, that is, funding to transportation providers as well as direct assistance to individual users who are able to choose among competing providers. Based on rider surveys in four Texas cities, a reassessment of fare reductions for specific population segments is warranted, with fare subsidies geared more specifically to local opinion and local population characteristics. A differential fare structure was found to be acceptable to current transit patrons, based on market segments, type of transit service, and other features. These options for a discriminatory fare structure suggest that minor fare alternations would prove beneficial to local systems.

Billingsley, RS ; Texas Transportation Institute, Texas State Department of Highways & Public Transp, (Tech Rpt. 1057-1F) Final Rpt. UMTATX-79-10571, Feb. 1980, 78 p., Figs., 20 Tab., 22 Ref., 1 App.; This study was conducted in cooperation with the Urban Mass Transportation Administration.; Contract Stdy No. 210-78-1057

43 313229 ALLOCATING FUNDS UNDER THE CALIFORNIA TRANSPORTATION DEVELOPMENT ACT. The Transportation Development Act (TDA) establishes a local transportation fund from sales tax money returned to the county of source. The fund is controlled by the designating Regional Transportation Planning Agency (RTPA) which determines the accounts for 'off the top' expenses as well as amounts designated for public transportation service. This report deals with an analysis of the fund distribution process under the California TDA. The report discusses an analysis of the fund flow process to the Regional Transportation Planning Agencies (RTPAs), lists the State suballocation requirements in greater detail, and a survey report on regional suballocation of TDA monies to transit properties concludes the study. The purpose of this study is to show how transit money is distributed in California particularly as related to transit performance, what was intended by the legislation, and what were some of the results to date.

Conant, JD McDonnell, J ; California Department of Transportation, Urban Mass Transportation Administration Intrm Rpt. UMTA-CA-09-8003-80-1, Nov. 1979, 74p; Contract DOT-UMTA-CA-09-8003; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-150121

43 314395 A MODEL FOR MEASURING THE IMPACT OF SUBSIDIES ON MASS TRANSIT EFFICIENCY. The paper develops a theory for the relationship between subsidy and efficiency in mass transportation. Wage per vehicle hour is used as a representative efficiency measure. A theory for the evolution of efficiency levels in transit organizations is developed, and the theory is used to identify the differences in efficiency that could occur between systems identical in every way except for the proportions of their revenues which come from fares and subsidies.

Barnum, DT Gleason, JM ;

Nebraska University, Omaha, Urban Mass Transportation Administration Spec Rpt. UMTA-NE-11-0002-S, May 1980, 20p; Prepared in cooperation with Indiana Univ. Northwest, Gary.; Grant DOT-UMTA-NE-11-0002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-189277

43 314435 EXECUTIVE REPORT: MEASURING THE INFLUENCE OF SUBSIDIES ON TRANSIT EFFICIENCY AND EFFECTIVENESS. The research is devoted to model development and data analysis in an effort to identify relationships between subsidies and transit performance. The theory underlying the determinants of the relationships is developed, and a justification is presented for the efficiency and effectiveness indicators to be tested. Each indicator, serving as the dependent variable, is regressed on relevant control variables, and on subsidies classified by source, use and control. For the sample of 55 observations from 1975-76, current levels of subsidies have increased riders per capita by 93 percent and expenses per vehicle hour by 9 percent over what they would have been if no subsidies had been provided. Subsidies have minor and generally insignificant effects on the six efficiency indicators, but state and local operating subsidies have significantly favorable impacts on the one effectiveness measure, riders per capita, resulting in increases of one to five riders for each dollar of subsidy.

Barnum, DT Gleason, JM ; Nebraska University, Omaha, Urban Mass Transportation Administration Final Rpt. UMTA-NE-11-0002-FER, Nov. 1979, 25p; See also PB80-189269. Prepared in cooperation with Indiana Univ. Northwest, Gary.; Grant DOT-UMTA-NE-11-0002; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-189251

43 314661 MASS TRANSIT FINANCING ALTERNATIVES (ELEMENT 6). In order to quantify the benefits of public transit to non-users in the Manhattan Central Business District, several scenarios were developed. In one scenario where the CBD was entirely dependent on vehicle entries, the density of the CBD was limited to 20 percent of the present level. Therefore, 80 percent of the current business activity and tax revenues in the area could be ascribed to the public transit system. In the second scenarios, 10 percent shift of the current subway and bus commuters to automobile use occurred. This caused street and river crossings to be filled to near capacity during rush hours. Employing this assumption, it is possible to observe the impact of the public transit system on an entire class of street users (e.g. cabs, motorists, truckers) with regard to increased travel time, travel cost and fuel consumption and pedestrians and other street users with regard to air pollution. The third scenario analyzed the adverse effects on the metropolitan New York area (e.g. increased fuel consumption, higher accidents rate) caused by the dispersion of the Manhattan CBD assumed in the first scenario. The information generated by these scenarios tend to support the contention that general revenue subsidies should be utilized to support public transit.

Institute for Public Transportation Final Rpt. TSA-181; IT-09-0058, Oct. 1979, 88p, 8 Tab., Refs., 5 App.; Prepared for the Tri-State Regional Planning Commission.

43 316579 INNOVATIVE FINANCING TECHNIQUES: A CATALOG AND ANNOTATED BIBLIOGRAPHY. This detailed research report and catalog reviews innovative financing techniques for transit improvements, and estimates the financing potential of these approaches. The majority of the techniques covered entail the concepts of joint development and value capture, and are therefore of most relevance when dealing with fixed guideway systems such as light rail, rapid rail, people movers, or personal rapid transit. The report found the most promising techniques to be tax techniques (dedicated property taxes, tax increment financing, and special benefit assessment), lease or sale of air rights, and incentive zoning in areas served by transit. Such approaches could cover from five to fifteen percent of the costs of transit improvements.

Witherspoon, R Arnold, H Abbey, D Reynolds, G Gladstone, R ; Gladstone Associates, Incorporated 1979, 350 p.; ACKNOWLEDGMENT: Monthly Catalog of US Government Publications, GPO; ORDER FROM: NTIS, GPO; PB80-188295

43 316666 FINANCING URBAN MASS TRANSPORTATION SYSTEMS: A STUDY OF ALTERNATIVE METHODS TO ALLOCATE OPERATING DEFICITS. This study examines allocation procedures to apportion transit operating deficits among user communities. These allocations were formulated in terms of allocation plans that incorporate factors to identify, accumulate, and distribute costs to a final cost objective. For urban transit systems such a plan combines an allocation performed within the system for cost determination purposes with an allocation that assigns deficit amounts to parties external to the system. External deficit allocations consist only of an allocation base; internal allocations consist of a cost hierarchy, an accounting technique, and an allocation base. An experimental environment is created to apply alternative allocation methods under identical operating conditions by using a computer model to simulate a transit system. Deficit amounts assigned to each community served are then examined to determine the effects of alternative allocation plans for the computation and distribution of transit system operating deficits. An analysis that focuses on the amounts allocated to individual communities shows that a high degree of variation is produced by alternative plans for allocating a transit operating deficit. Another analysis, which views each allocation plan as a single variable, reveals that plans that employ only an external deficit allocation and plans that use a systemwide average operating cost produce results distinctly different from plans that do not employ such procedures. (Author)

Dierks, PA (Texas University, Arlington) *Transportation Research Record* No. 735, 1979, pp 31-39, 2 Fig., 3 Tab., 1 Ref.; This paper appeared in *Transportation Research Record* No. 735: Public Transportation Planning and Development.; ORDER FROM: TRB Publications Off

43 318093 FINANCING URBAN TRANSPORTATION: GENERAL STUDIES. 1970-MARCH, 1980 (CITATIONS FROM THE NTIS DATA BASE). Financing methods are presented to show the various ways in which

urban transportation systems can be supported by communities, metropolitan areas, and regions. Systems such as bus lines, subways, rapid rail, and taxis are discussed, as well as dial-a-ride operations and transit for the elderly. Some attention is given to urban airports, fare structures, and ridership. A few case studies are reported for specific cities if they would be of general interest to other areas.

Kenton, E ; National Technical Information Service Final Rpt. Apr. 1980, 112p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-809429

43 318094 FINANCING URBAN TRANSPORTATION: LOCAL STUDIES. 1970-MARCH, 1980 (CITATIONS FROM THE NTIS DATA BASE). The financing of urban transportation in local areas is documented. Although these studies may be of interest to a number of metropolitan localities, they were originally prepared to study the fiscal planning of transit and travel systems for specific areas. Cities covered include Atlanta, New York City, Washington, D.C., Philadelphia, Houston, Baltimore, San Francisco, Minneapolis, Milwaukee, and many smaller localities. Among the systems involved are rapid transit rail, bus, shared taxicab, dial-a-bus, dial-a-ride, and subway. Some attention is given to metropolitan airports. (This updated bibliography contains 190 abstracts, 6 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service Final Rpt. Apr. 1980, 197p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-809437

43 318183 SELF-SUSTAINING PUBLIC TRANSPORTATION SERVICES. VOLUME II. TECHNICAL REPORT. The study examines three systems of urban transportation services which are self-sustaining (cover at least operating costs from the farebox). The three systems selected for the study are: (1) the Philadelphia-Lindenwold Hi-Speed Line, a rail rapid transit line operated by the Port Authority Transit Corporation (PATCO); (2) the express bus services in the City of New York, with routes operated by both the Metropolitan Transit Authority as well as private bus companies; and (3) the suburban railroad service in the Chicago metropolitan area of the Chicago and Northwestern Transportation Company (formerly C&NW Railway). These services are characterized by high fares; high service quality including a high probability of obtaining a seat and attention to consumer comfort and safety; travel times comparable to those on alternative modes, including the private car; service between residential areas and CBDs; market areas composed primarily of middle-to upper-income inhabitants; and costs not necessarily lower than comparable service by other operators. All three, until recently, have covered at least operating costs from the farebox. That two of them no longer do so is attributable to explicit policy decisions, and not to a failure in the viability of the service. The research concludes that although self-sustaining services are clearly appropriate only for certain markets, within those markets they have potential as a means of relieving the increasing scale of transit deficits.

Morlok, EK Viton, PA Sudalaimuthu, P Waldo, J Hessami, MS ; Pennsylvania University, Philadelphia, Urban Mass Transportation Administration Final Rpt. UMTA-PA-11-0017-80-2, Nov.

1979, 239p; See also Volume 1, PB80-196140.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-196157

43 318428 EFFECTS OF FEDERAL TRANSPORTATION FUNDING POLICIES AND STRUCTURES. FINAL REPORT (APPENDIX A THROUGH F). The study focuses on the effects of Federal funding policies and structures of transportation investment. Several recent policy developments in highways, airports, and transit were analyzed toward this end. Procedurally, the work progressed by performing six discrete transportation analyses and then drawing together insights gained from these to suggest basic funding principles. These principles are then investigated through interviews on the 1978 Surface Transportation Act with 21 transportation professionals.

Porter, AL Park, CY Rees, LP Connolly, T Rao, S ; Georgia Institute of Technology, Asst Secretary for Policy & International Affairs Final Rpt. DOT-P-10-80-09, Dec. 1979, 329p; See also report dated Dec 79, PB80-197536. Prepared in cooperation with Pennsylvania State Univ., University Park.; Contract DOT-OS-70036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-197528

43 318922 EFFECTS OF FEDERAL TRANSPORTATION FUNDING POLICIES AND STRUCTURES. APPENDIX A. MASS TRANSIT [Final rept. Apr 77-Dec 79]. The analysis concerns the manner in which Federal funding structures affect mass transit. It focuses on the implications of categorical versus block grants, different required local matching shares, and formula versus discretionary aid programs. This work is part of a broader study that addresses the effects of funding structures across the highway, airport, and transit modes.

Porter, AL ; Georgia Inst. of Tech., Atlanta.*Office of the, Assistant Secretary for Policy and International, Affairs (DOT), Washington, DC. Office of, Intermodal Transportation. DOT-P-10-80-11, Dec. 1979, 45p; See also reports dated Dec 79, PB80-197528, and PB80-197536, and Appendix B, PB80-202054. Also available in set of 6 reports PC E14, PB80-202039.; Contract DOT-OS-70036; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-202047

43 319560 SUBSIDISATION OF URBAN PUBLIC TRANSPORT. Because of the general trend of increasing costs of public transport operation and higher subsidies (in some cases accompanied by falling patronage) the ECMT initiated a study of subsidisation and sought the help of TRRL. The study, which involved 18 countries, was concerned with the aims of subsidy, the sources and conditions attached to subsidy, trends in subsidies and the effect of subsidies on patronage, fares, service levels, costs and productivity. The qualitative information concerning the aims of subsidy was analysed in relation to the likelihood of achieving such aims, with particular reference to current experience of attempts to switch car drivers to public transport. The quantitative information on trends referred to the countries as a whole and covered the period 1965 to 1977; these data were supplemented by data from 59 cities in 7 countries collected in the

course of a TRRL sponsored study of travel demand factors. The relationships between patronage and fares and service levels, and between subsidies and various operating factors, including costs and productivity, were studied using regression analysis and the general conclusion reached was that although the major part of the subsidy paid was reflected in reduced fares and improved service levels there may well have been some leakage into higher unit costs and manning levels.(a) (TRRL)

Bly, PH Webster, FV Pounds, S ; Transport and Road Research Laboratory, (0305-1315) Monograph TRRL Supl Rpt SR 541, 1980, 43p, 9 Fig., 9 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 247079); ORDER FROM: TRRL

43 32276 THE FINANCING OF MULTIJURISDICTIONAL PUBLIC TRANSPORTATION SERVICES. This study summarizes the means of providing non-federal support for public transportation in eight cities where more than one political jurisdiction is in the service area of the public transportation system. The cities studied are: Albany, New York; Gary, Indiana (and the Northern Indiana Commuter Transportation District); Miami, Florida; Norfolk, Virginia; Sacramento, California; Seattle, Washington; St. Louis, Missouri; and Washington, D.C. The report shows the extent to which funding sources are earmarked, the basis for cost-allocation formulas, the sources of public subsidies, the trends in operating deficits, and the problems inherent in welding several independent political jurisdictions into one financing arrangement. Solutions varied from consolidating taxing authority into one unit of government (as the case of Dade County) to setting a price and allowing jurisdictions to buy the level of service each wants, (as in the case of Norfolk where costs of service to each jurisdiction are determined after netting out revenues). Other solutions included earmarking of already collected state taxes, of basing relative contributions on relative assessments, and pure legislative fiat in allocation of local shares. Deficits appeared to grow faster in systems with earmarked revenue sources, and all systems tended to look to higher levels of government for support. (UMTA)

Kidder, AE ; North Carolina Agricultural and Technical State U, Urban Mass Transportation Administration, (NC-11-0008) UMTA-NC-11-0008-80-1, Mar. 1980, 73p; ORDER FROM: NTIS; PB80-198625

43 322307 FUTURE HIGHWAY FINANCING. Subjects discussed deal with transportation and highway needs, the character of transit funding, alternative financing methods for transit and additional funding sources.

Smith, WS (Smith (Wilbur) and Associates) *Traffic Quarterly* Vol. 34 No. 1, Jan. 1980, pp

21-32, 10 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

43 322751 A FISCAL AND INSTITUTIONAL ANALYSIS OF MASS TRANSIT IN SELECTED URBAN AREAS. LOUISIANA MASS TRANSIT STUDY SELECTED URBAN AREAS. LOUISIANA MASS TRANSIT STUDY. This report covers the financial and institutional aspects of the Louisiana transit systems—budgeting procedures, accounting practices, cost control programs, organizational structure, NOPSI's (New Orleans Public Service Incorporated) particular relationship with the City of New Orleans, and legal constraints. Following a brief overview of the status quo, the report evaluates strong points and problems areas, projects future trends to identify budding problems, and makes recommendations for resolving the solvable and minimizing the effect of situations beyond the scope of the State of Louisiana and the participating transit systems.

Daniel, Mann, Johnson and Mendenhall Oct. 1979, 142p, Figs., Tabs.; ORDER FROM: Louisiana Dept of Transportation & Development, P.O. Box 44245, Capitol Station, Baton Rouge, Louisiana, 70804

43 324312 MOBILITY FOR AMERICANS IN AN ERA OF INCREASING ENERGY, ENVIRONMENTAL AND FINANCIAL CONSTRAINTS. This publication is a transcript of six hearings composed of testimony from various federal, state, and local transit officials as well as members of universities and the private sector. Among those who testified were top level representatives from U.S. Department of Energy, American Public Transit Association, National League of Cities, National Association of Counties, Atlanta Metropolitan Rapid Transit Authority, Los Angeles County Transit Commission, California Department of Transportation, German Marshall Fund, University of Tennessee, and First National Bank of Seattle. The major themes apparent in the various testimonies included: coordination among the various levels of governments for formulation and implementation of consistent transit policies, public transportation for rural areas, public transit for elderly and handicapped, urban transportation planning, levels of transit service, ways to increase transit ridership, ridesharing, application of computers for commuter services, energy conservation, and emission controls to satisfy Clean Air Act Standards.

Government Printing Office 1980, 578p, Apps.

Hearings before the Subcommittee on Oversight and Review of the Committee on Public Works and Transportation, US House of Representatives, 96th Congress, 2nd Session.; ORDER FROM: GPO

43 326271 AN EXAMINATION OF THE TRANSIT FUNDING PROCESS AT THE LOCAL LEVEL. The study examines the transit funding process at the local level during the period of public ownership. In particular, the study focuses on what the recent injection of public funds has bought and on those features of the local decision making process which have led to the particular uses chosen for the funds. The study is organized around five types of decisions which encompass the key choices made in most localities since the time of public takeover. These are: (1) the decision to assume public operation and subsidization of the transit system; (2) decisions about the uses of federal capital assistance grants; (3) decisions about the use of formula funds from higher levels of government for capital and operating assistance; (4) decisions about the appropriate response to growing demands for attention to the special transportation needs of the elderly and handicapped; and (5) decisions about the appropriate response to the growing fiscal austerity of the late 1970s. The study findings are based on case studies in nine metropolitan areas. The study cities were selected to include a wide range of sizes, population densities and growth rates, mode splits for the journey to work, durations of transit deficits, and local government expenditures per capita.

Womack, JP Altshuler, AA ; Massachusetts Institute of Technology, Urban Mass Transportation Administration, (UMTA-MA-11-0030) Final Rpt. UMTA-MA-11-0030-80-1, May 1979, 70p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226954

43 330625 SOARING TRANSIT SUBSIDIES MUST BE CONTROLLED. Demand for transit operating subsidies is approaching crisis proportions. Transit systems received \$2.2 billion in Federal, State, and local government operating subsidies in 1978—the latest actual figure available. By 1985 more than \$6 billion per year may be needed. This report tells why the demand for transit operating subsidies is growing, what can be done to control subsidy growth, and what improvements are needed in the Federal transit operating assistance program. Transit systems must control costs and increase productivity if their subsidies are to be kept within acceptable limits. Transit systems must also adopt more realistic, efficient, and equitable fare policies. The Urban Mass Transportation Administration, which administers the Federal program, should help transit systems achieve these goals and should improve its administration of the Federal operating assistance program. (Author)

General Accounting Office Cong. Rpt. CED-81-28, Feb. 1981, 90p, Figs., Tabs., 2 App.

The Comptroller General's Report to the Congress of the United States.; ORDER FROM: GAO-Document Handling & Info Services Facility, P.O. Box 6015, Gaithersburg, Maryland, 20760

44 046700 QUO VADIS, ASCE. Through a congressional testimony of its representatives, the ASCE officially took the position that transit improvements should be financed from the Highway Trust Fund only if they are "highway-related", while other modes should be excluded. This "hardware" rather than functional approach to different transportation modes is obsolete and obviously contrary to the current needs of our cities. Better financing of new transit systems and modernization tax, which ASCE did not even consider. Promulgating a of the existing highways and transit facilities can be achieved through virtually negligible increase in gasoline tax, which ASCE did not even consider. Promulgating a policy so severely and widely criticized will not help us in our serious efforts to attract young people to Transportation Engineering. It is time that ASCE reexamine its policies and coordinate them with the needs of our car society.

Vuchic, VR *ASCE Civil Engineering* June 1973, pp 59-61; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

44 050075 THE LEGISLATION OF BALANCE. This paper explores various avenues of legislation that can be effective in rebalancing the nation's transportation modes, especially between Mass Transit and highway construction. The federal government is in a position to rebalance these modes by agreeing to pay the same 90% of mass transit projects as is paid for interstate highway construction, by exempting mass transit projects from elaborate comprehensive planning requirements, particularly with regard to replacement of capital equipment, when such extensive processes are not required for highway construction and to release mass transit funds which the Congress has appropriated but which are now held by executive impoundment. Local governing bodies should be given the right to decide which local transportation projects should be given priority with regard to allocation of the Highway Trust Fund. Historical background information and current transportation policy information are included.

Pikarsky, M *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE3, Paper 9938, Aug. 1973, pp 483-488; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

44 052086 CHICAGO PUSHES REGIONAL-AGENCY PLAN. The Chicago-area commuter railroads are taking a strong stand in favor of an authority with real authority, and they recently commissioned the Transportation Center at Northwestern University to study what public transportation now does and what it could do under regional organization. This study is briefly discussed.

Railway Age Vol. 174 No. 9, May 1973, 1 pp ORDER FROM: XUM, Repr PC

44 053986 COMMENTS ON THE STATEMENT BEFORE THE HOUSE APPROPRIATIONS SUBCOMMITTEE ON TRANSPORTATION, 5 MARCH 1974 BY CLAUDE S. BRINEGAR, SECRETARY. These brief comments are written on the request of the Subcommittee Chairman, Representative John McFall, and in response to Secretary Brinegar's invitation for comments on his Statement.

Vuchic, VR (Pennsylvania University, Philadelphia) ; Vuchic (Vukan R) Mar. 1974, 6 pp; ORDER FROM: Vuchic (Vukan R), Towne Building, 220 South 33rd Street D3, Philadelphia, Pennsylvania, 19174 Repr PC

44 057148 SHAPING TRANSIT'S FUTURE. The article discusses the Nixon Administration's urban transit proposals. The Urban Mass Transportation Administration's new organization and its technical R&D program are described.

Herringer, FC, Administrator (Urban Mass Transportation Administration) *Modern Railroads* Vol. 29 No. 5, May 1974, pp 68-70; ACKNOWLEDGMENT: Canadian National Railways, Headquarters Library; ORDER FROM: Cahners Publishing Company, Incorporated, 5 South Wabash Avenue, Chicago, Illinois, 60603 Repr PC

44 057533 RESEARCH NOTE: ANALYSIS AND DEMAND IMPLICATIONS OF THE RAPID TRANSIT VOTE IN ATLANTA. In November 1971 the voters of two metropolitan Atlanta counties agreed to build a rail based rapid transit system, to levy an incremental one cent sales tax to defray the operating costs of the system, and to impose a 15, fare on all public rapid transit modes for the next 8 years. Some questions are raised concerning the demand conditions facing the future rail transit system. The purpose of this paper is to analyze the "Yes" vote in Fulton County and from the analysis suggest some marketing problems that rapid rail transit is likely to face.

Neidell, LA (Georgia Institute of Technology) *Transportation Journal* Vol. 13 No. 4, June 1974, pp 14-18, 3 Tab., 3 Ref.; ACKNOWLEDGMENT: Transportation Journal; ORDER FROM: American Society of Traffic and Transportation, 547 West Jackson Boulevard, Chicago, Illinois, 60606 Repr. PC

44 057887 HIGH SPEED GROUND TRANSPORTATION ACT OF 1965 AND THE RAILROAD TECHNOLOGY PROGRAM 1973. The report presents studies on rail technology, such as improved passenger and freight service, safety research, improved track, rail and vehicle dynamics. The study evaluates the Washington-New York Metroliner and the Boston-New York Turbotrain Demonstration including ridership and mileage. The report also presents research on advanced systems such as tracked levitated, magnetically levitated, and tracked air cushion vehicle systems along with supporting technology, such as propulsion, communications and control, guideways and tunneling.

Federal Railroad Administration, (FRA-ORD/D-74/54) Annual Rpt No. 7, 1973, 205p

See also report dated Sep 72, PB-222 261.; ACKNOWLEDGMENT: NTIS (PB-233064/5); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-233064/5, DOTL NTIS

44 072462 CONTROVERSY STILL CLOUDS BART PROGRAM. Bay Area Rapid Transit has begun systemwide operation with principals and observers still debating the value of aerospace and other high-technology industry participation in the \$1.6-billion venture. The evaluation may be resolved in part by the courts as BART is filing suit against its principal consultant and equip-

ment suppliers. The transit district took this action at a time when it faces operational and financial problems that some observers find as complex and challenging as those of design, construction and start-up. BART still must prove it can provide the reliable, economical and convenient service it promised when it went to the taxpayers for support 12 years ago. Reliability and maintainability have moved to center stage.

Elson, BM *Aviation Week and Space Technology* Vol. 101 No. 16, Oct. 1974, pp 62-65; ACKNOWLEDGMENT: Aviation Week and Space Technology; ORDER FROM: McGraw-Hill, Incorporated, 1221 Avenue of the Americas, New York, New York, 10020 Repr. PC

44 072732 TECHNICAL ANALYSIS AND POLITICAL ACTIONS. It has become unnecessary to guess about the prospects for private enterprise funds to support transit. It is uncertain for most cities to know how much and what kind of public funds are going to be available from federal sources. Transit planning has often shifted from a long-term approach to a much more short-range orientation. The author notes that increased transit funds will need to be an act of faith, or at least a feeling that the near total automobile reliance of the past needs to be changed. Transit professionals will need to work with citizen and political leaders, steering them toward acceptance of funding that can assure local mobility without overwhelming dependence on the automobile.

Keith, RA (Voorhees (Alan M) and Associates, Incorporated) ; Cross (Richard B) Company Proc Paper Vol. 15 No. 1, 1974, pp 80-86; This paper is from Transportation in Focus, Proceedings of the Fifteenth Annual Meeting of the Transportation Research Forum, San Francisco, California, 10-12 October 1974.; ACKNOWLEDGMENT: Transportation Research Forum; ORDER FROM: Vietsch (Grant C), 181 East Lake Shore Drive, Chicago, Illinois, 60611 Repr. PC

44 080248 POLICING INTER-COMMUNITY MASS TRANSIT SYSTEMS: PROPOSED LEGISLATION FOR CHICAGO WITH A CONSIDERATION OF OTHER CITIES. The purpose of the report is to present model legislation that will require inter-community mass transit systems to be responsible for the safety of their passengers while using transit facilities. An effort is made to show why this legislation is necessary and how it is a solution to the present problem of high crime and low passenger safety on selected mass transit systems. In metropolitan Chicago, Illinois, as a selected example, the recent history is given (1967-1972) of the rise in transit crime and the apparent police response. The effects of the present multi-community policing are stated and explained. Some brief concluding remarks are presented.

Wallace, PS Buren, RM ; Illinois University, Chicago, Illinois University, Chicago, Urban Mass Transportation Administration, (UMTA-IL-0024) Res. Rpt. RR-7, Mar. 1974, 62 pp; ACKNOWLEDGMENT: NTIS (PB-235677/2ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235677/2ST, DOTL NTIS

44 080664 PAPERS PRESENTED AT THE ATA MID-YEAR MEETING HELD IN WASHINGTON, D.C. ON MAY 20-23, 1974. The authors' paper summarizes UMTA's accomplishments within the last year as well as pro-

posed transit legislation. Mr. Scott reviews minority employment in both the government and the transit industry. The next 3 papers deal with UMTA bidding procedures, the method of evaluation of new vehicles by the Ottawa-Carleton Regional Transit Commission, and a new specification for a 30' bus. Mr. Geissenheimer's paper discusses PAT's Product Price Promotion program. Mr. Mateyka deals with ways to improve the safety of TRANSBUS and the paper by Mr. Hoadley describes Split Grant Funding and the Criteria which guide UMTA in developing procedures for the changes made by the Federal Aid Highway Act of 1973.

Herringer, FC Scott, S Hare, W Chaput, H Giuliani, C ; American Public Transit Association, Urban Mass Transportation Administration, Mass Transit Administration, Port Authority of Allegheny County, Booz-Allen Applied Research, Incorporated ATA/MY-74-1, Oct. 1974, 124 pp; ACKNOWLEDGMENT: NTIS (PB-236562/SSL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236562/SSL

44 080939 FOUNDATIONS FOR MASS TRANSIT PROGRAM DEVELOPMENT IN THE TAMPA BAY REGION. MANAGEMENT REPORT. Report is part of a work effort being performed for the "Coordinated Support Services" program of the Tampa Bay Regional Planning Council (TBROC) to the Tampa Bay Area Rapid Transit Authority (TBART) in Florida. Report reviews recent efforts of TBRPC to establish the Authority. Chart. I, "Organizing for Transit Development," covers steps taken by the Planning Council and TBART to establish the Authority and reviews issues related to securing the required local commitments to undertake a transit development planning project. Chapt. II describes the nature and source of existing State and Federal grant programs to financially support planning and preliminary engineering efforts of the Authority, and alternative sources of long-term local financial resources necessary to support system construction, operation and maintenance. The chapter on "TBART Pre-Referendum Intergovernmental Relations Program" addresses itself to the procedural requirements necessary in the planning process to secure approval of the adopted TBART system concepts by units of local government, the State of Florida, and UMTA. Chapt. IV reviews the organizational structure and staffing pattern of transit agencies similar to TBART in legal and transit development status, recommends on organizational framework and accompanying pre-referendum staffing pattern and estimates financial resources required to support the Authority in the pre-referendum period. Chapt. V deals with issues confronting the Authority as it moves from system design efforts to construction and operation of a proposed transit system. /UMTA/

Research Group, Incorporated, (FL-09-0010) UMTA-FL-09-0010-73-1, Dec. 1973, 80 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238115/AS

44 080943 THE ROLES OF GOVERNMENT IN TRANSPORTATION PLANNING. Primary responsibility for transportation planning has moved from private industry to government. This shift has occurred as a result of growing awareness of the interdependence of transporta-

tion planning with all other aspects of the urban planning process. Decisions are no longer based solely on the economic advantage of the operator, but now are governed primarily by community-established acceptance criteria covering a wide range of social, economic, environmental and service impacts. The paper presents a discussion of governmental responsibility and strategy options, which may help to clarify some of the complex issues which face all levels of government as these new roles evolve.

Roennau, LV ; Rand Corporation P-5079, Aug. 1973, 28 pp; ACKNOWLEDGMENT: NTIS (AD/A-002179/OSL); ORDER FROM: NTIS, Repr. PC, Microfiche; AD/A-002179/OSL, DOTL NTIS

44 082827 URBAN MASS TRANSPORTATION: A DOZEN YEARS OF FEDERAL POLICY. This book begins with a review of the development of federal policy in urban mass transportation and goes on to discuss some of the pros and cons regarding transit. There is a brief examination of the transit industry and the federal agency responsible for the execution of the national government's transit policy. A few chapters follow devoted to some of the findings, successes, and failures of federal policy. There are some suggestions for long-run and short-run policy and procedural changes that might lead to improvement in urban mass transportation. Among the innovations that the author proposes are a massive information and community relations program and a new emphasis on marketing--finding out specifically what people want in mass transit and then tailoring the product to fit these needs.

Smerk, GM ; Indiana University Press, (ISBN 0-253036170-2) 1974, 388 pp; ORDER FROM: Indiana University Press, Bloomington, Indiana, 47401 Orig. PC

44 084214 CAPACITY UTILIZATION UNDER ALTERNATIVE REGULATORY RESTRAINTS: AN ANALYSIS OF TAXI MARKETS. Both the Averch-Johnson (A-J) model and the Chamberlin model fail to consider the value of excess capacity to consumers. Service industries, whether they are regulated or not, will usually have excess capacity in the Chamberlinian sense because this capacity conserves time for consumers. This paper examines a model of the taxi industry where allowance is made for capacity to affect the value or quality of the service through its effect on waiting time. The central issue is to determine equilibrium output, capacity, and the utilization of capacity when the market is organized as a franchised monopoly, through a medallion system, and when there is free entry, and to exhibit the relationship among these variables and prices, cost of capacity and output, and policies of the regulator. It is found that many of the characteristics of taxi markets that would appear to confirm the monopolistic-competition thesis arise because of the nature of regulation of these markets.

De Vany, AS *Journal of Political Economy* Vol. 83 No. 1, Feb. 1975, pp 83-94

44 084379 THE IMPACT OF TRANSIT SUBSIDY ON THE TAXI INDUSTRY. Evidence and arguments are presented concerning the existence and nature of an urban transportation problem of national scope, namely, the

taxi-transit competition. The background to the problem and the current situation are examined, and it is suggested that large-scale federal provision of capital for urban public transit systems has a detrimental impact on taxi operations in urban areas. The role of taxis in the urban transport system is significant in terms of numbers of passengers carried and revenue generated. Data examined that equipment grants for more than 100 buses have a detrimental effect on taxi operations. Possible solutions to the taxicab situation fall into five categories: technological improvements; regulatory legislation; financial assistance; legal action; and mergers of taxi companies.

Black, WR (Indiana University, Bloomington) *Traffic Quarterly* Vol. 28 No. 4, Oct. 1974, pp 619-633, 2 Fig., 2 Tab., 17 Ref.

44 084995 TRANSPORTATION FRAMEWORKS FOR THE CRITICAL DECISIONS TRANSPORTATION PLAN. To aid in focusing on those areas which need close evaluation (in arriving at the Critical Decisions Transportation Plan) the Southern California Association of Governments (SCAG) developed five alternative frameworks for the region, each of which supposes a different level of capital investment, and against which subregional proposals may be measured for consistency with an overall regional plan. The five frameworks are: status quo; minimal investment in transit; low capital investment in transit; high capital investment in transit; and investment in advanced technology. Each of the frameworks articulates the possible components of one 1990 air and ground transportation system, as well as implying a range of policy options. A report is also presented which contains the recommendations of SCAG for public transit development in the region and the technical documents supporting the recommendations. The recommendations were developed (using the adopted Critical Decisions Plan) as the basis for the transit element of the Regional Transit Plan.

Southern California Association of Governments 1974, 155 pp, Figs., Tabs., Refs., 3 App.

44 094125 SELLING RAPID TRANSIT TO THE VOTERS, THE LOS ANGELES EXPERIENCE. In 1968, an attempt was made to sell a sales tax and bond issue proposal to the voters of Los Angeles, California, for an 89 mile rapid transit system (Proposition A). The attempt failed to reach the required voter approval of 60% and even failed to achieve a simple majority. This report is an examination of that effort to learn what can be gained from the experience. The report includes a brief history of the various groups that preceded the final citizens group which undertook the promotion on behalf of the proposition. The report focuses on efforts to publicize the issue including actual sales techniques, the raising of funds, the separate roles of the transit district and citizen group, the opposition encountered, efforts to counteract specific opposition, and some retrospective insights as to why the issue ultimately lost at the ballot.

Erikson, G ; California University, Los Angeles, Urban Mass Transportation Administration, (UMTA-CA-11-0009) UMTA-CA-11-0009-75-2, Aug. 1974, 36 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248785/8ST, DOTL NTIS

44 095362 FOUNDATIONS FOR MASS TRANSIT PROGRAM DEVELOPMENT IN THE TAMPA BAY REGION: MANAGEMENT REPORT. This report reviews efforts of the TBRPC to establish the Authority. It examines issues related to securing required local commitments to undertake transit development planning projects, financial support, preliminary engineering efforts, organizational framework and other related topics.

Research Group, Incorporated FL-09-0010, Dec. 1973; Prepared for Tampa Bay Regional Planning Council (TBRPC) in support of Tampa Bay Area Rapid Transit Authority (TBART) Abstract in UMTA Abstracts, Feb/March 1975, p. 3.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB 238-115/AS

44 095978 METROPOLITAN TRANSPORTATION IN AN AGE OF SUBSTATE REGIONALISM. The substate regional-level-that level below the states but above the cities and frequently the counties-is discussed as it relates to implementation of metropolitan transportation planning. The status of substate regional development is discussed, and the advantages of this reorganization are given. ACIR developed an umbrella multijurisdictional organization strategy, which is recommended as one means of reorganizing jurisdictions at the substate level. The role of the metropolitan transportation planner is related to the development of these substate regions.

Walker, D (Advisory Commission on Intergovernmental Relations) *Transportation Research Record* No. 524, 1974, pp 4-9; ORDER FROM: TRB Publications Off, Orig. PC

44 096985 TRANSPORT ORGANIZATION IN A GREAT CITY. THE CASE OF LONDON. This study opens with an account of the growth of the transport infrastructure of London and of the institutions controlling the operation and development of that infrastructure. The present powers and roles of the main statutory bodies are discussed. There follows fifteen case studies concerning a wide variety of projects such as new underground lines, changes in the rail approaches from the south-east, bus priority schemes and the Heathrow link. These examine the formulation of schemes, their appraisal, problems encountered and action taken. This leads to a discussion of the problems of London's transport which contrasts the wishes and aspirations of the public with the choices open to decision-makers. A number of policy options are discussed ranging from the short-term, such as fixing fares, to the long-term where attention is paid to land-use planning. The performance of the present institutional arrangement is evaluated, illustrating the difficulties of decision-making and action, given the number of interested parties. Various changes are suggested such as grant alterations, the transfer of control of over trunk roads and British rail to the GLC and improved transport planning with greater public participation and more co-ordination in decision-making. /TRRL/

Collins, MF Pharoah, TM ; London School of Economics and Political Science 1974, 660 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 212263); ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England

Repr. PC

44 098884 LEGAL OBSTACLES TO THE USE OF TEXAS SCHOOL BUSES FOR PUBLIC TRANSPORTATION. The legal obstacles to the use of school buses for public transportation are created by three types of legal regulation (the implications of which are detailed in appendices) relating to the Texas education code, certification, and safety standards. Two courses of action are suggested for dealing with the core of the problem, namely, the education code which prohibits "unauthorized use" of school buses. Governmental units which possess the power to certify public transportation authorities are reviewed, and federal, state and local safety standards required of such vehicles are discussed.

Means, R Briggs, R Nelson, JE Thiemann, AJ ; Texas University, Austin, Department of Transportation No. 19, Jan. 1975, 24 pp, 3 Ref., 2 App.

44 099243 WORKSHOP 2: THE LOCAL POLICY-MAKER'S ROLE. The purpose of Workshop 2, which viewed the evaluation of urban public transportation from the local policy-maker's perspective, was to explore the following three research areas: (1) examination of organization forms to deliver adequate public transportation services; (2) determination of the current market for public transportation services and evaluation of existing services to ensure that services provided are in step with demands for service; and (3) review of the method of financing transit services that are needed or felt to be needed to meet community goals and objectives. This report of the proceedings of Workshop 2 identified the following research projects as being necessary for an adequate evaluation of urban public transportation: (1) financing of transit service to meet community goals and objectives; (2) examination of alternative organization forms for delivery of public transportation services; (3) use of marketing techniques to evaluate transit services; and (4) relation of transit service attributes and consumer preferences.

Echols, JC (Tidewater Transportation Commission) *Transportation Research Board Special Reports* No. 155, 1975, p 39; ORDER FROM: TRB Publications Off, Orig. PC

44 125386 TRANSPORTATION AT THE CROSSROADS. Present day transportation planners realize that along with implementing new policies, a corresponding shift in public attitudes and travel patterns must be effected as well. Accustomed emphasis on highway and air travel must be redirected toward more mass transit alternatives, including dial-a-rides, mono-rails, and people movers. The nearly completed interstate highway system brings home the message that funds previously earmarked for highway construction must be channeled into multimodal transportation planning. Society needs to take a hard look at itself and restructure its lifestyle according to the natural resources available. More rapid transit systems like BART do not seem to be the answer since the operating costs can never be balanced by fares. The ordinary, average income commuter cannot afford to use BART on a regular basis. In order to deal with the growing immediacy of these considerations, 27 states have now expanded their highway

departments into Departments of Transportation, giving attention to all modes of transport. More state aid for the promotion of air transportation in particular is being called for. As a result of this expansion in state transportation departments, the problem has arisen of placing competent personnel whose focus hitherto has been on highways. Talented people can be retrained for positions in mass transit, of course, and this can prove to be an economic benefit as well. Transportation organizations and policies have definitely shifted to encompass new technologies and orientations; it now remains to be seen if these developments can keep abreast of the current crises in the country that are rapidly necessitating change.

Wood, N *State Government Administration* Vol. 10 No. 5, July 1975, pp 14-18, Figs., Photos.

44 126192 POLITICAL AND PUBLIC POLICY ISSUES RELATED TO DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 2. The paper focuses on UMTA's view relating to the potential of paratransit or demand-responsive transportation (DRT), and discusses some of the policy implications. The future of community paratransit service, characterized by the flexible routing and scheduling of small vehicles to provide shared-occupancy, door-to-door, personalized transportation service within smaller communities and suburban neighborhoods is virtually assured. However, the biggest scope for the future expansion of paratransit lies in its becoming an element of integrated metropolitan transportation systems. An effective urban transportation system, one that will provide a high level of service at the least cost, requires a mix of vehicles, service levels, and operating regimens, tailored to the different demand conditions, widening densities, and travel patterns prevailing in particular corridors and subareas of the metropolitan region. UMTA will encourage applicants to be more mindful of the immediate and near-term transportation needs of metropolitan areas. UMTA will also want to know to what extent long-range transportation plans can be implemented in a more time-phased, incremental fashion. Examples of potential new paratransit applications are listed, and quoted as examples of the ways in which paratransit could complement (not compete with) existing transportation services. UMTA would like to know whether prearranged feeder service to line-haul commuter buses and trains could be provided by private operators at a cost that commuters could afford. It is emphasized that single-mode transportation systems, be it paratransit, rail, or freeway systems, cannot offer a solution to all transportation problems.

Orski, K (Urban Mass Transportation Administration) *Transportation Research Board Special Reports* Conf Paper No. 154, 1975, pp 162-165

Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

44 126193 POLITICAL AND PUBLIC POLICY ISSUES RELATED TO DEMAND-RESPONSIVE TRANSPORTATION. SPEAKER 3. The UMTA Service and Methods Demonstration Program is described, the purpose of which is to bring about the imaginative use of traffic management and marketing techniques, pricing, service variations, and technology to attain clearly defined objectives. The objectives selected for program planning purposes are listed: reduce travel time for transit uses; increase coverage of transit service; improve reliability of service; improve transit vehicle system productivity; improve service for the elderly and handicapped; increase convenience of using transit; and reduce congestion. The question was also addressed: should it actively induce change and diffuse innovation or build a knowledge base and be more passive with respect to a change-agent role? To implement the change-agent role, a category of demonstrations termed "exemplary demonstrations" are being established. An experimental demonstration category which will help expand the knowledge base will use a part of the resource for analytical studies (e.g. attitudinal surveys may be conducted). UMTA will put together the project designs and assume responsibility and the full cost for evaluations for both types (exemplary and experimental) of demonstrations. The above described resource employed in conjunction with other UMTA programs will make possible the following: the identification of vanguard practices for emulation and diffusion of best practices through a change-agent role by collaterally using planning assistance program as a resource to help a much larger number of cities evaluate promising new ideas; development of services standards and determinations of costs to meet them; possible simulation of service levels of advanced technologies by using available systems, or, failing that, establishing service levels approximating those of advanced technologies to judge the merits of incurring the incremental costs to achieve the higher service levels.

McManus, RH (Urban Mass Transportation Administration) *Transportation Research Board Special Reports Conf Paper No. 154, 1975*, pp 165-169; Presented at the Fifth Annual International Conference on Demand-Responsive Transportation Systems conducted by the TRB, Nov. 11-13, 1974, Oakland, Calif.; and co-sponsored by American Public Transit Association, California DOT, Alameda-Contra Costa Transit, MIT, UMTA and Technology Sharing Program of U.S. DOT.; ORDER FROM: TRB Publications Off, Orig. PC

44 127489 STATE ROLE IN PROGRAMMING. The need for a redefinition of the federal-state relation and a more effective federal role is emphasized. The state would like to see a recognition of the differences existing among states. Such recognition would lead to the establishment of planning and programming procedures that are truly multimodal and of one set of requirements for highways, aviation and transit. Federal guidelines should allow states to tailor their planning and programming processes to fit their own unique institutions and needs. The recent federal programming regulations blur the role of the states and diminish their importance in the planning and programming of highways and metropolitan transportation systems. Transportation guidelines should be directed primarily

toward the establishment of broad, overall performance goals rather than the specifications of narrow technical procedures. The essence of programming is the matching of limited resources to achieve a planned improvement. Programming deals with the basic problems related to determining the timing, the cost, and the funding methods of each transportation improvement.

Hughes, HR (Maryland Department of Transportation) *Transportation Research Board Special Reports No. 157, 1975*, pp 28-30; Proceedings of a conference held March 23-26, 1975 at Orlando, Florida. See individual sections, HRIS #127487-#127495.; ORDER FROM: TRB Publications Off, Orig. PC

44 131194 MARYLAND AGENCY SOLVES VANPOOL LEGAL SNAG. The Maryland Public Service Commission encountered a legal problem recently when petitioned to waive requirements that information on routes, fares, and schedules must be filed for company-sponsored vanpool programs. Commission law prohibits the waiving of these requirements. To solve this problem legislation has been introduced in the present session of the Maryland General Assembly calling for the Commission to issue an operating license to the sponsoring organization without public notice or hearings. In exchange for the operating license, the company must supply the Commission with a sworn affidavit including the identification of the work location being served, a description of the vehicles to be used, and statements that all persons who will operate the vehicles hold a chauffeur's license, and that the program will run on a not-for-profit basis. The proposed legislation also requires all employers to have evidence that each vehicle is insured and that the vehicles will be inspected annually.

Pool it News No. 7, Mar. 1976, pp 1-3

44 133228 BART IMPACT PROGRAM. PUBLIC POLICY PROJECT: RESEARCH PLAN. The report defines the scope of the Public Policy Project, identifies specific research issues, and outlines methods for performing the work. A theoretical framework encompassing the various anticipated public policy impacts outlines the impact process and defines the basic concepts used in formulating the research approach. The Work Elements describing the specific work to be done are closely tied to the research issues identified in the theoretical framework. Details of data collection and analysis are contained in the Work Elements. The Research Plan outlines how the work will be performed by proposing a preliminary schedule, staffing requirements and estimates of level of effort.

Bain, H Lyons, F; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development PD-22-8-76, Apr. 1976, 49 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251697/9ST, DOTL NTIS

44 136980 REPORT ON THE RAILROAD TECHNOLOGY PROGRAM (9TH), 1975, BY THE SECRETARY OF TRANSPORTATION TO THE PRESIDENT, THE SENATE, AND THE HOUSE OF REPRESENTATIVES [Rept. for 1 Oct 74-30 Sep 75]. The document contains the report on the Federal Railroad Administration's activities carried out under the

High Speed Ground Transportation (HSGT) Act of 1965 as amended and extended, for the Secretary of Transportation to report annually to the President and the Congress on activities performed under the Act. This report covers the HSGT-funded research, development and demonstrations programs administered by the Office of Research and Development (OR&D) and the Transportation Test Center (TTC) of the Federal Railroad Administration (FRA) in accordance with Section 10(a) of the Act and also encompasses related work performed under appropriations for advancing railroad technology and safety including the activities of the Transportation Test Center. The report covers program activities for the period October 1, 1974, to September 30, 1975. The report is designed to serve as a source of information for those having an interest in FRA's research, development and demonstration activities. A limited number of copies are made available to Committees of Congress, other Department of Transportation (DOT) organizations, academicians, prospective contractors, industry organizations and others who have an interest in FRA's R&D results.

Federal Railroad Administration, Washington, D.C., Office of Research and Development. FRA/ORD-76/245, Apr. 1976, 76p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-253197/8ST

44 137960 THE ROLE OF THE LOCAL AUTHORITY ENGINEER. The author sees the contribution of the local authority engineer as being his systematic approach to and application of public transport co-ordination, but prefers to consider the overall role of the local authority in transport co-ordination. A progression from the structure plan to A transport policy and programme (tpp) for day to day use is described. The tpp would provide a statement of policies and short-term programmes broken up into urban and rural needs and reviewed annually. It is suggested that within a county all the various operators should combine to schedule public transport services. The duties of the transport co-ordination team are listed in an appendix. The discussion which follows covers aspects including the transportation input into structure plans, industrial relations in co-ordination schemes, lack of forward planning in public transport and the need for increased marketing of public transport. /TRRL/

Madelin, KB (Cleveland County Council, England) Ennor, PI; New Castle-Upon-Tyne University Monograph 1974, pp 13-23; Proceedings of the symposium of co-ordinating Public Transport.; ACKNOWLEDGMENT: TRRL (IRRD 219541)

44 137962 THE ROLE OF THE PASSENGER TRANSPORT EXECUTIVE. The author emphasizes the importance of the role of the Passenger Transport Executive (PTE's) in the conurbations. Some of the objectives of a PTE are then outlined. A PTE should achieve complete co-ordination of all forms of passenger transport within an area. It can manipulate rail services and alter the balance between road and rail in order to optimise resources. Its duty is to provide a system which is a practical alternative to the private car and to which citizens will be attracted. The Greater Glasgow PTE is used as an example and details of committees involved given in

appendices. The discussion which followed the paper is included. /TRRL/

Cox, R (Greater Glasgow Passenger Transp Exec, Scotland) Ennor, PD ; Newcastle-Upon-Tyne University, England Proceeding 1974, pp 45-63; ACKNOWLEDGMENT: TRRL (IRRD-219543)

44 138146 LEGISLATIVE PERSPECTIVES ON THE STATE TRANSPORTATION PLANNING PROCESS AND TRANSIT PLANNING IN CALIFORNIA. The state of California has created a multimodal Department of Transportation and has embarked on a major statewide transportation planning effort. Although the legislation gives much of the responsibility for planning to regional agencies in the major metropolitan area, both the California Department of Transportation and the California legislature have important roles in the first iteration of a plan to be developed by 1976. This paper points out several concerns that the legislature may pursue in reviewing and guiding the planning process. These concerns deal with the issues of goal setting, decision making, and conflict resolution rather than with the technical details of planning. Four concerns about multimodal planning are examined in this paper: (a) planning for operations versus planning for facilities; (b) corridor versus local travel needs; (c) planning bases in technical expertise and analytical technique versus public openness and broad participation; and (d) programming versus master planning. Because transit planning has been largely absent from past state-level transportation concerns, several conceptual transit planning issues are raised in this paper as well. Examples from the recent Los Angeles planning experience illustrate legislative interest in staged decision-making and multimode transit solutions.

Burco, RA (Public Policy Research Associates) *Transportation Research Record* No. 563, 1976, pp 13-21, 4 Fig., 16 Ref.; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

44 142928 INTEGRATED EVALUATION FROM A REGIONAL PERSPECTIVE. Congestion in the Washington area is examined and statistical data on population are reviewed to show the number of people and vehicles in the Washington area. Local governments of the Washington area have been among the leaders in the national trend toward the development of growth management programs. The fact that local governments, regional planning agencies, citizen organizations, and private enterprise groups have expressed support for the development of metropolitan growth policy is analyzed. The impact of the different growth patterns and policies are viewed along with the varied social indicators used in impact analysis.

Rodgers, J Wickstrom, GV *ASCE Journal of the Urban Plan and Develop Div* Proceeding Vol. 102 No. UP1, Paper 12338, Aug. 1976, pp 125-136; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL

44 147862 THE 'NEW' TRANSPORTATION POLICY AND THE PUBLIC INTEREST. In June 1975, the Minister of Transport released a set of proposals for revisions of Canada's transport policy. The author explains that although as this is written, the proposed revisions have not

been embodied in new legislation, their appearance marks the end of a year's re-thinking of the federal government's role in Canadian transportation and, more importantly, an ostensible shift from the policy principles adopted so confidently in the 1967 National Transportation Act. The purpose of this paper is to review the Minister's transport policy proposals and to assess their impact on the public interest. Canada's transportation system is described as being 55 percent passenger transport and 45 percent freight. The split between intercity and urban is about 50-50, with intercity transport having a slight edge. An estimated two-thirds of the expenditures are made for private transportation and only one-third for commercial transportation. The role of the federal government in monitoring the operation and evolution of the system is described, a definition of the term "public interest" follows, and the policy proposals are then summarized and evaluated. /TRRL/

Munro, JM (Simon Fraser University, Canada) *Logistics and Transportation Review* Vol. 12 No. 1, 1976, pp 3-23, 2 Tab., 38 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-223045); ORDER FROM: British Columbia University, Canada, Faculty of Commerce, Vancouver 8, British Columbia, Canada

44 148243 CONSEQUENCES AND CAUSES OF PUBLIC OWNERSHIP OF URBAN TRANSIT FACILITIES. The reasons for the shift from private to public ownership of urban transit facilities are the subject of the paper. The regulation theory suggests that this shift is due to the increasing severity of regulation, while the declining-market and externalities hypotheses suggest that increases in automobile ownership are the reason for reduced profits and public ownership. Regression results indicate that profit margins of privately owned systems are higher when regulation is by a state rather than a local agency. Changes in profit margins over time are found to be directly related to increases in automobile ownership. /Author/

Pashigian, BP (Chicago University) *Journal of Political Economy* Vol. 84 No. 6, Dec. 1976, pp 1239-59, 7 Tab., 7 Ref., 1 App.

44 148877 TRANSIT REGULATION: IMPROVE IT, DECREASE IT OR ELIMINATE IT? It is pointed out that a serious problem in improving urban transportation is the lack of understanding of the complex economic, social and technical relationships, and it is shown that urban passenger transport is one of the activities in which free market cannot be applied. Although discussions of regulation in urban transportation often imply that they are relevant to all cities and all modes, actually they focus on paratransit only and are therefore relevant only to small cities and low density areas, with the exception of taxis applicable to all cities. Revision of some regulatory practices is desirable; in some areas revision should mean a decrease of regulation, in others an improvement and increase in regulation. The relevance of European experience in this area is noted. The goal of public regulation is not to maximize profits of operators but to ensure adequate public service. Transportation systems which meet these goals and are economically sound are best achieved by full coordination among modes, particularly between private and public transportation, as well as by closer coordi-

nation of regulation with short and long-range planning for communities and their transportation.

Vuchic, VR (Pennsylvania University, Philadelphia) *Transit Journal* Vol. 2 No. 4, Nov. 1976, pp 5-14, 1 Phot.

44 149948 THE ROLE OF TRANSIT OPERATING AGENCIES. By 1973, over 100,000 people were commuting daily into metro Toronto. Rush-hour congestion was no longer a purely local problem that could be solved by one region acting alone. It was realized that the needs of the commuter cannot be met without the co-operation and co-ordination of all transit properties in an urban area. This paper describes the formation of the Transit Operating Authority for the Toronto area, the first attempt by the province of Ontario to establish an appropriate agency to carry out the functions necessary to achieve an integrated network of transit operations. /TRRL/

Howard, WT (Toronto Area Transit Operating Authority); Roads and Transportation Association of Canada Proceeding 1976, pp 205-217, 2 Fig.; Proceedings of the RTAC Annual Conference, 1975, held in Calgary, Alberta.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada (RTAC02205E), TRRL (IRRD 223789); ORDER FROM: Roads and Transportation Association of Canada, 1765 St Laurent Boulevard, Ottawa, Ontario K1G 3V4, Canada

44 150446 IMPACT OF RECENT FEDERAL TRANSPORTATION POLICIES AND REGULATIONS ON LOCAL TRANSPORTATION PLANNING. A description of how the policies of transportation systems management (TSM) evolved, the role of traffic engineers in TSM, and the relationship of these policies to the TOPICS program are examined. A Federal Highway Administration and Urban Mass Transportation Administration task force developed a concept in which capital and non capital policy actions designed to improve the Management and operations of highway and transit systems were unified to form a single major element of the planning process. TSM provides the opportunity for various participants to work together in a coordinated process of planning and programming. The planning process consists of two major elements. The first is a set of major long-range highway and transit facilities which can expect to be implemented during the planning period. The second element is the TSM element which identifies policies and programs relating to traffic engineering, public transportation, regulations and pricing. In order to have an effective planning process, there must be a drastic shift from the traditional long-range, 20-year forecasts to planning for short-term issues in order to encompass more traffic engineering and transit development. With the elimination of separate categorical funding by TOPICS, most TOPICS projects will be funded under the urban system where there is competition from major new facilities and public transportation projects also eligible under the system, as well as competition for urban system funds between jurisdictions.

Heanue, KE (Federal Highway Administration); Institute of Transportation Engineers, Inc Proceeding 1976, pp 48-50 1, Fig.; Proceedings of the 46th Annual Meeting, Baltimore, Mary-

land August 15-19, 1976.

44 150447 A STATE PERSPECTIVE ON THE IMPACTS OF RECENT FEDERAL TRANSPORTATION: POLICIES AND REGULATIONS ON LOCAL TRANSPORTATION PLANNING. This paper discusses the opportunities and problems that have resulted from Federal policies and regulations and propose solutions to those problems. A major problem which has been highlighted by the DOT planning regulations, is the degree to which the Federal Government should become involved in the promulgation of regulations that intrude upon the responsibilities of state, county, regional and local levels of government. Another related problem from the states' perspective is the apparent complexity in the administration of Federal transportation programs that result from single laws passed by Congress. Furthermore, the use of the Federal Register as a vehicle for promulgating such complex regulations makes it hard to keep up with the new regulations and changes to existing ones. The Massachusetts case is examined as a possible approach and solution to working within the confines of the Federal regulations, but in a manner that best fits the requirements, conditions and traditions of Massachusetts. The following courses of action were suggested as a means of resolving the issues: States should try and take every advantage of the positive aspects of the regulations and concentrate on them; states should avoid strict interpretation of the regulations which result in administrative and institutional procedures that are not compatible with existing traditions and laws; there should be a single DOT field structure which would allow for regulations to be interpreted and implemented with greater ease; and lastly, a coordination between agencies within DOT and between DOT and other Federal departments.

Humphrey, TF (Massachusetts Department of Public Works); Institute of Transportation Engineers, Inc Proceeding 1976, pp 51-54, 1 Fig.; Proceedings of the 46th Annual Meeting, Baltimore, Maryland, August 15-19, 1976.

44 150448 NEW REQUIREMENTS FOR THE METROPOLITAN PLANNING ORGANIZATION (MPO); A FORUM FOR COOPERATIVE DECISION-MAKING OR AN IMPOSSIBLE MANDATE? The significance of the Federal Urban Transportation Planning Regulations with respect to the Metropolitan Planning Organization are reviewed. Also, a description of the issues and problems confronting the MPO and the possibilities of integrating long and short-range planning are included. The new Federal Regulations have several important significances. Because the regulations have emphasized the link between planning and programming, the activities of the MPO will necessarily become more meaningful and relevant. The planning process must also be carried out in at least two dimensions, short-term and long-term. New considerations must be made in the planning process to ensure for the efficiency of the system, air quality improvement and mobility needs of the elderly and handicapped. Some urban regions will have continuing problems in establishing acceptable MPO's which are able to meet their responsibilities. It is suggested that there be a simple MPO

for each urbanized area, established under State law, eligible to receive both highway planning and transit planning funds from DOT, and be recognized by the Office of Management and Budget to perform Federal Aid Review functions. Professional transportation planners also face a major challenge in demonstrating that adequate technical tools can be developed and applied to meet the new Federal mandates. The significance of both long and short-range planning necessitates a conscious policy decision to fix some long-range goals as inputs to the short-term decision making process. In so doing, long-term transportation commitments can be identified and worked toward within a process that will give primary consideration to short-term consequences.

Kochanawski, R (Southwestern Pennsylvania Regional Planning Comm); Institute of Transportation Engineers, Inc Proceeding 1976, pp 55-57; Proceedings of the 46th Annual Meeting, Baltimore, Maryland, August 15-19, 1976.

44 150758 IMPEDIMENTS TO THE IMPLEMENTATION OF DESIRABLE CHANGES IN THE REGULATION OF URBAN PUBLIC TRANSPORTATION. Economic and sociological aspects of transportation regulations are discussed. Impediments to change in regulations are considered to be legal, moral and intellectual in nature. Problems of deregulation, subsidizing and compensation involved in changes in regulation of urban public transportation are discussed.

Feldman, P; Public Research Institute Paper PRI-PP-166, Oct. 1976, 16 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; AD-A033322/9ST, DOTL NTIS

44 154803 TRANSIT AUTHORITY BOARDS OF DIRECTORS: MEMBERSHIP, ORGANIZATION, FUNCTIONS, AND PERFORMANCE. The study was designed to investigate the composition and function of boards of directors of public transit authorities. The objective was not only to identify the sources, education, and experience of transit directors and record the tasks that were within the purview of the board under its policy-making and overseeing roles, but also to compare the boards of directors of different sized transit properties and determine the degree to which the role of the board was altered under different forms of management input. The research tools consisted of structured interviews with the chairman of the board and questionnaires completed by individual directors. Statistical tests consisted mainly of Chi-square measures of association between the questionnaire responses of directors from transit authorities of different sizes and types of management input. The principal findings documented the differences between board members from authorities utilizing a management contract firm versus those authorities having internally developed management.

Horn, KH; Pennsylvania Transportation Institute, Urban Mass Transportation Administration, (UMTA-PA-11-0010) UMTA-PA-11-0010-77-2, Oct. 1976, 383 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265744/3ST

44 155983 ADMINISTERING STATE MASS TRANSPORTATION PROGRAMS IN PENNSYLVANIA. Since Pennsylvania has taken an early lead in assisting local public

transportation systems, its experience in this area should be of interest to other states. This paper presents the findings of a review of the transit related activities carried on by the Pennsylvania Department of Transportation, looking at both institutional arrangements and administrative processes. It points out a number of policy issues concerning the range of functional responsibilities, planning and programming processes, intermodal considerations, funding sources, and intergovernmental relations that may be facing other states in the development of transit programs. /Author/

Poister, TH (Institute of Public Administration) Larson, TD (Pennsylvania Transportation Institute) *Transportation Research Record* No. 603, 1976, pp 1-7, 18 Ref.; ORDER FROM: TRB Publications Off

44 156460 PSV'S AND THE LAW. The origins of licensing for public service vehicles are considered, together with the reasons for which it was first introduced: the securing of public safety and elimination of wasteful competition between transport operators. The social and legislative changes that have taken place since licensing was introduced are discussed, and the extent to which the system still satisfies its original objective is examined. /TRRL/

Thorpe, M Morgan, B; Confederation of British Road Passenger Transport Monograph Sept. 1976, 6 pp; ACKNOWLEDGMENT: TRRL (IRRD-224815)

44 157177 ECONOMIC EVALUATION OF TAXICAB REGULATION. Economic efficiency and equity are evaluated by comparing a theoretical ideal market for taxi services with apparent actual performance, based upon an examination of the codes of a selected sample of cities along with other supplementary information. Two general conclusions reinforce the results of previous studies of taxi regulation: (1) market behavior is readily explainable—at least at the level presented here—in terms of economic analysis, including the organizational structure of the industry and the consequences of monopoly power; and (2) regulation of the industry, while probably necessary, has contributed greatly to the demonstrable inefficiencies that lead to higher prices and lower service than is desirable. /Author/

Lee, D, Jr Valle, A; Iowa University Tech Report No. 70, 22 pp, 4 Fig., 1 Tab., 9 Ref.

44 157194 CITIZEN SUITS AND THE SHIFTING FOCUS OF TRANSPORTATION PLANNING. This paper attempts to present case interpretations of federal planning statutes in a more easily understandable form. The objectives of this paper are first, to clarify the meaning of the transportation planning process condition as well as several other provisions, and second, to demonstrate some of the ways in which recent federal legislation has contributed to changing the premises and procedures of transportation decision making. Emphasis is placed upon how local citizens have affected this decision-making process by seeking to halt transportation construction. This paper is separated into the following five sections: A historical development of the federal highway and mass transit programs; the requirement of standing and the scope of judicial

review; clarification of the transportation planning process requirement of the federal highway and mass transit act; federal statutory requirements for public hearings; and, an analysis of the effects of these statutory provisions upon the urban and mass transit decision-making process. Peterson, WC; Iowa University Tech. Rpt. No. 79, July 1976, 67 pp, 2 Fig., Refs., 9 App.

44 167084 THE URBAN CONSORTIUM AND ITS TRANSPORTATION TASK FORCE-A FEDERAL PERSPECTIVE. The report provides an overview of the U. S. Department of Transportation's cooperative interactions with the Transportation Task Force of the Urban Consortium for Technology Initiatives. The Consortium is a coalition of 34 major urban governments which is developing an agenda of research, development, and demonstration needs and data packages in priority need areas. The report describes the logic which led to the formation of the Consortium, the various management mechanisms which evolved, the procurement and administrative approaches used, and the types of outputs which are being produced.

Linhares, AB Paulhus, NGJ; Office of Systems Development and Technology Sumry Rpt. DOT-TST-77-45, July 1977, 24 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271282/6ST

44 168902 THE IMPACT OF BART'S BOND ISSUE ON REGIONAL PUBLIC FINANCING. This report documents the study of the impact of BART's General Obligation bond financing on the cost of public borrowing in the San Francisco Bay Area and the study of the magnitude of the debt on the financing of other public projects. The study comprises a statistical search to see if borrowing cost changes appear related to the level of BART debt, and a series of interviews and surveys among leaders in the municipal bond industry to see what, if any, impact they perceived in the 1962-1972 period. Methodology, results and findings are reported. (Color illustrations reproduced in black and white)

O'Neil, RK Long, CA; Metropolitan Transportation Commission, Bartle Wells Associates, McDonald and Grefe, Incorporated, Department of Transportation, Department of Housing and Urban Development Tech Memo DOT-BIP-TM-27-7-77, Aug. 1977, 142 pp; Prepared by Bartle Wells Associates, San Francisco, Calif. Prepared in cooperation with McDonald and Grefe, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273387/1ST, DOTL NTIS

44 168903 IMPACTS OF BART ON BAY AREA POLITICAL INSTITUTIONS. The report describes the impacts of BART upon local political institutions. It describes the effects of BART and BART related phenomena upon the process of political mobilization, political organization, and local political activity within two case study communities proximate to BART stations. Policy implications of the research findings are also included.

Duster, T; Metropolitan Transportation Commission, Jefferson Associates, Incorporated, Department of Transportation, Department of

Housing and Urban Development Tech Memo DOT-BIP-TM-32-6-77, May 1977, 60 pp; Prepared by Jefferson Associates, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-273389/7ST, DOTL NTIS

44 170920 MASS TRANSIT REGULATION: PROCEDURE GOVERNS SUBSTANCE. The question is asked: if public ownership is in the public interest, then why does regulatory activity proliferate? The observation is made that instead of assuming that the public transit manager knows the task, governments layer him with constraints—often conflicting and unreasonable. It is noted that regulation is inevitable but more rational applications can be expected in the future. The Federal aspect of regulation is discussed as well as that of labor. The effect of standards promulgated by the Occupational Safety and Health Administration and by the Environmental Protection Agency are discussed as well as interstate acts and the state regulatory activities. It is noted that the situation should improve in the future as UMTA is simplifying its grant administration procedures. The agency is being restructured to place more authority in its regional offices, which will mean closer coordination between transit authorities and UMTA officials. Regulatory reform is well underway with the Rail Revitalization and Regulatory Reform Act of 1976. State governments are becoming more active in transit matters and are also recognizing the need for uniform regulatory control.

Mauro, GT (Simpson and Curtin Incorporated) *Government Executive* Vol. 9 No. 11, Nov. 1977, pp 34-38, 1 Phot.

44 172907 UNIFYING TRANSPORTATION MANAGEMENT IN URBAN AREAS. The transportation areas that would need management (traffic engineering, traffic regulation, traffic enforcement, traffic restraint, transit operations, zoning and land-use control, high occupancy vehicles, construction of new or reconstruction of old facilities) are identified, and developments which have led to the recognition for the need for unification of urban transportation are listed. It is noted that an integrated approach to transportation management is not only possible but overdue. To bring about the necessary unification, some elements are essential. Thus, local officials must be permitted a strong voice in developing plans; they must set the goals for the community. State and federal officials must be flexible in enforcing their regulations, and the public must be involved in the plan development and to some extent, implementation process. The public, business community, transit operators, traffic engineers, and other major street users—all should be informed and consulted. Plan elements must be coordinated to avoid abruptness in implementation. The plan must have specific objectives and priorities for each objective. Tools and techniques must be developed to measure progress. It is important that real problems that need solution be addressed and not problems that may only seem to exist.

Johns, KB *Transportation Research News* No. 74, Feb. 1978, pp 2-5, 6 Phot., 2 Ref.; ORDER FROM: TRB Publications Off

44 173060 URBAN TRANSPORT ECONOMICS. While the book attempts to provide an understanding of urban transport economics, it also considers the effects of social, political and institutional constraints. The following chapters discuss the allocation of resources within the transport sector of the economy and its relationship to location and urban structures: Resource Allocation, price theory and policy, Kolsen, H and Docwra, G; The pricing of urban transport: Some implications of recent theory, Forsyth, P; Cost-benefit analysis, Hotchkess, W; The evaluation of urban transport improvements, Stanley, J and Nash, C; Demand for urban passenger transport, Hensher, D; Urban freight, Hicks, S; Integrated urban transport and location analysis, Hansen, S; Transport and land-use determinants of urban structure, Paterson, J; Transport decision-making and its spatial repercussions, Rimmer, P; The sociology of urban transport planning: A socio-political perspective, Healey, P. The urban transportation study, Duhs, A and Beggs, J.

Cambridge University Press Monograph 1977, 277 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 229573); ORDER FROM: Cambridge University Press, 200 Euston Road, London NW1, England; B7712602

44 175970 EQUITY OF TRANSIT SERVICE. VOLUME I [Final rept. Sep 75-Jan 77]. Recipients of grants from the Urban Mass Transportation Administration (UMTA) are required to comply with Title VI of the Civil Rights Act of 1964, as amended. The purpose of this research project, conducted for UMTA's Office of Civil Rights, was to develop a set of guidelines for UMTA grant recipients to use in applying for certification of compliance with Title VI. This study presents guidelines for grant recipients to use in submitting proof of compliance with Title VI, and it provides standards for Office of Civil Rights' reviewers to apply to the material submitted to make a determination of compliance. The guidelines and standards were developed after field surveys and pilot testing.

Miller, DR; Rouse (W.V.) Associates Ltd., Evanston, Ill.*Urban, Mass Transportation Administration, Washington, D.C. Office of Civil Rights., (UMTA-IT-09-9004) UMTA-IT-09-9004-78-1, June 1977, 26p; See also Volume 2, PB-279 074. Contract DOT-UT-50029; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279073/1ST

44 176473 URBAN TRANSPORTATION ECONOMICS. An attempt has been made to examine long-term forces in the urban transportation market that generate chronic transit deficits and to evaluate alternative courses of action to improve economic efficiency and financial viability at the local level. This report synthesizes theory and practice to produce a practical working program for planning, implementing and administering programs at the local, state, and federal levels. The study focuses on the financial difficulties that contribute to the deterioration of services, the causes of deficits, alternative programs to assist cities to reduce their dependence on federal financial assistance, the development of a framework to assist different levels of government to evaluate urban transportation costs versus revenues, and the summarizing of the state

of the art in this area. The proceedings are presented of five 2-to 3-day workshops. The workshop on urban transportation pricing considered several aspects of various alternatives. The workshop on economic regulation of urban public transportation considered how current regulations may be amended to facilitate more efficient workable public transportation. The workshop on labor relations issues was designed to identify problems and alternatives to current labor practices, explore increased labor involvement, as well as other aspects of labor relations. The workshop on measuring the effectiveness of transit marketing considered how public transportation may be managed, planned, and operated to provide the desired service and be financially healthy. The workshop on government responsibilities for financing efficient transportation examined the means available to local government to bring about the changes recommended in earlier workshops.

Transportation Research Board Special Report No. 181, 1978, 260 p., Figs., Tabs., Refs. Proceedings of five workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176478 WHY PRICE URBAN TRANSPORTATION SERVICES? This discussion of transportation subsidies and free transportation also lists the assumptions that underlie the prescription to price any service and particularly to price the marginal unit or incremental quality of any such service at the marginal or incremental cost of supplying it. It is noted that the strongest case for assigning any price presupposes determining the economically efficient price. The arguments for transport subsidies are discussed. Assuming that there is subsidization, at least to some degree, the question is asked if there is any possible aspect of free transportation that could maximize the benefit to be derived from a given subsidy. The two most likely candidates for this kind of freedom appear to be marginal free transportation and differential free transportation.

Nelson, JR (Amherst College) *Transportation Research Board Special Report No. 181, 1978, pp 17-20; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off*

44 176482 SUPPLEMENTARY LICENSING: AN EVALUATION. The Greater London Council (GLC) recently published the results of a study on supplementary licensing, a proposed new method of traffic restraint that would require drivers of certain vehicles to purchase special licenses to use their vehicles at specified times in designated areas. The study considered the pro-

posal as a means of providing traffic restraint in inner London; reviewed the effects of a number of alternative schemes on traffic patterns, on the environment and on the social and commercial framework of London; and determined the practical requirements of these alternatives. This article summarizes the methods used and the results obtained. The study concluded that all-day control in the central area would be the most efficient form of control, unless environmental gains from the extension of control to the inner area in the peak could be shown to outweigh the reduction in other benefits and the increased staffing problems. The GLC decided in July 1975 not to proceed with the supplementary licensing but to seek legislation to allow it to tax private parking spaces. The reasons given for rejecting the supplementary licensing were the adverse effect on the lower income motorist and on those with special needs and the problems of enforcement. The GLC has asked for information on similar schemes being considered or implemented elsewhere and for further evaluation of alternative measures that would overcome the problems it had identified.

May, AD (Greater London Council) *Transportation Research Board Special Report No. 181, 1978, pp 30-38, 3 Fig., 4 Tab., 18 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off*

44 176487 SUMMARY OF BARRIERS TO IMPLEMENTING PRICING INNOVATION. This article summarizes the barriers to implementing pricing innovation. The main barrier that is noted is on the political front. Although the federal government has provided incentive funds to explore the potentials and DOT has urged cities to adopt measures of restraint by pricing, there is still a great deal of reluctance to do so. The reason for this is that although the overall appeal of road pricing is efficiency and avoidance of waste, the benefits are to the community at large, at the expense of a small vocal minority. A solution to this problem is to identify the negative impacts that might be due to misunderstanding, bad planning or unforeseen contingencies. A more lasting solution is to develop a system such that the disaffected motorists would be better off than under the unpriced system. The majority opinion, it is noted, favors the approach of trying to persuade the majority that it is in their best interests to have some constraints. Many doubt however, that such persuasion will be effective.

Walters, AA (International Bank for Reconstruction & Development) *Transportation Research Board Special Report No. 181, 1978, p 50; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Admin-*

istration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176494 ISSUES IN THE ECONOMIC REGULATION OF URBAN PUBLIC TRANSPORTATION. This paper considers the question of more versus less regulation and the role of alternative institutional approaches. Provisions for entry and exit from urban transportation markets are discussed, as well as the constraints and incentives experienced by existing carriers. A fundamental difference is noted regarding the potential of competition as an alternative to regulation and planning as an incentive in present institutions for decision making in urban transportation. The issue of entry and exit in the provision of urban transportation service is closely related to the issue of the desirability of competition. The potential of competitive alternatives to conventional fixed-route transit-systems was discussed, and ride-sharing systems, jitneys, fee-paid carpooling, commuter bus operations and special paratransit services were considered. Both public and private operators expressed the view that regulation unduly restricted the prerogatives of management and was unresponsive to public needs. Support was expressed for greater flexibility for existing operators both transit and taxi, to experiment with changes in fares and service without being locked into the change. Comments are made on the brokerage concept. It is noted that dissatisfaction with the regulatory system appears to reflect the inherent, irreconcilable contradictions of competing objectives by participants in the regulatory process as well as the limitations of the institutional structures. Much of the disagreement about desirable institutional structures is based in part on significant differences in objective for urban transportation. New mechanisms must be developed to resolve the conflicts between certificated carriers and new entrants and for addressing the problem of how to regulate new modal alternatives.

Tye, WB (Charles River Associates, Incorporated) *Transportation Research Board Special Report No. 181, 1978, pp 68-71; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off*

44 176495 ISSUES OF REGULATION UNDER PRIVATE AND PUBLIC OWNERSHIP. This paper discusses the transition from private to public ownership, and comments on the regulation under private and public ownership. The shift from private to public operations changed the focus and the standards for the evaluation of systems. The question that is now raised related to how many people the system serves, how well it serves them, and the capacity of the policy, regulatory and management structure to meet the objectives established for public transportation

within the community. Regulation under private ownership involved regulation related to fare and the service (quantity, quality, safety) provided by private transit companies. When privately owned systems become public, the authorities in many situations were vested with the power, authority, and jurisdiction to exercise the functions necessary for maintaining public transportation as an ongoing function, sometimes restricted only by the intent that the system should be self-financing and self-liquidating. Many regional authorities have been given the power to regulate not only their own operations but also those of other systems that operate in their areas. Some transit systems suffer from the requirement that permission be requested from several levels of authority before decisions are made. Many authorities have been faced with making major regulatory decisions without having the needed expertise and data to handle the question adequately.

Buchanan, RC (National City Management Company) *Transportation Research Board Special Report No. 181, 1978, pp 71-73*; This paper appeared in *Transportation Research Board Special Report No. 181, Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176496 REGULATION OF URBAN TRANSPORTATION. It is proposed here that the appropriate course for public policy is to undo the damage done in the past (by regulation of transit) by abolishing the transit authorities, ending the Urban Mass Transportation Assistance Program, and allowing competitive markets in urban transportation. Regulation of the electric street railway operation is discussed. The power of the regulatory commissions depended in part on their statutory authorities and in part on their common-law obligations to provide due process of law to the regulated firms. The question of determining what was due process is discussed with reference to the case of *Smith v. Ames* (1898). The emergence of the jitney in 1914 in Los Angeles is described as well as its subsequent demise. Putting down the jitney meant that the public would turn to the automobile as a private carrier rather than as a common carrier. It also caused the conversion from streetcar to bus to be made within the economic organization of the street railways. Increasingly, the regulatory commissions were confronted with problems of simply keeping the transit companies in business. The conversion of most major transit systems to public ownership has reduced the significance of regulation. It is noted that American transit enterprises remain a monopolistic organization; the transit industry is overcapitalized—a situation which the federal transit subsidy program tends to make worse. Also, rate-base regulation tends to make regulated industries more capital intensive than they would otherwise be.

Hilton, GW (California University, Los Angeles) *Transportation Research Board Special Report No. 181, 1978, pp 73-75*; This paper appeared in *Transportation Research Board Special Report No. 181, Urban Transportation Economics*. It

contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176497 ELIMINATE, DECREASE, OR IMPROVE REGULATION OF URBAN PUBLIC TRANSPORTATION? The constraints that regulation represents and the concepts on which they are based are discussed, and the merits and limitations of the free market in urban transportation are evaluated. The family of urban transportation modes, the characteristics of each mode and the regulatory conditions necessary to yield the best service are reviewed. The paper noted that discussions of regulation in urban transportation actually focus only on paratransit and are therefore relevant only to small cities and low-density areas, with the exception of taxis, which are applicable to all cities. Urban transportation is an area where free market does not exist. The paper also notes that revision of some regulatory practices (decrease in some areas and increase in other areas) is desirable. It is pointed out that conditions in Western European cities are very similar to our cities, and therefore experiences in cities with better transportation than ours are highly relevant to us. The goal of public regulation is to ensure adequate public service and protect public interest; this can be achieved by full coordination between modes, between public and private transportation, as well as coordination of regulation with short-and long-range planning.

Vuchic, VR (Pennsylvania University, Philadelphia) *Transportation Research Board Special Report No. 181, 1978, pp 76-79, 11 Ref.*; This paper appeared in *Transportation Research Board Special Report No. 181, Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176498 ECONOMIC REGULATION OF URBAN PUBLIC TRANSPORTATION: AN OPERATOR'S PERSPECTIVE. The use of the term economic regulation is here broadened to encompass the application of rules or regulations from any source that affects the allocation of economic resources committed to public transportation in urban areas. It is noted that economic regulation as applied to public transportation has failed and that there are 2 reasons for the failure: the regulatory frame of reference has been too narrow; the application of the rules and regulations has been too fragmented. Control of competition is also regarded to be ineffective because the concept of the competitive universe is too restrictive. The determination of what is to be regulated, by whom, in

what frame of reference, and within what guidelines is discussed, and concern is expressed for whether such an evaluation is for or against the public interest. Actions in the right direction are listed: UMTA could sponsor a project to inventory and analyze direct and indirect regulatory constraints; UMTA could be the clearinghouse for changes or proposed changes in the regulations to attempt to determine costs and other impacts; These regulatory constraints should be analyzed to determine whether they are complementary with or contrary to the objectives of providing mobility in urban areas; UMTA's research programs and budget could be used to acquire better information and understanding of the interrelationships between transportation and nontransportation goals and criteria.

Gambaccini, LJ (Port Authority Trans-Hudson Corporation) *Transportation Research Board Special Report No. 181, 1978, pp 80-83, 1 Ref.*; This paper appeared in *Transportation Research Board Special Report No. 181, Urban Transportation Economics*. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176500 REGULATORY CONSIDERATIONS FOR ALTERNATIVES TO CONVENTIONAL TRANSIT SYSTEMS. The Reston Commuter Bus System is described as an example of a technically and financially sound transportation system being threatened by institutional policies that were originally designed to preserve public transportation. Details of the start of the service are given. The service was started in 1968 and was designed to serve commuters effectively and provide a realistic alternative to driving. By 1972 the service attracted more than 1,000 people (2,000 daily trips). However, transit ridership in the Washington area was declining and public acquisition was imminent. In 1973, the private carrier that served Reston was taken over by the Washington Metropolitan Area Transit Authority (WMATA). The WMATA pricing policies and the subsidizing of the Commuter System by Fairfax County are described. In 1975 the Reston Commuter Bus found a private carrier, Colonial Transit, which proposed to provide buses at only 62 percent of WMATA's price. Reston Commuter Bus had to prove to the Washington Metropolitan Area Transit Commission (WMATC) that there was a public need for Colonial to provide the service. The arguments for and against this contention are presented. The certificate of public convenience and necessity was issued in September 1975. It is noted in conclusion that regulatory procedures can serve to promote as well as serve as a check and balance on transit authorities. Also, since the justification for WMATA's opposition to Colonial Transit was based on the concept of a regional approach to public transit, this concept needs to be reexamined.

Reimer, R (Commonwealth Research Corporation) *Transportation Research Board Special Report No. 181, 1978, pp 95-97*; This paper appeared in *Transportation Research Board Special Report No. 181, Urban Transportation Eco-*

nomics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176501 CASE STUDIES OF TAXICAB REGULATION IN THE UNITED STATES.

The three traditional aspects of municipal taxi regulation (entry control, ownership and service standards) are considered, and the empirical evidence available on the actual relationships among these three variables in operation at the local level are reviewed. A comparison of the number of taxis per 1,000 people for 11 American cities (8 that have and 3 that do not have entry restrictions) is tabulated and discussed. Empirical analyses have prompted transportation planners to argue for deregulation of entry into the taxi industry at the local level. Arguments by the organized taxi industry against such deregulation are presented. Police departments and regulatory agencies agree with the industry position on deregulation. Some cities are considering permitting leasing arrangements as a way to: (1) find a middle position between free entry and tight control; (2) meet the demands of the organized taxi industry. These lead to new issues about the significance of vehicle-leasing restrictions in the cities. Many cities are also facing a different but complementary set of institutional issues because of a concern for the transportation disadvantage.

Rosenbloom, S (Texas University, Austin) *Transportation Research Board Special Report* No. 181, 1978, pp 97-101, 2 Tab., 9 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176502 INSTITUTIONAL ISSUES IN COMMUTER RIDE SHARING.

Successful commuter programs (Tennessee Valley Authority, TVA; 3M Company, Minneapolis; Continental Oil Company, (CONCO) are described, and the institutional issues involved are discussed. Updating laws and working toward systematic resolution of institutional issues the affect ride sharing is now established. For example, states have passed new laws that classify van pools as car pools which permit churches to donate parking facilities for park and ride lots without risking their tax-exempt status, and laws that require parking garages to provide the needed height for commuter vans. The liabilities of car poolers and van poolers, the exchange of money, driver compensation, and van pool insurance are discussed. In Minnesota, commuter vans are exempted from regulation by the Public Service

Commission. At present, adequate private capital to promote and capitalize on commuter ride sharing may be severely affected by regulations that limit legal operations.

Pratsch, LW (Federal Energy Administration) *Transportation Research Board Special Report* No. 181, 1978, pp 101-104, 3 Tab., 4 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176503 REGULATING AND INSURING PREARRANGED RIDE SHARING.

An attempt is made here to: describe the range of approaches to regulating and insuring prearranged ride sharing; summarize the arguments that have been put forward on behalf of various approaches; and to determine which approaches are being adopted at the state level where most of the decisions on regulatory practice are made. Four key characteristics are used to classify ride-sharing arrangements and the regulatory status of those arrangements are described. The range of possible regulatory approaches are considered, as well as the arguments for and against regulation. A survey of the regulatory and insurance status of car pools, van pools and subscription buses in 12 states, indicates a very mixed situation. A sensitivity to the interests of existing common carriers is noted. The problems presented by regulation under the best conditions, have led to a trend to deregulate van pools. Discount and liability premium for car pools are noted. The van pool insurance situation is very confused. There are several approaches to the van-pool insurance problem. The most promising is to develop a new insurance classification especially for van pools. The relationship between the vehicle owner and rider, and the degree of control the owner-operator and the insurer have over the driver are also discussed. Other approaches discussed here include: self-insurance for large employers programs; and (as in Minnesota) the amendment of the no-fault statute so that van pools will be classified as private automobiles for purposes of insurance.

Womack, JP (Massachusetts Institute of Technology) *Transportation Research Board Special Report* No. 181, 1978, pp 104-117, 4 Tab.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176504 CASE STUDY OF THE PROBLEMS OF TRANSIT REGULATION IN WASHINGTON, D.C.. The enactment of the statute and agency, the Washington Metropolitan Area Transit Regulation compact and the Washington Metropolitan Area Transit Commission (WMATC) are described, and the WMATC's regulatory performance is reviewed. It is noted that Washington's transit regulatory scheme excludes essential transportation elements from the scheme, has inappropriate protection for existing operators, and provides only limited enforcement capability to the responsible regulatory agency. The regulatory agency for the implementation of the scheme was limited in its outlook and the capabilities of its staff. Its activities were further narrowed by events to a concentration on rate matters to the exclusion of the pursuit of service improvements. Without the cooperation of the regulated companies, it is powerless to effect service improvements. Those segments of the for-hire transportation operations that come under the most active (though still limited) regulation, i.e. regular-route bus operators, collapsed within a decade. Those that did not, i.e., taxicabs, charter bus operators, and sightseeing companies, survived as private operators.

Schneider, DN, Jr (District of Columbia Department of Transportation) *Transportation Research Board Special Report* No. 181, 1978, pp 118-120

This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176505 WHY IS IT DIFFICULT TO CHANGE REGULATION.

This discussion of obstacles to change regulations focuses on factors related to law, morality (problem of vested interests), and the intellectual problem of the desire for order. It is noted that one way to promote progress is to try to pay off vested interest; for example, compensating medallion holders for the fall in medallion price resulting from allowing free entry into taxicab operations in New York. It is a mistake to assume that the regulated firms have benefited long enough to call for deregulation without compensation. If entry leads to the end of publicly operated buses, the only organized interest group associated with the industry will be labor. If change results in loss to some workers, then they could be compensated. The case of subsidized riders is discussed, and it is stressed that the few who are subsidized are supported by the public at large, and it is the public that must be satisfied that the few are being treated fairly.

Feldman, P (Public Research Institute) *Transportation Research Board Special Report* No. 181, 1978, pp 121-123; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the

Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176507 REGULATORY BARRIERS TO INNOVATION AND THE KNOXVILLE EXPERIENCE. This paper makes the point that urban transportation is shifting to services that are more flexible and labor intensive and that use smaller vehicles. It is also noted that existing regulation was designed to protect those who are dependent on public transportation with little regard for fuel and highway efficiency. The transportation regulatory commissions have no power or authority other than that of prohibiting the operation of for-hire carriage that is not consistent with the desires of the regulatory agency. The regulatory agencies are virtually powerless to ensure passenger service to the public, and they are reluctant to allow experimental demonstrations for fear the public will be left without even the minimal service after funding for the demonstration is terminated. Since regulatory authorities are bound by very specific laws, regulatory exemptions must come from the state legislature rather than from the regulatory bodies themselves. Perhaps the most restrictive regulatory bodies currently in existence are the regional transportation authorities, which may have very broad regulatory powers as well as operational authority. The development of simpler more specialized services is traced in 3 overlapping stages. The ways in which regulations strived to achieve their goals are described, and the regulatory power of local transport authorities is discussed. In Knoxville, Tennessee, a brokerage concept is in operation in which the role of transit is to meet public needs rather than promote one type of service. This concept developed because of the close cooperation between the Knoxville Transit Authority (KTA), several firms in the city and the University of Tennessee.

Davis, FW, Jr (Tennessee University, Knoxville) *Transportation Research Board Special Report* No. 181, 1978, pp 129-133, 6 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176508 THE ROLE OF PUBLIC UTILITY COMMISSIONS IN TRANSIT REGULATION. The opinion is expressed that there is no longer a significant role for public utility commissions (BUCs) in the daily operations of transit authorities. The PUCs must continue to exercise controls over the right of entry into the business and the right of exit. The operations of transit authorities should be subjected to specific controls in the form of service goals, service standard, and performance standards. Such standards should address every aspect of transit service: the number of standing passengers, owl service, the

spacing of routes and bus stops, the percentage of direct and transfer services, new service, and the cleaning and maintenance of buses. Performance and policy aspects that must be addressed are also listed.

Ison, D (Washington Metropolitan Area Transit Authority) *Transportation Research Board Special Report* No. 181, 1978, pp 133-134; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176523 CONTROLLING TRANSIT COSTS IN MEDIUM-SIZED CITIES. It is noted that there are areas of potential productivity gain and cost control in every transit operation. Some examples of these areas include: transportation, maintenance, labor relations, and personnel budget and finance and marketing and planning. Examples of areas in which significant cost reductions were achieved are briefly worked. The development of a better servicing plan, the bringing back, after cutback, of some operators for part-time work and analysis of absenteeism and overtime pay, are outlined, as well as the refining of the scope of a marketing budget, checking dishonesty in the collection of fares and cost, reducing operator's platform time following a study of servicing time, and changing dispatching procedures. Other successful cases outlined here relate to promotional and marketing programs, analysis of accident data, retention of operators, reclamation of wash and rinse water, a lower initial wage rate with periodic progression, and programs for the undisciplined use of sick leave and habitual late comers. Basic tenets that should be considered in these programs are listed.

Buchanan, RC (ATE Management and Service Company) *Transportation Research Board Special Report* No. 181, 1978, pp 216-217; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 176536 TRANSIT DEFICITS AND PUBLIC POLICY. Three conclusions are drawn from the survey of the transit deficit situation: The transit deficits reflect public-policy that fares should not bear the full burden of transit costs, that levels of service should be maintained or raised, and the transit is a public service that should be supported through taxes rather than user charges alone; given certain assumptions about the course of inflation and other factors, transit deficits will probably rise about 15 percent per year in the next few years; the cities have a

continuing commitment to public transportation and to improved transportation service. Current and impending issues discussed against this backdrop are: the effect of the residents balance budget policy, the social benefits of the transit systems, the increase of the local share of the transit deficits, the role of political leaders in making public transportation decisions, and the fact that money does not solve all problems-poor design may be the foremost problem.

Aex, RP (Knoxville, City of, Tennessee) *Transportation Research Board Special Report* No. 181, 1978, pp 253-254; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

44 178772 EQUITY OF TRANSIT SERVICE: VOLUMES I AND II. Recipients of grants from the Urban Mass Transportation Administration (UMTA) are required to comply with Title VI of the Civil Rights Act of 1964, as amended. The purpose of this research project, conducted for UMTA's Office of Civil Rights, was to develop a set of guidelines for UMTA grant recipients to use in applying for certification of compliance with Title VI. This study presents guidelines for grant recipients to use in submitting proof of compliance with Title VI, and it provides standards for Office of Civil Rights' reviewers to apply to the material submitted to make a determination of compliance. The guidelines and standards were developed after field surveys and pilot testing. This study consists of two volumes. Volume I contains an Executive Summary and Guidelines for Applicants. Volume I summarizes the project, that is, it summarizes the history, scope, and findings of research conducted on the subject of equity in transit service during the period from September 1975 to January 1977. Guidelines in Volume I are to be used by urbanized areas applying for annual certification of compliance with Title VI. There are four sections to the guidelines with instructions preceding each section. Volume II, a separate report, gives detailed information on the field studies and their results. Volume II presents the rationale for each data item requested and compares the guidelines with the previously requested material (Exhibit N). Review standards are also in Volume II. The Appendixes in Volume II contain a detailed discussion of the field tests and a listing of the 5 cities visited as well as the persons contacted during the field visits.

Miller, DR ; Rouse (WV) Associates, Limited, (IT-09-9004) Final Rpt. UMTA-IT-09-9004-78-1, UMTA-IT-09-9004-78-2, June 1977, 124 pp; This report was sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-UT-50029; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279073, PB-279074

44 179363 TRANSPORTATION SYSTEM MANAGEMENT ELEMENT OF THE RHODE ISLAND GROUND TRANSPORTATION PLAN, AND APPENDIX I. This report presents the short-range ground transportation development for the state of Rhode Island. The recommendations are based on an in-depth analysis of existing statewide transportation conditions, and are consistent with other related Statewide Planning Program publications. It is designed to guide and assist the efforts of the state Department of Transportation and the Rhode Island Public Transit Authority to make efficient use of existing transportation resources through improved traffic engineering, public transportation, regulation, pricing, management, operations and other means not including new facilities, and to qualify the state for federal financing under Urban Mass Transportation Administration and Federal Highway Administration programs. /Author/

Rhode Island Statewide Planning Program Report Number 25, Nov. 1977, 413 pp, Figs., Tabs.; Work project No. FRC-IGA-091-07, Tasks 02058X and 05068X.; ORDER FROM: Rhode Island Statewide Planning Program, 265 Melrose Street, Providence, Rhode Island, 02907

44 179527 THE ROLE OF BRITISH RAIL IN PUBLIC TRANSPORT. THE GOVERNMENT'S RESPONSE TO THE FIRST REPORT FROM THE SELECT COMMITTEE ON NATIONALISED INDUSTRIES: SESSION 1976-77 HC305. This report is the response by the government to the first report from the select committee on nationalised industries (HC305) on the role of British rail in public transport. The first part of the response gives a summary of the government's view of the report as a whole. Part II is a commentary on the various groups of themes and recommendations which emerge from the report and includes comment on the following topics: demand for rail services, Forecasting demand, international comparisons, inter-urban passenger transport, freight and parcels, capital structures, pricing, coordination, manpower and productivity, investment. Part III deals with further recommendations. The British Railways Board's own observations are also included as an annex to the government's response to facilitate discussion of the report.

Her Majesty's Stationery Office Paper NCMND 7038, Nov. 1977, 41 pp, 5 Tab.; See also RRIS 25 163875; Bulletin 7801.; ACKNOWLEDGMENT: TRRL (IRRD 231339); ORDER FROM: Pendragon House, Incorporated, P.O. Box 255, Old Mystic, Connecticut, 06372

44 181334 THE IMPACT OF BART ON GOVERNMENTAL ORGANIZATION AND OPERATIONS. The report presents an assessment of BART's impact on local, regional and state governmental structure, organization and operations; on the formation and cohesion of private and community groups and on municipal incorporation attempts in the BART District counties. Kelley, EW Graebner, LS Giles, PB; Metropolitan Transportation Commission, Booz-Allen and Hamilton, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-29-8-77, June 1977, 70 pp; Prepared by Booz, Allen and Hamilton, Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban

Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282944/8ST

44 181742 OHIO PUPIL TRANSPORTATION LAWS AND REGULATIONS, 1975. Contents: Boards and Superintendents (County Board of Education, City and Exempted Village Superintendents; Local, city and exempted village School Board responsibilities EDb-919-02); Transportation personnel (The transportation administrator, School bus driver qualifications EDb-919-04); Operational regulations EDb-919-05 (Operations and Driving, Pupil behavior EDb-919-06, School bus accident reporting EDb-919-07, Loading and unloading at school facilities EDb-919-08, School bus stops EDb-919-09, Pupil loading- capacity EDb-919-10, Non-routine use of buses EDb-919-11); General regulations (Transporting Equipment, Emergency drills, Forbidden cargo, Unauthorized passengers); Ohio Attorney General's opinions; Statutory-Laws.

Ohio Dept. of Education, Columbus.**Ohio Dept. of Highway Safety, Columbus. 1975, 46p Prepared in cooperation with Ohio Dept. of Highway Safety, Columbus.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-281440/8ST

44 183101 APTA LEGISLATIVE PROGRAM. A five-year public transit assistance program that would cost \$20-billion has been proposed by the American Public Transit Association (APTA) Board of Directors as part of a comprehensive legislative policy statement. The board, meeting at the APTA's national convention in Atlanta recently, also outlined a five-year, \$5-billion urban streets and highway program and called on the federal government to provide 100-percent funding for all public transit costs associated with providing services and accessibility to elderly and handicapped persons. The APTA circulated an overview of the policy statement to members and asked them to lobby on its behalf. /GMRL/

Metro Vol. 73 No. 6, Nov. 1977, pp 18-19 ACKNOWLEDGMENT:

44 186189 OPERATING MULTI-MODAL URBAN TRANSPORTATION SYSTEMS. The project examines the state-of-the-art in multi-modal urban transportation system operations, proposes and assesses eight model institutional arrangements for more efficient and effective urban transportation operations, assesses the influence of Federal policies in this area, and proposes possible changes to enhance coordination of urban transportation services. The report concludes that some of the more important elements determining the success of efforts to coordinate urban transportation operations are institutional structure, responsibility for coordination, incentives operating on each agency and individual, patterns of personal relationships, and specific mechanisms for coordination. Potential Federal actions and incentives for promoting coordinated urban transportation operations are proposed.

Petersilia, M Reno, A; System Design Concepts, Incorporated, Department of Transportation Final Rpt. DOT/P/10-78/41, Dec. 1977, 218 p.; Contract DOT-OS-60518; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287294/3ST, DOTL NTIS

44 191910 CONSOLIDATED AGENCIES TRANSPORTATION SYSTEM. The Consolidated Agencies Transportation System, a department of the Brevard County, Fla., Board of County Commissioners providing free transportation to the elderly, the handicapped, and the indigent is described. The philosophy of the system is to supply specialized transportation according to individual need at a low cost. The system began in 1971 as a limited service for teenaged mothers and expanded gradually until 1974, when the county assumed control of the system, taking over vehicles from separate county agencies. Service by an 11-bus fleet of small, wheel-chair accessible vehicles is offered 10 hours a day, with regular subscription service and with flexible routes in the middle of the day for nonregular riders; buses are radio-equipped. Administrative and planning functions are assumed by the director and business office staff, and operations functions, by a supervisor responsible to the director, a radio dispatcher, drivers, and assistant drivers; an external advisory committee assists in assurance of quality service. Drivers and assistants must be State-licensed and have completed a defensive driver course and basic first aid training. Funds derive from the Federal Government, the State of Florida, the Board of County Commissioners, United Way, and local donations; costs for sponsored riders, i.e., clients of a particular program, are reimbursed through a service contract with a specific agency. Such multiple-source funding protects against fund cuts, but creates complex guideline problems. Although private taxis, private bus lines, and public bus lines serve the same area, two studies show that little overlapping occurs and that conflicts should be resolved through the Metropolitan Planning Organization.

Consolidated Agencies Transportation System 1978, 21 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HRP-0027527/1ST

44 261519 URBAN TRANSPORT: STUDIES IN ECONOMIC POLICY. CHAPTER 11: REGULATION OF TAXIS. This paper, first published in 1973, discusses in the context of the London trade, how far the regulation of taxis is desirable. Regulatory instruments fall into three broad classes-monopoly rights, entry conditions and fare control. The London industry which has free entry, i.e. no restriction on numbers of drivers and cabs, is compared with the industries of Liverpool, Manchester and Birmingham, all having a restriction on numbers. There is some evidence that where entry restriction is combined with control of fare structure, the quality of service offered to the customer is lower. Problems arise as supply of taxis cannot adjust to changes in real costs over any lengthy period when fares are held constant and the value of money falls. The case for a second type of cab offering a less efficient service at lower cost is argued. The author concludes that no limit should be introduced on the numbers of cabs and drivers operating in London; he suggests that the current limits in provincial cities might beneficially be removed. /TRRL/

Beesley, ME; Butterworth and Company, Limited 1973, pp 354-379, 14 Ref; ACKNOWLEDGMENT: TRRL (IRRD 208982)

44 261537 WILLIAMSPORT AREA TRANSIT STUDY: TRANSIT DEVELOPMENT PROGRAM. On Aug. 7, 1969, the City of Williamsport, Pa., purchased, with the aid of a Federal grant, the Williamsport City Bus Lines. This action preserved transit service in the area since the private operator had been suffering losses which precluded continuation of operations. Despite progressive actions, however, performance of bus operations has been declining. Questions have been raised as to whether existing service should be increased or decreased, fares raised or lowered, routes changed, apportionment of operating losses to service municipalities be re-evaluated, and whether the ever-increasing deficit can be decreased. In addition, the issue of the most suitable form of public ownership has been raised by the problems which have developed in attempts to secure regional support for city operation. This study was undertaken to answer the above questions and to develop a short-range transit development program covering the five-year period of 1973-77. Observations of the long-range implications of present trends are also included. Recommendations are presented and include the formation of a City-County Transit Authority or a County Transportation Department as the first step in carrying out the transit development program. Appendices include transit analysis zones and tables of total person trips and transit trips. /UMTA/

Pennsylvania Department of Transportation, Williamsport, City of, Pennsylvania, Lycoming, County of, Pennsylvania, (PA-09-0015) Tech Study UMTA-PA-09-0015-74-1, Apr. 1974, 85 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Orig. PC; PB-234666/AS

44 261654 LEGAL AND INSTITUTIONAL ISSUES OF CARPOOLING. Legal and institutional issues must be identified before implementing carpool programs. Four areas that should be studied are: legal issues, security programs, compensation and Internal Revenue Service issues and insurance considerations. Some of the legal issues are incentives to encourage carpooling the regulatory status of a carpool or share-the-expense arrangement, the applicability of sponsors of carpooling programs and competitive aspects of carpooling. Security problems include control of information and controlling the processing and distribution phase. Compensation factors should be carefully questioned; are they tax deductible? Is the car depreciated because of carpool use? Questions on the status of the passengers, the car and the carpool as a group need examining.

Department of Transportation Jan. 1974, 14 pp
This report is part of a series. The full report is entered in HRIS as 263921. Prepared by Alan M. Voorhees and Associates, Inc.

44 262359 AN ADVENTURE IN CREATIVE FEDERALISM: THE TRI-STATE-URBAN MASS TRANSPORTATION ADMINISTRATION STORY. Transportation planning activity of the Tri-State Regional Planning Commission, which is both the comprehensive and transportation planning agency for the metropolitan region surrounding New York City, is reviewed. The Tri-State region presents many transit problems requiring complicated and extensive coordination (caused by it's more than 600 incorporated areas). The delivery of technical studies funding through

a single agency was welcomed but has proved to be a complicated task. The Commission undertook all or part of a particular study by providing staff and support to involved local governments. Difficulties encountered in administration were the question of priorities, and the difficulty of inserting a planning agency between eligible public agencies and federal grants. Procedures that give greater assurance of project success include techniques such as establishment of policy or steering committees that include representatives of the financing and working agencies as well as the planning and implementing agencies. The possession of substantial data supplies ensures that localities do not have to go to a consultant for information. Technical studies are evaluated according to the likelihood that they can lead to improvement of transit service. The cooperative effort is considered highly successful and extensions to the program are planned. The relation between transit planning and localities and land use planning is reviewed. An outline is presented of how a closer wearing of these concepts may be effected. Such a plan may be a means for increasing participation by local officials and also a means for implementing and coordinating region-wide plans.

Carroll, JD *Highway Research Record* No. 475, 1973, pp 5-8, 1 Tab.

44 262637 THE URBAN TAXICAB INDUSTRY IN WISCONSIN: AN INVENTORY AND EXAMINATION OF REGULATORY POLICIES. An examination is made of the role of the taxicab in urban transportation with a focus on the state of Wisconsin. This includes: An inventory of taxicab service including level of service, fare systems and other factors; a look at regulatory policy with emphasis on market entry restrictions; and an examination of the issue of financial assistance as it might apply to the taxicab. This report recommends inclusion of taxicabs in legislation relative to urban mass transit including financial assistance in some cases, maintenance of a statewide inventory of taxicab operations, and other general regulations. /NTIS/

Zachar, JA Beimborn, EA ; Wisconsin University, Milwaukee Feb. 1974, 70 pp; ACKNOWLEDGMENT: NTIS (PB-231443/3); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-231443/3

44 300692 STATUTORY BARRIERS TO COORDINATION. This paper reports on an initial investigation of statutory barriers to coordination, especially concerning transportation, evident in seven pieces of federal legislation. Using data collected from three American cities, the study found that most of these statutes encouraged or mandated various forms of coordination. All included provisions that could prove to be barriers to coordination, such as inconsistent federal-local matching ratios, differing definitions of a handicapped individual, differing planning cycles among the programs included in this study, and state and local interpretations of federal audit provisions. /Author/

Cutler, DA (Ecosometrics, Incorporated) *Transportation Research Record* No. 696, 1978, pp 20-24; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

44 300694 IMPLICATIONS OF DOT DRAFT SECTION 504 REGULATIONS FOR RURAL AND SMALL URBAN AREAS. The regulation that bans discrimination against handicapped persons is briefly reviewed. It is noted that the regulation places emphasis on large urban bus and rail systems and metropolitan planning organizations, and not on the institutions and conditions that the handicapped encounter. The development of accessibility guidelines by the Department of Transportation (DOT) is discussed, as well as the debate on how to provide accessibility. Fully accessible systems have been supported by some, while others argue that ridership is low on accessible systems, and costs do not justify investment. Some key points in the DOT response to the regulations (Section 504) are briefly reviewed, and attention is directed to the sections relevant to bus and paratransit, and to rural paratransit. Bus operations must make 50% of the service accessible to the handicapped, and speedy compliance is emphasized. Urban and rural paratransit operators who receive UMTA funding will be required to provide accessible services within 3 years. Other considerations associated with complying with Section 504 regulations are noted.

Gurin, DB (Urban Mass Transportation Administration) *Transportation Research Record* No. 696, 1978, pp 26-27; This paper appeared in TRB Record No. 696, Rural Public Transportation.; ORDER FROM: TRB Publications Off

44 301147 THE CONTROL OF REGIONAL DEVELOPMENTS IN THE RHEIN-NECKAR CONURBATION BY THE REORGANISATION OF PUBLIC TRANSPORT [Steuerung Raumbedeutsamer Entwicklungen im Verdichtungsraum Rhein-Neckar durch Neuordnung des Oeffentlichen Personennahverkehrs]. Although the Rhein-Neckar region, with around 1.8 million inhabitants, is the sixth largest conurbation in the federal republic, it ranks much lower in terms of the quality of service offered by its public transport (OEPNV). The aim is to expand rail-bound transport in order to regulate the processes of development in the areas of ecology, housing and traffic. So far the Rhein-Neckar region has not been included in the investment programmes of federation and states with regard to transport. Therefore an attempt must be made to remedy this situation by compensatory measures. Above all the new rail construction programme of the GFR which is already under way is to be utilized by consistently taking the long-distance traffic out of the existing network in order to improve the local transport service. In addition, individual measures are to be taken to remove persistent bottlenecks. Finally, the cooperation and integration of the eight transport authorities in the Rhein-Neckar region must be brought about by organizational measures; for this purpose a public transport commission is to be appointed, to lay the foundations for a transport and tariff authority within the framework of the three-dimensional model. /TRRL/ [German]

Patschke, W *Internationales Verkehrswesen* Vol. 30 No. 2, Mar. 1978, pp 94-100, 6 Fig., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-307804), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

44 301224 NEW YORK STATE TRANSPORTATION PART 1. MASS TRANSIT IN NEW YORK STATE: WHERE DO WE GO FROM HERE? This paper discusses the advantages and problems of mass transit in New York State as well as its administration. Public transit saves oil, reduces pollution by carbon monoxides and hydrocarbons, reduces noise levels, and saves land by reducing the need for highways. However, there are several problems facing public transit such as: rapidly rising costs, largely caused by increased outlays for energy and labor; substantially reduced ridership, caused partly by higher fares and the lower quality and quantity of service, and partly by the availability of new highways; aging of physical plant and equipment, aggravated by lack of preventive maintenance; poor communication by transit authorities with the public; and public reluctance to accept higher expenditures for mass transit, rising out of public attitudes that transit authorities operate inefficiently and without regard for service quality. Operation of mass transit has been delegated to "public authorities" due to unwillingness inability of both private industry and local government to operate the systems.

Rickles, RN (Institute for Public Transportation) *Empire State Report* Vol. 5 No. 1, Feb. 1979, pp 17-25, Tabs.

44 301309 PRE-METRO: CONVERSION NOW OR NEVER. This paper develops as a case study the 60-year experience of a light-rail transit system that was conceived as a pre-metro line with the option for eventual conversion to full metro or semi-metro status. It describes the metro features originally included and the added facilities aimed toward upgrading to metro. It explains the opportunities for full conversion that were passed by and the conflicts between incompatible regional rapid transit plans and competing rail technologies. The accumulation of factors both physical and political that finally arrested the development of this light-rail operation are laid out step by step. Forces and counterforces that acted on this system as the wider community worked slowly toward regionalization of transit are described. Special attention is given to those local community concerns that finally closed the door to metro conversion when at last the opportunity and funding to convert seemed to be available. Guidelines are developed for planners, designers, and civic and transit leaders. /Author/ Landgraf, RJ (Greater Cleveland Regional Transit Authority) *Transportation Research Board Special Report Conf Paper* No. 182, 1978, pp 62-67, 3 Fig., 10 Ref.; This paper appeared in TRB Special Report No. 182, Light-Rail Transit: Planning and Technology.; ORDER FROM: TRB Publications Off

44 301440 ISSUES BEING FACED BY THE WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY. Cost estimates for constructing the national capital's rapid-rail transit system have increased from \$2.5 billion in 1969 to \$6.8 billion at the end of 1978. Metro attributes almost half of the increased cost to schedule delays and cost escalation. Neither of the figures includes \$3 billion of estimated financing costs associated with the revenue bonds sold to help finance construction and some other adjustments. The Federal Government's share of all costs is projected at \$7.4 billion and the state/local share

at \$2.7 billion. This report discusses whether costs should be paid through fares or area taxes; the effect of Federal funding being less than Metro says it needs; the need for a revenue source dedicated to pay the costs of mass transportation; the issues surrounding parking at rail stations and subsidized employee parking; handicapped accessibility.

General Accounting Office CED-79-52, Apr. 1979, 82 p., 3 App.; ORDER FROM: General Accounting Office, Distribution Section, Room 1518, 441 G Street, NW, Washington, D.C., 20548 NTIS: PB-293959/3ST

44 303293 BART/BUS COORDINATION: INSTITUTIONAL AND POLITICAL CONSIDERATIONS. An attempt is made to point out the more subtle political and institutional aspects of coordination negotiations which tend to be overlooked by parties involved in the complex process of attempting to provide comprehensive public transit service. The article emphasizes the process of service coordination planning among the Bay Area Rapid Transit District, the San Francisco Municipal Railway, and AC Transit (Alameda-Contra Costa Transit) and later the Metropolitan Transportation Commission, since the early stages of BART development. The Bay Area with its strong political fragmentation and diversity of transit operators and their constituencies, is a unique example of institutional constraints which have hampered the long-term objective of achieving cost-effective and efficient coordination of transit services. A number of policy implications can be deduced from the Bay Area experience of attempting to coordinate the transit services of two existing local public transit operators with a new regional rapid rail transit operator. These implications relate to the organizational structure, the rapid rail system design, the transit service policy coordination, and the role of the regional authority.

Lyons, F (Metropolitan Transportation Commission) *Transit Journal* Vol. 5 No. 2, 1979, pp 27-44

44 303594 PRINCIPLES ON OFFICIAL CONTRIBUTIONS TO UNPROFITABLE PUBLIC TRANSPORT [Principer foer samhallsstodet till olonesam kollektiv persontrafik]. The aim of this report is to analyse the present system of official contributions to the collective passenger transport in Sweden, how the responsibility for this transport is divided between the state, the county administrations and the communities, and to give an outline for a possible alternative. The report limits itself to the unprofitable regional and local collective transport with the main emphasis on the railway traffic. The division of responsibility means a possible risk of factors other than traffic or socially economic governing the choice of transport means in the regional and local transport, as well as making the integration of a transport system within a region difficult. Also, the present system of contributions does not make possible a separation of different transport forms. The main advantages of the suggested alternative are: the same body decides the standard, the volume and the rates for the bus and the railway traffic. The head of the institution is responsible both for the planning and the expenditure, and the bus and the railway traffic have similar responsibilities re-

garding expenses. The contribution system becomes more neutral regarding choice of transport means and will be in harmony with the demand for the provision of transport. Unprofitable traffic on the two railway nets will be treated in a similar way. [Swedish]

Dennelind, L Nelldal, B-L Olsson, I Smittberg, E; *Handelshoegskolan* Volume 1, No Date, pp 201-224, 4 Fig., 5 Tab., 13 Ref.; Taken from *Transportekonomi*, Volume 1.; ACKNOWLEDGMENT: TRRL (IRRD 242536), National Swedish Road & Traffic Research Institute; ORDER FROM: Handelshoegskolan, P.O. Box 6501, Stockholm, Sweden; 79.0443

44 303955 INSTITUTIONAL AND POLITICAL CONSIDERATIONS OF BART AND BUS COORDINATION IN THE SAN FRANCISCO BAY AREA. The experience of the San Francisco Bay Area with discussions and negotiations regarding coordinating bus and Bay Area Rapid Transit (BART) should be of interest to other metropolitan areas currently operating or constructing new rapid transit systems. While the technical aspects of implementing such service, for example, mutual fare-collection systems and realignments of routes and schedules, tend to be the more frequent subject of discussion among transportation professionals, the subtler political and institutional aspects of consideration negotiations can be the deciding factors leading to implementation or, conversely, to the continuation of duplicated transit service and inadequate feeder-bus service to rail transit stations. The service-coordination issue, then, calls for politically acceptable and institutionally feasible responses as well as technical studies. The Metropolitan Transportation Commission, a regional transportation planning agency for the San Francisco Bay Area, armed with the authority to allocate local and federal discretionary transportation funds, has established a framework that acknowledges the political and institutional constraints to BART-bus coordination and facilitates negotiations among the transit operators. While a resolution to the service-coordination issue is still off in the future, the Bay Area experience thus far has implications for other regions faced with similar transit problems.

Lyons, F (Metropolitan Transportation Commission) *Transportation Research Record* No. 719, 1979, pp 53-60, 1 Fig., 7 Ref.; This paper appeared in TRB Research Record No. 719, Transit Development.; ORDER FROM: TRB Publications Off

44 310371 CAN BUS REPLACE TRAIN OR WILL THEY NEVER LEARN? This booklet is intended as an appeal to the government not to repeat policies made in the "Beeching era" during which time many railway lines were closed and replaced by bus services. The arguments for and against replacement buses are presented. Some case histories of lines that have closed together with the fate of their replacement buses are described. Some of the lines which might be considered as possible candidates for bus replacements are considered. A final chapter discusses some of the possible future developments for buses and trains touching on the following topics: urban buses, rural buses, post buses, community minibuses, car-sharing, minibuses, fuel, coaches, integration and community involvement. An appendix lists services, which in the publishers view are threatened. (TRRL)

Railway Development Society Monograph
Sept. 1977, 24 p., 16 Ref.; ACKNOWLEDGMENT:
TRRL (IRRD 243609)

44 310386 FREE COMPETITION OR POLITICAL CONTROL [Fri konkurrens eller politisk styrning]. This dissertation constitutes a study of Swedish transportation policy. Its point of departure is the decision on transportation policy passed by the Swedish parliament in 1963. There was broad consensus on this decision, yet it would later become the subject of much controversy. The object of study is the 1963 decision, its implementation and effects, as well as the ensuing debate. This implies a study at two levels: the reality level and the debate level. The decision has for fifteen years decreed the development of the transport sector. It implied that there would be free competition of the transport market: cars and trains would compete on the same conditions. Gradually as motorization has increased and public transport has developed more and more problems, the decision of 1963 has become one of the most criticized, political decisions in Sweden. The debate of transport policy has to a considerable extent concerned the question of free competition or political control on the transport market. In this book, a survey of this debate is given. More than 2000 contributions to the debate have been analyzed concerning the questions: (1) Was the decision of 1963 a good decision? (2) Has the decision been practiced in accordance with the guidelines? (3) What are the effects of this decision? After a description of how the decision is practiced and a discussion of the effects of the decision the results are appended to a general picture. (TRRL) [Swedish]

Sannerstedt, A ; Studentlitteratur Monograph
Lund Polt Sty Nr 28, 1979, 217 p., 5 Fig., Tabs.,
Refs.; ACKNOWLEDGMENT: TRRL (IRRD
244098), National Swedish Road & Traffic
Research Institute

44 311778 WASHINGTON METRO: A PEOPLE'S EYE VIEW. Much has been written about the technical aspects of this transit system. As important in Washington, D.C., were the political factors. Supported by presidents, scrutinized by members of Congress and governed by representatives of 8 jurisdictions, some say it is a wonder the system exists at all. Here's how it came to be, how it functions and some peripheral factors that often make or break a system.

Seltz-Petrash, A *ASCE Civil Engineering* Vol. 49
No. 6, June 1979, p 59; ORDER FROM: ESL

44 312024 TRANSPORTATION/HOUSING INTERRELATIONSHIPS: PILOT STUDY. This pilot study attempts to analyze and quantify the transportation costs, benefits, and effects of various schemes of subsidized housing in small, medium, and large cities. Thunder Bay, Winnipeg, and Toronto were selected as the sample cities. A data base was created from interviews with 598 households sampled from 12 government-sponsored housing projects. (TRRL)

Ministry of State for Urban Affairs Canada, Lea
(ND) and Associates Limited Monograph Jan.
1979, 172p, 5 Fig., 78 Tab., 16 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 245450), Roads and Transportation Association of Canada

44 312258 COORDINATION OF TRANSPORTATION BY HUMAN SERVICE AGENCIES: AN INTERORGANIZATIONAL PERSPECTIVE. Human service agency transportation systems are studied and the coordination of public transit and human services is studied in detail. A review of the literature of interorganizational behavior led to the development of a model of the coordination process which studied the entire process including the factors which influence an agency's willingness to coordinate. Characteristics of sets of agencies which facilitate or impede coordination, and the external forces which may influence the process were also studied. It was found that the most significant factor which affected the agency's willingness to coordinate was whether they perceived that the potential financial benefits were worth the loss of control which might result from coordinating with other units. Willingness to coordinate was also related to the nature of the agencies' commitment to transportation. Agency directors were sensitive to the fact that coordination needs some administrative effort and were more willing to coordinate if they had the time to enter into the necessary negotiations.

Saltzman, A ; California University, Irvine Jan.
1980, 227 p., 6 Fig., Tabs., Refs., 3 App.;
PERFORMING AGENCY; ORDER FROM: DOT

44 313909 HOUSE SELECT COMMITTEE TO INVESTIGATE SEPTA. Under mandate of House Resolution 118, passed on July 11, 1979, the Pennsylvania House of Representatives established a Select Committee to Investigate the Southeastern Pennsylvania Transportation Authority. During the ensuing six months the Committee conducted public hearings, toured SEPTA facilities throughout the service region, and analyzed data submitted by SEPTA and other witnesses. The result of this work is the Committee's completed 152 page report. The

major areas of concentration in the study are accountability by the authority to other governmental agencies and the public, public transportation financing, organization and powers of the SEPTA board, and the management of the authority. The report describes the most severe problems of SEPTA and makes recommendation for the alleviation of these conditions.

Pitts, JR Rappaport, S Rocks, MJ Hoeffel, JM
Micozzie, NA ; Pennsylvania House of Representatives Final Rpt. Jan. 1980, 167p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-154032

44 314379 ACCELERATED IMPLEMENTATION PROCEDURES. The bulletin describes the adverse effects of procedural delays and difficulties on the implementation of new transportation technologies, and suggests some practical solutions to this problem. Two Federal activities of special concern are the Urban Mass Transportation Administration's demonstration, capital and operating assistance, and the Federal Highway Administration's Federal-Aid Urban-System Program. Questions examined include program flexibility, local credibility, matching policies, and the overall complexity of the process.

Public Technology, Incorporated, Department of
Transportation DOT-I-78-7, Oct. 1978, 30p;
Prepared for Urban Consortium for Technology
Initiatives. Transportation Task Force.; Contract
DOT-OS-60076; ACKNOWLEDGMENT: NTIS;
ORDER FROM: NTIS; PB80-185937

44 319563 TAXICAB DEREGULATION: ECONOMIC CONSEQUENCES AND REGULATORY CHOICES. The regulation of taxicab services is receiving an increasing amount of attention by city governments. At issue are the questions of whether local regulations should limit the supply of taxicabs and whether the regulations should control taxi fares. Recently, deregulation has become a popular suggestion; however, little empirical or theoretical evidence has existed to indicate the effects of taxi deregulations. This paper discusses these effects within a framework of eight regulatory scenarios involving different price, entry, and industry concentration factors. The analysis provides support for a public brokerage function.(a) (TRRL) various traffic volumes and compositions.

Foerster, JF (Illinois University, Urbana) Gilbert,
G (North Carolina University) *Transportation*
(Netherlands) Vol. 8 No. 4, Dec. 1979,
pp371-387, 7 Fig., 8 Ref.; ACKNOWLEDGMENT:
TRRL (IRRD 247278), TRRL; ORDER FROM:
P1690:192

45 050335 ON RIPUPS, RIPOFFS, AND RESURRECTIONS. The case is made for preservation of railroad rights-of-way for future use both for freight service and for rapid transit in urban areas. It is pointed out that BART is to a great extent a replacement of the abandoned Key System. It is also noted that the Chicago area lost the Chicago, Aurora & Elgin and the North Shore Line only recently. It is suggested that the energy crisis may force more freight back on to the rails. Even if current operations are to be suspended, total loss of the right-of-way should be prevented by a 'soil bank' for railroad routes.

Ullmann, JE *Trains* Vol. 34 No. 1, Nov. 1973, 1 pp; ORDER FROM: Kalmbach Publishing Company, 1027 North 7th Street, Milwaukee, Wisconsin, 53233 Repr PC

45 050745 TRANSIT STATION JOINT DEVELOPMENT. Research was conducted to survey the problems and opportunities relating to joint development around transit stations of existing or proposed transit systems. The six sites selected for case study include the San Francisco Bay Area, Boston Metropolitan Area, Buffalo, Chicago, New York, and Washington, D.C. The objectives of the project were to assist representatives of local agencies in the preparation of draft applications to UMTA for funds to do joint development planning, and to provide a report identifying possibilities for and constraints to transit station joint development. The city applications are included in an appendix. The report discusses six major general categories of constraints to joint development with respect to legal, economic, institutional, and engineering and design factors. The recommendations of the report to provide a stronger basis for joint development relate to changes in the approach to transit station planning and implementation, Federal financing, Federal coordination and evaluation of transit station planning, and changes in State legislation. The text includes 20 illustrations, which includes a suggested organization diagram for transit station area planning.

National League of Cities Final Rpt June 1973, 247 pp; Prepared in cooperation with U.S. Conference of Mayors, Washington, D.C., and Skidmore, Owings, and Merrill Development Research Associates.; Contract DOT-OS-20021; ACKNOWLEDGMENT: NTIS (PB-223507/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-223507/5

45 051420 ON THE ALLOCATION OF LAND TO URBAN TRANSPORTATION. Land is one of the more important inputs in urban transportation. The purposes of this paper are: (a) to present a theoretical model of a city that will explain the amount of land devoted to transportation in various parts of a city, and in cities of different sizes; (b) to try and examine whether the available data on the amount of land used for transportation in various cities, and in various parts of the same city conform to what is expected according to the model. The model that is presented is a fixed coefficients model. The main feature of the model is that it allows explicitly for the use of land in transportation.

Borukhov, E (Ohio State University); American Society of Mechanical Engineers Paper 73-ICT-97, Sept. 1973, 12 pp, 4 Tab, 10 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Inter-

city Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

45 051912 SPATIAL AND TEMPORAL EFFECTS IN RESIDENTIAL SALE PRICES. To assess the extent of the impact upon housing prices of the introduction of a modern suburban rapid transit service, a two-way unbalanced analysis of variance model is estimated with residential sales price data. Inflationary and time stable neighborhood effects are accounted for in this manner. The first term of the singular decomposition of the interaction matrix summarizes the interaction, and may indicate the nature of the impact. Since the residuals from the additive model are too dispersed and negatively skewed to be normally distributed, the application of outlier-editing and robust estimation procedures is discussed.

Slater, PB (West Virginia University) *American Statistical Association, Journal of* Vol. 68 No. 343, Sept. 1973, 8 pp, Tabs, 34 Ref; ACKNOWLEDGMENT: American Statistical Association, Journal of; ORDER FROM: American Statistical Association, 806 15th Street, NW, Washington, D.C., 20005 Repr PC

45 057033 SUBWAYS AND LAND USE. This paper develops a general equilibrium model of a city with two transportation modes. One mode is land intensive, that is, roads, while the second is land economizing, that is, subways. The effects of subway construction on land values and land uses in a metropolitan area are discussed. An important implication is that, if a subway system is worth constructing, it will have a suburbanizing effect on the city. In addition there will be considerable impact on housing prices and land values, but these changes will not totally offset each other.

Capoza, D (University of Southern California) *Environment and Planning* Vol. 5 No. 5, Sept. 1973, pp 555-576, 10 Fig, 4 Tab, Refs; ACKNOWLEDGMENT: Environment and Planning; ORDER FROM: Pion Limited, 297 Bronesbury Park, London NW2 5JN, England Repr PC

45 071623 URBAN TRANSPORTATION ACCESSIBILITY MEASURES: MODIFICATIONS AND USES. The interaction between land-use activities and the transportation system is usually estimated by means of accessibility measures. This article discusses in general terms, the concepts, uses and mathematical formulation of accessibility measures. A new formulation of accessibility, measured by the travel impedance and the interaction between land-use activities is proposed. This measure would then be used for evaluating alternative transportation plans. It is claimed such evaluation is superior to methods of cost benefit analysis, since it takes into account not only the transportation costs but also the number of interacting land-use opportunities.

Zakaria, T *Traffic Quarterly* Vol. 28 No. 3, July 1974, pp 467-479; ORDER FROM: ESL, Repr. PC, Microfilm

45 071770 SOCIAL IMPLICATIONS OF LAND USE AND MODE CHOICE. Three sets of analysis are described which suggest that the choice of public transportation is related to higher

land use density. The first analysis is based on the New York Region's journey-to-work data of the 1960 census, concluding that higher employment and residential density will increase the proportion of transit users and that the proximity of jobs and housing to one another has important advantages for the low income worker because of shorter trip length. The second analysis, a theoretical examination of a hypothetical suburban area based on models developed in the first analysis, suggests that the clustering of housing around a large job concentration has benefits with regard to limiting highway construction. The third analysis suggests the residential densities at which public transportation can work. The trend today is away from the high densities that can support public transportation. The dilemma can be solved if higher densities of development are built.

Zupan, JM *ASCE Journal of Transportation Engineering* Vol. 99 No. TE2, May 1973, pp 383-391; ACKNOWLEDGMENT: ASCE Journal of Transportation Engineering; ORDER FROM: ESL, Repr. PC, Microfilm

45 081008 GROWTH MANAGEMENT: A NEW FRAMEWORK FOR LAND USE AND TRANSPORTATION PLANNING. This paper examines the role of the "growth management" framework being built at the local level and its effect on land use and transportation planning. Two considerations, fiscal and environmental, are basic to the position of local leaders who advocate managing or controlling growth along some rational lines. The key elements of growth management presented in this paper include tight controls over capital expenditures for water and sewer facilities and for transportation (both highways and transit); innovative revisions of zoning and subdivision regulations; coordinated administration of open space and park development programs; and initiation of new public mechanisms for joint public-private efforts in land development. Beyond these basic considerations, there are two other trends of particular significance. One is that the role of land use planning is taking on increasing significance as an integral part of the movement to manage growth. The other is the highway planning, which has dominated the transportation field, is losing its prominence in the local arena. This paper identifies three implications for transportation planning: Highway planning, as such, will come to have a new relationship to the local land use planning process; highway planning will be more fully integrated into a broader discipline of transportation planning based on multimodal movement of people and goods within growing urban areas; the linkage between transportation and land use planning will become a great deal closer in the future, with a set of relationships and feedbacks that will substantially cement the two disciplines.

Hammer, P (Hammer, Siler, George Associates) *Transportation Research Record* No. 508, 1974, pp 85-90; ORDER FROM: TRB Publications Off, Repr. PC

45 081198 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART III. LAND USE AND INVESTMENT. VOLUME I. ECONOMETRIC STUDIES. The first part of the land use and investment study presents the collection and preliminary analysis of econometric data on land prices in

portions of the Bay Area (homogeneous neighborhoods in central Contra Costa County).

Lee, DBJ ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. June 1973, 120p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-1, Appendix C, PB-236 740, and BART-2, Part 3, Volume 2, PB-236 742.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236741/5ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236741/5ST, DOTL NTIS

45 081199 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART-III. LAND USE AND INVESTMENT. VOLUME III. CASE STUDIES. The volume covers case-study analysis of BART's impact on selected parcels of property from the standpoint of the real estate appraiser. It includes--a summary and conclusions; the seventeen case studies preceded by a general description of case characteristics; and a discussion of the development of a methodology for estimating the dollar-value of the impact of a major public investment--such as BART--on a specific piece of real property.

Lee, DBJ ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 89p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 2, PB-236 742, and BART-2, Part 3, Volume 4, PB-236 744.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236743/1ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB0236473/1ST, DOTL NTIS

45 081200 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART III. LAND USE AND INVESTMENT. VOLUME IV. MARKET STREET STUDY. The study is an attempt to apply the methodology developed in Volume III for appraising the dollar-impact of BART on real properties to downtown San Francisco. The report establishes the framework of the study by presenting a discussion of the underlying theory of land use and of the economic characteristics of downtown development and by describing the study methodology. Results of a large number of case studies are presented and the effects of BART on downtown San Francisco are estimated.

Lee, DBJ ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 146p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 3, PB-236 743, and BART-2, Part 3, Volume 5, PB-236 745.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236744/9ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236444/9ST, DOTL NTIS

45 081201 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART III. VOLUME VI. IMPACTS OF BART ON PRICES OF SINGLE FAMILY RESIDENCES. The report presents a statistical analysis of the effect of the anticipation of BART service on sales values of single family homes in central Contra Costa County. Chapters include discussion of longitudinal residential samples, cross-sectional residential samples, and a commercial sample.

Lee, DBJ ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 53p; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 5, PB-236 745, and BART-2, Part 4, PB-236 747.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236746/4ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236746/4ST, DOTL NTIS

45 084767 REFERENCES ON TRANSIT SYSTEM IMPACTS ON LAND USE. Fifty three references are presented on various aspects of the subject such as methods of assessing the impact of transportation on land use and urban development, the impact of rapid transit in urban areas, effects on real estate values, the impact of subways, the impact of specific transit projects, land used models, socio-economic impact of investments in transit, and analysis of BART impacts. The bibliographic data are accompanied by annotations.

Trygg, L ; De Leuw, Cather and Company Bibliog. 1974, 10 pp, 54 Ref.

45 090980 HACKENSACK MEADOWLANDS AIR POLLUTION STUDY. AIR QUALITY IMPACT OF LAND USE PLANNING. The Hackensack Meadowlands Air Pollution Study final report consists of a summary report, five task reports, and three appendices, each bound separately. This report is the fourth of the five task reports. Its purpose is to describe the set of planning guidelines for considering air pollution in the urban and transportation planning process as derived from the analysis of land use plans for the New Jersey Hackensack Meadowlands.

Willis, BH Mahoney, JR Goodrich, JC ; Environmental Research & Technology, Incorporated, Environmental Protection Agency, New Jersey Department of Environmental Protection Final Rpt. ERT-P-244-4, July 1973, 148 pp; Prepared in cooperation with New Jersey Dept. of Environmental Protection, Trenton. See also PB-238 605.; Contract EPA-71-39; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-239728/9ST

45 092031 SURVEY OF DATA SOURCES FOR THE LAND USE AND URBAN DEVELOPMENT PROJECT. WORKING PAPER. The report identifies data sources which appear relevant to the study of BART's impacts on land use. The purpose of this report was to help design a Research Plan for the BART Impact Program Land Use Project. Thirty-seven data sources are described in detail. Use of the data and some analytical methods are described.

Skaburskis, A ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development

WP-13-5-75, June 1975, 71 pp; Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-242440/6ST, DOTL NTIS

45 092355 FACTOR ANALYSIS OF THE SYSTEMWIDE RESPONDENT, GEOGRAPHIC, CENSUS AND LAND USE VARIABLES. The report presents the rationale behind a factor analysis of selected respondent, geographic, census and land use variables from the pre-BART systemwide sample for the urban residential environmental impact study. It describes the sample, the variables and the statistical procedures used in that analysis and finally it presents the resultant factors and offers some suggestions for their utilization.

Carp, FM Zawadski, RT ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development WP-6-1-75, July 1974, 27 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244683/9ST, DOTL NTIS

45 092740 LAND USE IN URBAN AREAS (A BIBLIOGRAPHY WITH ABSTRACTS). Various aspects of urban land use are covered, including transportation planning, water resource management, air pollution, and land use zoning. Comprehensive development plans for specific cities in the United States are included. (Contains 183 abstracts).

Shonyo, C ; National Technical Information Service Bibliog. Aug. 1975, 188p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PS-75656/9ST

45 093923 LAND USE AND URBAN DEVELOPMENT PROJECT RESEARCH PLAN. The report defines the scope of the Land Use and Urban Development Project, identifies specific research issues, and outlines methods for performing the work. A theoretical framework encompassing the various anticipated land use impacts outlines the impact process and defines the basic concepts used in formulating the research approach. The Work Elements describing the specific work to be done are closely tied to the research issues identified in the theoretical framework. Details of data collection and analysis are contained in the Work Elements. The Research Plan outlines how the work will be performed by proposing a preliminary schedule, staffing requirements and estimates of level of effort.

Bain, H Escudero, E ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. PD-17-5-75, Sept. 1975, 63 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247767/7ST, DOTL NTIS

45 093924 PHOTO SURVEY OF DEVELOPMENT AND ACTIVITIES IN THE VICINITY OF BART STATIONS. USER'S GUIDE. A general description of BART Impact Program Photo Survey data and basic instructions for their use is given. The Photo Survey is a record of development and activities in the vicinity of BART stations at given points in time. The

photos, aerial photos and supplementary assessor's land use information. The three kinds of data are cross-indexed by map overlays. More detailed technical information concerning procedures used in establishing and maintaining the Photo Survey data area presented in the Photo Survey Technical Report (Christensen, 1975).

Christensen, DL ; Metropolitan Transportation Commission, California University, Berkeley Final Rpt. FR-14-17-75, July 1975, 40 pp; Prepared by California University, Berkeley, Department of Architecture.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-247768/5ST, DOTL NTIS

45 093954 PHOTO SURVEY OF DEVELOPMENT AND ACTIVITIES IN THE VICINITY OF BART STATIONS. TECHNICAL REPORT. The Photo Survey is a record of development and activities in the vicinity of BART stations at given points in time. The record consists of three categories of data: ground level photos, aerial photos and supplementary assessor's land use information. The three kinds of data are cross-indexed by map overlays. Additional description of Photo Survey data, as well as detailed instructions for their retrieval and cross referencing may be found in the Photo Survey Users Guide (Christensen, 1975).

Christensen, DL ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. FR-5-17-75, July 1975, 42 pp; See also PB-247 768. Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248313/9ST, DOTL NTIS

45 096103 IMPACT OF A HIGH SPEED RAPID TRANSIT FACILITY ON RESIDENTIAL PROPERTY VALUES. A very simple model of a radial transport investment impact is developed from the economic law of market areas. The model delineates spatially the areas that will be served by competing modes and by competing stations under Von Thunen assumptions that all economic activity takes place at the city center. The market area of the investment is shown to be also impact area of the investment. Benefits of the investment are in the form of transport costs saved by the users of the investment. Contours of equal benefit are easily derived from the analysis and shown to be hyperbolas. These savings will tend to be capitalized into the price of the properties in the impact area of the investment. The model is empirically estimated in the context of the Philadelphia-Lindenwold High-Speed Line. A regression model indicates that the savings variable is significant, has the correct sign, and represents an increase of \$149 in the sales price of a property for each dollar of daily savings that a commuter residing on the property receives. Overall, the benefit to the property owners in the Lindenwold Line's impact area is approximately \$34 million dollars.

Allen, WB Boyce, DE (Pennsylvania University, Philadelphia) *High Speed Ground Transportation Journal* Vol. 8 No. 2, June 1974, pp 53-60, 3 Fig., 1 Tab., 9 Ref.

45 096148 TOOLS FOR URBAN LAND USE-TRANSPORT STRATEGY PLANNING. Urban strategy planning studies are directed towards the estimation of the transport demand and other servicing implications of a range of urban development alternatives. A land use-transport model is described which may be used to estimate the implications of alternative public development policies. These policies may include servicing and transportation options, basic and service employment location alternatives, and zoning. The model calculates an internally consistent co-distribution of population and employment along with the associated travel demands for set of public policies. A corridor-level traffic assignment technique is described which may be used along with the land use-transport model to develop corridor travel demand estimates for each development concept. Computer-based procedures for estimating the servicing requirements of alternative development concepts are also described. These procedures directly employ the land use allocations calculated by the land use model. The use of the analytical tools is illustrated with information from the Hamilton area.

Hutchinson, BG *Canadian Journal of Civil Engineering* Vol. 2 No. 1, Mar. 1975, pp 85-97

45 096660 PRELIMINARY RESULTS FROM AN INTEGRATED TRANSPORTATION AND LAND USE MODELS PACKAGE. This paper describes the results, to date, of an effort to integrate a land use model with a transportation network model for the purpose of analyzing the inter-relationships of transportation facility development and land development. In the system which has been developed each model provides input to, and receives feedbacks from, each other model. To the author's knowledge, the effort described here represents the first successful attempt to develop and test an integrated model package involving these reciprocal relationships. The results obtained from preliminary runs of this package should be of considerable interest to both transportation planners and land use planners. With this integrated system it has been possible to observe the interrelationships, and in particular the feedbacks, between land use and levels of traffic on the networks. Preliminary results indicate that congested networks produce tendencies toward metropolitan centralization. Attempts to relieve congestion seem to produce metropolitan decentralization and increased travel which lead, in turn, to metropolitan sprawl and increased spread of congestion. /Author/TRRL/

Putman, SH (Pennsylvania University, Philadelphia) *Transportation* Vol. 3 No. 3, Oct. 1974, pp 193-223, 9 Fig., 5 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 211637); ORDER FROM: Elsevier Scientific Publishing Company, P.O. Box 211, Journal Division, Amsterdam, Netherlands Repr. PC

45 096891 URBAN TRAFFIC MODELS, VOLUME 1. Ten papers are presented which cover aspects such as the policy modelling interface, design in urban simulation, land use, prediction of planning parameters, parallel rail services and future development in this field of transportation studies. The problems of daily travel are covered in the paper on "The Future of Transportation Studies". Changes of emphasis in policy, the

implications for modelling and the impact of methodology are examined in "The Policy-Modelling Interface." The paper on the Polis Simulation Model describes a computer planning instrument which combines dynamic simulation of spatial urban development, advanced transportation modelling techniques, and multiattributed evaluation methodology. A unified approach to a class of iterative equilibrium methods based on the general approach of feasible-direction methods in non-linear programming is presented and incremental methods of the assignments problem are discussed in another paper. "Land Use and Transport Interaction" examines patterns of the trip length distributions by mode analyzed by distance of one end of the trip from the conurbation center. The structure of a city of a macro or conurbation level is considered in the paper. "Urban Land Use and the Derived Demand for Transportation". Another paper describes the matching of input requirements of a transportation model in terms of the land use data predictions (in terms of population and employment). Other papers included here are: "Some Considerations Concerning Technological and Economic Capabilities of New Urban Transportation Systems and their Influence on City Structure;" "Methods of Relating the Provision of Public Transport to the Planning of Land Use Development;" and "Reduced of Road-Traffic Volumes by Parallel Rail Services."

Planning and Transport Res and Computation Co Ltd PTRC/P/101, July 1974, 243 pp, Figs., Tabs., Refs.; Proceedings on the Seminar on Urban Traffic Models held during the PTRC Summer Annual Meeting, 8-12 July 1974, at the University of Warwick.; ORDER FROM: Planning and Transport Res and Computation Co Ltd, 167 Oxford Street, London W1, England Orig. PC

45 096910 TECHNIQUES OF LAND USE/TRANSPORTATION PLANNING IN AUSTRALIAN CITIES. With the publication of the Sydney area transportation study, land-use/transportation studies now have been conducted in all capital cities as well as in the majority of other urban areas with populations in excess of 40,000. A review of these studies is made and a qualitative assessment is attempted of the technical phases-land-use planning, trip-generation, trip-distribution, modal-split, traffic assignment and evaluation. Full summary results of this comparative survey are presented in tabular form, although themes developed in the text are illustrated with specific examples from individual studies. The methodology of land-use/transportation studies has been attacked by some Australian writers. An attempt is made to assess the relevance of these criticisms when applied to the practical planning process in Australia. /Author/TRRL/

Black, JA (Australian National University) *Transportation* Vol. 3 No. 3, Oct. 1974, pp 255-284, 1 Fig., 9 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 211640)

45 097122 INTERACTION BETWEEN PUBLIC TRANSPORT AND URBAN DEVELOPMENT. It is essential to abandon the concept of the city as a separate element and to plan for whole regions involving a number of metropolitan areas and transportation networks. Public transportation will be a vital element in the implemen-

tation of planning to restore a balance between the center and the rest of the city. The further demands for mobility, which economic growth will inevitably continue to generate, will have to be met by giving priority to public transportation. Efficient integration of all transportation systems through complementary services, is the only way of ensuring continued movement.

Paschetto, A ; International Union of Public Transport Report 1, 1975, 57 pp; Presented at the 41st Annual Congress of the International Union of Public Transport.

45 098579 EFFECTS OF PUBLIC PROVISION OF ROADS ON THE STRUCTURE AND SIZE OF CITIES. It is argued that public provision of city streets introduces an illusionary reduction in the costs of urban transportation, and that this distorts the spatial pattern of land use and land prices in cities. The direction of this distortion is such that it favors use of peripheral land at the expense of land in central locations. The downward bias in the price of urban transportation introduces an upward bias in the size of cities. Because the prices that people face do not reflect the full cost of transportation, too many people are attracted to big cities. The phenomenon discussed here is a long-term one—an externality which is imposed in the long run when the capacity of the roads is variable.

Borukhov, E *Environment and Planning* Vol. 7 No. 3, May 1975, pp 349-355

45 126318 TRANSPORT CONTROLS, TRAVEL COSTS, AND URBAN SPATIAL STRUCTURE. This paper explores the implications of a number of different types of transportation strategies designed to reduce auto travel. Two kinds of policies are compared: those that increase the cost of travel by car, and those that improve the quality or reduce the price of public transportation. The first part of the paper deals with the instant or market period and the short run—that period of time in which households can change their method or travel but not their place of residence or work. A simple model of work-trip mode choice is developed for households. Using this model, individual responses to various transportation control strategies are explored. The second part deals with the long run, the time period in which households can adapt to changes in the relative cost and attractiveness of different modes of travel by moving their residence and/or their place of work. Similarly, firms can alter their locations. A basic urban land-use model developed by urban economists is adapted to explore the long-run changing patterns of land use. /GWU/

Goldstein, GS Moses, LN *Public Policy* Vol. 23 No. 3, June 1975, pp 355-380

45 128752 TRAVEL COST, TRANSIT, AND CONTROL OF URBAN MOTORING. Three issues relating to mass transit, motoring and land use are examined to ascertain the probable effects of policies designed to reduce vehicle miles travelled. The performance of various transit modes is analyzed, as are the effects of mass transit construction or subsidization on transit usage, motoring and land use. Consideration is also given to those policies which can be expected to reduce motoring and effect transit patronage. It is concluded that mass transit construction and subsidy have not substantially reduced automot-

bile travel. The importance attached to travel time is reflected in the tendency for transit usage to increase only until congestion is reduced. The most effective deterrent to increased private transportation appears to be imposition of social costs of private transportation upon the motorist.

Deweese, DN *Public Policy* Vol. 24 No. 1, Jan. 1976, pp 59-79, 2 Tab.; Presented to the Caltech Seminar series on Energy Consumption in Private Transportation Program VI: Land Use and Transportation: Future Patterns of Living, April 29-30, 1971.

45 128815 ESSAYS ON URBAN SPATIAL STRUCTURE. Seventeen essays are presented which summarize more than a decade of research on various aspects of urban economic analysis and policy. The essays are categorized in five parts: (I) residential and commuting decisions; (II) the location of jobs; (III) effects of racial discrimination; (IV) analysis of urban housing markets; and (V) urban transportation. Three essays analyze decisions by urban households on how much residential space to consume, i.e. at what residential density to reside, where to live within the metropolitan area, how far to commute, and what travel modes to use. The principal feature of analyses of the residential and commuting choices of urban household is the emphasis on the importance of specific workplace location as a determinant of housing, residential location and commuting choices. Research on employment location and the determinants of industry location are summarized. Essays are also presented which identify, trace and quantify the effects of urban discrimination and segregation in urban housing markets on the pattern of urban development and on black welfare. Partial equilibrium models, theoretical explanation of urban density functions, the various dimensions of housing bundles, and housing services for the behavior of housing suppliers are considered in an analysis of housing markets. Research findings are presented related to costs serving peak hour commuters by alternative technologies. The essay on the future of urban economics, identifies the forces influencing developments in the 30 years following the end of World War II, and places the essays presented here in the overall context of urban economics.

Kain, JF ; Ballinger Publishing Company 1975, 412 pp, Figs., Tabs., 1 App.

45 128819 COORDINATING LAND USE AND TRANSPORTATION: HOW IT WAS DONE AT THE COMMUNITY SCALE IN COVENTRY, CONNECTICUT. Methodology is described and a case study is presented for micro of community scale transportation planning. The plan for the new community in Coventry called for the construction of 400 and 500 dwelling units per year over a 15 year period, which would result in approximately 6000 units completed by 1990. The projected population for this new community was 20,000 persons. The goals for the new community from the inception of planning, had a direct and practical bearing upon the physical design of the new community's road system and upon planning for other transportation services. There are 6 basic elements in the micro scale planning process. (1) Initial plans—the outputs of this stage are a tentative land use plan, a tentative circulation system and

transit policy. (2) Internal zoning—a zone structure based upon internal street circulation must be established. (3) Trip generation—for each zone estimates should be prepared of two way residential trips. (4) External zones and opportunities. (5) Trip distribution and (6) traffic volumes and highway requirements.

Creighton, RL, President Manning, CW (Creighton, Hamburg Incorporated) *Planners Notebook* Vol. 5 No. 3-4, Aug. 1975, 6 pp, 1 Fig., 4 Tab., 3 Ref.

45 131661 FISCAL IMPACT OF NEW TOWN AND SUBURBAN DEVELOPMENT. AN EMPIRICAL STUDY OF RESTON, WEST SPRINGFIELD AND FAIRFAX COUNTY, VIRGINIA. Over the past few years several new techniques have been incorporated into the process of planning for land development. One of significant interest is analysis of fiscal impact—the effect a community has on a local government's revenues and expenditures. Used primarily to predict the fiscal effect of a proposed land use change, fiscal impact analysis rarely describes what actually happens; more often it is used to compare alternative proposals for development. This article includes both: it is an empirical fiscal impact study which compares effects on finances of a single local government caused by a new town and a conventional suburb. According to data analyzed for Fairfax County, Virginia, the new town of Reston more than paid its own way in fiscal year 1971, while a conventional suburb, West Springfield, failed to do so. This outcome is due to several factors discussed below. Both communities are unincorporated places with similar populations. These two communities differ most obviously in their form: West Springfield (as designated in this study) is a typical Washington, D.C. suburban of single-family homes on quarter-acre lots, with a small townhouse cluster; Reston is a new town designed for commercial and industrial development concurrent with a variety of residential types and recreational open spaces. Fairfax County, located west of Washington, D.C., experienced rapid (350 percent) growth between 1950 and 1970. Both communities selected for this study developed during the 1960s; had approximately equal population in the 1970 U.S. census; are located outside the interest beltway which rings the District; had sanitary sewer service available during development; and are not centered by a pre-existent community. Fairfax County is the single local taxing jurisdiction for both communities and supplies the usual local government services such as education, library, and public safety. Fairfax County income from and outlay for both places are reconciled and observations are offered in this report. /Author/

Cuthbertson, ID (Soil Conservation Service) *Urban Land* Vol. 35 No. 1, Jan. 1976, pp 5-12, 9 Tab.

45 132255 LAND USE AND TRANSPORTATION INTEGRATION IN IRVINE NEW TOWN. The paper starts with the description of the original planning proposals for Irvine New Town and the need, because of sub-regional developments and additional information, to revise the plan and the opportunity taken by the development corporation officials to integrate land use and transportation in conjunction with the public transport operators. Intrinsically

linked with the planning and construction of the new town is the financing method for the infrastructure provision and the shortcomings of this are highlighted and suggestions made as to how this might be improved following local government reorganisation. The paper was one of four presented at a conference in Edinburgh in January 1975. Arranged by the Scottish Association for Public Transport, and entitled "Public Transport and the New Regional Authorities", the conference was held against a background of local government reorganisation in Scotland which took place in May 1975. /Author/ /TRRL/

Prince, E. *Highway Engineer* Vol. 22 No. 10, Oct. 1975, pp 14-21, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-216074)

45 132277 THE INTERDEPENDENCE OF TRANSPORT DEMAND, PLANNING DEVELOPMENTS AND TRAFFIC PLANNING [Onderlinge afhankelijkheid van vervoervraag, planologische ontwikkeling en verkeersplanning]. This article deals with a model defining the interaction between transport demand, planning developments and traffic planning. The model is a general form of traffic model without any, with one and with two fringe conditions. With the help of the dynamic version of the model and simple exogene assumptions it is possible to stimulate developments, such as: urbanisation and suburbanisation; the springing up of a central town or agglomeration; the shifting of activities to the periphery of big cities under the influence of increasing car ownership. The article contains a few remarks about further evaluation of the model. /TRRL/ [Dutch]

Hamerslag, R. *Verkeerskunde* Vol. 26 No. 9, Sept. 1975, pp 440-451, 5 Fig., 4 Tab., 27 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD-216261)

45 134328 JOINT DEVELOPMENT IN URBAN TRANSPORT CORRIDORS. The concept of corridor development (in its several guises) embraces three main ideas: (a) the planned and complementary functional relationship between one or a number of modes of transport and the surrounding development, (b) the desire to obtain optimum economic rent from land within the immediate influence of transport routes involving, where desirable, the multiple use of transport lands, and (c) an embracing management framework for conceiving, implementing and monitoring the effects of corridor developments. The essential elements in jointly developing transport routes with adjoining land uses are securing land early, buying more than is immediately required, and managing it soundly before obsolescent property is demolished and re-developed, and replacing the acquired property with a diversity of new complementary uses. /Author/ /TRRL/

Edmonds, PH Miller, IRW Pak-Roy, PG *Australian Road Research Board Conference Proc* Vol. 7 No. 3, 1975, pp 244-256, 3 Fig., 2 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218052)

45 134763 TRANSPORTATION AND THE RECYCLING OF URBAN LAND. The current trend toward declining numerical growth, leveling off of economic standards, and the deterioration of the urbanized areas are reviewed, evidence that the limits of the urban system will be

determined by the travel time of citizens from residence to work is discussed, the need for shifting priorities and resources from the private car to transit and express busways is noted, and the need for recycling land use and the problems of transportation investment are emphasized and illustrated with two alternative scenarios. The first Scenario projects into the future by extension of current trends, instrumentalities and resources. Without a positive policy of disincentive for outward expansion, the trend of outward growth and migration from the older neighborhoods will continue. The second scenario anticipates the emergence of a high level of political sophistication, of a willingness to formulate and provide support for anticipatory interventions in preference to remedial ones, and the emergence of a high level of comprehensive rather than fragmented exploration, planning, and programming. This scenario has no categorical distinctions between plans for transportation and plans for recycling. Arbitrary divisions and allocations of responsibilities have been liquidated, and a single coordinated governance of the process of functioning and change within the urban system has been instituted. Details are briefly outlined of economic disincentives for outward expansion, a continuously updated master plan of urban processes, new systems of public transportation, a new implementation instrument—a neighborhood recycling corporation, and short-term, low cost improvements.

Contini, E (Gruen Associates) *Urban Land* Vol. 35 No. 4, Apr. 1976, pp 6-11, 1 Fig.

45 134878 JOINT DEVELOPMENT: INSTITUTIONAL CONSTRAINTS AND POTENTIALS. The need and the opportunity to achieve joint development of various transportation facilities and such facilities and land use are now greater than ever. However, if joint development is to occur on a significant scale, a number of financing, organizational, legal, and other institutional techniques must be developed and applied. A recent amendment to the National Mass Transportation Assistance Act of 1974 appears to be a step in the right direction. A number of other steps, some of which are described in this paper, should be pursued. For example, legislation should be pursued. For example, legislation should be adopted by states that will permit agencies and corporations to undertake developments that span several modes or functions. In many situations, too, legislation is needed to permit "tax increment" and other innovative forms of financing to be used to stimulate needed development. It is important that further work be done soon to refine these techniques so that they can be applied to the many highway, rail, transit, airport, and similar projects where they are needed.

Engelen, RE (Barton-Ascham Associates, Incorporated) *Transportation Research Record* No. 565, 1976, pp 12-17, 8 Ref.; Presented at the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

45 134885 DIRECTING THE EVALUATION OF URBAN LAND USE TO ACHIEVE IMPROVED TRANSPORTATION SYSTEM PERFORMANCE. This paper investigates the potential for directing the growth of an urban region so that the evolving urban form contributes to high levels of access opportunity with

minimum travel requirements. Measures of total travel, accessibility, and spatial equity are defined for use in the evaluation of alternative urban spatial patterns. A computer-aided investigation determines optimum locations within the urban region for expected growth. Repeated application of a technique for assigning small increments of growth results in the definition of a high-performance growth path for a 10-to 20-year period. As a case study, the population and employment growth forecast for 1970 to 1990 for the Puget Sound region in the state of Washington is assigned to subregions. Contrast of the study results with current growth trends reveals that new travel requirements could be reduced by two-thirds, access levels could be improved 4 times, and distributional equity could be improved 3 times. These results are judged to be significant enough to warrant further intensive investigation into the feasibility and desirability of actually trying to achieve an urban form that could produce such dramatic improvements in transportation system performance without further substantial investments in capital-intensive transportation facilities or highly subsidized transportation services.

Clark, JW (Washington University, Seattle) *Transportation Research Record* No. 565, 1976, pp 61-74, 10 Fig., 10 Ref.; Report prepared for the 54th Annual Meeting of the Transportation Research Board.; ORDER FROM: TRB Publications Off

45 137473 OECD CONFERENCE ON BETTER TOWNS WITH LESS TRAFFIC, PARIS, 14-16 APRIL 1975. PROCEEDINGS. The aim of the conference was to evaluate the possibilities and effects of policies for limiting motor traffic in urban areas. The proceedings contain seven case studies discussed at the conference as follows: Uppsala (Sweden), Bosacius, B; Bologna (Italy), Formaglini, M; Singapore, Geok, LL; Nagoya (Japan), Miyazaki, T; Munich (FEDERAL Republic of Germany), Meighoerner, G and Doleschal, H; Besancon (France), Regani, Nottingham (United Kingdom), Waller, EJ. The proceedings also contain summaries of the seven specialised sessions dealing with: parking; traffic limitation; cyclists and pedestrians; priorities for public transport; para-transit; planning, financing and implementing policies for urban transport; and the economic and energy implications of these policies. /TRRL/

Organization for Economic Cooperation and Devel 1975, 275 pp, Figs., Tabs., Photos.; ACKNOWLEDGMENT: TRRL (IRRD 218542)

45 137505 THE DESIGN OF URBAN GROWTH MODELS FOR STRATEGIC LAND USE TRANSPORTATION STUDIES. In the design of urban growth models for use in strategic land-use transportation studies, it is suggested that such models have a more important role to play in the initial testing and evaluation of land-use transportation options than has hitherto been recognized. This proposition is illustrated by reference to the development of one such model, the urban systems model (usm) which has recently been adopted by the United States Department of Transportation and which is currently being applied to the Dallas-Fort Worth metropolitan region of Texas as part of an ongoing regional public transportation

study. Conclusions are drawn on the direction in which the design of urban growth models should be moving if their potential in this area is to be fully realized; and on the particular implications of this for conventional transportation models. /TRRL/

Turner, CG *Regional Studies* Vol. 9 No. 3, Nov. 1975, pp 251-264, 10 Fig., 2 Tab., 36 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218806)

45 137670 URBAN ACTIVITY PATTERNS AND MODAL SPLIT IN THE JOURNEY TO WORK. Relationships between modal split for the journey to work and patterns of social and economic activity in large urban areas are investigated in this paper. Small zone data from six major land-use transportation studies were used as a basis for a systematic comparative analysis of these relationships. Three of the studies were British-London, West Midlands and Selne-and three American-Tri-State, Penn-Jersey and Los Angeles. Standard correlation and regression programmes were employed on a wide range of data, using three distinct approaches. Our first models were based on all trip origins and destinations for each zone, while the second set analyzed the major inter-zonal traffic flows. A third group of models assigning all trips to a shortest route network and investigating the modal split along each link was attempted, though not fully explored due to computer limitations. The results reveal the overriding influence of car-ownership on modal split, but also demonstrate the limitations imposed by urban structure in the form of employment and population densities. (a) /TRRL/

Sammons, R Hall, P ; Reading University, England. (0 7049 0337 7) Monograph Paper No. 32, Nov. 1974, 60 pp, 6 Fig., 19 Tab., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 218730)

45 137959 THE ROLE OF THE LOCAL AUTHORITY PLANNER. An account is given of transport problems emphasizing the conflict between availability of cars and limitations on fuel resources. Past planning policies and the increase in movement they caused are described and future policies suggested. Broader issues are reviewed including the use of other non-renewable resources and the problems of noise, pollution and visual intrusion. It is suggested that the role of the town planner would be in working in collaboration with the engineer and public transport operators where he would be able to contribute in fields where intangible environmental considerations are involved. In the discussion which follows, the effect of the fuel crisis on transport planning is considered and delegates describe experiences of teamwork. Other topics covered included segregation by time and the problems of public transport in residential areas, particularly new towns. /TRRL/

Wood, AA (West Midlands Metropolitan County Council, England) Ennor, PD ; New Castle-Upon-Tyne University Monograph 1974, pp 3-12; Proceedings of the symposium of Co-ordinating Public Transport.; ACKNOWLEDGMENT: TRRL (IRRD 219540)

45 138173 OF LAND, LEISURE AND ENERGY. Replanning land use to include accessible recreation areas for all will require coordination of park and transportation policies and a change in American life style. Public transit systems have

been geared to getting commuters to and from their jobs and tend to stop functioning at times when recreation demands could be made on them. Walk-to parks are of great importance to inner city residents because regional parks have been designed to serve the mobile middle and upper classes. Federal and state policies can make regional parks available to urban dwellers with preferential funding, setting top priority on projects with transportation resources. /DCK/

Houston, L (Department of Housing and Urban Development) *Energy Abstracts for Policy Analysis* Vol. 2 No. 6, #949, June 1976, p 180; ORDER FROM: GPO

45 139634 DEVELOPING TRANSPORTATION AND LAND USE ALTERNATIVES IN TORONTO. The Metropolitan Toronto Transportation Plan Review is discussed with special reference to public participation, developing transportation and land use alternatives, and the testing and evaluation of alternative systems. An attempt is then made to highlight some conclusions which may have general relevance to transportation planning in any urban area. The Toronto Review did not recommend a single transportation plan but described a number of alternatives for different development alternatives. An attempt was made to point out the degree of commonality associated with specific transportation decisions sufficient information was provided for each of the transportation components to evaluate their effectiveness and desirability in terms of the measures related to demand satisfaction, economics and other criteria. Based on the commonality aspects of specific transportation projects and the ways in which they contribute as part of an overall system to long-range development objectives, individual transportation decisions were categorized into those that were neutral and those that had a high degree of impact on development. An attempt was also made to indicate how certain short-term improvements could be made to the existing transportation system in ways that would ensure that subsequent investment in major projects would produce the highest payoff possible in terms of effectiveness.

Soberman, RM (Ontario Transportation Development Corporation) *Transportation Research Board Special Reports* No. 168, 1976, pp 23-34, 5 Fig., 2 Tab., 5 Ref.; Proceedings of a conference held July 22-23, 1975, and sponsored by the Social, Economic, and Environmental Factors Section of the TRB and the School of Environment and Engineering of Cornell University.; ORDER FROM: TRB Publications Off

45 139638 NEIGHBORHOOD AND OTHER LAND USE CONSIDERATIONS. Comments are made on 4 papers relating to transportation and land use alternatives, public participation in transportation planning, neighborhood traffic management, and the effectiveness of pricing in restraining city traffic. It is noted that urban needs and the ways in which they may be satisfied require greater study. The question is asked if the methods used to generate public participation are getting at the fundamental issue: is the public participating in planning the transportation it wants? It is noted that most transportation efforts are at the systems level while people's concerns are at the local level. Another point which is

raised concerns the degree to which we accept current travel patterns and trip habits as a basis for predicting future travel patterns. The observation is made that transportation is essentially a political process. This must be recognized and the choices implied in land use and process. This must be recognized and the choices for local politicians and decision makers. Comments are also made regarding the sociological implications of urban planning.

Friskin, F (York University, Toronto) *Transportation Research Board Special Reports* No. 168, 1976, pp 54-55; Proceedings of a conference held July 22-23, 1975, and sponsored by the Social, Economic, and Environmental Factors Section of the TRB and the School of Environment and Engineering of Cornell University.; ORDER FROM: TRB Publications Off

45 143759 TRANSPORTATION AND LAND USE PLANNING ABROAD [Special rept]. The papers discuss some of the ways that transportation and land use planning abroad is providing experience that can be helpful in the United States. Geographic areas from which experience is drawn include Japan, Canada, Europe, and the Middle East. Topics include noise and other transportation impacts, land use techniques to deal with these impacts, transit financing, public participation, 'pedestrianization' in various countries, pricing to restrain parking, truck regulation, highway needs in Canada, and transportation sensitivity considerations in developing countries.

Thiel, FI Kitamura, T Torii, Y Sloan, AK L'Huillier, D ; Transportation Research Board, Washington, D.C. TRB/SR-168, 1976, 83p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-255911/OST

45 144014 THE IMPACTS OF BART ON PROPERTY VALUES-A CASE STUDY OF THE ROCKRIDGE NEIGHBORHOOD. This report describes BART's impact on the sales price of single-family houses in the Rockridge neighborhood. The Rockridge area of Oakland and its recent history are described as the hypotheses to be tested, and the general research strategy. Four specifications of an econometric model are discussed, and the variables used in the regression equations are identified. The before-after, the cross-sectional and the cross-sectional-longitudinal approaches are evaluated. The four models were used to test the null hypothesis that changes in sales prices of comparable houses did not correlate with distance to the BART station.

Skaburskis, A ; Metropolitan Transportation Commission, Department of Transportation, Department of the Air Force Work Paper DOT-BIP-WP-10-@-76, Jan. 1976, 100 pp; Report on BART Impact Program.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-258367/2ST, DOTL NTIS

45 147861 LAND-USE RESOURCES AND TRANSPORT. The space requirements of transport networks are reviewed and problems arising out of space shortage are analysed in road, rail, harbour and airport land use. Possible space saving options from within the transport system include: collective as opposed to individual transport; underground as opposed to surface collective transport; pedestrian zones as opposed to space for vehicles; and traditional as opposed to

new technologies. Land use and transport planning should aim at reducing both the need to travel and the length of the journeys to be made. The number of the covering abstract of the symposium is IRRD no. 221684. /TRRL/

Hernando, J (Ministry of Public Works, Spain) *SIXTH INTERNATIONAL SYMPOSIUM ON THEORY AND PRACTICE* Conf Paper 92-821-1036-2, 1976, pp 243-343, 7 Fig., 3 Tab., Refs.; Presented at the Sixth International Symposium on Theory and Practice.; ACKNOWLEDGMENT: TRRL (IRRD-222853); ORDER FROM: OECD Publications Center, 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006

45 153313 URBAN ECONOMICS, THEORY AND POLICY. The book deals with the financing of local government expenditure, regulation of urban land-use patterns, limitation of traffic congestion and control of urban environmental decay. The theoretical background is given, followed by a more detailed discussion of current urban problems from the economist's view point. Chapters are included on: the economics of geographical concentration, intra-urban location and land use, the urban labour market, the dynamic urban economy, the theory of city size and spacing, the urban environment, the urban transport problem, urban housing, the urban public economy, urban planning. /TRRL/

Button, KJ (Loughborough University of Technology, England) ; Macmillan Press, Limited, (33185943) Monograph 1976, 218 pp, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 224386)

45 153991 URBAN TRANSPORTATION AND LAND USE: A BIBLIOGRAPHY. This bibliographic reference guide to urban transportation and land use literature contains publications that synthesize the relationships among people, movement systems, and land uses in medium-size urban areas. It also samples literature on diverse topics such as car pooling, travel disincentives, pedestrian movement, zoning, traffic restraints, bus lanes, and travel behavior. The primary emphasis is on qualitative knowledge regarding the land use-transportation interface. As such, it is designed for public policy makers, interested citizens, and professionals in the planning and design disciplines. The 1107 citations are categorized into eight general areas: transportation, urban areas, activity and travel, urban form, land use, urban development processes, bibliographies, and miscellany. Author and subject indexes are included.

Edwins, SB Deacon, JA Leggett, HM Harris, RB Kentucky University Bibliog. DOT-TST-75/145, Oct. 1975, 184 pp; Contract DOT-OS-50111; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264926/7ST

45 155577 DFW GETS IT ALL TOGETHER FOR DEDICATION THIS MONTH. This article comments on the planning of the Dallas/Fort Worth facility and the related land use planning factors. The construction innovations implemented at DFW are briefly discussed, the special features of the central utility plant are described, and the ground transportation and planning aspects are reviewed. Comments are also made on the economic impact of the airport, and the

financing of the construction. The airport which was 3 runways and 2 additional preplanned primary runways, is designed to accommodate the wing spread and fuselage lengths for any foreseeable future aircraft. Among the construction innovations developed here was the construction of runways and taxiways with a new mechanized system for installing expansion and contraction bars. Terminal facilities are based on a circular design. Steam and chilled water are generated from a central utility plant located in the center of the terminal complex and midway through the spine tunnel. It is expected that the airport will contribute almost \$267 million in direct purchases of goods and services.

Airport Services Management Vol. 14 No. 9, Sept. 1973, pp 16-21 ACKNOWLEDGMENT: Federal Aviation Administration Library

45 155980 A REVIEW OF TRB ACTIVITIES: JOINT DEVELOPMENT AND VALUE CAPTURE. The concepts of joint development and value capture are summarized and the highlights of the TRB Committee conference are presented. Joint development is the use of corridors, station and stop areas to gain greater economic return on public transit investment and to achieve an improved environmental relation between transportation and land uses. Value capture is the returning to the public a portion of the increased value that attaches to private property by virtue of the development, with public tax money, of a public facility. The role that joint development and value capture will play in the financing and implementation of Dade county's regional transit system development program is described. An alternative analysis that takes into account detailed socioeconomic impact criteria, including joint development is presented and the need for close coordination between the transit system development activities and the local community planning process is addressed. The enabling statutes and constraints of planning joint development are discussed as well as the importance of joint development to the achievement of CBD development plans in Miami. A review of the historical land development changes that have occurred in the Toronto region as a result of the transit planning program are included, as well as the evolution and various results of joint development planning and activity in the U.S. and Canada during the past 15 years. Differing views of the best course of legislative and administrative action to encourage joint development were presented. UMTA emphasized that the entire exchange among local, state, and federal officials was critically needed.

Harmon, RJ (Harmon (Robert J) and Associates Incorporated) *Transportation Research News* No. 69, 1977, pp 6-7, 1 Phot.; ORDER FROM: TRB Publications Off

45 157192 MODELING MASS TRANSIT ON URBAN LAND VALUES. In this effort to develop a multiple regression model for the study of the impact of mass transit on proximate land values, the major concepts which provide the basis for the model are first examined. These concepts include the land value and mass transit gradients. The property value model and the concept of housing and housing value are also detailed. The model formulated recognizes the relationship between property value and transportation costs. The impact of mass transit on

property values represents the capitalization of the reductions in travel costs (travel savings) afforded by a new transportation alternative, and therefore is a function of proximity of the improvement and to the CBD. The model provides for 4-fold improvement over similar models currently in use: the property value gradient is derived from empirical estimations; two property value gradients (the traditional value gradient to the CBD; and the mass transit gradient which is more sensitive to transportation improvements) were incorporated into the model; a residualization process was applied to control multi-collinearity by adjusting the effects of intercorrelation among the independent variables; a statistical method was employed to hold constant the factors that might effect property values other than the transportation improvement.

Koutsopoulos, KC ; Iowa University Tech Report No. 67, Feb. 1976, 29 pp

45 158065 TRANSIT STATION AREA JOINT DEVELOPMENT: STRATEGIES FOR IMPLEMENTATION. VOLUME 1. Joint development strategies seek to create three conditions in station areas: improved design, integrated transit and land development, and value capture. This study constitutes one part of an overall effort by UMTA to promote joint development (multiple use of transportation corridors and stops). This study addresses the practical means of implementing joint development. A major focus of this effort is to develop methods which could be used to make accurate estimates of the value capture potential of transit station areas. This report presents the results of a two years analysis of joint development and contains: (1) an analysis of 19 case studies of examples of transit/land use joint development; (2) an analysis of the impacts of transit on property values; (3) an analysis of 28 techniques—including regulatory mechanisms, taxation, land acquisition, and public assumption of risk strategies—available to local governments which can be used to foster station area development; and (4) a proposed model legislation for the creation of Transit Corridor Development Agencies. Three categories of constraints on joint development are identified: limited station area development and value capture potential; multiple ownership of land; and inadequate public/private and interagency coordination. Recommendations resulting from this study include suggestions for program revisions, more coordination among Federal departments, and better Federal-local relationships. This study indicates that the recapture of land values will prove an important but limited source of transit financing.

Administration and Management Research Association, Urban Mass Transportation Administration Final Rpt. UMTA-NY-06-0047-77-1, Feb. 1976, 343 pp; Sponsored by DOT, Urban Mass Transportation Administration. See also Volume 2, PB-268104.; Contract UMTA-NY-06-0047; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-268103

45 158066 TRANSIT STATION AREA JOINT DEVELOPMENT: STRATEGIES FOR IMPLEMENTATION ECONOMIC CASE STUDIES. VOLUME 2. Case studies is a separate and supplement volume to the Final Report of the Joint Development Study and contains the

complete reports on each of the station areas discussed in the Final Report. Case Studies reviews specific examples of joint development. Such an analysis permits an investigation of practical problems faced in creating joint development projects, and it provides a laboratory for testing the usefulness of alternative implementation techniques. Information in this report should be useful to planners. Thus far, transit planners have not included property value impacts as one of the variables used to determine route alignment and station locations. Case studies focuses on the economic analysis of land values in specific transit areas and purports to develop a simple and inexpensive methodology for estimating transit impact and providing a basis for value capture policy. The methodology used in the empirical research (described in Final Report) is conceptually simple and has been designed to be easily applicable by individuals who possess a good working knowledge of development conditions within a given station area. In this report the methodology was applied to the study of land values in fourteen different station areas in four cities: Washington, D.C., San Francisco, Baltimore, and Atlanta. Case Studies are "live" examples of joint development representing a variety of situations and reflecting diverse attempts to deal with actual obstacles. Work in this area covers historical examples as far back as 1900, as well as current projects and proposed developments.

Administration and Management Research Association, Urban Mass Transportation Administration, (NY-06-0047) UMTA-NY-06-0047-77-2, Feb. 1976, 355 pp; Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-UMTA-NY-06-0047; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-268104

45 164192 URBAN LAND USE AND TRANSPORT POLICIES. Cities are adaptive, and all cities work. An opportunity was recently available to examine the adaptation of various cities in both Britain and the United States, to different land use and transport policies, given differences in: (A) the access of the population to private motor vehicles, (B) the ability of the population to make residential location choice, and (C) the strength of controls on land use development. Three factors that (apart from fund shortages) seem to be encouraging similar transport policies in both countries are: (a) energy consumed in the transport task, (b) environment--pollutants generated in the transport task, and (C) equity--the relative opportunities available to different segments of the population. Because of the adaptability of the city, we are caught in something of a democratic dilemma, where the aggregations of our individual optimum actions cause a departure from our corporate optimum. Some implications of these factors for urban transport planning are examined. /Author/TRRL/

Rahmann, WM (Queensland Main Roads Department, Australia) *Australian Road Research Board Conference Proc* Proceeding Vol. 8 1976, pp 12-21, 6 Tab., Refs.; Proceedings of the 8th Conference of the Australian Road Research Board.; ACKNOWLEDGMENT: Australian Road Research Board, TRRL (IRRD 226311)

45 164436 EVIDENCE OF LAND USE IMPACTS OF RAPID TRANSIT SYSTEMS. This paper draws from the findings of published

empirical studies and observations of the impacts of rapid transit systems on urban development. Analysis is based on comparisons of impact findings by different researchers and for different cities. An initial set of key issues is proposed, against which available information is arrayed and compared. It is concluded that rapid transit can have substantial growth-focusing impacts, but only if other supporting factors are present.

Knight, RL Trygg, LL (De Leuw, Cather and Company) *Transportation (Netherlands) Analytic* Vol. 6 No. 3, Sept. 1977, pp 231-248; ACKNOWLEDGMENT: Transportation (Netherlands), TRRL (IRRD-233293); ORDER FROM: ESL, Elsevier Scientific Publishing Company, P.O. Box 211, Amsterdam, Netherlands

45 165493 ACQUISITION OF LAND FOR JOINT HIGHWAY AND COMMUNITY DEVELOPMENT-EXECUTIVE SUMMARY AND MAIN REPORT. Excess or expanded acquisition by public agencies to provide sites for public and/or private development projects adjacent to transportation facilities is limited. This report examines legal, financial, political, and administrative parameters of four types of takings: remnants or remainders, acquisition for protection of the facility or adjacent land from adverse impacts, recoupment of project costs, and acquisition expressly for joint development. Case studies are made of actual projects in six States (Arizona, Florida, Kentucky, Maryland, New Jersey, and Nevada) and on the Toronto subway system. In several cases the highway or transportation agency was used as an arm of the local government to undertake expanded acquisition. Few acquired properties were sold; typically the highway agency or local government leased the sites on a long-or short-term basis. In most cases a formal inter-agency group coordinated and directed the process from acquisition through site development, and there was significant public support and high quality technical and political leadership. The study recommends that highway agencies broaden their financial and administrative support to highway corridor planning by: (1) identifying surplus land already in their ownership and working with communities and community groups to determine where and how this land could be used for mutually beneficial joint development projects, (2) offering the services of their skilled personnel to communities interested in joint development, and (3) encouraging local communities to adopt their own acquisition programs and regulatory techniques to capture the wide range of public benefits of highway development.

Rivkin, MD Brecher, S Bivkin, GW ; Rivkin Associates, Incorporated FHWA/SES-77/07, Sept. 1976, 144 pp, Refs.; Sponsored by the Department of Transportation, Federal Highway Administration.; Contract DOT-FH-11-8848; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS

45 165561 EFFICIENT USE OF TRANSPORT INFRASTRUCTURE THROUGH LAND USE PLANNING AND CONTROL. The extent to which transportation efficiency can be achieved through land use planning and control is researched in this paper. Experience in Australia and overseas in controlling land development on new towns and old is reviewed and some general conclusions developed. /TRRL/

Johnson, DK (Voorhees (Alan M) and Partners Pty., Ltd., Aus.) ; Institution of Engineers, Australia, (0 85825 074 8) *Analytic* Mar. 1977, pp 39-46, 2 Fig., 8 Ref.; Proceeding of the Institution of Engineers, Australia Engineering Conference 1977, Cooma, Australia, March 14-18, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227864), Australian Road Research Board

45 167487 LAND USE AND TRANSPORTATION MODES. The first part of this report addresses the question of whether multi-activity clustering is the emergent land use pattern. One urban area, Atlanta, Georgia, is examined. The purpose of the analysis reported in part I is to see if concentrations that are not so easily visible are emerging. The second part of the report starts from the premise that such localized clustering exists, but that the clusters are less concentrated than is desirable or possible. The study examines how the excessive spreading of high intensity activities, such as stores and offices, along arterial frontage came about, and how this spreading-out can be reduced. The study findings contain some significant implications for metropolitan transportation and development planning. One is that the conventional orientation of high-speed, high capacity transit towards a single core makes sense. The expansion of the area of intensive development indicates another possible transportation need. A high-frequency, short-haul public transit distribution system, one that could be insulated from competition with private autos for congested street space, is considered to be very desirable. In this research, three forms of analysis were used: Factor and principal component analysis, regression analysis, computer map analysis. The computer mapping was found to be more informative, convincing and interpretable. It also gave very useful spatial information to guide initial strategy development for transit.

Fredland, DR ; Florida State University, Tallahassee, (FL-11-0003-14) UMTA-FL-11-0003, Sept. 1974, 115 pp, 21 Fig., 6 Tab., 33 Ref.; This report was made possible through the support of DOT, U.S. Urban Mass Transportation Administration.

45 167601 IMPACT OF TRANSIT LINE EXTENSION ON RESIDENTIAL LAND USE. ABRIDGMENT. The purpose of this paper is to investigate the effectiveness of zoning regulations in controlling residential land development in a community that is served by a new extension line of a high-speed rail rapid transit system. A mathematical model was established to determine the significant variables that explained the rapid development that took place in Quincy, a suburb of Boston. In the transit impact study, travel time, zoning policy and public transportation service variables were used in this model. Data was also collected for the period 1963-1973 and stratified by traffic analysis zone. The impact of transportation on each analysis zone was measured by the transportation service variables. Multiple linear regression analyses were performed on various linear and log-linear transformations for the variables. The mathematical model for the city of Quincy illustrated that residential land development will be stimulated by the construction of the new extension line of the rapid transit system. Land developers will begin construction of new housing units with construction of the new transit

line if initiated, and will not wait until the line is open for service. Zoning regulation is a significant mechanism for controlling the location and type of land development. Neighborhoods that are primarily zoned for single and two-family dwelling units are particularly vulnerable to rapid change in neighborhood character, if zoning a regulation permits construction of medium and high-density units. Since transit service variables are not statistically significant variables, they have no quantifiable impact on land development.

Ossenbruggen, PJ (New Hampshire University) Fishman, MJ (Penney (JC) Company) *Transportation Research Record* No. 627, 1977, pp 10-13, 2 Fig., 3 Ref.; From TRB Record 627, Rail Transit.; ORDER FROM: TRB Publications Off

45 167967 BUSWAY VERSUS RAIL TRANSIT--A LAND-USE PERSPECTIVE. Inherent in the decision between implementing a busway and rail branch are "perceived" or expected land-use impacts attributed to each mode. External to the decision-maker, time and market generally influence land patterns more than modal choice. Unfortunately, perceived impacts related to mode choice exist in the mind of decision-makers and frequently control the mode selection process. This paper examines the land-use assumptions and perceived impacts formulated during a busway versus rail branch alternative analysis in Atlanta, Ga. The principal assumptions utilized in the decision-making process are described and analyzed. Deficiencies in the process are identified and means of improvement are presented.

Bers, EL (Sverdrup and Parcel and Associates, Incorporated) Hotine, P *ASCE Journal of Transportation Engineering* Vol. 103 No. 5, Sept. 1977, pp 605-616, 11 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 168032 THE GROWTH SHAPERS--THE LAND USE IMPACTS OF INFRASTRUCTURE INVESTMENTS. This book examines the major role which many public facilities, termed "infrastructure" investments, play in the local development process. It covers such facilities as water and wastewater systems, power supplies, highway and secondary road networks, mass transit systems, and airports. Such investments affect local growth by influencing the location and costs of new construction, and can have a powerful effect on the density, timing, and amount of new development. This handbook is intended to improve understanding of the link between infrastructure and land use. /GMRL/ Urban Systems Research & Engineering, Incorporated May 1976, 71 pp; ACKNOWLEDGMENT:

45 168909 ACQUISITION OF LAND FOR JOINT HIGHWAY AND COMMUNITY DEVELOPMENT. CASE STUDIES. This volume examines case studies of actual projects in six states (Arizona, Florida, Kentucky, Maryland, New Jersey, and Nevada) and on the Toronto subway system.

Rivkin, MD Brecher, S Rivkin, GW ; Rivkin Associates, Inc., Washington, D.C.*Federal, Highway Administration, Washington, D.C., Socio-Economic Studies Div. FHWA/SES-77/06, Sept. 1976, 262p; See also PB-273 398. Also available in set of 3 reports PC E10, PB-273 397-SET.; Contract DOT-FH-11-8848; ACKNOWLEDGMENT: NTIS;

ORDER FROM: NTIS; PB-273399/6ST

45 169227 POTENTIAL FOR BETTERMENT--DISTRICT FINANCING AND JOINT DEVELOPMENT APPLICATIONS TO SURFACE TRANSIT. The report proposes a general methodology for evaluating land use and investment activity with respect to land in the vicinity of surface transit facilities. The three major objectives were: (1) to determine if there are incremental benefits accruing to land near bus, trolley, and by inference light rail facilities; (2) to examine equity issues in potential tax benefit districts serving such facilities; and (3) to examine the potential of joint development with respect to surface transit. An underlying objective was the presentation of an interactive spatial analysis system suited to the small-scale study of transit system impacts and relationship to their environment. Primary focus was directed to exploring locations in the vicinity of multiple routes where levels of commercial and multi-family new investment might be particularly high. The study concludes that the use of special benefit districts would be difficult to operationalize and that joint development opportunities are encouraging.

Shawcroft, RG Horwood, EM Lester, MS ; Washington University, Seattle, Urban Mass Transportation Administration, (UMTA-WA-11-0005) Res Rpt. UMTA-WA-11-0005-77-1, RR-77-7, July 1977, 65 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274618/8ST, DOTL NTIS

45 169261 TRANSIT'S ROLE IN THE CREATION OF THE POLYCENTRIC CITY: AN INITIAL ASSESSMENT. The report investigates the role of transit in aiding the implementation of land use plans that call for the creation of major diversified centers in the outer city. The polycentric city concept is defined and illustrated by reference to regional planning work in the Twin Cities of Minnesota. Arguments for and against the concept are outlined and the results of a survey relating to the present status of the concept are presented. An evaluation framework is developed and applied in visits to ten American and two Canadian urban regions. The most interesting work on this topic was found in Vancouver, B.C., and Toronto, Ontario. Other interesting work has been done in the Twin Cities and San Diego. The results of the field work are summarized and seven specific examples of noteworthy progress toward the development of outer city centers of significant scale are described.

Schneider, JB Noguchi, T ; Washington University, Seattle, Urban Mass Transportation Administration, (UMTA-WA-11-0005) Res Rpt. UMTA-WA-11-0005-77-2, RR-77-6, Aug. 1977, 256 pp; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-275043/8ST

45 170568 RAILROAD RIGHT-OF-WAY USE AND ECONOMIC VALUE. The economic value associated with the use of railroad rights of way is defined and its measurement is discussed. As long as existing uses are unchanged, the value of a right of way may be substantial but there is no compelling reason to know what it is. Changes in such use arising from causes such as abandonments, supplementary uses by others seeking transmission facilities or new public transport

corridors, or assumption of private rail facilities by governments can make valuation important. Assembled rights of way represent a resource for society that should not be discarded lightly and efforts to avoid dismemberment should be stressed.

Beetle, GR *Appraisal Journal* Oct. 1977, pp 511-518; ORDER FROM: American Institute of Real Estate Appraisers, 155 East Superior Street, Chicago, Illinois, 60611

45 170858 LOCATION OF CAPITAL AIRPORTS. Description of the structure and future development of the airspace and air traffic control system, especially safety of aircraft operations. Mathematical models are presented for the calculation of collision risks. Environmental and access criteria to locate aerodromes on the ground are then treated. Public transport taking over a part of the traffic to and from the airports has been analysed. An evaluation of the possibilities to extend and relieve existing airports by existing airfields or to construct new aerodromes is finally given. Also transfer of air passengers to other means of transport has been studied.

Denver, L ; Royal Technical University of Denmark 1974, n.p.; ACKNOWLEDGMENT: European Conference of Ministers of Transport

45 172875 LAND USE AND TRANSPORTATION. Land Use and Transportation will report on research projects, legislation, policy, other information, and views concerning coordinated land use and transportation planning. It is published periodically by the Transportation Research Board Committee on Joint Development of Land and Transit Systems: Robert J. Harmon, Chairman, Andrew E. Euston, Jr., secretary, and Floyd Thiel, TRB staff. Submit items to Steven Bloomfield, editor, Land Use and Transportation, Transportation Research Board, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

Land Use and Transportation 1978, 5 pp, 4 Fig. ORDER FROM: TRB Publications Off

45 173186 INSIGHTS INTO THE PRACTICE OF JOINT DEVELOPMENT: LESSONS FROM EXPERIENCE. Case studies of joint-development projects in six states and one Canadian metropolitan area were conducted for the Federal Highway Administration. Land acquisition associated with joint development, the extent to which highway agencies and other public bodies acquire more land than is actually needed for specific facility sitings and the incidence of complementary public and private development projects on the surplus land were evaluated. Examination of the literature showed severe legal, financial, political, and institutional constraints that restrict this form of expanded acquisition and subsequent joint development. At the same time, however, numerous individual projects are being undertaken and somehow circumventing the constraints. The case studies examined over 35 specific projects completed or planned in Arizona, Florida, Kentucky, Maryland, New Jersey, and Nevada and a large number of developments on surplus land of the Toronto subway system. The studies showed situations where the highway or transportation agency was used as an arm of general-purpose local government in undertaking expanded acquisition. Many of the successful examples illus-

trated special administrative and financial arrangements between local government and the transportation agency for the acquisition and disposition of the land, unique institutional solutions for planning and implementing projects, significant support from public opinion, and a high quality of technical and political leadership. /Author/

Rivkin, MD (Rivkin Associates, Incorporated) *Transportation Research Record* No. 634, 1977, pp 32-39, 1 Tab., 4 Ref.; This article appeared in *Transportation Research Record* No. 634, Predicting and Measuring Impacts of Transportation Systems.; ORDER FROM: TRB Publications Off

45 176922 SHEFFIELD AND ROTHERHAM LAND-USE/TRANSPORTATION STUDY. 3. TRAMS FOR SHEFFIELD? This paper deals specifically with the development and testing of a modern tramways system for operation within the city of Sheffield. The main reasons for the initial examination of such a system arose firstly, from the fact that the city planned a rapidly-expanding commercial centre in a region of 800000 people; secondly, because there was limited space for highway expansion radial to the city centre and strong environmental objectives to such; and finally, due to the growing uncertainty over the long-term availability of oil. The paper looks initially at the two main stages in the development of the tramway system. Stage 1, as a preliminary analysis, concentrated on examining the potential, corridor by corridor, of a system based on the concept of the light articulated tramcar presently in use in a large number of continental cities. Stage 2, investigated a specific system in depth using the full transportation model to forecast peak and off-peak flows and benefits for 1986, the study's forecast year. The system, as described, was assumed to be low voltage, say 600 V d.c., overhead pick-up, 2.2 or 2.5 M wide, articulated or car-and-trailer stock running on a network of 110 km, with on-vehicle fare collection or pre-purchase fares and an average stop spacing of 300-400 M. The paper examines the derivation of operating costs and capital costs, the effect of such a system on other 'on-street' traffic and a comparative assessment of bus and tram systems. Final recommendations are defined by reference to a proposed, reduced, 60 km system at a capital cost of 20 M pounds, and the recommendation that rights-of-way be reserved immediately in order that construction of a fixed-track system could be undertaken during the later 1980's. For abstracts of parts 1, 2, 4 and 5, see IRRD Abstract Nos. 227772, 228768, 231331 and 231332 respectively.

Coventry, PS (Martin and Voorhees Associates, England) *Traffic Engineering and Control Analytic* Vol. 18 No. 10, Oct. 1977, pp 470-474, 3 Fig., 2 Tab., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-229481); ORDER FROM: ESL

45 177276 LAND ACQUISITION AND RELOCATION ASSISTANCE UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED. This manual is designed to provide guidance to grantees of mass transit projects under the Urban Mass Transportation Act of 1964 as amended, to meet the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, by identifying and adapting the requirements imposed referenced authorities on projects involving

land acquisition and/or the relocation of persons, businesses, farm operations and non-profit organizations. This manual contains guidance relating to requirements on the necessity for, and providing a means of preparation of: the appraisal and acquisition of real property; rendering relocation services; moving, relocation and replacement housing payments; and, other expenses when land acquisition and/or relocation are involved.

Urban Mass Transportation Administration
UMTA C 4530.1, Mar. 1978, v.p., 4 App.

45 177352 ACCESSIBILITY IN TRANSPORT/LAND-USE MODELLING AND ASSESSMENT. The relationship between accessibility and urban density is examined both conceptually and experimentally. A linear relationship between the logarithm of density and centrality, a derivative of accessibility, is calibrated. It is shown that centrality can be used to measure the utility of location in the context of the land-use/transport system. This provides a basis for evaluating land-use/transport changes by using only data readily available from transportation studies. /Author/TRRL/

Davidson, KB *National Society of Professional Engineers* Vol. 9 No. 12, 1977, pp 1401-16, 2 Fig., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 231781)

45 178455 LAND USE PLANNING AND TRANSPORTATION [Raumplanung und Verkehr]. The premise is made that all mechanical forms of transport constitute a nuisance and bring about damage and that an inequitable degree of transport will lead to collective immobility. In four theses the aims for land use planning in relation to transportation are formulated. A reduction in the need for mechanical transport is demanded and of forced travel or else a promotion of voluntary mobility. Similarly there should be a demand for collective transport or, where this is unsuitable, for community transport (e.g. Taxis). Individual transport should become excluded in all but extremely thinly populated areas. The then employed form of energy and its environmental benefit deserves great consideration in these problems. A further aim in land use planning should be the preservation of unpopulated and thinly populated areas by the appropriate configuration of the populated areas. One must understand by this a "small centre" interaction based upon sociologically and functionally different areas of life. By reducing the size of settlement or by raising the density of population it will be possible to forego the use of mechanical transport within each unit. Finally a plea is made for human rights in planning rather than for traffic rights. /TRRL/ [German]

Gruen, V (Zentrum fuer Unnweltplanung, Austria) *SIR-Mitteilungen und Berichte* No. 1, 1977, pp 13-28; ACKNOWLEDGMENT: TRRL (IRRD-306479); ORDER FROM: Salzburger Institut fuer Raumforschung, Postfach 2, Salzburg, Austria

45 179977 EFFECTS OF BART ON URBAN DEVELOPMENT. The research objectives of the BART Impact Program Land Use and Urban Development Project are summarized, and the results of studies of BART's accessibility impacts and their importance in explaining: (1) Regional shifts in employment and population; and (2) BART's effects on the office construction and

housing industries are presented. A preliminary analysis of regional trends since 1950 indicates that BART has not measurably affected population and employment growth within the corridors it serves. Changes in the office construction and housing industries within the three-county BART service area are covered, and BART's role in timing and location decisions is analyzed. Topics yet to be addressed in the research project are highlighted and the implications of these preliminary findings are described.

Dyett, MV (Blayney (John) Associates) Escudero, E *ASCE Journal of Transportation Engineering* Vol. 104 No. 3, May 1978, pp 239-251, 4 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 180019 A REVIEW OF URBAN LAND USE MODELS. Standard transport planning procedures developed in the United States of America have been used to estimate travel demands within transport studies in Indian metropolitan areas. This has led to an awareness of land use-transport planning models which attempt to minimize travel demands through manipulation of land use patterns. The author reviews urban land use models which have been developed in many countries, and in particular discusses activity or operational allocation models where future development is estimated relative to a set of zones within the region. The models are classified and examined as follows: (1) trend models, which project the location of activities within a region by calibrating a model to base year information, and using the model to predict the change in activities between the base and horizon year in each zone given some exogenously prepared estimates of the future urban activities. (2) equilibrium models, which predict the activity locations of a set of inter-related urban activities at some point in time, given information about the locations of at least one set of the activities. (3) land use design models, which allocate activities to zones in an urban area so as to optimize a given objective function. This examination established a number of criteria for identifying the type of model that would be most useful for land use-transport planning analyses of urban areas and regions in India. The author discusses these criteria, and the resulting selection of the Lowry model for development for application in India. This model is described, an important feature of which is considered to be its ability to estimate distributions of population and employment, and the associated travel demands. /TRRL/

Sarna, AC (Central Road Research Institute, India) *Indian Highways* Vol. 5 No. 6, June 1977, pp 9-16, 1 Fig., 1 Tab., 20 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 232075)

45 180094 LAND-USE DENSITY, PATTERN, AND SCALE AS FACTORS IN URBAN TRANSPORTATION. This article considers the density and pattern of urban land use in subjective terms to demonstrate the difference between them, illustrate land-use patterns not normally considered, and relate these variables and urban scale to transportation technology. This framework was then expanded into the two-function situation that is most prevalent in the determination of urban transportation demand. From theoretical considerations 10 basic combinations of trip origins and destinations were identified.

The relationship of these to transportation technology and especially to the relative importance of line-haul transport is discussed.

Betz, MJ *Traffic Quarterly* Vol. 32 No. 2, Apr. 1978, pp 263-272; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 181222 LAND USE, ENERGY FLOW AND DECISION MAKING IN HUMAN SOCIETY--THE TRANSPORTATION-ENERGY-EMISSIONS MODEL. The Transportation-Energy-Emissions Model (TEEM) was developed to study the varying effects upon energy use and air quality due to the implementation of several alternate traffic systems in a metropolitan area. Given certain information on number of persons using each part of the transportation system, time allocation of use, modal split, and certain characteristics of the transportation system, it estimates energy use and emission of SO_x, NO_x, CO, and HC. Emphasis of this study is based on the fact that the way a system is used affects energy use and pollutant emissions, and demonstrates how the volume of flow affects energy-emission rates by automobile, bus, and BART-type train use. Tentative results indicate that: (1) during peak congestion periods, arterial road use implies higher rates of fuel consumption than freeway, but during off-peak periods the situation is reversed; and (2) switching 30 percent of passenger miles from auto to either buses or trains improves the energy use and emissions situation significantly.

Lee, J Flory, J ; California University, Davis, National Science Foundation NSF/RA/E-73/494, Dec. 1973, 21 pp; Grant NSF-GI-27; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-280045/6ST

45 181337 STATION AREA LAND USE. BART IMPACT PROGRAM. LAND USE AND URBAN DEVELOPMENT PROJECT. The report summarizes time series data on BART stations compiled for the Land Use and Urban Development Project. Data collection and classification methods are described, and data sources are documented. Station area land use changes during the period 1965-77 also are summarized. (Color illustrations reproduced in black and white)

Dyett, MV ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Housing and Urban Development, Department of Transportation DOT-BIP-WP-39-5-77, Nov. 1977, 37 pp; Prepared by Blayney (John) Associates, San Francisco, Calif. and Dornbusch (David M.) and Co., Inc., San Francisco, Calif. Sponsored in part by Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282996/8ST, DOTL NTIS

45 182110 STUDY OF WORKERS' LOCATION DECISIONS. LAND USE AND URBAN DEVELOPMENT PROJECT. BART IMPACT PROGRAM. BART's effects on workers' location decisions in San Francisco and Oakland are investigated. BART's effect on residential location decisions, as influenced by job location decisions, also are examined. The principal means of investigation is computer analysis of the results of a survey of downtown workers

recently changing jobs and a survey of employees working in the BART corridors. The paper concludes with an assessment of the policy implications of this research.

Dyett, MV Castle, GH, III ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-38-5-77, Mar. 1978, 84 p.; Prepared in cooperation with Blayney (John) Associates, David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Revision of report dated Nov 77; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-285969/2ST, DOTL NTIS

45 184709 TRANSPORTATION AND LAND USE PLANNING TO ACHIEVE NATIONAL GOALS: THE NETHERLANDS. The Netherlands is one of the most densely populated countries in the world. The Dutch people have a long history of rigid land use controls; urban sprawl is unknown there. High-rise apartment complexes generally mark the boundary between urban and agricultural land uses. Urban expansion and some decentralization of urban activities since World War II have placed a difficult burden on transportation. The number of passenger automobiles has increased fivefold between 1960 and 1970. Transportation policy goals for the Amsterdam region call for public transportation in the future to accommodate about 60 percent of the journey to work traffic (it now accommodates about 25 percent), bicycle and pedestrian trips will be 30 percent, and the private automobile will account for the remaining 10 percent. To help achieve the latter goal, parking will be provided for no more than 10 percent of central city employees. The key to land use control in the Netherlands is municipal expropriation of land ripe for development. The three-tiered land use planning process (national, provincial, municipal) is described in some detail, as well as the process of land acquisition, the provision of funding, and the installation of public facilities prior to private development. The manner in which highway planning is incorporated into and becomes an integral part of the overall planning process is described. The nature and degree of public participation in highway planning and the method of resolving disputes is discussed. The moderate effectiveness in coordinating highway development and land use activities to minimize adverse effects and enhance beneficial effects of highways is more an indirect result of the intensive overall land use planning process than the result of specific controls for such purposes. The Netherlands system of land use controls might not be as effective if not for the extremely high financial costs involved in preparing sites for construction (draining, removing peat and top soil, sand layering, and installing piles). Moreover, their land use control system does not appear to be politically or institutionally acceptable in the United States at this time. The remarkable success of the Netherlands in controlling a very scarce and valuable resource, land, has probably led to a more stable economic and social system for the country as a whole, but it has not been without some trade-off costs--restrictions of free-

dom of private land ownership and an almost total constraint on private gains from land value appreciation. /Author/

Gamble, HB (Pennsylvania State University, University Park) *Transportation Research Record* No. 658, 1977, pp 5-9, 3 Ref.; This paper appeared in *Transportation Research Record* No. 658, Transportation Development and Land Use Planning.; ORDER FROM: TRB Publications Off

45 186187 LAND USE IMPACTS OF RAPID TRANSIT: IMPLICATIONS OF RECENT EXPERIENCE. The report seeks to display available evidence on the extent to which recent (post-World War II) major rapid transit improvements in the United States and Canada have influenced urban land use. From this compilation are derived several types of conclusions. The factors governing the size and nature of land use impacts of transit are determined; implications for appropriate Federal policy are drawn; and specific needs for related future research are identified. The report's intended use is as a resource for those involved in the planning and evaluation of possible improvements in urban transit systems.

Knight, RL Trygg, LL ; De Leuw, Cather and Company, Department of Transportation Final Rpt. DOT/TPI/10-77/29, Aug. 1977, 266 p.; Contract DOT-OS-60181; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287190/3ST, DOTL NTIS

45 186188 LAND USE IMPACTS OF RAPID TRANSIT: IMPLICATIONS OF RECENT EXPERIENCE. EXECUTIVE SUMMARY. The report reviews evidence of land use impacts of recent major rapid transit improvements and draws conclusions concerning the extent and nature of such impacts and the conditions under which they have occurred. Transit improvements studied are primarily post-World War II in origin. American and Canadian examples are stressed, although European experience is treated briefly. Virtually all major modern American and Canadian rapid transit improvements are included, covering conventional rapid rail, commuter rail, light rail and bus/busway. In addition to conclusions on general patterns of land use impact causes, research recommendations and Federal policy implications are drawn.

Knight, RL Trygg, LL ; De Leuw, Cather and Company, Department of Transportation DOT/TPI/10-77/31, Dec. 1977, 19 p.; Contract DOT-OS-60181; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287191/1ST, DOTL NTIS

45 186225 STUDY OF BART'S CONSUMPTION OF LAND AND PROPERTY. LAND USE AND URBAN DEVELOPMENT PROJECT. The paper documents BART's consumption of land and property in terms of the characteristics of business and people displaced, describes the relocation process, and examines development on surplus land BART acquired and subsequently sold. Study methods included statistical analysis of parcel data obtained from the BART Real Estate Department and the California Department of Transportation, a small survey of households and firms receiving relocation payments from BART, and key informant interviews with persons knowledgeable about BART's real estate activities. The paper closes with assessment of policy implications. (Color illustrations reproduced in black and white)

Dyett, MV Castle, GH, III ; Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development Work Paper DOT-BIP-WP-55-5-78, May 1978, 51 p.; See also report dated November 77 PB-282996. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-287797/5ST, DOTL NTIS

45 188405 A ZERO-ONE INTEGER-PROGRAMMING FORMULATION OF THE PROBLEM OF LAND-USE ASSIGNMENT AND TRANSPORTATION NETWORK DESIGN. A zero-one integer-programming formulation of the simultaneous optimization of the problems of land-use assignment and transportation-network design is presented. The problem is modeled through a set-partitioning approach and incorporates a multiple-criteria objective function, appropriate upper-and lower-bound constraints on area assignments, and construction costs. A simple example and a more complicated urban-design case study are included to demonstrate the viability of this approach in solving the simultaneous-optimization problem. As a secondary benefit, this set-partitioning model can be reformulated as an integer, generalized-network, flow problem for which new efficient computer codes, capable of solving networks with thousands of nodes and variables, are available.(a)

MacGregor, DS Liebman, JS *Environment and Planning B* Vol. 5 No. 1, June 1978, pp 101-115, 9 Fig., 3 Tab., 23 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 235548)

45 188418 LAND USE AND ENERGY UTILIZATION FOR THE ST. LOUIS SMSA. The sensitivity of energy consumption to the residential patterns of the population growth in the St. Louis region between 1970 and 1995 is investigated. Methodology is presented for computing transportation and residential energy consumption, making maximum use of local data in a manner which is intimately tied to land use. Results of energy computations for a 1995 land use plan developed by East-West Gateway Coordinating Council and four alternatives are presented. The results are put into perspective with other related energy conservation measures.

Wallace, ND (Southern Illinois University, Edwardsville) Kahn, A ; Missouri University, Rolla 1978, pp 325-335; Proceedings of the Fourth Annual Missouri Department of Natural Resources/Missouri University, Rolla Conference on Energy, Missouri University, Rolla, October 11-13, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 190214 URBAN TRANSPORTATION AND NEIGHBORHOOD PRESERVATION. During the past decade neighborhood preservation has become an integral component of urban programs to preserve older cities as desirable residential locations. The purpose of this report/analysis is to increase the understanding of the relationship between transportation and neighborhood preservation. The materials upon which it is based include general literature on transportation and the history of cities and three specific studies undertaken as part of this project. Two of

the studies are detailed transportation studies of neighborhoods in Baltimore and Pittsburgh-neighborhoods typical of those with stabilization and preservation programs. The third study is a national survey of neighborhood-oriented organizations, including community groups, church organizations, senior citizens and social clubs, regarding transportation related problems and their identification and resolution. Major problems identified herein are: streets in poor repair, insufficient parking; excessive through traffic; a lack of transportation for the elderly and those without automobiles. Questionnaire returns of 104 leaders of neighborhood organizations revealed that the most common and major problems encountered include: streets not repaired (49%); not enough off-street parking (49%); traffic passing through neighborhood (41%); streets not cleaned (41%); parking for residents (40%); and transportation for elderly (39%). This report states that an important role for UMTA, regional and city transportation agencies is to be sure that recent programs such as on-street parking to neighborhood residents be rigorously evaluated and information on successful programs be disseminated widely. /UMTA/

Bish, RL ; Maryland University, College Park, (MD-11-0003) Final Rpt. UMTA-MD-11-0003-79-2, Sept. 1978, 26 p.; Sponsored by the Urban Mass Transportation Administration. Related reports: "Guidelines for Undertaking a Neighborhood Transportation Needs Assessment," UMTA-MD-11-0003-79-1; "Pittsburgh's Central Northside Neighborhood: A Transportation Case Study," UMTA-MD-11-0003-79-3; "Baltimore's Hollins Park Neighborhood: Transportation Case Study," UMTA-MD-11-0003-79-4.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-290590

45 190217 PITTSBURGH'S CENTRAL NORTHSIDE NEIGHBORHOOD: A TRANSPORTATION CASE STUDY. Pittsburgh's Central Northside neighborhood is typical of inner-city neighborhoods with established neighborhood stabilization and preservation programs. This study provides an analysis of the transportation system and transportation problems in the neighborhood. The results are useful for understanding transportation problems in the neighborhood as well as contributing to a larger study of the relationship between neighborhood preservation and transportation underway at the University of Maryland. One hundred and fifty families were interviewed for this study, and an analysis of streets, bus service, taxi service, jitney service, and services for the elderly and handicapped were examined. Almost half (47%) of the residents surveyed owned one (37%) or more (10%) cars and 78% of the car owners parked on the street. Results show major problems are: 1) parking in the renewed section of the neighborhood; 2) long waiting times for buses at night; 3) knowledge of transportation for the elderly; and 4) personal safety at night. This report concludes that the residents of the Central Northside neighborhood do not seem to face any severe problems even though parking is a definite problem in the Mexican War Streets areas. Most respondents feel satisfied with the neighborhood and only a few felt that transportation problems contributed significantly to their dissatisfaction with the neighborhood's living conditions. The appendix herein provides a summary of survey results of the

163 respondents as well as the survey form. /UMTA/

Mollerstrom, WW Amailes, JA Weichert, CF ; Maryland University, College Park, (MD-11-0003) Final Rpt. UMTA-MD-11-0003-79-3, Sept. 1978, 34 p.; Sponsored by the Urban Mass Transportation Administration. Related reports: "Guidelines for Undertaking a Neighborhood Transportation Needs Assessment," UMTA-MD-11-0003-79-1; "Urban Transportation and Neighborhood Preservation," UMTA-MD-11-0003-79-2; and "Baltimore's Hollins Park Neighborhood: Transportation Case Study," UMTA-MD-11-0003-79-4.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-290591

45 190224 BALTIMORE'S HOLLINS PARK NEIGHBORHOOD: A TRANSPORTATION CASE STUDY. The revitalization of central cities has been recognized by both Federal and State governments as an important national objective. Earlier programs that concentrated on central business districts are now being joined by programs which reflect the government's increasing concern with the various subareas of the central city. The Hollins Park Transportation Study is a small but comprehensive analysis of the transportation facilities that serve the Hollins Park neighborhood and identifies the transportation problems that the residents face. The information presented was obtained from various city agencies, and also from visits to the neighborhood to collect data on parking regulations, location of vacant lots and parking lots, and other information which is presented in Appendix A. A Home Interview Survey was conducted in the neighborhood and 151 families were interviewed. An analysis of streets, public transit, and alternative transportation services was also undertaken. The information obtained concerned the residents' travel patterns, automobile ownership and usage, bus and taxi usage as well as any other available forms of transportation and information concerning the quality of life and residential desirability of the neighborhood. A summary of the survey results are presented in Section IV, and the complete survey is presented in Appendix B of this report. The transportation problems identified in this study which affect the quality of life in the neighborhood are: parking problems; bus scheduling; transportation for the elderly and handicapped; and noise on Lombard Street. It is suggested that City government work with neighborhood organizations in order to solve these problems. /UMTA/

Maryland University, College Park, (MD-11-0003) Final Rpt. UMTA-MD-11-0003-79-4, Sept. 1978, 46 p.; Sponsored by the Urban Mass Transportation Administration. Related reports: "Guidelines for Undertaking a Neighborhood Transportation Needs Assessment," UMTA-MD-11-0003-79-1; "Pittsburgh's Central neighborhood: A Transportation Case Study," UMTA-MD-11-0003-79-3; and "Urban Transportation and Neighborhood Preservation," UMTA-MD-11-000-79-2.; ACKNOWLEDGMENT: UMTA, NTIS; ORDER FROM: NTIS; PB-290592

45 190263 LAND USE AND TRANSPORT IN SYDNEY AND TORONTO. Land use patterns and journey to work characteristics are compared for the Sydney and Toronto metropolitan areas using information collected in 1971. Both regions

had populations of 2,780,000 as well as very similar socio-economic characteristics. Sydney is served by a comprehensive radially-focussed commuter rail network while Toronto is served by an underground rapid transit system in the central area and a comprehensive freeway network in the outer suburbs. Gross residential densities in Sydney are about one-half those in Toronto while employment densities tend to be higher in Sydney. Employment distributions in Toronto are influenced strongly by the freeway network while commercial employment locations in Sydney are influenced by the rail network. While the majority of travel in Sydney is by private automobile the dominant orientation of home-work travel is along radial corridors focussed on the CBD. In Toronto the spatial orientation is along the subway system in the inner areas while the freeway system is the dominant influence in the outer suburbs. Daily home-based work travel in Toronto exceeds that of Sydney by 5,000,000 km. The use of public transport for the journey to work is marginally higher in Sydney.

Hutchinson, BG (Waterloo University, Canada) Black, J (New South Wales University, Australia) *Australian Road Research* Vol. 8 No. 3, Sept. 1978, pp 28-37, 13 Fig., 4 Tab., 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-236758), Australian Road Research Board; ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

45 190485 STUDY OF BART'S CONSTRUCTION IMPACTS. LAND USE AND URBAN DEVELOPMENT PROJECT. BART IMPACT PROGRAM. The study examines the effects that BART's construction activities had upon retail sales and services and upon real property. Key informant interviews were supplemented by longitudinal data on taxable retail sales and on permits for construction in areas near BART. Many retail merchants near the sites of BART cut-and-cover construction claimed to have suffered losses in sales during the period. The Mission District (San Francisco) and the Ashby station area (Berkeley) show the most distinct signs of losses linked to BART construction. Property owners and builders were found not to have deferred or eliminated maintenance, rehabilitation or new construction near BART construction. (Color illustrations reproduced in black and white)

Gussman, V Schnetlage, T Falcke, CO ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-48-5-78, Apr. 1978, 49 p.; Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288653/9ST

45 190582 LAND USE AND URBAN DEVELOPMENT PROJECT STUDY OF OFFICE CONSTRUCTION INDUSTRY. The study addresses BART's effects on the three-county BART service area office construction industry. Building permit data for new and rehabilitated offices throughout the three-county BART area were compiled for the period from 1960 through

early 1977. Eighteen-year trends in regional and local office patterns were analyzed and specific office construction industry hypotheses were investigated. The hypotheses addressed specific issues of BART effects on regional office patterns, local office location shifts to BART station areas, and the timing of BART-induced changes in office location patterns. Key informants were interviewed to supplement the building permit data analysis. Information from the interviews provided insight into office location decisions and aided the interpretation of the building permit data. (Portions of this document are not fully legible) (Color illustrations reproduced in black and white)

Merchant, JP Schnetlage, T ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-33-5-77, Aug. 1977, 65 p.; Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288678/6ST

45 190848 ENVIRONMENTAL ANALYSIS FOR DEVELOPMENT PLANNING IN CHAMBERS COUNTY, TEXAS, LAND USE POLICY COMPONENT, INTERIM SUMMARY OF FEDERAL INFLUENCE OVER LAND USE. This summary covers major Federal programs that affect land use and indicates some of the influence which these programs may have on Chambers County, Texas. The first part is divided into specific areas of study and includes the history of Federal assistance programs to date. These areas are housing and urban development, the Rural Development Act of 1972, transportation, mass transit, energy, air pollution controls, the National Environmental Policy Act of 1969; power plant siting, the Environmental Protection Agency (EPA), Coastal Zone Management (CZM), the National Land Use Policy (NLUP) and Planning Assistance Act, and the interrelation of EPA, CZM, and NLUP. The second part deals with constitutional power in relation to transportation, housing and slum clearance, urban renewal, Federal assistance for new communities and open space acquisition, the Rural Development Act of 1972, the EPA, CZM, NLUP and Planning Assistance Act, and power plant siting bills. Included are the legislative history of these land use acts and their actual terminology, control and enforcement procedures and research and developing funding. Specific references to Texas, and especially Chambers County, in relation to these programs are made throughout the report.

Mixon, J ; Southwest Center for Urban Research, Houston, TX.**Bates Coll. of Law, Houston, TX.*National, Science Foundation, Washington, DC. Applied, Science and Research Applications. NSF/RA/E-73-518, Nov. 1973, 142p; Prepared in cooperation with Bates Coll. of Law, Houston, TX.; Grant NSF-GI-39211; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-288314/8ST

45 190905 THE IMPLICATIONS OF BART'S LAND USE AND URBAN DEVELOPMENT IMPACTS FOR THE TRANSPORTATION DISADVANTAGED. The report examines the land use and urban development impacts that the 71 mile Bay Area Rapid Transit System has had to date on the transportation disadvantaged. Three special population groups are the focus of analysis-- ethnic minorities, the elderly and handicapped. These groups are of special concern for transportation planning and policy because of either low-income status or mobility related impairments. Findings are reported from the investigation of six issues related to BART's impacts for the transportation disadvantaged in terms of population distribution effects, residential location decisions, and station area neighborhood level impacts. Evaluation of these findings is made in the context of the level, nature, and degree of equity in the incidence of BART's economic impacts. Based on the findings of the study, the land use implications for the transportation disadvantaged of a regional rapid rail transit investment are presented in terms of policy considerations for other areas in which similar systems may be considered.

Donnelly, R Arguelles, J ; Metropolitan Transportation Commission, Urban Dynamics Associates, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-56-10-78, Apr. 1978, 58 p.; Prepared in cooperation with Urban Dynamics Associates, San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289644/7ST

45 190906 STUDY OF DEVELOPMENT PATTERNS. The working paper examines BART's effects on Bay Area, corridor, and station area land use and development patterns. BART's effects on the supply and demand for housing, commercial, and institutional uses are evaluated, using a variety of analysis techniques. These include regional regression analysis of BART's influence on population, housing, and employment; statistical analyses of survey results; and key informant interviews. Particular emphasis is placed on effects on minorities. The paper also synthesizes earlier work elements of the BART Impact Program Land Use and Urban Development Project. Study conclusions are that BART has not affected regional development patterns, but has had effects on station area (mostly commercial and institutional) and corridor development patterns. These effects, however, have been less than the anticipated level of influence. The policy implications of these findings also are addressed. (Color illustrations reproduced in black and white)

Fajans, MH Dyett, MV Dornbusch, DM ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-51-5-78, Sept. 1978, 120 p.; Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-289704/9ST

45 190968 STUDY OF PROPERTY ACQUISITION AND OCCUPANCY, BART'S EFFECT ON SPECULATION, LAND USE AND URBAN DEVELOPMENT PROJECT. BART IMPACT PROGRAM. The working paper addresses BART's effects on speculation in real estate in the three-county BART service area. Information from interviews with key informants was combined with quantitative analyses of data assumed to be indicative of speculation at eight study sites throughout the service area. The resultant station-specific syntheses were further synthesized to deduce observations applicable to more than one station area. The study addresses specific issues of the timing and the extent as well as the character of BART-induced speculation. (Color illustrations reproduced in black and white)

Falcke, CO Schnetlage, T ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-45-5-78, Oct. 1978, 96 p.; Revision of report dated Apr 78. Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Transportation, Washington, DC., and Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-290147/8ST, DOTL NTIS

45 190970 RECOMMENDATIONS FOR LONG-TERM MONITORING. Options for monitoring the impacts of the Bay Area Rapid Transit (BART) system on land use and urban development are examined and evaluated in terms of the importance for policy making, the probability of impact and the measurement feasibility. Analysis techniques are discussed, and monitoring issues in each station area summarized. A recommended long-term monitoring program is presented, including a cost estimate for the first five years.

Dyett, MV ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-54-5-78, July 1978, 50 p.; Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291016/4ST, DOTL NTIS

45 191029 PROGRAM-WIDE CASE STUDIES. LAND USE AND URBAN DEVELOPMENT PROJECT. BART IMPACT PROGRAM. The paper consists of in-depth, policy-oriented case studies of BART's impacts on selected communities, synthesizing all case study work in the BART Impact Program. The variety of BART impacts are described for downtown San Francisco and downtown Oakland, representing urban core areas; the Mission District of San Francisco, the Rockridge neighborhood of north Oakland, and Richmond, representing urban residential areas; and Walnut Creek and Fremont, selected as typical suburban residential communities. BART impacts on the natural environment, public policy, institutions and lifes-

tyles, transportation service and travel behavior, as well as land use and urban development are evaluated in terms of pre-BART and no-BART alternatives. Comparative statistics on population, employment, housing, land use and travel behavior are presented, and pre-and post-BART land use and zoning are mapped for each study area. Each case study concludes with an analysis of similarities and differences, and an assessment of the policy implications of the BART experience to date. (Color illustrations reproduced in black and white)

Fajans, MH Dyett, MV ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-53-5-78, July 1978, 166 p.; Prepared in cooperation with Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291388/7ST, DOTL NTIS

45 191362 THE IMPACT OF BART ON LAND USE AND DEVELOPMENT POLICY. The working paper assesses the relationship between the construction and operation of BART and changes in local land use policy and resulting changes in actual land use and development. This study presents findings in four areas: (1) Local government involvement in BART station location and design decisions related to land use policy; (2) BART impacts on local government planning studies, rezonings and use of special development incentives or controls; (3) BART impacts on local government policy regarding BART-related joint development, particularly public improvements, redevelopment and marketing; (4) The impact of BART-related land use policy upon actual changes in land use and development.

Jonash, RS ; Metropolitan Transportation Commission, Booz-Allen and Hamilton, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP/WP-41-8-77, Sept. 1977, 92 p.; Prepared by Booz, Allen and Hamilton, Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Report on BART Impact Program, Public Policy Project. Color illustrations reproduced in black and white.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-291957/9ST, DOTL NTIS

45 191659 STUDY OF BART'S EFFECTS ON PROPERTY PRICES AND RENTS. The paper addresses BART's effects on residential and commercial property prices and rents. Multiple regression analyses were carried out on eight study sites throughout the service area. The separate study site analyses were synthesized to derive observations applicable to more than one station area. At most sites, the data permitted separate analyses of pre-service (anticipatory) effects, immediate, and longer term (post-service) impacts. The study addresses specific issues of the timing of BART impacts as well as joint distribution effects. Information from key informants was used in specifying study areas, determining vari-

ables to be included in the models, and in corroborating analytical results.

Falcke, CO ; Metropolitan Transportation Commission, Blayney (John) Associates, Dornbusch (David M) and Company, Incorporated, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-52-5-78, July 1978, 142 p.; Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Report on BART Impact Program, Land Use and Urban Development Project.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-292401/7ST, DOTL NTIS

45 192212 THE EFFECT OF THE WASHINGTON METRO ON URBAN PROPERTY VALUES. As with other forms of urban infrastructure, public mass transit systems can alter the spatial distribution of urban property values. The magnitude of this effect is likely to be highly parcel-specific, and changes in real estate values may occur both prior to and after a transit system's construction. The report describes a series of econometric models of real estate values estimated for parcels in Washington, DC., over the period of the Metro system's development. Separate models are estimated for single family dwellings, multi-family structures and retail stores. Access to the transit system and the implementation schedule of Metro are both found to be significant determinants of parcel transaction prices. Studies of five separate transit stations are described. For each case study, results and forecasts of property value changes under different conditions are given.

Lerman, SR Damm, D Lerner-Lamm, E Young, J ; Massachusetts Institute of Technology, Transportation Systems Center, (UMTA-MA-11-0004) Final Rpt. CTS-77-18, UMTA-MA-11-0004-79-1, July 1978, 135 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-293730/8ST

45 193387 AN INTRODUCTION TO TRANSPORTATION AND URBAN LAND POLICY IN DEVELOPING COUNTRIES. The papers presented at this session dealt with the relationships between urban travel, urbanization of land, and land use policies in developing countries. It is necessary to make such information available because conclusions reached in the post-industrialized world are not applicable to developing countries due to entirely different tripmaking patterns, several additional forms of formal and informal public transit, a low rate of auto ownership, and population subgroups of qualitatively different cultures and life styles. For example, the most effective means to affect congestion in most developing countries is the control of auto ownership by regulating import tariffs and restricting assembly and manufacture of automobiles. Such a policy would be unthinkable in post-industrialized countries. Another problem that faces planners and policy makers in developing countries is the transfer of solution modes from one country to another, for each time a method is transferred from one environment to another it brings with it features that were required for the previous situations which are unapplicable to the next one.

Gakenheimer, R (Massachusetts Institute of Technology) *Transportation Research Circular* No. 199, Feb. 1979, p 2;

ORDER FROM: TRB Publications Off

45 193390 AN OPERATIONAL LAND USE TRANSPORT MODEL FOR THE TEHRAN REGION, IRAN. The land use and transportation model developed for the Tehran region, Iran, unlike most models, seems to meet the needs of the real world of professional and political planning in that it was completed in seven to eight months at a maximum cost of \$150,000; while models for most cities have cost millions of dollars and have taken two to three years to complete. The Tehran program was divided into two parts: phase one for development and calibration of the model and phase two for the testing of existing and proposed policies and programs. The model contains three interdependent components: the regional growth submodel, which predicts the growth of economic and residential activities for the region as a whole; the land use submodel, which predicts the locations of these activities within zones and regions; and the transport submodel, which predicts the travel between zones and activities. In addition to being pleased about its completion in record time at the lowest possible cost, the authors are convinced that the Tehran model is a useful and important tool to aid in the planning process and to develop and test various policies affecting growth and development.

Hirten, JE (American Institute of Planners)
Echenique, M (Applied Research of Cambridge)
Transportation Research Circular No. 199, Feb. 1979, pp 6-7, 2 Tab.; ORDER FROM: TRB Publications Off

45 193391 TRANSPORTATION, LAND POLICY AND THE URBAN POOR IN THE DEVELOPING COUNTRIES. The paper addresses the necessity for development of a transportation and land policy that is responsive to the needs of the urban poor in developing countries. Most transport studies tend to address the top 50% of the population in income terms and in many cases the top 25%, because planning is done for a level of affluence and affordability that is found mainly in developed countries and not in developing ones. Since the number of urban poor in developing countries is estimated at 250 million at present and to increase by 450 million more people in the next 25 years, it is essential that policy makers focus attention to the needs of such people. The high cost of land in the central areas of cities in developing countries prohibits poor people from living near their places of work. Since public transport is not available to most of these people, they must walk as long as two hours each way to work. Thus, any land development policy should stress the location of housing close to jobs and services, especially for the poor. In an effort to substantiate the arguments made in this paper, the authors have included a case study of metropolitan Manila.

Courtney, J (International Bank for Reconstruction & Development)
Transportation Research Circular No. 199, Feb. 1979, pp 7-10; ORDER FROM: TRB Publications Off

45 193392 THE DISCUSSION ON THE SESSION ON TRANSPORTATION AND URBAN LAND POLICY IN DEVELOPING COUNTRIES. In his discussion, Thomas B. Deen reviews the four papers submitted at a session on Transportation and Urban Land Pol-

icy in Developing Countries. He feels that each of the papers approaches the problem from an entirely different perspective: one on basic travel demand characteristics; another with a rather comprehensive land use transportation model that almost makes an effort at embracing the entire urban system; the third paper addresses the physical planning and design of a new town; while the fourth addresses the urban issue as fundamentally one of income re-distribution and ways to carry it out. He recommends the paper by Byrne, Tadross, and Grava, particularly the discussion of the background of the several new towns that have been built in the last two decades. It is the author's opinion that the Zahavi paper has a unique and innovative method of data analyses, but its conclusion that the population in a compact city requires more motorized mobility than in a dispersed city is not supported by the data. Deen views the Horten and Echenique paper as a well written straight forward description of the background, development, and application of a very comprehensive macro urban model system developed in a remarkably short time; although, he feels it would be even more impressive if additional examples were given on how well the model was able to perform. Deen's major criticism of the fourth paper is that the author, Courtney, states that the urban problem is a poverty problem; while although it is definitely one of the major ones, the emphasis from the other papers suggests that there are some other aspects of the problem as well.

Deen, TB (Voorhees (Alan M) and Associates, Incorporated)
Transportation Research Circular No. 199, Feb. 1979, pp 10-13; ORDER FROM: TRB Publications Off

45 193458 TRANSPORTATION AND LAND DEVELOPMENT. CONFERENCE FINDINGS. The findings summarized here represent points of emphasis, considerations that served as threads linking several sessions and informal conversations, and observations useful in judging needed actions and in assessing impacts. Among recurring themes were those related to conserving energy, improving the environment and the quality of life, and revitalizing cities. Although several speakers referred to the role of transportation in the economic and social revival of downtown areas, there was a wide recognition that development does not necessarily accompany transportation improvement alone. Since most urban places are already connected with other places, at least by automobiles, improvements in transit may have little effect on development nearby. For economic development and urban revitalization to accompany improvements in transportation, several speakers emphasized that transportation and other key ingredients such as housing must be tied together in an integrated, coordinated program realized through a public and private partnership. The city as the "new frontier" and the issues of efficiency and equity emerged as top candidates for priority attention. /Author/

Hand, I (Pennsylvania State University)
Transportation Research Board Special Report No. 183, 1978, pp 2-3; These conference finding summarize the views presented at the Transportation and Land Development Conference. Individual papers appeared in TRB Special Report 183.; ORDER FROM: TRB Publications Off

45 193459 TRANSPORTATION AND LAND USE POLICY. PART 1--PRINCIPAL. This paper discusses an agenda essential to the achievement of a national urban policy and a national transportation policy, efforts that are "the moral equivalent of the space program." The agenda consists of four items: to talk to elected officials, i.e., to inform and guide them; to learn what is happening, for example, in bills affecting transportation; to develop an urban policy that gives adequate consideration to transportation modes and how they relate to population density; and to work on an urban policy and a transportation policy that have interdisciplinary dimensions, i.e., that recognize economics, energy, housing, land use, taxes, and sewer and water policies as they relate to a comprehensive urban policy that includes transportation. /Author/

Edgar, RW (U.S. Representative, Pennsylvania)
Transportation Research Board Special Report No. 183, 1978, pp 4-7; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193460 PUBLIC TRANSPORTATION AND LAND USE: A DEVELOPER'S PERSPECTIVE. Transit and land use impacts have had a questionable linkage. Public transportation does not work automatically as a tool to assist and enhance the viability of a city. Transit can be a very special economic development tool that cannot stand by itself but that, if coordinated with other leverage mechanisms and if tuned to the strengths of the city, can be instrumental in the rebirth of central cities. Cooperative detailed planning before the route and mode are set and a created capacity to carry out these developments through a public and private partnership are needed. /Author/

Jensen, HS (Urban Land Institute)
Transportation Research Board Special Report No. 183, 1978, pp 7-11; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193461 LAND USE AND TRANSPORTATION IN AN ENERGY EFFICIENT SOCIETY. Most people are aware of the close relationship between land use and transportation. However, little is known of how to apply this conceptual knowledge in achieving the goal of a mobile and energy efficient region and nation. Despite the research studies and publicity to the contrary, transit can be an energy saver; energy savings can be an argument for transit. The comparison should not be made simply between a bus and a van pool or between a streetcar and a heavy-rail vehicle but between transit-oriented environments and automobile-oriented environments. /Author/

Pikarsky, M (Regional Transportation Authority, Chicago)
Transportation Research Board Special Report No. 183, 1978, pp 11-16; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193462 TRANSPORTATION PROGRAMS AND INVESTMENTS TO DEAL WITH CRITICAL NEEDS. Revitalization of the inner city--or perhaps of the older city--is the most

critical economic need that faces us today. We are not going to solve that problem by dreaming up some program and imposing it from the top. Rather, we need programs that will respond to and will encourage local initiative; the stimulus for improving the economy must come from the bottom. What is needed is flexible joint development. While the money may come from the top, work with local government and with private investors in realizing whatever potentials may exist at local levels is also necessary. /Author/

Hammer, P (Hammer, Siler, George Associates) *Transportation Research Board Special Report* No. 183, 1978, pp 16-20; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193463 TECHNICS AND ETHICS IN TRANSPORT DECISIONS. Long-term trends rather than shifts in fashion or fad should be sought in developing principles for research and policy. The demonstrations of the 1960s led to some new concerns for personal liberties and for the needs of our multiple-minority society. The demonstrations prompted unusual roles for citizens in transportation and in other matters that had been considered technical and the province of specialists. Engineers' or economists' concerns for efficiency yielded to public concerns for equity. There is also a trend toward a high level of accessibility throughout metropolitan areas. Since virtually every place in the metropolitan area is connected to every other place, the influence of a new fixed-route transit system does not affect location decisions very much. However, high accessibility in metropolitan areas is not available to those who do not have automobiles; other systems are needed for these people. /Author/

Webber, MM (California University, Berkeley) *Transportation Research Board Special Report* No. 183, 1978, pp 20-22; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193465 TRANSPORTATION AND LAND DEVELOPMENT. CONFERENCE PROCEEDINGS. The proceedings reported here are the record of the Conference on Transportation and Land Development and its consideration of the meeting's central theme--strategic transportation investments to achieve urban and regional development objectives. Transportation policies and programs must be examined to ensure that they achieve such purposes as revitalizing inner cities, encouraging energy efficient development, improving the environment and quality of life and facilitating mobility for disadvantaged people.

Transportation Research Board Special Report No. 183, 1978, 49 p., Refs. Proceedings of the Transportation and Land Development Conference, held in Chicago, Illinois, November 10-12, 1977. For individual papers appearing in TRB Special Report 183, see HRIS 193459-193478.; ORDER FROM: TRB Publications Off

45 193466 EFFECTS OF QUESTIONS OF EQUITY, EFFICIENCY, AND REVITALIZATION OF CITIES ON TRANSPORTATION POLICIES. A critical problem for society is the social injustice that maintains poverty and rac-

ism. There is no decent solution possible to the urban problem so long as poverty and racism exist. These issues must be tackled. They are the basis of a sound urban policy of which transportation is an essential part. Since mobility is one of the fundamental rights in our society, transportation plans should be checked to see whether some people have been neglected or have been deprived of this right. /Author/

Davidoff, P (Suburban Action Center) *Transportation Research Board Special Report* No. 183, 1978, pp 24-25; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193467 NATIONAL LAND POLICIES AND PROGRAMS AFFECTING TRANSPORTATION: SESSION 1. The relationship between transportation and urban development is central. The revival of cities as places to live as well as to work does not mean that the abandonment of the suburbs is imminent or even desirable. Instead, it means pursuing an equalization of city and suburb as residential, social, and economic centers. The present Administration seeks to revitalize central cities, to equalize cities and suburbs as residential environments and as economic centers, and to conserve energy. To take advantage of benefits that transit can provide in these areas, preference will be given to cities that accent public transit as an expression of coordinated transportation and land development planning and action. Transportation priorities will change from highway construction to maintenance and to making the best use possible of existing facilities. The process of developing policy is as important in staying abreast of trends as the policy and its resulting programs. Reform of current programs is necessary in making more effective tools to reach policy objectives. /Author/

Downey, ML (Department of Transportation) *Transportation Research Board Special Report* No. 183, 1978, pp 25-28; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193471 PATTERNING CITIES AND CHANGE: CHOICES AND IMPLICATIONS. The growing ascendancy of multicentered or nodal cities--urban centers within the metro region--is an unmistakable trend. Urban transportation planning should take this pattern into account and not attempt to return cities to their 19th century mold. However, it will still be for planners to decrease dependence on the private automobile by encouraging people to live, work, and shop in a given subregion and by improving mass transit facilities between satellite urban centers.

Gamble, HB (Pennsylvania State University) *Transportation Research Board Special Report* No. 183, 1978, p 38; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193472 VALUE CAPTURE AND JOINT DEVELOPMENT: FAD OR FUTURE. The discussion cited three studies currently under way on joint development: one on the joint development and value capture potentials at 49 transit

stations at 14 US cities, one on the theoretical and empirical aspects of joint development, and one on the joint development potentials of five stations on the proposed Detroit transit system. A number of new areas for future research were identified including: joint development in smaller suburban communities, coordinating funding for joint development, and identifying optimal station locations.

Harmon, RJ (Harmon (Robert J) and Associates, Incorporated) Khasnabis, S (Wayne State University) *Transportation Research Board Special Report* No. 183, 1978, p 39; This paper appeared in TRB Special Report 183, Transportation and Land Development, Conference Proceedings.; ORDER FROM: TRB Publications Off

45 193727 WORKSHOP MODERATOR'S COMMENTS. The various parking facilities at Los Angeles International Airport (LAX) are briefly described. There is a central terminal for short-term parking. (The rate structure discourages long-term parking) and perimeter lots with free tram service to and from the terminals. There is also a FlyAway Lot at Van Nuys Airport which provides high frequency bus service to LAX.

Schoenfeld, WM (Los Angeles Department of Airports) *Transportation Research Circular* No. 202, Mar. 1979, p 5; Proceedings of the AOCI Annual Conference, New York, N.Y., October 13, 1978. Appeared in TRB Circular No. 202, Solving the Airport Auto Parking Problem.; ORDER FROM: TRB Publications Off

45 195496 AN INTEGRATED LAND USE AND TRANSPORT MODEL. This paper presents an integrated land use and transport model. The fundamental idea behind the paper is that land uses determine the traffic generation and hence the transport demand in a city, and the transport, in turn, influences the further location of land uses. The paper first gives a conceptual framework which argues the need for a systems view of the city in which all the components interact. This is followed by the mathematical formulation of a system model, and finally the calibration principles of the model are presented. This model has been implemented for Sao Paulo metropolitan area and has been used since 1975 to study transport and land use policies for this city.(a) /TRRL/

Echenique, M *Martin Center Transactions* Vol. 2 1977, pp 195-230, 8 Fig., 16 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240320)

45 195967 HOW TO DO A TRANSIT STATION LAND-USE IMPACT STUDY. Several improvements in the conceptual basis and methodology for studies of land-use impacts have occurred over the past two decades, but the framework is still incomplete because the need to incorporate the policy context into the study design has not been fully recognized. A revised model for impact studies is proposed, and the approach is illustrated by a case study of a planned rail rapid transit station. One of the major differences between this and previous methods is that the method described in this paper acknowledges several possible outcomes or impacts as a function of alternative public policies in addition to the transit station itself. Five categories of impacts are evaluated: public facilities, environment, market, neighbourhood, and costs and revenues. /Author/

Lee, DB, Jr (Iowa University) *Transportation Research Record* No. 677, 1978, pp 28-33, 4 Fig., 1 Tab., 5 Ref.; This paper appeared in TRB Research Record No. 677, Transportation System Analysis.; ORDER FROM: TRB Publications Off

45 196493 AIRPORT PLANNING MANUAL. PART 1 MASTER PLANNING. This manual consists of 4 principal sections. The section on airport planning outlines the planning process and the important factors in an airport master plan. It explains the importance of consultation and cooperative planning and the need to develop a systematic approach to determining future airport requirements. The purpose and objectives of an airport master plan are described, and guidance is provided as to how the master plan should be used. Section 2 outlines the factors to be considered in air side development. Runways and taxiways are considered. The determination of the dimensional criteria, pavement strength and airfield capacity and configuration are considered as well as their elements. Such as the apron the navigational and traffic control aids. Section 3 provides specific guidelines from airport areas to which the non-travelling public has free access, as well as the non-public portions of airline operations and cargo facilities, airport administration and government facilities. The major elements of land side development include the passenger building, cargo facilities, and ground transport and vehicle circulation and parking. Special purpose buildings necessary to support the operation of an airport are considered in Section 4.

International Civil Aviation Organization DOC-9184-AN/902, 1977, 175 p., Figs., Refs., 2 App.; Direct requests to the Distribution Officer.; ORDER FROM: International Civil Aviation Organization, P.O. Box 400, 1000 Sherbrooke Street West, Montreal, Quebec H3A 2R2, Canada

45 197283 THE IMPACT OF TRANSIT INVESTMENT ON HOUSING VALUES: A SIMULATION EXPERIMENT. This paper uses a joint-choice logit model of travel demand and residential location to simulate the impact of urban rapid-transit investment on housing values within a radial corridor. The model developed is a clean break with the traditional urban economic theory. Instead the heterogeneous nature of travel and location decisions is recognized and the logit model, consistent with stochastic utility maximization, is employed. Simulation experiments reveal that the aggregate increase in property values caused by transit's impact on work trips is highly sensitive to the aggregate number of vacancies within the corridor. Under reasonable assumptions, transit investment tends to lower central-city property values, to increase central-city vacancies, and to raise suburban property values. It tends to help the poor move further away from the center and penetrate the inner suburbs. Depending on several influences, aggregate property values can increase or decrease and the change can often be statistically insignificant. Calculations show that an equitable taxation (and compensation) of property-value changes may raise a small to modest proportion of a transit system's construction cost. Several considerations suggest that even these modest estimates might be

optimistic. These results help develop an improved perspective on "value-capture policy" which has not, up to now, benefited from quantitative analysis. Major extensions of the model are briefly considered.(a)

Anas, A *Environment and Planning A* Vol. 11 No. 3, 1979, pp 239-255, 3 Fig., 4 Tab., 24 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241042); ORDER FROM: Pion Limited, 207 Brondesbury Park, London NW2 5JN, England

45 197653 FEASIBILITY ANALYSIS OF JOINT DEVELOPMENT FOR TRANSIT STATIONS IN THE DETROIT AREA. The concept of Joint Development(JD) embodies various forms of public/private sector coordination relative to physical, fiscal, and institutional aspects of transit station development. The objective of this study is to analyze the feasibility of joint development in conjunction with transit station area planning in the Detroit area where the planning of a high-level transit system is underway. The report is organized in three parts. In the first part, the basic concepts of JD are initially presented with a brief state-of-the-art review and a discussion of opportunities, incentives, and constraints. In the second part, the feasibility of joint development in the Detroit area is examined relative to the legal, institutional, and fiscal framework. The development and application of an analytic technique for prioritizing station locations based upon development potential is also presented in Part two. The last part of the report provides the conclusions and recommendations, along with a series of guidelines that may be applied for planning joint development studies in transit stations in other urban areas.

Khasnabis, S Opiela, KS Arbogast, RG ; Wayne State University, Urban Mass Transportation Administration, (UMTA-MI-11-0003) Final Rpt. UMTA-MI-0003-79-1, Nov. 1978, 266 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295347/9ST

45 199138 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: FRINGE PARKING SITE REQUIREMENTS [Final rept]. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. The analytical aid described in this report provides a method to: (1) identify candidate sites for change-of-mode fringe parking facilities; (2) estimate specific parking facility requirements at these candidate sites; and (3) estimate highway access requirements for the sites.

Peat, Marwick, Mitchell and Co., Washington, DC.*Urban Mass Transportation Administration, Washington, DC., (UMTA-IT-06-9020) UMTA-IT-06-9020-79-6, Jan. 1979, 64p; nSee also PB-299 984. n Also available in set of 6 reports PC E11, PB-299 979-SET.; Contract DOT-UT-50021; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299985/2ST

45 261398 INNOVATION IS NEEDED IN THINKING ABOUT TRANSPORTATION AS IT RELATES TO URBAN DEVELOPMENT VALUES. The opportunity for structuring growth patterns and for coordinating community development objectives with transportation facilities has greatly increased in the past few years as a result of transportation

legislation and administrative policies that have been evolving since 1962. The emphasis has been on flexible use of federal funds for improving local transportation decisions. As a result, the potential for joint development is great. But, state and local redevelopment laws must be structured to permit the designation of redevelopment projects along corridors and at transit stations and also permit the use of "tax increment" or "tax recapture" financing.

Hirten, JE *Journal of Housing* Vol. 31 No. 5, May 1974, pp 214-219

45 262606 TRANSPORT AND URBAN STRUCTURE. Transport planning and the design of urban transport facilities requires accurate predictions of future urban structure and the residential density and demographic composition of zones in the urban region. In turn improvements to the urban transport system can affect the distribution of population in the urban region. Some results of a current research program in Melbourne University, Australia on the effect of accessibility and traffic density on urban structure are described. A new accessibility model for residential development is proposed and techniques described for determining the likelihood of changes in residential density and demographic composition of zones. A definition of environmental capacity is proposed. /Author/

Clark, N *Transportation Planning and Technology* Apr. 1973, pp 249-268, 10 Fig., 14 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208109)

45 262882 URBAN CENTER DEVELOPMENT AND MASS TRANSPORTATION. Creating new transit systems in a retail and commercial setting can be instrumental in the activation of additional "street" levels. The author discusses the case of the planned construction in New York City of a new subway line, the Second Avenue subway. Essentially the legislative proposal would extend the public domain below-grade and into the ground floor area by establishing easements for the movement of people within the property line of new projects in the Special Transit use Districts. A full realization of American urban-planning potential will create new instruments of ownership, liability, profit participation, and planning incentives.

Croxtan, RR *Real Estate Review* Vol. 4 No. 2, July 1974, pp 87-94

45 263153 AIR RIGHTS, SUBSURFACE EASEMENT, AND OTHER FRACTIONAL EASEMENTS. The author analyzes air space uses over existing rights of way and beneath viaducts and bridges and advises rule of thumb tests for feasibility and appraisal approaches. Using the bay area rapid transit tunnel esements in Berkeley, California, as his example, he describes the valuation problems involved in its construction and the appraisal method that was employed successfully. The value of the actual easement taken was estimated to be the present worth of future extraordinary engineering, architectural, and construction costs for foundation work.

Rhodes, RM *Appraisal Journal* Vol. 42 No. 2, Apr. 1974, pp 261-272

45 263779 CRITERIA USED BY TRANSIT OPERATORS AND PLANNING AGENCIES IN SELECTED CITIES TO EXTEND SERVICE TO NEWLY DEVELOPING AREAS. Public planning agencies and transit operators responded to a questionnaire designed to indicate general opinions and attitudes towards the extension of transit service to newly developing areas within their communities. Economic feasibility seems to be the major determinant. There was little indication, in the responses from the planning agencies, of any well-conceived and positive coordination of land development policies and transit system planning policies in order to achieve mutually complementary results. While there were some indications that trial service was used by the transit operators as a means of measuring demand, policies were not clearly defined.

Niklaus, JL ; Tulane University Rept. 2, 1974, 76 pp

45 263838 DEVELOPMENT POLICIES FOR URBAN MASS TRANSIT STATION AREAS. More than 20 metropolitan areas in the country are presently considering the construction of fixed-rail mass transit systems. It is estimated that these new systems would entail approximately 600-700 new transit stations, each with an immediate impact on land use development opportunities within a radius of approximately one-half mile. One means of taking advantage of these opportunities is through application of the joint development concept. "Joint development" is defined to include coordinated planning and development of transportation facilities and changes in land use over, under, or in the immediate vicinity (one-half mile radius) of the facility. It includes public and private development activity. Some recognized advantages include better use of scarce and expensive urban land through multiple use of rights-of-way and encouragement of land use arrangements which enhance and make more efficient use of transportation facilities. /Author/

Urban Land Vol. 33 No. 8, Sept. 1974, pp 3-10

45 263899 ENERGY, URBAN FORM AND TRANSPORTATION POLICY. A frequently suggested strategy for alleviating transportation energy shortage is to reduce travel demands by altering the patterns of land uses in cities. This paper examines this strategy by exploring the interface between urban structure, transportation energy consumption, and transportation policy. The interrelationships between travel demand and urban form are first examined, and research attempts to clarify and model these relationships are reviewed. The role of transportation as a land use development control is discussed, and the use of "transportation performance standards" is proposed as a method for integrating transportation energy considerations into land development controls and decisions. /Author Abstract/

Gilbert, G (North Carolina State University, Raleigh) Dajani, JS (Duke University) *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 267-276, 4 Tab., 20 Ref.

45 265390 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. APPENDIX C. DATA DOCUMENTATION FOR THE LAND USE AND INVESTMENT STUDY. The report contains a detailed description of the data items collected as a part of the study of pre-BART property value changes (reported in Volumes I and VI of BART II, part III), and a study of office space in downtown San Francisco (Volume IV or BART II, Part III). Data descriptions include longitudinal real property sales (both residential and commercial), cross-sectional real property sales (residential), and the market street survey (commercial).

Clemons, D Corpus, J ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 113 pp; See also BART-2, Appendix B, PB-236 749. Sponsored in part by the Department of Housing and Urban Development, Washington, D.C.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236750/6ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236750/6ST, DOTL NTIS

45 265392 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART III. VOLUME II. KEY INFORMANT INTERVIEWS. The report presents the results of key informant interviews with realtors, developers, bankers, and other participants in the land development process. It includes a summary and conclusions, and discussions of the development process and its participants, the interviews, methodology, and recommendations.

Lee, DBJ ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation Final Rpt. June 1973, 85 pp; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 1, PB-236 741, and BART-2, Part 3, Volume 3, PB-236 743.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS (PB-236742/3ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236742/3ST, DOTL NTIS

45 265393 BART-II: PRE-BART STUDIES OF ENVIRONMENT, LAND USE, RETAIL SALES. PART III. VOLUME V. PILOT LAND USE, INFORMATION SYSTEM: WALNUT CREEK. The report attempts to demonstrate the particular qualities that computer operation can offer in building a land use information system. It presents the pilot system whose purpose is monitoring the land use and related activities around the Walnut Creek BART station. Chapters include map construction, data collection, retrieval and display, system development, and costs.

Lee, DBJ ; California University, Berkeley, Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. June 1973, 61 pp; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. See also BART-2, Part 3, Volume 4, PB-236 744, and BART-2, Part 3, Volume 6, PB-236 746.; Contract DOT-OS-90023; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236745/6ST, DOTL NTIS

45 267002 LAND ACQUISITION AND CONVEYANCING BY URBAN TRANSPORTATION AUTHORITIES: A CASE STUDY OF METRO. In recognition of the need to relieve traffic congestion and improve the physical character, economic growth and well-being of the National Capitol region, the Washington Metropolitan Area Transit Authority (WMATA) was created in 1967. On December 9, 1969, a bill authorizing Federal participation in the 98-mile regional system (METRO) was signed by the President authorizing \$1.1 billion in Federal funds to be expended over a 10 year period. METRO will be a modern rapid rail transit system, utilizing its own exclusive right-of-way with 47 of the 98 miles and 53 of the 86 stations underground. Some 42 miles will be on the surface and 30 miles will be along existing railroad rights-of-way or in medians of highways. The remaining 8 miles will be on aerial structure, mainly grade separations and bridges. As of September 25, 1972, a total of \$81.2 million had been committed to real estate and rights-of-way acquisition. The primary objective of this study has been to investigate the plans, programs and operations of WMATA with regard to real estate acquisitions with special emphasis placed on the preparation and conveyancing of title to WMATA. In order to accurately investigate the preparation and conveyancing practices, it was necessary to work closely with Land Title Insurance Company and attorneys with whom WMATA had contracted to do this work. As a direct result of the investigation and analysis, included in this report are guidelines which should be of assistance to other urban transportation authorities involved in the acquisition of real estate. A bibliography is included.

Ryan, TT, Jr ; Consortium of Universities, (UTC-04-73) UMTA-DC-11-0003-7314, May 1973, 61 pp; ACKNOWLEDGMENT: UMTA (DC-11-0003); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232314/AS

45 300113 EVALUATION OF THE SEVERANCE EFFECTS OF A PROPOSED RAPID TRANSIT CORRIDOR. The paper describes a study of potential trip severance and disruption to the residential environment by a proposed rapid transit public transport route through suburbs in Adelaide. The study showed that physical severance can be avoided, and in some places access can be improved, if appropriate route crossings are provided. Evaluation of a number of research methods used in the study suggests that more consideration of the behaviour underlying trip-making will lead to better solutions than simple trip-counting procedures in this and perhaps in other aspects of transport planning. Study data on pedestrian movement around suburban areas have important implications for residential subdivision and associated transport planning. /Author/TRRL/

Braddock, M (Adelaide University, Australia) ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 171-183, 4 Fig., 1 Tab., 7 Ref.; From the papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239204), Australian Road Research Board

45 300369 WHAT FOREIGN CITIES CAN TEACH AMERICAN CITIES. This paper discusses the benefits to be derived by the United States from exchanges of information with European countries. There is a detailed discussion of three areas of European experience from which Americans could learn and profit--management of urban open spaces, public transportation, and urban conservation. Other subjects mentioned as suitable themes for international exchange include: public/private partnership in urban redevelopment, urban impact analysis, urban financing, and metropolitan growth management. The exchanges will take the form of reciprocal visits of transfer teams composed of local officials, community leaders, and urban professionals from the United States, Germany, and the United Kingdom. The teams will examine urban conditions and practices in selected cities on both sides of the Atlantic with a view to transferring lessons of successful experience to their own countries.

Orski, CK *Urban Land* Vol. 38 No. 2, Feb. 1979, pp 13-18, 4 Phot.

45 300967 COMMUTING AND AVERAGE JOURNEY TIMES. EVALUATION OF FOUR LAND USE ALTERNATIVES [Pendling och medelresettider. Utvärdering av fyra fysiska regionsstrukturer]. In a study by the Stockholm Regional Planning office (1975-1976), six land use alternatives for the year 2000 are presented. This paper presents an extensive evaluation of four of the alternatives in regard to the development of commuting within the region. Three forecasting methods are used: a neutral forecast (based on a neutral assessment of present commuting situation), a forecast based on random selection and a forecast based on minimization of mean travel time. The alternatives are then compared in three ways. First in regard to estimated mean travel time (both by private car and public transport system), and then in regard to the resulting modal split between the different housing areas. A detailed presentation is given of the results of the study together with a demonstration of the method used. /TRRL/ [Swedish] Snickars, F ; Royal Institute of Technology, Sweden Monograph June 1977, 53 p., 22 Fig., 5 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 241301), National Swedish Road & Traffic Research Institute

45 301612 RESIDENTIAL AREA LOCATION PREFERENCE SURFACES. Although an understanding of the interaction between land use and transportation is essential to a rational evaluation of urban and regional policy, it is frequently complicated by the introduction of sophisticated mathematical techniques. In an effort to make this interaction more visible to the decision maker, two of the more advanced techniques--multinomial logit analysis and mental maps--are placed in a common framework of analysis and presentation. The strength of a rigorous theoretical background is thus combined with the simplicity of a visual presentation. The theory and development of the technique are outlined, and its use in a case study of the residential location preferences of residents of the inner suburbs of Melbourne, Australia, is described. /Author/

Young, W Richardson, AJ (Monash University, Australia) *Transportation Research Record* No. 707, 1979, pp 39-47, 14 Fig., Refs.; This paper appeared in *Transportation Research Record* No. 842

707, Urban Transportation Planning, Evaluation, and Analysis.; ORDER FROM: TRB Publications Off

45 302274 AN ANALYSIS OF JOINT DEVELOPMENT PROJECTS: FINAL REPORT ON FIRST YEAR TASKS. This report presents the results of the first year of study into a number of characteristics of an urban area in which joint development is taking place. The objectives of this study are to: 1) investigate the economic and population trends that influence economic and location decisions within the region; 2) investigate ways in which transit serves as a catalyst for development and in particular, delineate and quantify these ways; 3) determine the relative attractiveness of downtown as a retail attractor when compared with suburban regions; and 4) investigate analytic techniques that may help delineate the success of particular joint development projects. The study was carried out in the Buffalo, New York SMSA. Construction has recently begun on a six-mile Light Rail Rapid Transit System (LRRT). This study focuses on Central Business District and Regional development concerns with specific attention to the LRRT. The results of a number of tasks accomplished during the first year of analysis are discussed and brief summaries of discussions with local planners or policy makers are presented. The findings of the study found to be most significant are: 1) the phenomenon of suburbanization is so strong that competing redevelopment strategies, even those of major proportions may not succeed, except under the most focused and intense development conditions; 2) the importance of the combination of population decline and job category shifts must be realized; 3) accessibility is not the only, nor even the most important variable that should be measured by transit improvements; 4) variables that control retail activity linked to transit include quality of the activity, parking, and safety, and that currently, the CBD in Buffalo is not "attractive" enough to offer competitive pull to the suburban malls; and 5) the new LRRT is perceived of, together with a proposed joint development mall, as a positive gain for the CBD.

Paaswell, RE Berechman, J Parker-Simon, K McNally, M Cirrincione, M ; State University of New York, Buffalo, Urban Mass Transportation Administration Final Rpt. UMTA-NY-11-0020-79-1, May 1979, 140 p.; Contract NY-11-0020; ORDER FROM: NTIS; PB-300414/AS

45 304120 REMOTE SENSING APPLIED TO URBAN AND REGIONAL PLANNING (A BIBLIOGRAPHY WITH ABSTRACTS). Urban and regional planning using aerial photography and satellite remote sensing methods is discussed. Abstracts cover the use of remote sensing in land use mapping, traffic surveys and urban transportation planning, and taking inventories of natural resources for urban planning. Abstracts dealing with land use and residential quality associated with and acting as an influence on health and physical well-being are included.

Hundemann, AS ; National Technical Information Service Aug. 1979, 74 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0843/7ST

45 305353 THE INTERACTION BETWEEN URBANIZATION AND LAND QUALITY AND QUANTITY IN ENVIRONMENTAL PLANNING AND DESIGN. THE TRANSPORTATION MODEL TECHNICAL DOCUMENTATION. The objective of the transportation model is the projection of travel demand on transportation facilities in the study area. These projections provide data for the evaluation of the transportation network and are linked to other models such as fiscal, air and noise. The model is composed of a travel demand and a supply or volume/performance component. The demand submodel projects travel demand between internal zones in the study area and between internal and external zones. The supply model is implemented by adding each projected origin destination pair into the network incrementally and recalculating the network equilibrium after each increment using the least time rule. In this manner, travel demand is allocated over alternative routes as a function of the level of demand.

Tyler, M Cummings, S ; Harvard University, National Science Foundation NSF/RA-780430, May 1979, 61 p.; Grant NSF-ENV72-03372; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-300981/8ST

45 305689 LAND USE IN URBAN AREAS. VOLUME 2. SEPTEMBER, 1975-OCTOBER, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS). Research reports are cited on various aspects of urban land use including transportation planning, water resource management, air pollution, and land use zoning. It excludes local studies.

Kenton, E ; National Technical Information Service Dec. 1979, 275 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-801236

45 305843 URBAN TRANSPORTATION PLANNING SYSTEM (UTPS), THE COMMUNITY AGGREGATE PLANNING MODEL (CAPM) USERS' GUIDE. HIGHWAY SKETCH PLANNING. The report is an introduction to the Community Aggregate Planning Model (CAPM), and its potential uses. CAPM has recently been incorporated as a module of the Urban Transportation Planning System (UTPS) package of computer programs, and is a computerized transportation sketch planning model, which permits fast and inexpensive preliminary screening of highway improvement alternatives. It is useful in a number of sketch planning applications, such as the analysis of urban development patterns, alternative system investments, air quality, and energy consumption. The report incorporates two documents--the CAPM Users' Guide and the CAPM Program Writeup. The Writeup is included in this report as an Appendix. Together, these documents provide information of the program's capabilities, limitations, data needs, potential applications, and computer requirements. Both are now available on the UTPS tape.

Ryan, JM ; Federal Highway Administration, Urban Mass Transportation Administration Final Rpt. UMTA-UPM-20-79-2, Apr. 1979, 146 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-131923

45 307769 A RECREATION NEEDS ASSESSMENT PROCESS-AN ORIGIN-DESTINATION APPROACH. Presented here is a process that communities can use to plan improvements in their recreation system which are responsive to the expressed needs of their residents. It is particularly useful for demonstrating the optimum locations for urban parks to maximize energy conservation and social service return on capital investment. Central to the process is a comparison of projected recreation needs and desires, based on an attitude survey, with the capacity of the existing local park systems, to identify future deficiency problems. The process employed a regional origin-destination travel model to distribute demand. A citizens' advisory committee to the planning program, along with the parks and recreation commission, reviewed and made recommendations for each task in the process. /Author/TRRL/

Klein, DH (Department of Environmental Management) *Transportation Planning and Technology* Vol. 5 No. 3, 1979, pp 169-182, 5 Fig., 4 Tab., 26 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242187)

45 308080 PUBLIC TRANSIT AND DOWNTOWN DEVELOPMENT. The findings and conclusions are discussed of recent research related to transit and urban development, including a study of transit-related joint development projects in the U.S. and Canada, an analysis of the changing economic role of central cities, and a current study of downtown office growth. Houston is described as a good example of the need for downtown access improvements. Surveys of the Urban Land Institute found that downtown office space in 20 selected cities has increased an average of 41.4% between 1970 and 1978. Office space expansion leads to new demands on urban transportation systems. Mass transit could add significant capacity to urban transportation services and prevent highway and local street capacity from limiting urban accessibility. Transportation improvement programs of seven major North American cities are used to illustrate the range of strategies for linking transit and downtown development. These cities include Toronto, Montreal, San Francisco and Oakland, Washington, D.C., Los Angeles, Portland and Denver. The most land use benefits have been realized by cities that have carefully coordinated land use and transportation planning.

Lovely, ME (Harvard University) *Urban Land* Vol. 38 No. 10, Nov. 1979, pp 14-22, 2 Fig., 4 Phot.

45 309181 STRUCTURING THE URBAN AREA TO MAKE BETTER USE OF PUBLIC TRANSPORT. A study is made of changes which might be made to urban development patterns and trends, to facilitate improvement to public transport services. The implications of encouraging higher densities around existing railway stations are analysed. Alternative urban forms, appropriate to the characteristics of demand bus and fixed-route bus services, are proposed and discussed. Major diversified centres are postulated as potentially useful components of an urban structure suited to public transport systems. (TRRL)

Patton, TA Wight, ID ; Institution of Engineers, Australia, (0 85825 119 1) No. 79/11, 1979, pp 39-44, 1 Tab., 6 Ref.; This paper was presented at the Transportation Conference, 1979, Ade-

laide, 14-16 November 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239410), Australian Road Research Board

45 310170 ACCESSIBILITY AND THE EVALUATION OF LAND USE / TRANSPORT PLANS. This paper was presented at Session 25-Transport and Accessibility. A systems approach is used to analyse the faults of the conventional evaluation methods used in the land use/transport planning process. The approach shows six features which are essential for an improved evaluation process, including the use of objectives relating to all relevant community goals, the avoidance of sub-optimal objectives and the investigation of distributional impacts. Accessibility indices are appropriate measures of performance in such an approach because they measure the choice of opportunities available rather than traffic demands. They measure an output of the urban system, not just the transport sub-system. Two accessibility indices have been developed and compared using data from the Sydney area transportation study and the 1971 census of population and housing. The two measures were found to be highly correlated, although one measure contains behavioural elements whereas the other is a measure of physical accessibility. There was found to be as much variation in accessibility between occupation groups as there is between municipalities in inner Sydney suburbs. Improvements in the road system would exacerbate the inequality of access to job opportunities in the inner suburbs, because the majority of non-professional workers do not have cars available for the journey to work (a). (TRRL)

Conroy, M (New South Wales University, Australia) *Australian Road Research Board Conference Proc* Vol. 9 No. 6, 1979, pp 19-35, Figs., 4 Tab., 25 Ref.; Proceedings of the Ninth Australian Road Research Board Conference, Isbane, 21-25 August, 1978.; ACKNOWLEDGMENT: TRRL (IRRD 239560), Australian Road Research Board

45 312556 IMPACT OF INTENSIVE HIGH-RISE DEVELOPMENT IN SAN FRANCISCO. A SUMMARY [Final rept]. The effects of alternative patterns or scenarios of intensive high-rise development are analyzed with respect to the amount and distribution of growth in San Francisco, Calif., in or around the year 1990. The scenarios consist of maps and photographs of the commercial sector of the city; the first outlines the existing skylines and oblique projections, while four subsequent scenarios illustrate and chart expected changes wrought by committed and proposed office and hotel site development. The selected scenarios are discussed in terms of policy issues relating to environmental, transportation, municipal finance, and urban economic considerations. Study findings and conclusions, presented individually for each of these policy areas, discuss, among other things, the city's dependence on offices and hotels as an "industry," describe prototypical "industry" workers, and analyze the economic effects of an increase in the work force. Intensive high-rise development will, in addition to increasing city revenues, necessitate increased expenditures for municipal services, particularly those relating to mass transit. Increased building heights are not

seen as creating necessarily commensurate increases in environmental problems relating to noise levels, air quality, views and visual impact, park use, and livability. Summary tables present the actual amounts of space, persons, revenues, and costs for 1974 and for the projected scenarios.

Keyser/Marston Associates, San Francisco, CA.**Oriffenhausen-Kroeger, Inc., San Francisco, CA.**Field Research Corp., San Francisco, CA.**Kaplan and McLaughlin, San Francisco, CA.*Department of Housing and Urban Development., Washington, DC. Office of the Assistant Secretary, for Policy Development and Research. HUD-0000057, Mar. 1975, 61p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-109937

45 313230 JOINT DEVELOPMENT REPORT. This report is a status report of joint development activity in cities across the nation, documenting research conducted between July 1976 and June 1979. This document is in three parts. Part One discusses legal, organizational, and procedural issues which were observed in the case study research documented in Part Two. Part Two is a status report of national joint development activities, current as of May 1979, and includes seven city summaries and 26 project case studies. Part Three presents brief status reports of 29 projects. This report also contains a public/private process chart which illustrates the steps necessary for joint development and an examination of the Transportation Corridor Development Corporation (TCDC). The city and project cases discussed in this report are presented in a case study format. Each study presents the kind and size of the project(s), the actors involved, a description of the area immediately surrounding the stop, and the contributions and payoffs of both the public and private sectors.

Sharpe, CP Dixon, S Case, B Kurtzman, J Modisette, L ; Rice Center for Community Design and Research, Urban Mass Transportation Administration UMTA-TX-11-0006-80-1, June 1979, 175p; Prepared in cooperation with Harmon (Robert J.) and Associates, Inc., Washington, DC. and Ross, Hardies, O'Keefe, Babcock and Parsons.; Grant DOT-UMTA-TX-11-0006; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-150139

45 313640 JOINT DEVELOPMENT: MAKING THE REAL ESTATE-TRANSIT CONNECTION. EXECUTIVE SUMMARY. The publication describes the public and private sectors' roles in joint development-real estate that is closely linked to public transportation station facilities. It includes general conclusions about transit planning, joint development ventures, and joint development deal making. The Summary Guide highlights implementation techniques by focusing on four key issues: (1) What agreements and arrangements are necessary among developers, transit authorities, and other public agencies; (2) How these arrangements, or "deals," are made; (3) How improved transit planning can lead to more frequent and efficient implementation of joint development projects, and (4) How communities can use transit to guide or encourage development. The Guide is designed to provide information to both public and private sectors, and aid practitioners in maximizing the benefits of the Nation's investments in public transportation facilities.

Urban Land Institute, Department of Transportation Final Rpt. DOT/I-79-13, July 1979, 19 p.; Contract DOT-UMTA-DC-06-0183- (79); ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-163454

45 313664 JOINT DEVELOPMENT: MAKING THE REAL ESTATE-TRANSIT CONNECTION. The purpose of this report is to inform new and potential participants in joint development (JD) of the financial, legal, organizational, and operational aspects of the deals involved in the implementation of JD projects. Basically, this book is designed for use by decision-makers and practitioners in the land use and development fields, by those in both the public and private sectors who are responsible for planning and implementing JD projects. Through case studies, this report reviews the planning and deal-making involved in the execution of seven major projects in five cities in the United States and Canada (Boston, Philadelphia, Washington D.C., Montreal, and Toronto). The case studies include reactions from developers and transit authorities and recommendations on improvements to the JD process from transit planning and physical design stages through construction to the operation of the projects.

Urban Land Institute, Urban Mass Transportation Administration, (UMTA-DC-06-0183) Final Rpt. UMTA-DC-06-0183-79-1, June 1979, 345 p.; See also Executive Summary dated Jul 79, PB80-163454.; SPONSORING AGENCY; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB80-169683

45 314804 TRANSPORTATION IN CITIES. This book introduces some basic aspects and problems of urban transportation, beginning with a historical survey. A major theme is the relationship between land use and transportation, and much of the book is an examination of how changing transportation needs require land use change and vice versa. The cost of transportation and who pays for it is analyzed. The author compares transportation systems in developed nations with the needs of Third World nations and concludes that Third World transportation problems are much more difficult, and likely to remain severe for many years. (Pergamon Press)

Pederson, EO ; Pergamon Press, Incorporated 1980, 100p; ACKNOWLEDGMENT: Maxwell Scientific International

45 315290 TRANSTEP USER MANUAL: A LAND-USE / TRANSPORT MODELLING SUITE. TRANSTEP is a suite of programs designed to assist land-use planners and transportation planners model land-use / transport interaction problems. This latest version of transtep, which is currently available for UNIVAC 1100 computers, has been revised from earlier CDC/TRANLAN or IBM/UTPS versions to simplify and accelerate both operational and user aspects of the suite and does not incorporate the more seldom used models for mode split and economic evaluation. Transtep is designed to operate (optionally) with a public transport passenger assignment suite called PTIS. Incorporating the ability to preload public transport link volumes on the highway network. In this form transtep provides most of the facilities available within the CDC/TRANPLAN or IBM/UTPS suites, together with its new facilities, but is not

bound by commercial availability considerations to either CDC or IBM user bureaus and is, therefore, available for conversion or transfer to any suitable computer. (TRRL)

Nairn (RJ) and Partners Proprietary, Limited Monograph Dec. 1979, 118p, Figs., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239632), Australian Road Research Board

45 315403 JOINT DEVELOPMENT MARKETPLACE. On June 25, 26, and 27, 1978, more than 600 persons met in Washington, D.C. to learn about and discuss emerging joint public-private development opportunities throughout the United States. One hundred forty-six private companies and firms were represented. Seventy-eight cities and urban counties sent their mayors or other senior officials. Thirty-six of these cities and counties exhibited plans for more than 100 joint development projects, and their representatives were available—in formal site marketing sessions and informally—to answer questions about them. Top Federal officials, including Secretary of Transportation Brock Adams and Assistant to the President Jack Watson, emphasized the opportunity for a creative partnership among all levels of government and the private sector in the revitalization of our cities. Nationally recognized leaders in the fields of urban planning and economic development, development, urban transportation, land development, and real estate investment discussed joint development from their particular perspectives and took part in a series of workshops relating to public-private negotiations and the planning of joint development projects. The JOINT DEVELOPMENT MARKETPLACE—as the title indicates—was designed to be a marketplace for projects ready for development and a marketplace for ideas. In this respect it differed from the traditional Federally sponsored activity, at the conclusion of which is brought forth a transcript of the proceedings and a series of recommendations. The value of the JOINT DEVELOPMENT MARKETPLACE was in being there, seeing what others had to offer, exchanging experiences, and making contacts.

Public Technology, Incorporated Proceeding June 1978, 217 p, Tabs., 2 App.; Proceeding from the Joint Development Marketplace, held at the Shoreham Americana Hotel, Washington, D.C., June 25-27, 1978.

45 316932 PUBLIC TRANSPORTATION AND LAND USE POLICY. This book studies the relations between the supply of transport service, the demand for it and urban density. Four aspects of this relationship are examined: response of ridership to improvements in public transport service, effect of different densities on ridership, in particular the role of the automobile, costs of different public transport modes, and influence of density on the provision of service. The relations developed are used to illustrate the suitability of different urban densities to 8 types of public transport: taxi, dial-a-bus, local bus, express bus, light rail, light guideway transit, rapid transit, and commuter rail. (TRRL)

Pushkarev, BS Zupan, JM ; Indiana University Press Monograph 252p, Figs., Tabs., Photos., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 246391); ORDER FROM:

45 319939 JOINT DEVELOPMENT: MAKING THE REAL ESTATE-TRANSIT CONNECTION. This book, consisting of an overview of the potential and problems of developing real estate in conjunction with rapid transit stations and then seven case studies, identifies for public and private participants the financial, legal, organizational and operational aspects. In order for joint development to enhance economic development related to transit investments, deal making between public and private parties is a necessity. Even experienced practitioners can learn of new arrangements for transit-related property development. The case studies about Philadelphia, Washington, Montreal, Boston and Toronto are presented in a rather consistent manner with special issues and innovative features of each project being highlighted.

Urban Land Institute 1979, 216p, Photos.; ORDER FROM: Urban Land Institute, 1200 18th Street, NW, Washington, D.C., 20036

45 322034 IMPACT OF RAIL TRANSIT ON LAND USE: EVIDENCE AND A CHANGE OF PERSPECTIVE. The paper reviews the experience of the post-World War II period in rapid transit investment and its apparent effects on urban development. The intent of this review is to draw inferences concerning the potential strength of that relationship and to indicate why success in achieving such effects on land use seems to have varied so much between places such as Toronto, Ontario and San Francisco, California.

Knight, RL *Transportation (Netherlands)* Vol. 9 No. 1, Mar. 1980, pp 3-16, 1 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 322827 OPTIMIZING JOINT DEVELOPMENT AT TRANSIT STATIONS. The Detroit Metropolitan Area was used as the experimental site for such feasibility testing. Two priority ranking methodologies were developed based upon provisions of rating and ranking methods. Station development potential was identified by a set of socio-economic and land use indicators, and the viewpoints of local professionals were solicited in assessing the relative importance of the indicators identified. Next, the relative rankings for 37 proposed transit stations on two travel corridors were developed using the indicators and the viewpoints of the local professionals. The study shows that it is possible to prioritize station locations for joint development based upon selected socio-economic and land use indicators. The results also suggest that the station ranks obtained by the two methods are not likely to be affected by input solicited from local professionals. Lastly, the procedures developed are found to be sensitive to selection of the indicators.

Arbogast, RG (Wayne State University) Khasnabis, S Opiela, KS *ASCE Journal of Transportation Engineering* Vol. 106 No. 5, Sept. 1980, pp 539-557, 13 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 322835 LAND USE IMPACTS OF FIXED GUIDEWAY TRANSIT SYSTEMS: IMPLICATIONS FOR DOWNTOWN PEOPLE MOVER PROJECTS. This paper describes the factors which have had an influence on the land use impacts of rapid rail systems in the past and the implications for the future Downtown People Mover projects. These factors include favorable local government policies, strong market conditions, and land availability.

Zumwalt, BA (Mitre Corporation) *Journal of Advanced Transportation* Spring Vol. 13 No. 1, 1979, pp 67-79, 7 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 324878 APPLICABILITY OF JOINT DEVELOPMENT TOOLS IN DETROIT. Joint development (JD) is a process by which major public facilities are constructed in concert with other projects through the coordinated efforts of public or private agencies, or both. This paper focuses upon the identification and analysis of JD mechanisms for use in the Detroit area where major transit investments are anticipated. A total of nine basic types of JD mechanisms were identified and evaluated in the context of the institutional structure of the area. The mechanisms were evaluated for feasibility by considering statutory basis, taxation issues, revenue sources, bonding authority, public approval, jurisdiction, organizational basis, and other relevant aspects. The evaluation indicated that many JD mechanisms could be considered feasible for use in the Detroit area. In some cases, precedents existed for the use of particular tools. In addition, several local agencies were found to have the authority and capabilities to administer JD programs.

Opiela, KS (General Motors Corporation) Khasnabis, S Arbogast, RG *ASCE Journal of the Urban Plan and Develop Div* Vol. 106 No. 1, Nov. 1980, pp 71-88, 16 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

45 325872 RESPONSE OF URBAN REAL ESTATE VALUES IN ANTICIPATION OF THE WASHINGTON METRO. The effect of public mass transit systems on the spatial distribution of urban property values is likely to be highly parcel-specific. Changes in real estate values may occur both before and after construction of a transit system. This article describes a series of econometric models of real estate values estimated for parcels in Washington, DC, over the period of the planning and initial construction of the metro system. Separate models are estimated for single-family dwellings, multi-family structures and retail stores. Access to Metro and its implementation schedule are both found to be significant determinants of parcel transaction prices.(a)

Damm, D (Department of Transportation) Lerman, SR (Massachusetts Institute of Technology)

Lerner-Iam, E (Orange County Transit District) Young, J (Commonwealth Of Massachusetts) *Journal of Transport Economics* Vol. 14 No. 3, Sept. 1980, pp 315-336, 6 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 250273); ORDER FROM: London School of Economics and Political Science, Houghton Street, Aldwych, London WC2A 2AE, England

45 326472 THE LOCAL IMPLICATIONS OF BART (BAY AREA RAPID TRANSIT) DEVELOPMENT. The report presents the final results of the Local Policy Implications Work Element. The report assesses whether BART has achieved the original objectives of local communities. The report also outlines local policy implications in the form of practical guidelines for local government officials either considering an investment in rapid rail transit or in the process of designing and constructing a rapid rail transit system. Implications are presented for each of nine original community objectives for the BART system. This material is further organized into five chapters relating to major areas of local policy--transportation, land use, finance, economic development and environment.

Graebner, LS Giles, PB Higgins, TJ Jonash, RS Curtis, E; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-11, Apr. 1979, 158p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001643. Prepared by Booz-Allen and Hamilton, Inc., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118069, DOTL NTIS

45 326479 LAND USE AND URBAN DEVELOPMENT IMPACTS OF BART (BAY AREA RAPID TRANSIT). The report assesses the land use and urban development impacts of the 71-mile Bay Area Rapid Transit (BART) system, the first rail transit system to be built in the United States in 50 years. How and to what extent BART has influenced the spatial arrangement of people and activities in the San Francisco Bay Area is documented. All aspects of development that BART may have affected or potentially could affect are examined--including households' and workers' location decisions, development decisions of housing and commercial developers, retail trade and shopping patterns, and property values and rents. Changes attributable to BART

are measured against pre-BART and no-BART alternatives using a variety of analytical techniques, surveys, statistical analyses and case studies. The report concludes with an assessment of the policy implications of the BART experience to date.

Dvett, M Dornbusch, DM Fajans, M Falcke, C Gussman, V; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-09, Apr. 1979, 208p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001682. Prepared by Blayney (John) Associates/David M. Dornbusch and Co., Inc., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118135, DOTL NTIS

45 330171 JOINT DEVELOPMENT AROUND INTERMODAL TRANSFER FACILITIES. Efforts undertaken in the city of Baltimore to initiate joint development around transit stations are examined. Under the provisions of the 1974 amendment to the Urban Mass Transportation Act of 1964, the U.S. Department of Transportation could make grants or loans for the establishment of transit corridor development corporations and for the purchase of land and the development of property adjacent to transit stations. Baltimore was one of the first cities to apply for funds under the new legislation. Although the Urban Mass Transportation Act of 1964 has since been amended to remove specific authorization for the funding of transit-corridor development corporations, the Urban Initiatives Program, established in 1979, provided funding for the Baltimore program. The key factors underlying the successful development of the Baltimore program are identified. Specific joint-development projects are examined, and the main points of the joint-development application are discussed. Observations are offered on the nature of contemporary joint development and the involvement of the public sector. (Authors)

Lutin, JM (Parsons, Brinckerhoff, Quade and Douglas, Inc) Walker, CA (Southeastern Michigan Council of Governments) *Transportation Research Record* No. 760, 1980, pp 33-39, 6 Fig., 3 Tab., 6 Ref.; This paper appeared in TRB Research Record No. 760, Rail Transit Planning and Rail Stations.; ORDER FROM: TRB Publications Off

46 072118 STRESS FOR PEOPLE. A number of OECD countries are experimenting with various ways to limit the number of vehicles crowding into downtown areas. The factors contributing to the success of a car-free area are analysed on actual cases. Experience proves that such bans on general traffic definitely improve the quality of the environment and dramatically reduces pollution. Usually welcome by the pedestrians, they are commercially successful. Buses and taxis may be allowed if the concerned area is large enough. Their efficiency is than very much increased. Problems come from the cost of the program (park and drive services, special vehicles), some accessibility difficulties (deliveries, transportation of heavy items), and uncertainty about the long-term influence on the use, of land and the character of the area.

Organization for Economic Cooperation and Devel 1974, 125 pp, Figs., Tabs., Photos., 34 Ref.; ACKNOWLEDGMENT: TSC

46 083970 PARKING PATTERNS AND PRICES IN THE CBD. This paper shows how the flow of automobile traffic from residential areas is allocated among downtown parking facilities by a pattern of prices that acts to minimize the total driving and subsequent walking costs for the drivers as a group. These prices also provide the maximum revenue that can be collected each parking facility when competing freely. A set of data from a central business district with more than 10,000 parking spaces demonstrates the validity of the analysis and shows that the parking patterns and prices can be determined inexpensively by computer. The model should be useful to traffic engineers and urban planners in their design of more efficient urban transportation systems.

Okechuku, C Lambe, TA (Toronto University, Canada) *Transportation Research Record* No. 514, 1974, pp 44-54, 1 Fig., 3 Tab., 10 Ref.; ORDER FROM: TRB Publications Off, Orig. PC

46 084304 EFFECTIVENESS OF NEAR-TERM TACTICS FOR REDUCING VEHICLE MILES TRAVELED: A CASE STUDY OF THE LOS ANGELES REGION. An analysis of near-term transportation alternatives for the Los Angeles region using the Policy-Oriented Urban Transportation Model developed by Rand is presented. The predicted effect on regional vehicle miles traveled of various levels of bus system improvements, carpooling incentives, and economic disincentives (i.e., mileage surcharges or increasing gasoline prices, and parking surcharges) are shown. Changes in personal mobility as reflected in changes in the total number of person trips are also included. The analysis indicates that a number of transportation management alternatives are available that could potentially reduce vehicle miles traveled in the Los Angeles region by approximately 20 percent, or more, while minimizing adverse impacts on personal mobility. /Author/

Mikdowsky, WT Stanley, WL Goeller, BF; Rand Corporation P-5336, Dec. 1974, 40 pp; ORDER FROM: Rand Corporation, 1700 Main Street, Santa Monica, California, 90401 Orig. PC, NTIS, Repr. PC, Microfiche

46 084756 DOWNTOWNER BUS SERVICE. The Washington, D.C. Downtowner "Midibus"

Demonstration Project has for its goals: (1) reduction of downtown congestion; (2) reduction in size of transit coaches in the city core area; (3) reduced air pollution; (4) assistance and support of downtown revitalization efforts; (5) a revenue-cost ratio of 0.5; and (6) optimum routing of downtown circulation vehicles. The medium-sized bus, 25' long and 8' wide, has peripheral seating for 25 and standing capacity of 15. The Daytime Connector Route proved to be optimum by all performance measures as indicated. By completion of the program in June '74, more than 1,200,00 passengers has been carried on all routes, nearly all on the Connector route. In July '74 the service was taken over by the Washington Metropolitan Area Transit Authority in consonance with an agreement with the District Government to continue service if the demonstration proved utilitarian and well patronized. A modified-zone fare structure proved acceptable and the service-cost ratio of 0.5 was exceeded by a wide margin. Both low fare and convenience of movement within the CBD encouraged public use of mass transit to circulate around the CBD for shopping and other errands. The net result was a reduction of downtown traffic with consequent lowered air pollution and progress in efforts to revitalize the downtown area. Chapters address the project in terms of financing, management, publicity, vehicles, liquified natural gas fuel system and ridership. /UMTA/

Neumann, AL; Urban Mass Transportation Administration, (DC-06-0069) Final Rpt. UMTA-DC-06-0069-74-1, Nov. 1974, 44 pp; Sponsored by Urban Mass Transportation Administration.; ACKNOWLEDGMENT: UMTA, NTIS (u7511); ORDER FROM: NTIS, Repr. PC, Microfiche; PB 239-826/AS

46 093683 ROAD USER CHARGES. SOME PRACTICAL CONSIDERATIONS. While a number of proposals for applying road user charges have been considered by analysts and policy makers, little unanimity currently exists on the most appropriate scheme. Much of the difficulty stems from the fact that transportation systems interact in a complex manner with many facets of urban life, and any particular scheme of user charges is likely to have some undesirable impacts which will make it difficult to implement. This paper reviews past experience with road user charges, principally automobile tolls, and estimates the changes in traveler behavior which are likely to result from use of congestion tolls. It concludes with some general observations on how congestion pricing policies might be made more palatable politically.

Kirby, R; Urban Institute, National Science Foundation UI-1212-5, NSF/RA/S-74/039, Mar. 1974, 27 pp; ACKNOWLEDGMENT: NTIS, Highway Safety Research Institute (HSRI-34641); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245643/2ST

46 096920 TRAVEL MODE CHOICE IMPACT OF POTENTIAL PARKING TAXES IN DOWNTOWN CHICAGO. The likely travel mode choice effects of a potential parking tax increase ranging up to \$10.00 per day was investigated in Chicago Central Area which covers approximately 15 square miles and includes the most dense square mile of downtown Chicago, the Chicago Loop. Details are given of the

analysis which consisted of determining the mode split between auto and transit trips for each zone in the central area, dividing the area by rings into separate subareas which include zones with similar modal splits, and applying a travel mode choice estimation procedure to each subarea to determine the effects of possible tax increases on the existing modal splits. The data for the analysis were obtained from a 1970 home interview survey. It is noted that the degree to which parking taxes would eventually change modal shares would depend on the boundaries of the area indicated and include the study of shift of auto drivers to areas outside tax area boundaries, shift of non-work trips to alternative activity centers (such as shopping centers), and parking tax revenue estimation.

Lisco, TE Tahir, N; Illinois Department of Transportation Tech Paper Series #12, Feb. 1974, 18 pp, 2 Fig., 6 Ref.

46 097227 PARKING IN AMSTERDAM. At noon some 29,000 cars are parked on the public road in the City Centre of Amsterdam, 20,000 of which occupy legal parking lots. The parking garages in this part of the city have a capacity of 3,000 lots. There are no plans to further extend the total parking capacity of the City Centre. Studies have been conducted to see whether so-called parking-districts could be introduced, in which case their street area would be regarded as one big parking-area and the control would take place at the periphery of the district. At night and at the weekends the regular parking-capacity of the public road in the old residential zone around the City Centre is exceeded by 14%. The solution to the parking problem in this area has to be found within the framework of urban renovation. /TRRL/ [Dutch]

Hoogenboom, GHA *Verkeerstechniek* Vol. 25 No. 12, Dec. 1974, pp 630-633, 3 Fig., 1 Tab., 1 Phot., 2 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 211742)

46 097681 LONDON IN THE 1970'S. THE BRITISH ROAD FEDERATIONS REPLY TO THE GLC GREEN PAPER TRAFFIC AND ENVIRONMENT. This document is a reply to the G.L.C.'s green paper-traffic and the Environment. It begins by examining the balance, between the demand for movement and the supply of facilities to enable movement to take place. It notes that there is A lack of emphasis on road-building in transport policy. There is a general discussion of potential methods of restraint on traffic flow and speeds, and the bulk of the report compares the different methods. These methods include parking controls, supplementary licencing and road pricing. The extent of on-and off-street parking is indicated and estimates of its potential contribution to reducing congestion are given. Supplementary licencing is evaluated with particular reference to goods vehicle movements and work journeys. Administrative problems are suggested and the effects on the economic and social life of the city noted. Road pricing is limited by it being a national development. Shorter sections on traffic management, buses and heavy lorries examine the potential improvement in flow, safety and the general environment but note that drawbacks exist with each policy. Conclusions emphasize the need for road building and accept that extensions of parking control and

the banning of through heavy lorries are feasible and desirable. /TRRL/

British Road Federation R&D Rpt. No Date, 9 pp, 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 212152)

46 099491 COMPARTMENTATION AS A TOOL TO REDUCE TRAFFIC CONGESTION AND IMPROVE THE ENVIRONMENT. A system of compartmentation or zoning used in Gothenburg, Sweden, to reduce traffic congestion, to improve public transit operation, and to improve environmental quality in the central core of the city. This system is described, and the effects it has had on vehicle flow, parking, public transit operation, accidents, and noise and air quality are discussed. Polls of citizen reaction to the compartmentation revealed that two out of three citizens had favorable reactions to the system. Although Gothenburg has had difficulty securing funds for follow-up studies, several other Swedish cities have been impressed with the Gothenburg system and have adopted a similar compartmentation system.

Elmberg, CM (Gothenburg Transit Authority, Sweden) *Transportation Research Board Special Reports* No. 153, 1975, pp 1-9, 5 Fig., 10 Tab.; Presented at the 7th Summer Mtg. of TRB in cooperation with Florida DOT, Jacksonville, Fla., Aug. 5-7, 1974.; ORDER FROM: TRB Publications Off, Repr. PC

46 125034 IMPLEMENTATION AND ENFORCEMENT OF RESTRAINTS. The assumption of the need for constraints underlies discussion of congestion in cities, but local authorities appear reluctant to extend restriction for fear of alienating the public. The main instrument of restraint is likely to be intensification of existing parking control and pricing. Enforcement is a separate and major problem with existing methods and new techniques of restraint offer little scope for reducing the difficulties of enforcement. Land use planning can be important, but the most effective and acceptable policy is likely to be a combination of constraints and incentives (particularly in the form of improved public transport). The number of the covering abstract of the textbook is irrd abstract no 212297. /TRRL/

Moseley, GW (Department of the Environment, England); David and Charles (Holdings) Limited Textbook 1974, pp 119-122; ACKNOWLEDGMENT: TRRL (IRRD 212309)

46 125503 MAKING MINNEAPOLIS WORK. Like most other cities Minneapolis has been shaped by its transportation. A recently completed plan has come up with a way which might, for an estimated \$800 million, contain the auto and give the city back to the people who use it. "Metro Center '85" suggests a ring road circling the central business district, parking garages located near this road, and a central district free from automobiles. This article reviews projects currently under way: updating the parkways; the IDS Center; Cedar Riverside, a new-town-in-town; Loring Greenway to connect with a Nicollet Mall extension; and St. Anthony Falls area rehabilitation. /HRIS/

Carpenter, EK *Design and Environment* Vol. 6 No. 2, June 1975, pp 32-47

46 125540 THE ENGINEER'S ROLE IN TOWN CENTRE DEVELOPMENT. This paper gives an outline of the part played by the municipal engineer in town centre development. The author illustrates it with examples taken from the city of Swansea. He first gives a brief account of the city's quadrant scheme to re-develop its war-damaged centre. The scheme has been prepared by consultants and after 15 revisions has been finalized. The author discusses the various problems that have had to be resolved. These include building line problems which were complicated by the siting of an old rising main; the extinguishment of highways and their pedestrianization; and problems associated with sewers, both old and new. Problems arising from public transport services are discussed at rather greater length, and in particular the routes of bus services. He then deals with mains and services, realignment of which has been strongly opposed by the consultants because of the effect of possible faults on traders. The author concludes by briefly discussing the future, in which the engineer will be concerned with the demolition of buildings, the construction of bridges and underpasses, and possibly with the design and construction of a multi-storey car park. /TRRL/

Wallbank, AWF *Institution of Mechanical Engineers Proceedings* Vol. 102 No. 2, Feb. 1975, pp 36-38, 1 Fig.; ACKNOWLEDGMENT: TRRL (IRRD-212994)

46 125579 TRANSPORT AND CENTRAL AREAS. The author introduces this brief article by contrasting the large shopping developments in the central areas of Singapore with equivalent British developments, and pointing out the need for flexibility in design. Urban transport policies are discussed in general terms and particularly in relation to the restraint of personal transport. After a brief reference to land use the different traffic-generating characteristics of each use are examined. Roads and parking policies are dealt with, reference being made to the capacity of roads (which may be physical or environmental), the locations of car parks and park-and-ride schemes. Mention is made of the different types of public transport that are available and proposals for siting office blocks close to public transport interchanges. After commenting on vehicle access to buildings for servicing and refuse collection, particularly in relation to shops, the author concludes the article by discussing facilities for pedestrians, including grade-separated crossings, covered areas, the use of walkways, lifts and escalators and the minimization of movement distances and travel times. /TRRL/

Simpson, M (Arup (Ove) and Partners) *Consulting Engineer* Vol. 39 No. 1, Jan. 1975, pp 37-39, 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-212633)

46 125648 CARS IN CITIES-CAN THEIR USE BE LIMITED?. This article briefly summarizes recent changes of attitude towards car restraint and promotion of public transport. Many factors, including the rise in oil prices and increased public opposition to urban highway building, have led to a change from pro-highway to pro-public transport policies. This change was recommended in November 1974 by the OECD Council and by its ministers of the environment. A group of OECD countries then met to organise a conference on "better towns with less traffic", for

April 1975. The secretariat, in preparation, surveyed 444 cities of over 100,000 population, and found that control of car parking is now being supplemented by efforts to improve public transport. Progress in three cities is described: in Nagoya, traffic management, parking control and bus priority have halved commuting by car and increased by 1/3 bus speeds. Besancon has restricted central access to buses or cars with permits, and replaced buses with shared taxis on some routes in the evening. In Nottingham there are pedestrian malls and bus-only streets, while use of cars to the centre will be limited by "controlled congestion" created by traffic signals. The conference will include sessions on express buses, sharing of cars and taxis, improved safety for cyclists and supplementary licences. Reports will be presented on energy conservation in transport, and on reduction of travel by land-use planning and by staggered working hours. /TRRL/

OECD Observer No. 73, Jan. 1975, p 26, 1 Phot. ACKNOWLEDGMENT: TRRL (IRRD-213018)

46 127231 TRANSPORTATION STUDY TOUR TO MUNICH AND PARIS-SEPTEMBER, 1974. The cities of Munich and Paris are both vigorously attacking the problems of street congestion and environmental pollution created by the unrestricted use of private cars and heavy lorry traffic. It is recognised in both cities that through traffic must be kept out of the centres by the provision of ring roads, but as these go through mainly suburban areas, special steps must be taken to protect residents from noise. So far as the private car user is concerned both cities have adopted policies of heavy investment in providing an efficient and reliable public transport system which will persuade the public to accept restrictions in the use of private cars. In neither city is public transport expected to pay its way in normal commercial terms but is supported by payments from the central or local government. Other means of reducing pressure on the city centres is to construct new towns or expand existing ones round the perimeter in such a manner that the employment and shopping requirements of the residents can be met without the need to commute to the city itself. The one week visit to Munich and Paris, which took place from September 15th-21st, 1974, and was initiated and organised by the institution's transportation board, was designed to examine the ways in which these policies had been planned and carried out. The amount of time available was insufficient to enable enough information to be obtained for a detailed report, but a general description of the public transport systems in the two cities is included, as well as some information on town planning policy, and on measures to reduce the noise and visual impact of major roads in urban areas. The article also includes descriptions of visits to some large new shopping areas on the outskirts of Paris, and to the big office and residential complex at La Defense to /TRRL/

Ritchie, AGB Tingari, MB (Strathclyde University, Scotland); New South Wales University, Australia Conf Paper No Date, pp 157-175, 10 Fig., 4 Tab., 12 Ref.; Presented at First Australian Conference on Engineering Materials.; ACKNOWLEDGMENT: TRRL (IRRD 213780)

46 127759 CONTROLLED MOBILITY? ASPECTS OF TRANSPORTATION GEOGRAPHY IN THE ORIENTATION REPORT [Beheerste Mobiliteit? Verkeers-en Vervoers-Geografische Beschouwingen naar Aanleiding van de Oriënteringsnota]. One of the central goals of the physical planning orientation report of 1974 is the future restriction of mobility in the Netherlands. It is in conflict with many forces in present society, which rather stimulate the increase of personal mobility. Consequently limited use of private cars can only be realized if alternative mobility opportunities are strongly promoted, e.g. fail transport for commuting and other public transport facilities. The orientation report, however, is very indefinite on this point. That a brake should be put on the further growth of motor traffic is shown by a calculation of the total areal occupation of this kind of mobility. It appears that by the year 2000 as much space will be needed for motorways and their noise zones as for all residential areas. Therefore, promotion of public transport is necessary to secure urban renewal as well as rural open areas. /TRRL/ [Dutch]

Lohuizen, C *Tijdschrift voor Economische en Sociale Geografie* Vol. 65 No. 4, 1974, pp 288-304, 1 Fig., 4 Tab., 35 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 214768); ORDER FROM: Koninklijk Nederlands Aardrijkskundig Genootschap, 63 Mauritskade, Amsterdam, Netherlands Repr. PC

46 128805 REPORTS ON OECD CONFERENCE ON "BETTER TOWNS WITH LESS TRAFFIC" AND FIELD VISITS TO VARIOUS WESTERN EUROPEAN CITIES--APRIL 1975. Field trip reports are presented which highlight current practice in urban transportation in Europe. The report of visits to 3 case study cities (Munich, Bern, Besancon) notes many innovative concepts, and the European emphasis on mid-range programming (6-10 years). The importance of form, size, population density, dispersal characteristics, and historical and cultural restraints in relation to transportation is emphasized. The European countries which submitted case studies at the Conference reported measures to restrict the use of the private auto, and measures to promote the use of public transit. A visit to Nottingham, Leeds and London has shown that where pedestrianization has taken place, business has improved; community groups must be included in the planning process; and good public relation schemes must be implemented. The conference also provided for exchange of information related to systematic problems that arise when a traffic restraint is undertaken. A report is made of a visit to several European cities (in England, West Germany, and Netherlands) engaged in the use of public transportation and/or traffic management to reduce the adverse impacts of automobile traffic. A report of general and specific observations, notes that European programs are geared to a total system concept, and are much less inhibited by transfers or constrained by safety hazards. Specific observations made in Munich, Bern and Besancon are discussed. A report on a visit to Sweden notes the success of traffic restraint schemes. Such restraints are part of a larger process of city planning, citizen involvement and traffic management whose goal is to gradually alter the traffic flow so as to achieve the same

standards of safety and environmental quality as is achieved when planning new developments.

Transportation Research Circular No. 171, Oct. 1975, 47 pp. ORDER FROM: TRB Publications Off, Orig. PC

46 129641 "FOOT STREETS" HELP WITH LONDON'S TRAFFIC PROBLEM. A scheme is described where 1 km west of Oxford Circus (London's primary shopping street) was closed to ordinary traffic between 1100 and 1900 hours on Mondays to Saturdays, and only buses, taxis and service vehicles were admitted. Surveys indicate the scheme is very successful. The scheme is being experimentally extended to other areas. Nearly 20 years ago, a scheme (Barbican) was begun which was aimed at restoring life to the heart of the city by providing accommodation plus new facilities for work and leisure on the basis of complete pedestrian/vehicle separation principle. By adopting the principle of a podium, with connecting elevated walkways within the site, and linking it to adjacent office areas, the residential neighborhood is made into a pedestrian precinct free from noise and safe from traffic. Streets, service roads and access to garages and parking are either underground or below the podium.

Tiffen, CE *Shire and Municipal Record* Vol. 68 No. 8, Nov. 1975, pp 551-553

46 131404 THE EUROPEAN PICTURE: BETTER TOWNS WITH LESS TRAFFIC. Case studies are outlined of European cities which have implemented automobile management measures. The importance is recognized of conditions by which automobile restraint measures are developed, and it is pointed out that in the European cities, such restraints marked a reflection of public policy that automobile use in urban areas needed to be controlled. Comprehensive planning objectives were established, and the benefits derived from implementing automobile restraints were measured in numerous terms--thus making strategies politically acceptable and therefore more feasible to implement. In Uppsala (Sweden), the program which was implemented in successive phases, attempted to restore the factor of the human scale as the primary planning element. Bologna, Italy, adopted a development program intended to further the government policy of decentralization and restoration of regional equilibrium. Proposed or implemented schemes in Singapore, Nagoya (Japan), Besancon (France) and Nottingham, England are outlined. Points which should be considered in the design of restraints include those relating to the psychological resistance of drivers, the inclusion of the area's merchants in the preparatory plans, planning in conjunction with urban goods delivery, and the improvement of transit levels of service. The transferability of projects is discussed and certain measures were singled out for implementation within a short time frame: priority scheme for buses; metering schemes; bypass and cell schemes; and exchange of information would be useful are noted.

Banarjee, FT (Southern California Association of Governments) *Transportation Research News* No. 62, Jan. 1976, pp 5-8, 1 Tab.; ORDER FROM: TRB Publications Off

46 132307 NEWCASTLE MOTORWAY RELIEVES CITY CENTRE CONGESTION. Details of the design and construction of Newcastle's

Central Motorway east are given. Within its length of less than a mile there are five vehicle access points, eight pedestrian crossings by overbridges and subways, and two underground tunnels constructed in the contract in advance of the proposed rapid transit system. The motorway is partly in cutting and partly on two levels, one above the other. The motorway was completed on 12 August 1975. /TRRL/

Highways and Road Construction Vol. 43 No. 1789, Sept. 1975, pp 12-14, 1 Fig., 5 Phot. ACKNOWLEDGMENT: TRRL (IRRD-215424)

46 132308 NOTTINGHAM PUTS ON A NEW COLLAR. A brief outline is given of the peak-hour traffic control experiment being carried out by Nottinghamshire CC's planning and transportation department. A "collar zone" extends for more than two miles on the city side of the ring road in the western part of Nottingham, access to the main roads within the zone being limited by traffic lights. There are restrictions on cars leaving the ring road and entering the inner city area. Car commuters are encouraged to park their cars free at "park and ride" sites and to use buses. /TRRL/

Highways and Road Construction Vol. 43 No. 1789, Sept. 1975, p 18, 1 Fig. ACKNOWLEDGMENT: TRRL (IRRD-215423)

46 133655 WILL BRISTOLIANS TAKE TO THE TOLLS IN 1986. The article describes proposals given in the Bristol area Land Transportation Study by Jamieson, Mackay and Partners to relieve the growing congestion in the city of Bristol. The study recommends the setting up of a car restraint cordon about the city centre where motorists will be charged for journeys in or out of the central area during peak hours. Various forms of car restraint were considered in the study with two other strategies based on highways and bus priorities; but it was decided that the highways strategy could not cope with the increased traffic, and the bus priority scheme would not significantly alter the mode of travel. The team concluded that the cordon was the only method which would avoid long delays and discourage through traffic, giving equality to those who at present enjoyed free parking and those who had to pay; inside the cordon parking would be free. The toll cordon would have to be accompanied by road building to carry the increased circumferal traffic. Bus priority lanes should be introduced on all routes into the city centre through the cordon. /TRRL/

Merchant, M *Surveyor - Public Authority Technology* Vol. 146 No. 4347, Oct. 1975, pp 14-16, 3 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (TRRL49095E)

46 133696 THE DESIGN AND EVALUATION OF AN URBAN PARK-AND-RIDE SYSTEM: SOME METHODOLOGICAL ISSUES. This paper presents a summary of findings on the design and evaluation of an urban park-and-ride system. Three main aspects are presented: the construction of mixed-mode demand models; the calculation of user benefits; and the consideration of optimization procedures for the design process. The problems of determining the optimal number, location, parking charges, and sizes of car parks are considered. Discussion is appropriate to car-bus and car-rail interchange. (A) /TRRL/

Williams, HCWL Sanderson, IR Senior, ML (Leeds University, England) *Environment and Planning* Vol. 7 No. 6, 1975, pp 689-702, 10 Fig., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 216916)

46 133710 CAR FEES IN THE CITY OF STOCKHOLM. AN ECONOMIC STUDY OF A LICENCE FEE AS A MEANS TO LIMITATION OF CAR TRAFFIC IN THE CITY OF STOCKHOLM [Bilavgift: Stockholms innerstad. En samhaellsekonomisk studie av licensavtift som medel foer begrænsning av biltrafiken i Stockholms innerstad]. An excessive number of cars in towns gives rise to environmental damage and congestion. Of the possible physical restrictions such as traffic planning measures, introduction of bus lanes, parking fees, better public transport and a licence system during rush periods, this report discusses the one mentioned last. The analysis suggests that the net overall economic gains of such a system would range between skr. 0.2 and 1.5M annually. Reduction of traffic would also have favourable environmental effects, and total gains would thus be greater if this plus the improvement in road safety were considered. Licence revenue can be redistributed between groups of road users or between modes. The effects of a licence system over the whole day should be investigated, and the effects of changes in traffic conditions should also be examined. /TRRL/ [Swedish]

Jansson, K ; Stockholms Laens Landstings Kollektivtrafik No. 20, 1975, 34 pp, 2 Fig., 5 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-216970)

46 134037 THE RESTRAINT OF VEHICULAR TRAFFIC. The need for traffic restraint is identified by the inefficiency with which the existing road system operates, the pressure for reduction in traffic in sensitive areas, and the impossibility of meeting future demands for travel. Traffic restraint methods must meet the identified restraint needs, be flexible, selective, fair, adaptable, simple and inexpensive and easy to comply with. Methods to assess the desired level of restraint and methods to achieve that level are outlined. Existing (parking controls) and new methods of restraint on the private car are discussed. Private parking reduction by legislation (to reduce the number of spaces, taxiing ownership of spaces, and charging for spaces), control of through traffic, supplementary licensing by price, supplementary licensing by permit and physical controls are outlined. The restraint on commercial vehicles and the problems in implementing new measures are discussed.

May, AD *Traffic Engineering* Vol. 46 No. 2, Mar. 1976, pp 15-18, 2 Fig., 1 Tab.

46 134250 ILL FITTING COLLAR HAM-PERS NOTTS EXPERIMENT. The progress made in the Nottingham zone and collar experiment for controlling the traffic flow in the city centre across a cordon is reviewed. The control is achieved by installing traffic signals on all radial roads where they cross the collar and adjusting the signal settings to limit the flow. At each set of signals a reserved lane enables buses to bypass the queues. It is said that the park and ride scheme offered as an alternative to private cars has so far

been unsuccessful. The controls have not yet been fully tested as they will not be fully operational until autumn 1976 when the computer linked area traffic control will be in operation. /TRRL/

Ferguson, H *New Civil Engineer* No. 177, Jan. 1976, pp 22-23, 1 Fig., 1 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-217533)

46 137652 GOALS FOR THE DEVELOPMENT OF THE CITY CENTRE WITH SPECIAL REGARD TO TRAFFIC PROBLEMS. The Standing Committee on Traffic Problems of the International Federation for Housing and Planning studies the problem of the aims of development of city centres. It asked members to prepare reports for one or two cities in their country, and also to fill in a questionnaire concerning statistics on centre development in the cities. 16 reports were received and were discussed at a committee meeting in Copenhagen in September 1970. The problem was also discussed at a committee meeting in Belgrade in 1971. The general reported was Mr. Hans B. Barbe, Zurich. Recommendations and conclusions concerning "goals for the development of the city centre" were adopted unanimously by the meeting in Belgrade. A comparison of the statistics of the various city centres has been worked out and may be of help in work with city centre problems in other cities. (A) /TRRL/

Bendtsen, PH ; International Federation for Housing and Planning Monograph 1973, 46 pp, 5 Fig., 19 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 218401)

46 138867 PEAK HOUR RESTRAINT CAN BE MADE TO WORK. The author argues that peak hour car restraint would further erode off peak bus services. He suggests that priority be given to buses because they are the means of most journeys to work in urban areas. Buses at peak periods, because of their high load factors, use energy and road space more efficiently than the private car. There is also a large bias towards low income earners amongst bus passengers. Evidence is given that only in some medium sized urban areas are more than half the work trips made by car, and that high levels of car commuting can only be achieved by increasing road capacity or by planning the location of industry to facilitate car movement. Although peak hour car restraint may have some undesirable side effects, these can be minimised by a number of mechanisms available to local authorities. Before it can be given a fair trial, the political will is needed to pursue the policy of car restraint. /TRRL/

Hamer, M *Surveyor - Public Authority Technology* Vol. 147N No. 375, pp 11-12, 3 Tab., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 220097)

46 141303 UNCROWDING CROWDED STREET. In order to relieve the congestion that characterizes State Street, Chicago's busiest street, a transit mall is scheduled to be created in 1977. An interagency task force came up with a plan calling for the restriction of vehicular traffic, allowing only pedestrians and buses and emergency vehicles. Three basic objectives are behind the mall scheme: the improvement of State Street's pedestrian environment, the improvement of public transportation services in downtown Chicago, and the provision of an economic stimulus to the State Street business community. Several useful, as well as esthetic, improvements

will be made such as shelters, escalators leading to subways, trees, etc. The bus system will be systematized, and provision for taxi stands will be made on the cross streets, which will still be open to traffic. Side street loading for delivery trucks will be designated, and traffic control measures are planned for the traffic that must be rerouted from State Street. The area computerized traffic signal system, a parking ban on streets in the Loop area, and exclusive reverse flow bus lanes are all measures that will increase traffic flow speed and vehicle capacity on the streets. The idea of a "mall" is descended from the Middle Ages, where its purpose was to promote interaction and communication. Today's transit malls have begun to do that again, as well as promote transportation and economic improvements. After grant applications are filed and the final design stage completed, construction on the Chicago Transit Mall will get under way.

Chicago Public Works Vol. 5 No. 3, 1975, pp 10-13, Figs.

46 142796 CAR PARKING. This report has outlined the growing need for traffic restraint, especially during the peak periods, and has noted some of the problems that might arise from the imposition of such restraint by the restriction of parking spaces in new developments. The standards suggested reflect the following 5 main policy criteria: (1), the need for more restraint orientated control over the movement of private cars during peak periods, particularly with regard to office commuter trips to those parts of the borough that are comparatively well served by public transport. (2), the standard of provision for commuters' cars to industrial/warehousing areas remote from public transport should be demand orientated. (3), journeys which can be made by car during the off-peak period, i.e. Shopping trips, pose no great problem and merit more generous standards than advocated by the glc. (4), the need for one space per dwelling as a minimum requirement with certain exceptions. (5), the parking requirements for other categories of development be treated on the merits of each case. Proposed car parking standards are summarised in an appendix. /TRRL/

Alan, D ; London Borough of Greenwich Monograph July 1973, 22 pp; Borough Development Plan, Interior Policy; ACKNOWLEDGMENT: TRRL (IRRD-221484)

46 146633 PARKING MANAGEMENT STRATEGIES FOR REDUCING AUTOMOBILE EMISSIONS. This report defines the concept of parking management and explores how parking management can be used to improve air quality, support mass transit, reduce energy consumption and improve the amenities of life in urban areas. Specific aspects of this analysis were developments of a prototype parking management plan for the Washington, D.C. metropolitan area illustrating types of measures which can be used for parking management; evaluation of the socioeconomic impacts of parking measures in the plan and their effectiveness in reducing vehicle miles traveled (VMT) and improving air quality; development of a parking management planning process which integrates local and regionwide planning through the use of regional guidelines. Four target areas in the D.C. region were studied in detail: the D.C. Core, Rosslyn, Va., Silver

Spring, Md., and Centreville, Va. A regional plan was then developed from information gathered in the target area studies, including an analysis of regionwide parking related goals and problems.

Dern, J Cole, J Fallon, B Heller, J Hickey, S ; Energy and Environmental Analysis, Incorporated, Environmental Protection Agency Final Rpt. EPA/600/5-76/008, Sept. 1976, 196 pp; (PC A09/MF A01); Contract EPA-68-01-3243; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259949/6ST

46 147489 PARKING RESTRAINT AND PARK-AND-RIDE MODELLING. The article discusses parking restraint and park-and-ride travel in the context of a transportation model. The model was developed to test and evaluate a number of 1986 transportation strategies for the Doncaster Metropolitan Borough Council. Details are given of the use of subzones to account for different types of parking facilities within a zone, and to model park-and-ride movements to a central area. An assessment is made of the effect of the split between public and private transport when there are some privately owned car parking spaces available in the area. Park-and-ride trips are modelled as a separate mode. The split between private, public and park-and-ride modes is carried out in one operation at the distribution stage so that all constraints and trip opportunities interact simultaneously. The authors claim that little program development is needed to incorporate these facilities into standard transportation planning programs. /TRRL/

Wheeler, MK Mathieson, BJ *Traffic Engineering and Control Analytic* Vol. 17 No. 6, June 1976, pp 260-261, 2 Fig., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-222369)

46 147628 EVALUATION METHODS IN URBAN TRANSPORT PLANNING. Evaluation methods, particularly with regard to measures and facilities which are directed to a limitation of car traffic and an improvement of public transport in the cities, are described. The paper deals with some problems concerning the evaluation of alternative plans. Next it reviews some examples of evaluation methods which are in use. It also gives an example of a so-called "evaluation after", viz. An examination of the effectiveness of certain instruments with activities to match. The evaluation methods described are applied to projects, which are all directed to an improvement of public transport in or around Amsterdam. /TRRL/

Kleijn, HJ (Publieke Werken, Netherlands) ; Colloquium Verkeersplanologisch Speurwerk Analytic 1976, pp 69-92, 2 Fig., 3 Tab.; ACKNOWLEDGMENT: Institute for Road Safety Research (SWOV55005E), TRRL (IRRD-221557)

46 147866 WILL RAIL INTERCHANGES LEAD LIVERPOOL CITY CENTRE REVIVAL? An outline of the new Merseyside Underground railway system due for completion by summer 1977 is given. The idea of the 'loop and link' system is to give people easy access to all parts of Liverpool city centre by getting people to make the change from bus to rail out in the suburbs. At the moment the number of potential users of the new system is thought not to be very great but the planners hope that the new system itself will help to initiate a revival in the city's economic fortunes and hence lead to a greater demand for public transport. /TRRL/

Merchant, M *Surveyor - Public Authority Technology* Vol. 148 No. 44, Oct. 1976, pp 12-13, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-222790); ORDER FROM: ESL

46 149099 TRANSPORT POLICY. THE CONTROL OF PRIVATE NON-RESIDENTIAL PARKING, A CONSULTATION PAPER. This document is issued as a part of the consultation document on transport policy and shows the various means by which parking generally, and private non-residential parking (pnr) in particular, might be controlled and what would be involved in operating such controls. It discusses the need for control and gives various reasons for the control of pnr. Some of the problems involved in the operation of the two most feasible methods; taxation and parking permits are discussed. It is emphasised that pnr control alone would not solve congestion problems; it would be one of a number of measures and would only be used where more orthodox restraint and traffic management were not suitable and adequate public transport was available. Although alternative methods of restraint may prove to be unacceptable or unpopular, the control of parking on private property raises controversial points of principle. The document invites the views of organisations and individuals on the need for pnr control, its method of enforcement, and possible alternatives. /TRRL/

Department of the Environment, England Monograph July 1976, 17 pp; ACKNOWLEDGMENT: TRRL (IRRD 222125)

46 150445 IMPLEMENTING A PARKING FREEZE IN DOWNTOWN BOSTON. An analysis is presented of the parking freeze procedures in downtown Boston. The freeze, initiated locally, translated into Federal Law and returned to the local level for administration is complicated and unprecedented. The freeze resulted from Boston's violation of the air quality standards set forth in the Clean Air Act, and the state's subsequent failure to comply with such corrective measures as indirect land use and transportation controls. The policy background, prior to the EPA's intervention, is discussed, as well as a description of the various agencies involved in implementing the freeze. "The freeze bank" (to determine how many spaces were available to trade off against new spaces planned for downtown) is discussed and permit procedures and permit criteria are explained. Several implications of the freeze for the downtown Boston area are reviewed.

Algmin, JD (Boston Redevelopment Authority); Institute of Transportation Engineers, Inc Proceeding 1976, pp 105-114, 1 Fig., 4 Ref., 2 App.; Proceedings of the 46th Annual Meeting, Baltimore, Maryland, August 15-19, 1976.

46 152354 THE POTENTIAL APPLICATION OF TRAFFIC RESTRAINT IN CONNECTICUT. This discussion of the transportation and urban planning issues within Connecticut and their relationship to controlling automobile usage, also documents a study which evaluates the possible application of traffic restraint concepts within the state. The feasibility of traffic restraint is achieved by comparing the knowledge about restraint measures from a literature review (first phase of the study), with situations in Connecticut.

The study considered the automobile related problems of congestion and parking, as well as regional land-use plans, environmental objectives, and public transportation plans. The project focused on where restraint might be considered in transportation planning.

Miller, HW, Jr Wortman, RH ; Connecticut University, Storrs, (Project 74-3) Final Rpt. Rept No JHR 77-103, Feb. 1977, 93 pp, 1 Fig., 1 Tab., 43 Ref., 2 App.; This research was sponsored by the Joint Highway Research Advisory Council of the University of Connecticut and the Connecticut Department of Transportation.

46 152916 PAPERS ON TRAFFIC RESTRAINT. The following papers were presented: The Evolution of Thinking and Techniques for Restraining Traffic During the Past Fifteen Years by Bendixson,T; Restraining Traffic-A Study of Some Possible Methods by Goode,AP; The Restraint of Vehicular Traffic by May,AD; Land Use Implications of Traffic Restraint by Bone,RA; Practical Difficulties of Pricing Roadway Use in the United States by Kulash,DJ. /TRRL/

Bendixson, T Goode, AP May, AD Bone, RA Kulash, DJ ; Planning and Transport Res and Computation Co Ltd No Date, pp 41-104, 3 Fig., 4 Tab., 46 Ref.; These papers were presented at Seminar R, Traffic and Environmental Management, held during the PTRC Summer Annual Meeting, July 8-11, 1975, at Warwick University, England.; ACKNOWLEDGMENT: TRRL (IRRD 220765)

46 152919 RESTRAINING TRAFFIC-A STUDY OF SOME POSSIBLE METHODS. The paper summarizes the results of a study in which the effects of the following five methods of traffic restraint in a medium-sized city were studied: parking control, supplementary licensing, road pricing, cordon pricing, physical restraint. It was found that: (1) a comprehensive parking policy could be as effective as more sophisticated fiscal restraint systems until at least the early 1980S. (2) physical restraint, associated with comprehensive traffic management including priority provision for public vehicles, appears to be feasible. (3) general restraint of traffic volumes is not likely in itself to reduce perceived noise, although it would reduce air pollution; noise exposure could probably be reduced by traffic management. (4) peak-period traffic restraint (unless applied very severely) is unlikely to have any general adverse effect on shopping or business activities, but there could be certain exceptions. (5) fiscal restraint systems would be likely to bear most heavily on the above average income groups. On balance, lower income groups would be expected to gain, particularly from improved bus services. /TRRL/

Goode, AP (Department of the Environment, England) ; Planning and Transport Res and Computation Co Ltd Proceeding No Date, pp 51-67, 1 Fig., 1 Tab., 3 Ref.; This paper was published as part of Traffic and Environmental Management, Proceedings of the PTRC Summer Annual Meeting, July 8-11, 1975, Warwick University, England.; ACKNOWLEDGMENT: TRRL (IRRD 220766)

46 157189 PEOPLE MOVEMENT FOR DOWNTOWN IMPROVEMENT. Information on the range of pedestrian and transportation

improvements available for the improvement of the downtown movement system is presented. These improvements include simple and low cost innovations such as temporary street closing (closed to vehicles), sidewalk widening, and pedestrian and bus passenger shelters, as well as more expensive propositions. Escalators, elevated skyways or public walkways below street level, and moving walkways for conveying standing or walking passengers in a straight line either level or up a moderate grade are also suggested. Free or reduced fare bus service is appropriate in large business and recreational areas. Traffic lanes along curb or within the center median may be used exclusively by buses or shared with taxis or carpools. Park and ride facilities at the edge of the city center and paratransit services like the jitney and the minibus will also help movement within the CBD. People movers consisting of separated or entrained driverless electric cars (of 6 to 60 passenger capacity) which operate on exclusive guideways, and other fixed guideway systems (aerial tramways, electric trolley buses, Light Rail Transit) are also discussed. The pedestrian mall (closed to vehicles) and transit malls (for exclusive use by transit and pedestrians) are further possible innovations. Examples of the successful use of these improvements are described, and their typical operation, range of capacity and capital, and operation and maintenance costs are summarized.

Urban Mass Transportation Administration
Jan. 1977, 26 pp, Figs., Photos.

46 159598 PUBLIC POLICY AND OPTIMAL TRANSPORTATION PLANNING STRATEGIES. Restrictions on metropolitan core area travel by private vehicles to limit air pollution and to reduce fuel consumption will necessitate extensive programs for change-of-mode facilities on line-haul public transport routes. The parking spaces in the core area must be transferred so as to minimize the total vehicle-kilometers traveled throughout the area subject to technical, public policy, and economic constraints. This creates a need for a master plan that will identify the apportionment and extent of parking and other change-of-mode facilities, including feeder bus service at line-haul public transport routes. This paper briefly describes the salient transportation and parking features in Boston as a background to formulating a generalized public policy and a linear programming approach for the preparation of optimal plans incorporating a defined range of objectives and constraints.

Schoon, JG (Smith (Wilbur) and Associates) Falcocchio, JC Pignataro, LJ McShane, WR (Polytechnic Institute of New York) *Transportation Research Record* No. 614, 1976, pp 14-20, 4 Fig., 6 Tab., 10 Ref.; This article appeared in *TRB Research Record* No. 614, Transit Facility Operation.; ORDER FROM: TRB Publications Off

46 163922 INTERFACING TRANSPORTATION MODES FOR ACCESS TO A CENTRAL BUSINESS DISTRICT (ABRIDGMENT). The objectives of this study were to estimate the desires of travelers in the CBD area of Alexandria, Virginia in relation to the two Metro stations; to investigate various small-scale transit systems that would interface between the primary and access modes, and select a vehicle that is based on the level of demand,

urban design, and operational, environmental, and community acceptance; and to recommend a series of preliminary corridors for the proposed mini transit system. Land use modeling, travel forecasting model, and trip desires relative to the mini transit system were examined. System analysis include urban design and community impact factors, technological analysis, and evaluation criteria. The authors conclude that the range of demand indicates a sufficient number of trips to justify a mini transit system in the CBD of Alexandria; a small fleet of mini buses is well suited to accommodate the peak hour volumes; an elevated guideway would be incompatible with the historic and residential environments; the selection of a minitransit vehicle will give weight to considerations of carport, interior design and the attractiveness of the vehicle as it contributes to the city street scope.

Khasnabis, S (Wayne State University) Joyner, HR (Barton-Aschman Associates, Incorporated) Pickard, JG (Buchanan (Colin) and Partners, England) *Transportation Research Record* No. 619, 1976, pp 1-4, 1 Fig., 6 Ref.; This article appeared in *Transportation Research Record* No. 619, Innovations in Transportation System Planning.; ORDER FROM: TRB Publications Off

46 165219 DOWNTOWN RESIDENTIAL-TRANSPORTATION DEVELOPMENT. A single general equation useful in estimating the residential development potential has been developed. The method relates the road capacity to the residential development. The variables in the road capacity include the percentage of travel during the peak period by both auto and transit, the efficiency of this travel, and the relative effectiveness of each mode. The methodology developed includes a representation of the interaction of the variables used in the estimating equation and the degree of control various agencies exercise over them. The methodology was applied to downtown Vancouver, British Columbia. The results indicate that some of the proposals for residential development in the downtown area may in fact be high.

Navin, FPD (British Columbia University, Canada) *ASCE Journal of the Urban Plan and Develop Div* Proceeding Vol. 103 No. UP1, ASCE 13085, July 1977, pp 91-102; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

46 172158 STREETS FOR PEDESTRIANS AND TRANSIT: EXAMPLES OF TRANSIT MALLS IN THE UNITED STATES. This Transit Malls Site Report is intended to acquaint the planning community with the concept of transit malls and to provide information about several of the most important and interesting transit mall projects to a wider audience. Details of six transit malls are presented, based on interviews, site inspections, and available written data. This report contains the following elements: site descriptions including general geographic and demographic conditions; general traffic/transit characteristics; description of project streets before and after the malls including design characteristics, traffic/transit/pedestrian use, and funding; and project histories. Where available, results such as indicators of transportation service and economic impact are presented. A second report that is more analytical in nature is being prepared. It seeks to quantify the potential benefits and disbenefits of transit malls and

identify the circumstances which justify their construction. /Author/

Koffman, D ; Transportation Systems Center, (UM-727-R-7710) Final Rpt. UMTA-MA-06-0049-7711, Aug. 1977, 181 pp, 45 Fig., 58 Ref.; Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-TSC-1081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-278487/4ST

46 172368 CONGESTED STATE STREET OPTS FOR CONSTRUCTION OF TRANSITWAY MALL. This article describes the planning and development of a Transitway Mall for Chicago's Central Business District. The plan provides for narrowing the existing State Street roadway from six, open-traffic lanes to two exclusive busways. Sidewalks will be broadened to accommodate landscaping, benches, and other amenities. The mall plan is founded on three basic objectives: The improvement of public transportation service in downtown Chicago; the improvement of State Street's pedestrian environment; and, the provision of an economic stimulus to the State Street business community. The Mall, in addition to providing a more attractive shopping environment and an increase in sales, will also be affected by the construction of new residential projects designed to revitalize and repopulate the city's CBD, the construction of new office buildings will increase the number of individuals working downtown who would patronize downtown stores, and the increasing emphasis placed on convention and tourism business in the CBD could mean more evening activity downtown. The Nicollet Mall in downtown Minneapolis is cited as an outstanding example of a mall that has worked. It is aesthetically pleasing and has influenced and attracted new investment in the downtown area. It is noted that one of the biggest problems for Chicago will be the diversion of regular traffic now utilizing State Street. To accommodate the necessary altered vehicle patterns, three traffic control measures will be implemented. A computerized traffic signal which will respond to changing volumes of traffic by providing longer green time in the direction of the heavier flow; parking bans on one side of the street, thus increasing the vehicle capacity; and, the implementation of exclusive reverse flow bus lanes.

Midwest Engineer Vol. 30 No. 4, Dec. 1977, pp 3-5, 5 Fig.

46 172921 PRELIMINARY DESIGN STUDY: FIFTH AND SIXTH AVENUES TRANSIT MALL, PORTLAND, OREGON. The project described in this study consists of the preliminary designs of a mass transit mall along 5th and 6th Avenues in downtown Portland, a distance of approximately 11 blocks for each Avenue. The mall is designed to make mass transit an attractive and compelling alternative to the automobile. Almost all buses operating in the downtown area will be routed to and through the transit mall. In addition, the mall is expected to provide convenient transfers between lines and serve as a link between suburban transit stations, shuttle buses, inter-city buses and, heavy and light rail transportation. Included in this study are construction cost estimates, preliminary engineering design plans, traffic design plans, landscape architecture designs, traffic improvement plans, an environmental impact analysis.

Skidmore, Owings & Merrill Architects, Halprin (Lawrence) & Associates, Moffat, Nichol & Bonney Engineers UMTA-IT-09-0022, Aug. 1974, 107 pp, 67 Fig., 1 App.; Prepared for Tri-County Metropolitan Transportation District of Oregon. Funding assistance provided by DOT, Urban Mass Transportation Administration.

46 176458 EFFECTS OF PARKING COSTS ON URBAN TRANSPORT MODAL CHOICE. The effects of parking costs on urban modal choice are investigated by using a standard binary-choice model and estimated by using the logit technique. Previous studies have misspecified the form of the parking-cost variable and the model normally estimated. After estimating the traditional and correctly specified models, the claim that parking taxes are an effective substitute for roadway pricing in influencing congestion is only partially supported. Aggregate elasticities for four policy-oriented variables are calculated. The elasticities provide a measure of the bias from misspecification and indicate the most effective policy variable for the reduction of automobile use. /Author/

Gillen, DW (Alberta University, Canada) *Transportation Research Record* No. 637, 1977, pp 46-51, 2 Tab., 11 Ref.; This article appeared in the Transportation Research Record No. 6737, Forecasting Passenger and Freight Travel.; ORDER FROM: TRB Publications Off

46 176480 SUMMARY OF EXPERIENCE WITH ROAD PRICING. From the standpoint of politically feasible public policy, road pricing currently appears to hold promise not so much as the marginal-cost pricing measure for efficient road use but rather as an automobile-disincentive component of overall transportation improvement programs. Road pricing that levies special charges on low-occupancy vehicles appears to be more effective in improving mobility than other more general changes in prices or taxes. Of several alternative forms of road pricing, the most effective form available today is the use of a supplementary license to enter the zone or travel in the zone. However, actual experience with road pricing in the U.S. is very limited. Proposals have been developed for Caracas, Bristol, London and Singapore and desk studies have taken an in-depth look at planning, marketing, and implementation aspects of road pricing, and have evaluated the impacts of such strategies. Evaluation results from the Bristol study suggest that a cordon-crossing supplementary licensing scheme would be more efficient in achieving the modal shift and increased mobility than areawide licenses, exclusive bus lanes, parking surcharges and parking restrictions. The highly successful Singapore plan includes road pricing and expansion of public transportation. It produces revenues far in excess of the expenditures. In spite of the relatively positive information from abroad, however, it is hazardous to make definitive estimates of the major impacts of road pricing in the American context.

Bhatt, K (Urban Institute) *Transportation Research Board Special Report* No. 181, 1978, pp 26-27; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held

by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

46 176481 CONGESTION PRICING: THE EXAMPLE OF SINGAPORE. The Singapore government has adopted a policy, the short-run objective of which was to relieve congestion in the central city, and the long-run objective, to persuade motorists to reconsider their attitudes toward automobile ownership and use. The policy instrument selected was a form of congestion pricing called area licensing, and its goal was to reduce peak-hour traffic by 25-30%. Underlying the license scheme was the concept that a special supplementary license had to be obtained and displayed if a motorist wished to enter a designated restricted area within which congestion was to be reduced. The first task was to delimit the boundary of the restricted zone; the second, to set the license fee. The license requirement does not apply to buses or commercial vehicles. A park-and-ride scheme was designed to complement the area license scheme. The third element of the scheme was an increase of about 100% in public parking charges within the restricted zone, and a surcharge on private parking lot operators. The monitoring of the impact of the scheme is described as well as the effect on unrestricted traffic. Comments are also made on some of the problems that were encountered in the implementation of the plan. All preliminary observations and analyses indicate that the scheme has been very successful in reducing traffic in restricted zones during hours of restriction. Benefits have accrued to some car drivers, and the administration and enforcement of the scheme has been manageable.

Watson, PL Holland, EP (International Bank for Reconstruction & Development) *Transportation Research Board Special Report* No. 181, 1978, pp 27-30; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

46 176489 IMPLEMENTING A CITY CONGESTION-PRICING DEMONSTRATION: OVERCOMING THE HURDLES. This article highlights some of the ideas for coping with the many concerns of localities with city congestion pricing and making implementation of an UMTA pricing demonstration more likely. Four major points are highlighted. First, the need to recognize that the problems of implementing a congestion-pricing demonstration will not be overcome by continued talk of efficiency, optimization, and maximization of social benefits. Second, a first requirement for the implementation of any pricing scheme is that it attack a problem perceived by motorists and decision makers. Third, the fact that a downtown cordon or areawide scheme

might have disadvantages for business and the poor is one of several adverse effects that need to be recognized and allowed for rather than sidelined. Fourth, unforeseen and unlikely failure and adverse outcomes must be insured against. The author concludes that analysts, economists, and program managers need to be aware of the policies of implementation as well as the policies of pricing in particular. Decision makers need to be queried on what trade-offs should enter into the discussion of a pricing demonstration to make such a demonstration likely. Lastly, UMTA should be prepared to institute short-term renewable contracts for demonstrations, share veto control over certain project variables with the sponsor, and develop policies with sponsors to ensure against possible failures and adverse outcomes.

Higgins, T, Public Policy Analyst *Transportation Research Board Special Report* No. 181, 1978, pp 52-54, 1 Ref.; This paper appeared in Transportation Research Board Special Report No. 181, Urban Transportation Economics. It contains proceedings of Five Workshops on Pricing Alternatives, Economic Regulations, Labor Issues, Marketing, and Government Financing Responsibilities held by Transportation Research Board. Sponsored by Office of the Secretary, Federal Highway Administration, and Urban Mass Transportation Administration of DOT; Environmental Protection Agency; and Federal Energy Administration.; ORDER FROM: TRB Publications Off

46 177150 AUTO RESTRICTED ZONES--BACKGROUND AND FEASIBILITY. This report was prepared as part of the Auto Restricted Zone/Multi-User Vehicle Systems Study of the Service and Methods Demonstration Program of the Urban Mass Transportation Administration. The purpose of the study is to (1) investigate existing experience with auto restricted zones and multi-user vehicle systems, (2) evaluate their feasibility as concepts applicable to urban transportation systems, (3) identify and evaluate potential sites for demonstration, and (4) design demonstration programs. This volume examines the concept of auto restriction, investigates its application in both Europe and the U.S. Auto restricted zones were found to be feasible for application to U.S. cities, and a number of key factors were identified in their successful implementation. /UMTA/

Herald, WS; Voorhees (Alan M) and Associates, Incorporated Final Rpt. UMTA-VA-06-0042-78-1, Dec. 1977, 88 pp, 11 Fig., 12 Tab., 2 App.; Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-TSC-1057; ORDER FROM: NTIS

46 178321 AUTO RESTRICTED ZONES: PLANS FOR FIVE CITIES--BOSTON, BURLINGTON, MEMPHIS, PROVIDENCE AND TUCSON. This volume documents Auto Restricted Zone (ARZ) demonstration program designs for five selected cities: Boston, Mass; Burlington, Vt.; Providence, R.I.; Memphis, Tenn.; and Tucson, Ariz. Plans were drawn up in response to the specific characteristics of a given city. These plans illustrate the adaptability of the ARZ concept to different conditions and support the conclusion that city size is not critical to ARZ success and that complete prohibition of traffic is not the only option. The emphasis in these

proposals is primarily on enhancement of existing auto restricted areas through improvement of public transit and extension of pedestrian malls.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated Final Rpt. UMTA-VA-06-0042-78-3, Dec. 1977, 245 pp, 87 Fig., 22 Tab.

Sponsored by DOT, Urban Mass Transportation Administration.; Contract DOT-TSC-1057; ORDER FROM: NTIS

46 179090 ACTIONS TO REDUCE VEHICLE USE IN CONGESTED AREAS. Federal TSM guidelines are used as a basis for four broad groups of measures for reducing vehicle use in congested areas. Within each group, examples of specific measures now in use or planned for implementation are presented. These are classified according to their important operational features; their advantages and problems are discussed. The four groups are (a) voluntary measures to increase vehicle occupancy, such as single-destination or regionwide car pooling, subscription buses, van pooling, and shared-ride taxi; (b) pricing mechanisms using supplementary or area licenses, parking surcharges, automatic vehicle identification, on-vehicle meters, and manual toll collection; (c) physical and operational restraint of vehicles by means of complete or partial street closures, traffic cells, traffic signals, and intersection modifications; and (d) peak-hour truck restrictions using permits or vehicle-size limitations. /Author/

Crain, J Glazer, L Higgins, T Koffman, D (Crain and Associates) Ross, D (Daro Associates) *Transportation Research Board Special Report* No. 172, 1977, pp 74-81, 4 Tab., 34 Ref.; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

46 180653 NOTTINGHAM ZONES AND COLLAR STUDY-RESULTS OF THE 'BEFORE' SURVEYS. This report describes the first part of a 'before' and 'after' study which will evaluate the effects of the introduction, in August 1975, of an experimental traffic control scheme in the western sector of the city. It details the measurement techniques used and the results obtained from surveys held in Nottingham during April and May 1975. Similar measurements will be made, during the second part of the study in April and May 1976. The experimental traffic control scheme called 'Zones and Collar', aims to make travel by bus more attractive and to reduce the need for major urban highway construction. Private traffic leaving the residential zones and entering the inner city area will be controlled at locations where buses can be given priority. (Copyright (c) Crown Copyright 1977.)

Layfield, RE Bardsley, MD ; Transport and Road Research Lab., Crowthorne, (England). 43 TRRL-SUPPLEMENTARY-3, 1977, 59p; Also Pub. as ISSN 0305-1315; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279121/8ST

46 183623 CLEARWAYS: THEIR EFFECTS ON TRAFFIC AND TRADERS. This report was submitted in partial fulfillment of the requirements for the graduate diploma in town planning, South Australian Institute of Technology. In order to aid the assessment of the effects of proposed 12-hour clearways on arterial roads in Adelaide, an investigation was made into the customer parking requirements of various types of retail establishment. A questionnaire survey was used to obtain from shopkeepers certain basic data, which were then used to formulate a simple parking demand model. A method was developed to apply the model to real situations, in order to compare parking requirements with parking availability both with and without clearway conditions. The conclusion was reached that on arterial roads with a high level of shopping activity, the imposition of a 12-hour clearway could have serious detrimental effects on traders and on the amenity of areas adjacent to the shopping areas, with little overall benefit to through traffic. However, because of small sample sizes in the original survey the above conclusion should be regarded as indicative only, pending further more detailed research to validate the findings of this study. /TRRL/

Zetlein, LH ; South Australia Highways Department, Australia Monograph Oct. 1977, 68 p., 5 Fig., 11 Tab., 18 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-234163), Australian Road Research Board

46 184073 EFFECTS OF LIMITATIONS IN THE USE OF CARS IN TOWNS ON THE INDUSTRY AND EMPLOYMENT [Effets sur l'industrie et sur l'emploi de la limitation de l'usage de l'automobile dans les villes]. Increased growth in vehicle ownership leads to a reorganization of transport policies, introducing private traffic restraint in urban areas and improvements in public transport. This article studies the possible effects of such measures in the future, and in France on the automobile industry and employment. These effects could influence the demand for new private cars thus bringing changes to the market of public transport vehicles, and to the car manufacturing industry. The latter usually results in modifications in the level of employment. /TRRL/ [French]

Averous, C Godard, X Naessany, S *Transports Urbains* No. 35, Apr. 1976, pp 33-42, 2 Fig., 4 Tab., 10 Phot.; GETUM: Groupement pour l'Etude des Transports Urbains Modernes; ACKNOWLEDGMENT: TRRL (IRRD 105266), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

46 184202 REDUCTIONS IN AUTOMOBILE USE IN FOUR MAJOR CITIES AS A RESULT OF CAR POOLING AND IMPROVED TRANSIT. Voluntary car-pool matching programs and improvements in transit services are two transportation control policies that have received wide support from environmentalists, energy-conservation groups, and the public. This paper presents estimates of how these two policies would affect vehicle kilometers of travel and automobile emissions in Boston, Los Angeles, Chicago, and Washington, D.C. Because the four cities differ widely in terms of their spatial structure and their transportation systems, the estimates should cover the range of impacts expected in many large cities. The results indicate

that car pooling will reduce vehicle kilometers of travel and automobile emissions by roughly 0.1 percent if pessimistic responses to employer-based car-pool matching programs are used and by as much as 1.5 percent if optimistic levels of participation are used. Improvement in transit performance, represented as a 20 percent reduction in travel time, is projected to reduce vehicle kilometers of travel by 0.5 to 1 percent and automobile emissions somewhat less. Crude cost-effectiveness analyses suggest that voluntary employer-based car-pool matching programs are attractive even if they only reduce vehicle kilometers of travel by 0.1 or 0.2 percent. The costs of improved transit service are difficult to estimate, but some bus-lane proposals are likely to be cost effective. However, savings that result from reductions in vehicle kilometers of travel attributable to improved transit performance are unlikely to justify investments in fixed-rail systems. /Author/

Ingram, GK (Harvard University) *Transportation Research Record* No. 650, 1977, pp 59-66, 1 Fig., 8 Tab., 10 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

46 184333 PATTERNS OF CAR USAGE AND RESTRAINT MODELLING. Transport demand forecasting procedures have traditionally employed household based modal split models implicitly assuming a selection of mode for each trip based on relative generalised cost. A detailed examination of the trip patterns of a sample of household in West Yorkshire shows that in fact there is little discretionary choice of public transport; public transport trips in car owning households generally being explained in terms of the specific unavailability of the car for such trips. Two versions of a category analysis model for modal split are based on this observation and applied to household data for Glamorgan and Monmouthshire to show that such a procedure is workable and produces results comparing favourably with traditional approaches. The likely implications of three types of restraint policy are examined and it is concluded that the existing interdependence in trip patterns and modal choice within the household is of great significance in determining their effects. In particular it appears that positive attempts to increase vehicle occupancy at the peak are likely to be more favourable to public transport finances than the more negative policies to restrain use of the car for journey to work, or second car ownership. /Author/TRRL/

Gwilliam, KM Banister, DJ *Transportation (Netherlands)* Vol. 6 No. 4, Dec. 1977, pp 345-363, 8 Tab., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233287)

46 184409 TRAFFIC ASPECTS OF PEDESTRIAN MALLS AND PEDESTRIAN MALLS SEMINAR REPORT. The conversion of existing streets into pedestrian shopping precincts, and the construction of regional shopping malls, both require consideration of and design for traffic movements in the area surrounding the mall. Traffic destined for the mall, as well as through traffic, must be catered for in a manner that provides for ease and safety of movement and retention of the opportunities of mobility and

access afforded by the automobile. Care should be taken that the formation of a pedestrian shopping precinct, or the construction of a regional shopping mall, does not reduce the accident record at the site of the new mall at the expense of increasing the accident record at another location. Not only is the design for automobile movements important in the development of a pedestrian mall, but also other traffic aspects such as the provision for public transport, the construction of satisfactory parking, the requirements of service and emergency vehicles and, most importantly, the safe and efficient movement of pedestrians must be considered. Case studies provide examples of the effectiveness of existing malls and highlight some of the features which should be considered at the design stage.(a) /TRRL/

Tuohey, GJ ; National Roads Board, New Zealand Monograph 1978, 44 pp, Figs.; ACKNOWLEDGMENT: TRRL (IRRD-232901)

46 186086 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. VOLUME I. AUTO RESTRICTED ZONES: BACKGROUND AND FEASIBILITY. The general goals of such zones are to preserve and enhance the attractiveness and vitality of urban centers, to improve environmental quality of urban areas, and to encourage increased utilization of non-auto modes of transport. The underlying characteristic of an auto restricted zone (ARZ) as discussed in this study is that of a district or zone distinguished by a higher degree of control over vehicular traffic than the surrounding area. The report discusses techniques for ARZ which have been identified and categorized as physical, operational, economic, and regulatory control measures. The investigation of existing experience with ARZ focuses on U.S. cities and on European cities where the concept is most advanced, such as in Copenhagen, Amsterdam and Vienna, and discusses its similarities and differences. The investigation indicated that there are substantial opportunities for ARZ in American cities. A number of key factors are identified for its successful implementation, such as urban activity patterns, urban design issues, transportation infrastructure, accessibility maintenance, ARZ size, transportation policy impacts, and institutional and legal factors. The report contains Appendix A: 'Bibliography' and Appendix B: 'Characteristics of Pedestrian Areas in European Cities'.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Header Architects, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-1, Dec. 1977, 130 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., and Moore-Header Architects, Cambridge, MA. See also Volume 2, PB-286314. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286313/2ST

46 186087 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. VOLUME II. MULTI-USER VEHICLE SYSTEMS: FEASIBILITY ASSESSMENT. Volume II documents the results of an investigation into the feasibility of Multi-User Vehicle Systems (MUVS) as a mode of urban transportation and which is often suggested as one solution to the

problem of transportation within congested urban areas. A review of existing experience, an examination of key factors, and an assessment of MUVS feasibility was conducted as the first stage in a potentially in-depth research and experimental effort. MUVS is a paratransit mode of transportation which consists of a fleet of small user-operated vehicles available for rental between terminals within a well-defined service area. Although this study considered a wide array of potential vehicles, the basic concept examined herein is similar to the various short-term rental cars. The goals and objectives of MUVS are to: (1) alleviate congestion and improve traffic flow; (2) increase mobility; (3) provide an additional choice of mode; (4) reduce air pollution from vehicle emissions; (5) reduce noise; (6) conserve energy; and (7) reduce land requirements for parking. A detailed examination of a MUVS as a Central Business District (CBD) circulation service in Amsterdam and in Montpellier, France is presented. Various characteristics of each system are identified and compared.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Header Architects, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-2, Dec. 1977, 105 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA. See also Volume 1, PB-286313, and Volume 3, PB-286315. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286314/0ST

46 186088 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. VOLUME III. AUTO RESTRICTED ZONES: PLANS FOR FIVE CITIES. The report discusses the application of some of the auto restricted zones (ARZ) techniques to downtown areas of five U.S. cities: Boston; Burlington; Memphis; Providence; and Tucson. While these cities were not selected as being representative samples of American cities, they do cover a wide range of sizes and conditions and have many characteristics which are shared by other cities. This shows the adaptability of the ARZ concept to different conditions and reinforces the conclusion that city size is not critical to ARZ success and that complete prohibition of traffic is not the only option. In each city, the approach of the ARZ planning team was keyed to local plans and problems. Emphasis was on tailoring an ARZ plan to each specific urban environment rather than imposing a preselected strategy. The process began with a systematic examination of the existing downtown infrastructure and current plans and projects already underway were also assessed for impact toward ARZ planning.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Header Architects, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-3, Dec. 1977, 257 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., and Moore-Header Architects, Cambridge, MA. See also Volume 2, PB-286314, and Volume 4, PB-286316. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286315/7ST

46 186089 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. VOLUME IV. SITE SELECTION METHODOLOGY. Volume IV presents methodology followed in the selection of sites for auto restricted zones (ARZ) demonstrations. Of more than 75 applicants, five cities were selected for participation: Boston; Burlington; Memphis; Providence; and Tucson. The report includes the design of site specific programs to demonstrate this methodology in the five selected cities. The program was structured into seven major work elements which are outlined in the study. In the review process for each city, indicators of past performance, present commitment, future planning in institutional performance, transportation factors, and urban form and opportunities were examined. Six basic criteria were submitted to each city and are presented in this report.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Header Architects, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-4, Dec. 1977, 72 p.; Prepared in cooperation with Cambridge Systematics, Inc. MA., and Moore-Header Architects, Cambridge, MA. See also Volume 3, PB-286315, and PB-286317. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286316/5ST

46 186090 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. TECHNICAL APPENDIX: BOSTON AUTO RESTRICTED ZONE STUDY. The report examines a proposal for an auto restricted zone (ARZ) and revised circulation patterns in downtown Boston. In the City of Boston, the main problems can be summarized as congestion, conflict of pedestrian and traffic, and confusion, rather than a lack of basic vitality. This study seeks to remedy the current imbalance of pedestrian versus auto use, and to reduce the prevailing congestion in the older downtown. The objective is not to eliminate vehicles, but to promote a more appropriate balance in the use of public spaces, which would enhance the long-range economic future as well as the environment of the downtown area. The need to eliminate these problems, to create an appropriate environment for the existing or potential activities, and to improve connections among major activity areas are the basic factors for an Urban Design Plan. The goal for undertaking this proposed ARZ plan is to encourage the continued physical and economic revitalization of downtown Boston.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Header Architects, Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-5, Dec. 1977, 155 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., Moore-Header Architects, Cambridge, MA., and Kearney (A. T.), Inc., Chicago, IL. See also PB-286316, and PB-286318. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286317/3ST

46 186091 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. TECHNICAL APPENDIX: BURLINGTON AUTO RESTRICTED ZONE STUDY. The report examines a proposal for an auto restricted zone (ARZ) for the City of Burlington. The City is faced with increased competition from a proposal for a major suburban shopping mall, as well as internal competition from a recently completed shopping arcade in the downtown area. Such competition pressure has been a primary incentive for local efforts to improve the character of the existing downtown retail area through auto restriction and pedestrian improvements. The increases in the economic health of the City have also created strong pressures for physical change and for improving the quality of public space. This concern has culminated in the current proposal for construction of a 4-block pedestrian mall. A further issue facing the City is the quality of transit facilities in the downtown. Several of Burlington's earlier Urban Design Plans now comprise the main urban design components of the proposed ARZ plan. Four existing characteristics were assessed to test potential of an ARZ. The Urban Design Plan consists of two elements: a circulation framework and a street improvement program. These elements are described in detail in the text.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Heder Architects, Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-6, Dec. 1977, 128 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., Moore-Heder Architects, Cambridge, MA., and Kearney (A. T.), Inc., Chicago, IL. See also PB-283317, and PB-286319. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286318/1ST

46 186092 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. TECHNICAL APPENDIX: MEMPHIS AUTO RESTRICTED ZONE STUDY. The report presents analysis, data and supplementary information developed in the preparation of the Memphis auto restricted zone (ARZ) Demonstration Plan. The general approach of the ARZ study has centered on the identification and development of opportunities existing in U.S. cities for a reorientation to transit and pedestrian travel. Much of that opportunity is defined by characteristics of the vehicular and pedestrian networks and the traffic that uses them. The circulation framework that is eventually developed as a principal element of the ARZ plan requires coordination in the reallocation of street space among transit riders, pedestrians, auto users, and goods movements. The approach taken in planning the circulation framework for the Memphis ARZ was somewhat different than that used in the other cities. Memphis had recently implemented a major change in its downtown circulation system by closing ten blocks and creating the Mid-America Mall. The Mall is active at midday during the week, but the evenings and weekends are quiet. Given the density, auto orientation, and customary use patterns of its citizens, the downtown is not likely to benefit from major street closings or changes

in traffic patterns. However, selective and modest additions could extend the Mall to a larger district, provide better facilities for the now disadvantaged transit riders, and encourage development projects that could improve street environment and support conversion of now-vacant buildings.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Heder Architects, Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-7, Dec. 1977, 184 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., Moore-Heder Architects, Cambridge, MA., and Kearney (A. T.), Inc., Chicago, IL. See also PB-286318, and PB-283320. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286319/9ST

46 186093 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. TECHNICAL APPENDIX: PROVIDENCE AUTO RESTRICTED ZONE STUDY. The report presents technical analysis, data and supplementary information developed in the preparation of the Providence auto restricted zone (ARZ) demonstration plan. Several existing urban design factors are critical to assess the potential for an ARZ in Providence: pedestrian environment; connections between downtown districts; quality of transit environment; historical quality and development potential; quality of economic environment; and management of public spaces. These issues are discussed in the text and the urban design proposals address these as problems that the ARZ should help resolve. The city built a shopping mall, which was intended to compete with the increasing number of suburban shopping centers and to reestablish the downtown as the activity center of the city. However, while pedestrian volumes still remain high, several stores on the mall have closed. This trend suggests that the downtown may need solutions other than just pedestrianization. Several plans and developments that relate to the ARZ study have been proposed or are being prepared. The city has advanced proposals to expand the mall along with a major rehabilitation of its existing ARZ. This report addresses these proposals and the feasibility of creating a major expanded ARZ in the downtown.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Heder Architects, Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-8, Dec. 1977, 207 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., Moore-Heder Architects, Cambridge, MA., and Kearney (A. T.), Inc., Chicago, IL. See also PB-286321. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286320/7ST

46 186094 AUTO RESTRICTED ZONE/MULTI-USER VEHICLE SYSTEM STUDY. TECHNICAL APPENDIX: TUCSON AUTO RESTRICTED ZONE STUDY. The report examines a proposal for the preparation of an auto

restricted zone (ARZ) in Tucson. In order to revitalize the downtown, the City plans include reinforcement of the public transit system, construction of a major private office building and a public library, studies for rehabilitation of in-town historic residential neighborhoods, and attempts to attract new residential development downtown. The revitalization has made considerable progress, but has not yet succeeded in the critical area of attracting people downtown or keeping workers there for other activities. The government center and the financial district are active during the work day, but are deserted in the evenings; the new Civic Center is underused; and the shopping areas are declining. In considering an ARZ for Tucson, the main questions that had to be answered were whether it could help in overcoming downtown's negative image, in attracting and keeping people there, in unifying and clarifying the new and old districts, and in creating economic activity.

Herald, WS ; Voorhees (Alan M) and Associates, Incorporated, Cambridge Systematics, Incorporated, Moore-Heder Architects, Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-VA-06-0042-78-9, Dec. 1977, 162 p.; Prepared in cooperation with Cambridge Systematics, Inc., MA., Moore-Heder Architects, Cambridge, MA., and Kearney (A. T.), Inc., Chicago, IL. See also Volume 1, PB-286313, and PB-286320. Also available in set of 9 reports PC E20, PB-286 312-SET.; Contract DOT-TSC-1057; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-286321/5ST

46 188001 AUTO RESTRICTED ZONES FOR NORTH AMERICAN CITIES. Concept plans have been developed for auto restricted zones (ARZ) in five cities, and one or more demonstrations will soon be implemented. Impetus for development of an ARZ arises from inefficient use of street space, environmental considerations and concern for pedestrians. Each ARZ must be individually designed. No one pattern will fit all sites. Key design factors are activity within the area, the intrinsic attractiveness of the area, transit service, parking policies, size of the area, maintenance of accessibility, the street pattern, institutional inclination and coordination with areawide transportation systems management strategies.

Spielberg, F ; Institute of Transportation Engineers 1977; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977. 711B (ARZ) in five cities, and one or more demonstrations will; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

46 188005 EFFECTIVE LOW COST TRAFFIC ENGINEERING. The City of Hamilton, Ontario, Canada, has implemented transportation policies of low cost with dramatic results in accident reduction for pedestrians and vehicles, increased speed of vehicular flow, increased capacity for some arterial streets, and reduction of vehicular stops. Two major policies were adopted in traffic operations. The first covered the development of an extensive one-way arterial street system, covering the Central Business District and surrounding residential areas and a major industrial area. The second significant policy was

in parking regulations. The two policies have been accepted by the decision makers many years ago and are supported by evidence documented from time to time, to indicate the value of such traffic engineering techniques, together with dramatic and visual results on the streets recognized by the citizens themselves.

Desjardins, RJ ; Institute of Transportation Engineers 1977, pp 648-660; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

46 188020 TRAFFIC ZONE SYSTEM IN THE CITY CORE OF GOTHENBURG, SWEDEN. The paper discusses a case history in solving a problem to minimize the traffic on the streets and plan for well situated parking facilities. The CBD was divided in five zones. Each one has its own enter-and exit connection to the ringroad. There are no connections between neighboring zones. All-day-parkers are directed to parking facilities outside the ringroad. Short-time-parking is arranged in parking-houses in each zone, with access direct to the ring-road. Public transport has its own lanes. These lanes are the borderlines between the zones. The solution turned out as estimated. In the hardest loaded street the traffic volume was reduced to 30%. All congestion in CBD-streets disappeared. Carbon monoxide was in several points reduced from 60-70 ppm to 2-5 ppm, measured as a 30-minute value. The noise-level was half of the value before. Traffic-accidents decreased 50% in the CBD and 26% in the ringroad.

Lindqvist, S (Gothenburg Parking Company) ; Institute of Transportation Engineers 1977, pp 53-60; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

46 188021 TRANSPORTATION INNOVATIONS IN CHICAGO'S CENTRAL BUSINESS DISTRICT. The City of Chicago is now in the process of implementing a major anti-pollution and transit improvement program in the City's CBD. An exciting aspect of the current City plan is the nine-block State Street Transit Mall through the heart of the CBD. This Mall will upgrade public transportation by speeding up bus movements, providing bus shelters, and adding escalators to the subway; it will improve the pedestrian environment, and it will provide an economic stimulus to State Street businesses. The on-street parking restrictions required by the EPA Transportation Control Plan will increase the capacity and efficiency of eight east-west streets crossing the Mall and the north-south one-way pair paralleling State Street, thus providing the additional capacity necessary to handle the traffic diverted from the Mall. All of these improvements are tied into a broader overall Central Area plan.

LaPlante, JN (Chicago Bureau of Street Traffic) Institute of Transportation Engineers 1977, pp 611-618; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City,

October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

46 188497 TRAFFIC ASPECTS OF PEDESTRIAN MALLS. The conversion of existing streets into pedestrian shopping precincts, and the construction of regional shopping malls, both require consideration of the design for traffic movement in the area surrounding the mall. Traffic destined for the mall, as well as through traffic, must be catered for in a manner that provides for ease and safety of movement and retention of the opportunities of mobility and access afforded by the automobile. Care should be taken that the formation of a pedestrian shopping precinct, or the construction of a regional shopping mall, does not reduce the accident record at the site of the new mall at the expense of increasing the accident record at another location. Not only is the design for automobile movements important in the development of a pedestrian mall, but also other traffic aspects such as the provision for public transport, the construction of satisfactory parking, the requirements of service and emergency vehicles and, most importantly, the safe and efficient movement of pedestrians must be considered. Case studies provide examples of the effectiveness of existing malls and highlight some of the features which should be considered at the design stage. /Author/

Tuohey, GJ ; National Roads Board, New Zealand RRU Bulletin 36, May 1977, v.p., Figs., 15 Ref., 2 App.; Pedestrian Malls Seminar Report.

46 189551 THE EFFECTS OF PARKING FEES-A RETROSPECTIVE STUDY [Effekter av parkeringsavgifter vid Lunds Universitet-ens efterstudie]. The aim of the study was to evaluate the effects of parking fees on modal choice, car-bicycle and car-public transport. In a preliminary study (see IRRD 236471) a forecast model was developed. This report compares the forecast with results of a subsequent study. The results are as follows: (1) car-bicycle: the results of the second study show a larger reduction of car use than the forecast model except for centrally located buildings. The differences are not significant. (2) car-public transport: the actual results show overall a larger reduction than predicted. The differences are not significant. /TRRL/ [Swedish]

Andersson, B Johansson, I ; Lund University of Technology, Sweden Monograph Bulletin 22, 1978, 39 p., Figs., 10 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236492), National Swedish Road & Traffic Research Institute

46 189604 PRISONERS OF THE MOTORIZED SOCIETY [Bilsambaellets Faangar]. Urban districts will need to be zoned off in the future so as to cut down sharply on the volume of motor traffic. The quantity of cars must be reduced within the neighbourhood so that they can exist side by side with pedestrian traffic and be driven under terms dictated by the pedestrians. On the perimeter streets around these tranquil islands motor traffic should not be accepted on the scale it has been today. Even the main streets have limited "traffic tolerance". It is by defining clear-cut limits for traffic tolerance in the street environment, as well as for the interference of motor traffic with pedestrian and bicycle traffic,

that we can get useful measuring instruments towards transformation of the city's traffic network, which is bound to happen in any case. Although the instruments that must be used are largely provided by traffic legislation and other administrative measures, the potentials of physical planning for controlling land use and the establishment of activities also must be exploited. /TRRL/ [Swedish]

Bluecher, G Carlestam, G *Plan* Vol. 32 No. 4, Sept. 1978, pp 258-69, 14 Fig., 22 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236511), National Swedish Road & Traffic Research Institute

46 191351 CENTRAL AREA AUTO RESTRAINT: A BOSTON CASE STUDY. Convenience, travel patterns, and transportation facilities of the Boston metropolitan area served to elect Boston as a case study for auto restraint schemes. This report analyzes the benefits and costs, and political and administrative feasibility of several measures designed to restrain auto use and reduce traffic congestion in the central area. Specific restraint policies examined herein include: increases in central area parking charges, special area licenses for the use of central area streets, and a small auto-free zone. Applications of these measures during morning, midday, and evening peak periods are considered. All restraint measures produced positive net benefits. The highest net benefits were generated by parking surcharges and area license schemes, with estimated gains of \$15 to \$24 million in 1975 and perhaps a doubling of annual benefits over 10 to 20 years. The optimal parking surcharge or license fee is in the range of \$0.50 to \$1.00 per vehicle, which reduces the number of autos entering Boston's central area by 15 to 35 percent. This report not only provides a summary of the results of both the cost/benefit and travel impact analysis and the political analysis, but also presents recommendations for restraint measures that are both socially beneficial and easily implemented.

Fauth, GR Howitt, AM Gomez-Ibanez, JA Kain, JF Wilkins, HC ; Harvard University, Urban Mass Transportation Administration, (UMTA-MA-11-0007) UMTA-MA-11-0007-79-1, Nov. 1978, 264 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-290913/3ST

46 194618 AN URBAN MASS TRANSPORTATION ADMINISTRATOR'S EXPERIENCE WITH PRICING TO CONTROL TRAFFIC. The presentation provides an overview of UMTA's experiences in implementing roads and parking pricing techniques and describes innovations developed since the start of the program (e.g. corridor, spot and parking pricing). Some existing projects designs underway in various cities are summarized. This presentation also addresses the factor which influence whether or not the public will support these projects' implementation.

Arrillaga, B (Urban Mass Transportation Administration) *Transportation Research Circular* Vol. N No. 05, May 1979, pp 1-3; This paper appeared in Transportation Research Circular No. 205, The Role of Citizens in Implementing Transportation Pricing.; ORDER FROM: TRB Publications Off

46 195077 ANALYSIS OF INTERNAL TRANSIT SYSTEMS REQUIREMENTS FOR CENTRAL CITIES. This paper has two principal objectives. First, it describes an approach entitled Performance Requirements Analysis for developing a set of requirements or standards that a downtown transit system should satisfy and structuring these requirements so as to generate a small set of alternative generic systems for detailed evaluation. Second, it provides a preliminary assessment of performance requirements for distribution systems in 19 of the largest cities in the United States.

Chan, Y (Pennsylvania State University, University Park) Ellis, RH *Transportation Planning and Technology* Vol. 5 No. 1, 1978, pp 1-11, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

46 195512 NOTES ON THE PREPARATION OF PEDESTRIANISATION SCHEMES. Many towns and cities throughout the country have now implemented schemes which wholly or partially close streets or areas to vehicular traffic. This note draws together the experience gained by local authorities in the past five years or so and puts forward ideas that might be helpful to authorities intending to undertake projects of this kind for the first time. Schemes are considered firstly as parts of comprehensive planning, possibly for gradual adoption, secondly as purpose built pedestrian areas and thirdly where there are varying degrees of traffic restraint. Some general points on signing are included and mention is made of special provisions required for e.g. emergency vehicles. /TRRL/

Department of Transport, England, Department of Transport, England Monograph Local Trans Nt 2/78, 1978, 13 p.; ACKNOWLEDGMENT: TRRL (IRRD 240295)

46 197689 STREETS FOR PEDESTRIANS AND TRANSIT: AN EVALUATION OF THREE TRANSIT MALLS IN THE UNITED STATES. The report represents the second phase of a two-phase project designed to acquaint the planning community with the concept of transit malls and to provide information about three of the most important and interesting transit mall projects to a wider audience. The first phase of the study consisted of a site report: *Streets For Pedestrians and Transit: Examples of Transit Malls in the United States* (PB-278 487), which described the characteristics and histories of six transit malls. This second evaluation phase is more analytic in nature and quantifies the benefits and disbenefits of the three major transit malls in Philadelphia, Pennsylvania; in Minneapolis, Minnesota; and in Portland, Oregon. The transit malls in each of these cities was first reviewed in the site report. This evaluation is concerned with the impact of the three malls on pedestrians, on transit service, on excluded or restricted general traffic, and on economic conditions, particularly on retail sales in the immediate vicinity of the mall. This report contains the results of analysis on the following topics: maintenance and construction costs; transit service improvement including bus speed, reliability, coverage, capacity, ridership, productivity, and system understanding; the level of service provided pedestrians and waiting transit patrons; environmental impacts; pedestrian and bicyclist safety; traffic diversion; parking; goods delivery; and economic impacts. This report documents fifteen major conclusions regarding the transit malls.

Edminster, R Koffman, D ; Crain and Associates, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-79-7, Feb. 1979, 255 p.; See also report dated August 1977, PB-278487.; Contract DOT-TSC-1081; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295728/OST

46 260588 A RATIONAL APPROACH TO ROAD CONGESTION AND THE PARKING PROBLEM. A possible method of reducing road congestion by instituting a complex system of parking charges is outlined. sophisticated equipment and administration would be required to ensure that the private motorist pays a realistic parking charge related both to the true value of the land used for parking (assessed by opportunity costing) and to his contribution to local traffic congestion then travelling to and from the car park or roadside parking area. In order to assess the fairest charges consistent with maintaining optimum traffic conditions and to give some attention to the wishes of local traders while obtaining the appropriate revenue associated with the opportunity cost of the parking site, the equipment would have a price adjustment facility so that various schedules could be tried. This type of system would be expected to increase parking charges considerably in some towns so that many private motorists would change to public transport. Thus a fair economic balance between public and private transport would be achieved by ensuring that the car user pays all the costs associated with private motoring.

Marshall, CW *Surveyor-Public Authority Technology* Vol. 142 No. 4248, Nov. 1973, p 40; ACKNOWLEDGMENT: TRRL (IRRD-207679)

46 261400 NEW CONCEPT IN URBAN PARKING. This paper reviews parking policy options for major metropolitan areas as they relate to demonstrated demands, transit-service extensions, and community preferences. It identifies approaches to dealing with community concerns through a participatory process which involves continuous review of alternatives and programs. Attitudes and characteristics of parkers and other downtown travelers in the Boston metropolitan area are related to downtown and transit parking supply and demand. The range of available transportation policy options imply combinations of increased, stabilized, or reduced supply within the city center with complimentary adjustments in transit-related parking.

Schoon, JG Levinson, HS *ASCE Journal of Transportation Engineering* Vol. 100 No. TE3, Proc. Paper 10731, Aug. 1974, pp 611-623

46 261642 ENVIRONMENTAL IMPLICATIONS OF AUTOMOBILE-FREE ZONES. The purpose of this paper is to clarify some of the environmental issues associated with automobile-free zones and to determine whether automobile-free zones can reduce environmental problems. It is designed to give planners an overview of the subject and to suggest some procedures for future studies. Past experience with automobile-free zones has indicated that noise and air pollution are significantly reduced on streets where automobiles are banned. As to the wider, external effect of automobile-free zones, few or no data exist, but an analytical procedure is suggested to assess this effect:

compare trips to a target area, with and without the automobile-free zone, and convert this trip information into pollution-emission data. Although the relationship between automobile-free zones and nonautomobile modes is not certain, it appears that these modes conserve more energy than do automobiles and that they emit lower levels of certain pollutants. To reduce area-wide environmental problems, it is suggested that automobile-free zones be centrally located in relation to market areas and transit systems, that provisions be made to handle re-routed traffic, and that use of nonautomobile modes to automobile-free zones be encouraged.

Lieberman, W (Barton-Aschman Associates, Incorporated) *Transportation Research Record* No. 492, 1974, pp 17-26, 1 Fig., 6 Tab., 14 Ref.; Presented at 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB, Orig. PC

46 261787 PEDESTRIAN STREETS IN CENTRAL COPENHAGEN. This article surveys the effects of the pedestrianisation of several streets in the central business district (CBD) of Copenhagen. Air pollution and noise levels fell, and pedestrian traffic increased. Not all of the former vehicular traffic was diverted to adjacent streets. Rush hour public transport patronage declined, daily patronage less than for the city on a whole. There was a tendency for accidents to shift from the CBD to the surrounding streets. The concluding section examines the future transport strategy for Copenhagen. /TRRL/

Lemberg, K *Ekistics* Vol. 37 No. 219, Feb. 1974, pp 129-133, 3 Fig., 4 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 209545)

46 261991 PEDESTRIAN MALL: ITS ROLE IN REVITALIZATION OF DOWNTOWN AREAS. Overall experience patterns of the 25 permanent pedestrian malls in the U. S. indicate that sales generally increase, some new construction is generated, and property values and subsequent tax revenues to the city have increased over pre-mall levels. A number of key elements in mall development are defined here as the need for adequate off-street parking, workable vehicular patterns around the mall, improved loading facilities, better merchandise and merchandising, and improved public transportation to and within the mall. Surveys of shoppers on the F Street Mall in Washington, D. C. reveal their feelings that shopping on F Street is safer than shopping in other parts of downtown. A pedestrian mall becomes especially worthy of consideration when cities realize that most of their other options for revitalizing their CBDs are becoming foreclosed. /DOT/

Carlson, D Carlson, MRS *Computers and Structures* Vol. 33 No. 5, May 1974, pp 3-9

46 262007 EUROPEAN PRACTICES-WHAT WE CAN LEARN. This paper presents a summary of observations concerning European practices which are pertinent and have potential application in the U.S. to the following four problem areas: (1) parking; (2) traffic restraint; (3) urban development; and (4) public transportation. Because the Europeans have been faced with resource constraints which are only beginning to be addressed in the U.S., it is possible for traffic and transportation engineers to learn from these European approaches to these problems.

Wortman, RH *Arizona Conference on Roads & Streets Proc (22nd) Apr. 1973, pp 1-7*

46 262010 APPROACHES FOR EVALUATING ALTERNATIVE METHODS OF RESTRAINT. This paper examines various methods for restraining city traffic including an electronic point-pricing system; peak and off-peak prices for crossing boundaries of a few large zones; and parking charges, which could be varied according to location and time of day. It is necessary to devise specific design patterns for a particular city and analyze the costs, problems, and performance in a specific network rather than try to choose among different methods of pricing in terms of abstract characteristics. A model similar to those presently in use in traffic and public transport studies is examined in comparison with the performance of other suggested pricing systems. The simulation model would set standard levels and match individual costs with marginal social costs all over the network.

Holland, EP *Transportation Research Record No. 494, 1974, pp 11-14, 2 Ref.; ORDER FROM: TRB, Repr. PC*

46 262501 OECD-STUDY OF TRAFFIC REDUCTION EFFORTS. OECD is currently engaged in a project to reduce the use of private vehicles and in conjunction with this, to improve public transportation. The emphasis will be on better use of existing facilities: e.g. parking restrictions, bus priority and exclusive bus lanes, promotion of car-pools, and encouraging bicycle use. Data from these investigations will be summarized and presented at an Advisory Conference to be held late in 1974.

Department of Housing and Urban Development No. 29, Aug. 1974, p 3; HUD International Information Series.

46 262801 PARKING POLICY AS A TRAFFIC MANAGEMENT TOOL. This paper applies traffic management to planning for parking. Traffic management relies on the interaction of traffic engineering methods, separation of road users, especially pedestrians from vehicles, establishment of public transport priorities and restriction of car parking. These same elements of traffic management must be applied to parking policy. A successful parking policy should consider the conflicting desires of the road users; it should consider parking as part of a complete journey rather than as just a vehicle at rest.

Gould, P (Department of the Environment, England); Planning and Transport Res and Computation Co Ltd July 1974, 12 pp; Presented at the PTRC Summer Annual Meeting, Warwick University, England, 8-12 July 1974.

46 262928 WHY RESTRAIN TRAFFIC? The author puts the case for restraining traffic in town centers, briefly mentioning the main benefits which can be derived from restraint measures, including reduced delays to other road users and to public transport services. The various restraint techniques, such as changes to street network, special licences to enter certain areas, control of parking, and road pricing are summarized and the political significance of such methods is discussed.

Hitchcock, A (Transport and Road Research Laboratory); Organization for Economic Cooperation and Devel, (92-64-11116-6) Conf Paper

1973, pp 22-29, 1 Fig., 2 Ref.; Abstract of Conference is IRRD Abstract No. 2096187.; ACKNOWLEDGMENT: TRRL (IRRD 209619)

46 262930 TECHNIQUES OF IMPROVING URBAN CONDITIONS BY RESTRAINT OF ROAD TRAFFIC. SESSION 2. TRAFFIC PLANS AND NETWORK PLANNING. The papers contained in this session were as follows: How to Improve Urban Traffic Conditions by Restraining Private Traffic-Preference of Public Surface Transport, by Cecilia, F; Historical Centres and Pedestrian Areas, by Sagona, PL; Motor Vehicle Traffic Restraints in Central Copenhagen, by Lemberg, K; Better Traffic Service in the Central Area of "Freie Hansestadt Bremen" as a Result of Traffic Restrictions, by Kurp, A; Some Devices of Urban Traffic Planning for Improving Urban Conditions in Japan, by Niitani, V; The Problems in Big Towns Created by Traffic Increase, by Ozdirim, M; An Effective Bus System, Main Component of a Comprehensive Traffic Plan for Landskrona, Sweden, by Rosen, N; Vehicle Free Zones in City Centres, by Orski, KG.

Cecilia, F (Ministry of Public Works, Italy) Sagona, PL (Automobile Speciale) Lemberg, K (Copenhagen, City of, Denmark) Kurp, A (Freie Hansestadt Bremen) Niitani, V (Tokyo University, Japan) Ozdirim, M (General Directorate of Highways, Turkey) Roscn, N (Trafikplanering AB) Orski, KG (Organization for Economic Cooperation and Devel); Organization for Economic Cooperation and Devel, (92-64-11116-6) Conf Paper 1973, pp 31-78, 7 Fig., 4 Tab., 4 Ref.; In "Proceedings of the Symposium on Techniques of IMPR," 1973.; ACKNOWLEDGMENT: TRRL (IRRD 209620)

46 262935 METHODS OF EVALUATION OF TRAFFIC RESTRAINT TECHNIQUES SIGNALS. In order to determine the "best" level of restraint to achieve optimal use of a given resource, it is necessary to decide on the objective function to be maximized (or minimized). As restraint operates by affecting behavior, such a function must include valuations of the changes in behavior observed. A measure of consumers' surplus must therefore be included and valuations obtained for comfort convenience, and similar variables affecting behavior. This approach to the evaluation of restraint systems is illustrated by two examples: (a) Average link model, in which a homogeneous urban area is represented by the average major road in the area. Total flow of car and bus travelers along this average road is fixed, although present car travelers change their travel mode when relative travel costs alter (due, for example, to introduction of road pricing). All-day travel costs for all travelers and vehicles (cars, buses, taxis and goods vehicles) were obtained and a minimum overall travel cost was computed by optimising items such as bus loadings, bus stop frequency, relative density of bus routes and amounts of private car restraint. The losses in comfort and convenience associated with a switch from car to bus travel are estimated by considering the present situation and then imposing a rising road pricing charge. Using this method of representing comfort and convenience costs, an optimum level of private car restraint was obtained. (b) A network approach—a model designed to reproduce the behavior of travelers

moving over a company network. Here, travelers are offered a choice of routes for a given trip, over roads with widely different characteristics. The pattern of traffic flow produced is therefore a direct consequence of the balance between money time, and distance that the average traveler can be observed to accept. The valuation of any specific fiscal policy is then a matter of applying the charges and tracing the behavioral effects through to the new situation provided.

Wigan, MR Webster, FV Oldfield, RH Barnford, TJ (Transport and Road Research Laboratory); Organization for Economic Cooperation and Devel, (92-64-11116-6) Conf Paper 1973, pp 152-161, 6 Fig.; Proceedings of the Symposium on Techniques of IMPR.; ACKNOWLEDGMENT: TRRL (IRRD 209625)

46 263420 PEDESTRIANISATION IN LEEDS-AN ASSESSMENT. The paper describes how paved pedestrian streets fit into transportation policy for Leeds by providing a comprehensive system of tinted pedestrian ranks through commercial and shopping areas. An assessment is made of the scheme which includes restraint on car use in the central area, and the use of minibuses to link the pedestrian area with the central rail and bus stations. It is concluded that the scheme is successful because of an increase in the popularity of the area indicated by greater pedestrian volumes and increased made.

Wyborn, JH *Institution of Municipal Engineers, Journal of Vol. 100 No. 9, Sept. 1973, pp 253-258, 3 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 208076)*

46 265497 THE EDINBURGH TRANSPORT MODEL. THIS ARTICLE IS CONCERNED WITH THE TRANSPORT MODEL EMPLOYED IN PREPARING THE TRANSPORT PLAN FOR THE CENTRAL AREA OF EDINBURGH WHICH WAS COMPLETED IN OCTOBER 1972. THE AUTHOR DISCUSSES THE REQUIREMENTS OF THE MODEL, WHICH WERE THAT IT SHOULD ALLOW REALISTIC COMPARISONS TO BE MADE BETWEEN DIFFERENT TRANSPORT SYSTEMS WHILE ALLOWING BOTH PEAK AND OFF-PEAK FLOWS, SPEED/FLOW RELATIONSHIPS AND RESTRAINT IN CAR USAGE TO BE STUDIED. A DIAGRAM SHOWS THE ELEMENTS OF THE TRANSPORT MODEL AND FOUR FEATURES OF PARTICULAR INTEREST ARE DESCRIBED IN MORE DETAIL. THESE WERE (1) THE PEAK AND OFF-PEAK TRIP MATRICES WHICH ALLOWED MODIFICATIONS TO PEAK FACTORS ACCORDING TO A NUMBER OF POSSIBLE CHANGES THAT ARE LIKELY TO OCCUR IN THE FUTURE; (2) SPEED/FLOW ADJUSTMENTS AND MULTIPLE ROUTING TECHNIQUES; (3) RESTRAINT ON CAR USAGE BY MEANS OF PARKING CONTROLS; AND (4) ESTIMATES OF DEMAND FOR PARKING DIVIDED INTO DISTANT PARKING AND LOCAL PARKING. THE AUTHOR CONCLUDES BY COMPARING THE TECHNIQUES USED WITH EARLIER STUDIES AND POINTING OUT THAT THE INCLUSION OF OFF-PEAK TRAVEL FACILITIES RESULTED IN A MUCH MORE REALISTIC INTERPRETATION OF THE PROBLEMS TO BE FACED THAN MODELS

STUDYING PEAK PERIOD TRAVEL ALONE.

Foyster, MJ (Freeman Fox and Associates) *Traffic Engineering and Control* Vol. 15 No. 12/1, Apr. 1974, pp 571-574, 3 Fig., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 210255)

46 300076 TRAFFIC AND TRANSPORT IN THE DUTCH TOWN PLANNING [Verkeer en Vervoer in de Nederlandse Stadsplanning]. The different countries have the same problems and solutions. Traffic and transport must not be separated from the other components of urban planning, namely housing, work and amenities. More bicycles and cars are bought in the Netherlands. Bicycles, however, are used less frequently and cars cover shorter distances per year. Cars used to be parked in a higher density. Areas of traffic restraint with motor traffic on surrounding roads are required. Traffic rules are increasingly being broken. Public transport suffers great shortages. The Dutch government is trying to reduce mobility and to promote the bicycle and public transport. /TRRL/ [Dutch]

Vaner, HJB ; Koninklijk Instituut van Ingenieurs 1978, pp 91-101, 2 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 240986), Institute for Road Safety Research

46 300077 TRAFFIC AND TRANSPORT PLANNING IN ANTWERP [Verkeers-en Vervoersplanning te Antwerpen]. During the 19th century Antwerp expanded greatly. Now it is trying to restore, by limitation of parking facilities and traffic, the residential functions of the inner town, which were lost with suburbanization. A circular motorway around the city has improved the traffic circulation, despite some shortcomings. Dispersion of authority makes rational planning difficult. Until recently, there had always been a lack of traffic planning. /TRRL/ [Dutch]

Nys, J ; Koninklijk Instituut van Ingenieurs 1978, pp 7-18; ACKNOWLEDGMENT: TRRL (IRRD 240980), Institute for Road Safety Research

46 300080 TRAFFIC PLANNING ACTIONS IN GOTHENBURG. The traffic zone system, by which the central business area was divided into 5 separate zones, resulted in fewer accidents, noise and air pollution. Regularity in public transport improved and ridership increased. Vehicle volume but also travel speed on the ring road increased. The implementation of the system cost nearly 5.5 million Swedish crowns. The system is to be extended to other parts of the city. Other traffic policy actions concern signalization, retired people, the handicapped and express bus routes. /TRRL/

Refsnes, B ; Koninklijk Instituut van Ingenieurs 1978, pp 59-77, 8 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 240984), Institute for Road Safety Research

46 300082 TRAFFIC PLANNING IN DUSSELDORF [Verkehrsplanung in Duesseldorf]. The population had decreased while the number of commuters increased. The necessary extension of the road network and of parking space in the inner zone will not be made. A dense radial network of railways and underground railways is planned, and car-free pedestrian zones. Apart

from a bus network through it, the outer zone is intended for private transport, with tangential highways and parking space, and conjunctions with the railways. Between these two lies a transitional zone. There has been civil opposition against the building of the eastern tangent. Roads will therefore now be built in such a way that noise and pollution are minimized. /TRRL/ [Dutch]

Meyer, HJ ; Koninklijk Instituut van Ingenieurs 1978, pp 79-89; ACKNOWLEDGMENT: TRRL (IRRD 240985), Institute for Road Safety Research

46 300116 FINDING WAYS OF HOLDING BACK THE TRAFFIC AVALANCHE. The article summarises the findings of the West Yorkshire transportation study. A wide variety of communities and aspects of transportation were studied. The Leeds forecast for the 1990's showed that increased car ownership and centralisation of jobs would cause severe congestion if counteractive measures were not taken. Although the study considered the effect of traffic constraint, car pooling and the staggering of working and school hours, the article compares only the effectiveness of the five main forms of restraint: parking and physical controls, road pricing, cordon pricing and supplementary licensing. The efficiency, practicality and fairness of each restraint mechanism is considered separately and compared with criteria of performance laid down in the article. No one method has a clear advantage over any other. /TRRL/

Coombe, D (Martin and Voorhees Associates) Foyster, M Riley, T (Halcrow, Fox and Associates) *Surveyor - Public Authority Technology* Vol. 152 No. 4513, Dec. 1978, p 18, 1 Tab., 2 Phot., 1 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241064)

46 300117 FIVE MYTHS OF PARKING POLICY. This paper discusses five commonly held myths concerning parking policies in central cities in Australia. 1) parking policies and objectives are articulated in a meaningful way; 2) central city councils have substantial control over the stock of parking spaces; 3) parking costs are high in central cities; 4) acceptable changes to the price and stock of parking spaces can have a significant impact on mode choice; 5) the primacy of the central city can be maintained through the provision of adequate short-term spaces. (A) /TRRL/ Segal, L MacLean, S (Clark (Nicolas) and Associates) ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 274-286, 1 Tab.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979; ACKNOWLEDGMENT: TRRL (IRRD 239197), Australian Road Research Board

46 300742 IMPLEMENTING PACKAGES OF CONGESTION-REDUCING TECHNIQUES. STRATEGIES FOR DEALING WITH INSTITUTIONAL PROBLEMS OF COOPERATIVE PROGRAMS. Institutional problems have been identified as being the most serious obstacles to implementing programs to reduce traffic congestion, reduce air pollution, and conserve energy. This report, therefore, will be of special interest to transportation professionals and administrators, at all levels of government, who are attempting to implement programs to

meet these goals. Institutional barriers to cooperative programs for implementing complex packages of congestion-reducing techniques are identified. Incentives and penalties are suggested to obtain essential participation of existing institutions. Peak-period traffic congestion continues to be a widespread urban transportation problem despite the availability of technologically feasible solutions. Research reported in NCHRP Report 169 revealed that the most effective congestion-reducing (C-R) programs were those combining several of these techniques into coordinated implementation packages. These packages, designated by the names of their primary techniques, were (1) Changes in Work Hours, (2) Pricing Techniques, (3) Restriction of Access, (4) Changes in Land Use, (5) Prearranged Ride Sharing, (6) Communications Substitutes for Travel, (7) Traffic Engineering, and (8) Transit Treatment. Implementing these C-R packages and similar packages to obtain compliance with the Clean Air Act Amendments of 1977 calls for the cooperation of a number of independent public agencies and private organizations. Barriers to such cooperation are vested interests, inadequate funds, legal and regulatory constraints, and failure to provide an effective organizational structure for joint implementation. The research agency, Remak/Rosenbloom, documented experiences of 18 cities in carrying out joint-agency transportation projects. In addition, case studies in Jacksonville, Seattle, Houston, and Dallas were conducted. Institutional problems found were grouped into three categories as they relate to (1) individual techniques selected for the package, (2) needs to coordinate activities of independent agencies, and (3) site-related problems. Findings and recommendations in the form of incentives and penalties are presented in tabular form for respective techniques in category 1. For categories 2 and 3, general guidelines are presented. An example application of these results to a metropolitan planning organization is provided. /Author/

Remak, R Rosenbloom, S (Remak/Rosenbloom) *NCHRP Report* No. 205, June 1979, 128 p., Figs., Tabs., Refs., 3 App.; ORDER FROM: TRB Publications Off

46 300755 FLEXIBLE WORKING HOURS AND ITS EFFECT ON COMMUTING PATTERNS. The development of flexible working hours in the Public Service, the Post Office and private industry within Wellington City is reviewed. The effect flexible working hours had on the commuting patterns of employees from two Government Departments was analysed from information given in two questionnaires. It was found that the resulting shifts in working hours tended to decrease the number travelling to and from work at times when the roads were congested. An increase in private transport (car passengers and drivers) at the expense of public transport (buses and trains) was also noted. /Author/

Jacket, MJ ; Ministry of Transport, New Zealand *Traffic Res Rpt* 19, 1978, 15 p., 4 Fig., 4 Tab., 3 Fig., 2 App.

46 302110 AUTO-USE DISINCENTIVES. Reduction of automobile use in urban transportation is an important measure in improving urban environments. This study attempts to identify and

provide guide-lines for politically feasible measures termed auto-use disincentives. The objective of such measures is not to ban people from using private cars, but rather to persuade them to use more efficient and less environmentally-detrimental forms of transport whenever possible. In this report, a select group of disincentive measures, which have either experienced the most success or shown great potential, are analyzed. The group is divided into five categories: Exclusive Lanes (transit and carpool); Other Preferential Treatment (including ramp metering, toll treatment, and signal preemption); Traffic Re-Direction; Auto-Free Zones and Streets; and Pricing Disincentives. In each of these five discussed areas of auto-use disincentives, planning and design guidelines for the included measures are outlined and explained. This paper also presents case study reviews for the five major topics. Within each case study review, the procedures contributing to the success of the particular project are highlighted. A number of applications of these auto-use disincentive measures are presented, evaluated, and their applicability to different conditions and coordination with other Transportation System Management (TSM) measures are discussed. Data sources for this report include journals, reports, dissertations, and books from various libraries. This report provides a list of available material on the subject, as well as a description of references actually used for this report.

Dunlay, WJ Soyk, TJ ; Pennsylvania University, Philadelphia, (PA-11-0016) Final Rpt. UMTA-PA-11-0016-79-2, Oct. 1978, 174 p.; ORDER FROM: NTIS; PB-299597

46 302253 SIMPLIFIED AIDS FOR TRANSPORTATION ANALYSIS: FRINGE PARKING SITE REQUIREMENTS. VOLUME 6. This is one of a series of six reports describing simplified aids to improve transportation decisions without resorting to computers or extensive data collection. In January 1976, the U.S. Department of Transportation issued Technical Notice DOT-1-76 requesting transportation planners, engineers, and transit operators to submit useful, but not widely known manual techniques that could be developed and distributed as simplified aids for transportation analysis. Over 70 analytical aids were submitted in response to this request. Based on an evaluation process conducted to determine the most useful, easily applied, and generally applicable techniques, several of these analytical aids have been selected and documented in sufficient detail to permit their immediate use. In addition to these techniques, three additional analytical aids were developed as part of the Short Range Transportation Planning project, and an annotated bibliography of each analytical aid reviewed was prepared. These individual analytical aids and the annotated bibliography have been prepared as separate technical reports and have been brought together in this Manual of Simplified Aids for Transportation Analysis. The analytical aid described in this report provides a method to: 1) identify candidate sites for change-of-mode fringe parking facilities; 2) estimate specific parking facility requirements at these candidate sites; and 3) estimate highway access requirements for the sites. Because the intent of this report is to provide a simplified analysis aid, modifications, embellishments, and improvements to the suggested procedures and models are encouraged should local data or

previous analyses suggest a more appropriate method.

Peat, Marwick, Mitchell and Company, Urban Mass Transportation Administration, (UTP.PMM.77.1.1) Final Rpt. UMTA-IT-06-9020-79-6, Jan. 1979, 64 p.; Contract DOT-UT-50021; ORDER FROM: NTIS; PB-299985/AS

46 302266 PARKING POLICY AS A TRANSPORTATION SYSTEM MANAGEMENT MEASURE. In many cities, parking is considered as an independent component of the transportation system, and often without public control. With the increasing need to treat transportation in cities as one system, which is the basic rationale for Transportation System Management (TSM), parking emerges as a very important system component, since it can be used effectively for influencing travel patterns and for restraining automobile use, particularly in congested areas. The main purposes of this study are: 1) to show that parking policy represents a potentially effective tool for regulation of urban transportation under the TSM program; 2) to define the relationship between the parking policy with other complementary or alternative TSM measures; 3) to present and evaluate various aspects of a parking policy and illustrating these by various applications in different cities; and 4) to recommend the potential parking policies which cities can apply as a part of their TSM Measures. This study presents different types of parking restraints in the forms of regulatory measures, limits on parking supply, and pricing. Applicability and effectiveness of each measure is discussed. Groups affected, whether positively or negatively, by various parking measures are defined. Experiments undertaken in several cities with different types of parking regulations and pricing are described. The report recommends that parking be included in analyses and planning of urban transportation systems and used as a very effective tool of traffic regulation, modal split change, and improvements of both urban travel conditions and urban environment in general. (UMTA)

Vuchic, VR Hessami, MS ; Pennsylvania University, Philadelphia, Urban Mass Transportation Administration Final Rpt. UMTA-PA-11-0016-79-1, Aug. 1978, 75 p.; Contract PA-11-0016; ORDER FROM: NTIS; PB-299515/AS

46 304234 EFFECTS OF TRANSPORTATION ON THE COMMUNITY. Contents: Public attitudes toward automobile-restricted streets in Philadelphia and Trenton; Density as a determinant of highway impacts; Attraction of interstate radial freeway corridors for new office sites; Neighborhood quality-of-life indicator model for highway impact assessment; Applications of variable work hours in the Twin Cities metropolitan area; Analytical process for coupling economic development with multimodal and intermodal transportation improvements; Regulatory implications of individual reactions to road traffic noise; Effectiveness of shielding in reducing adverse impacts of highway traffic noise; and Effects of highway noise on residential property values.

Loukissas, PJ Gancarz, R Chernoff, M Frost, M Ludwig, AK ; Transportation Research Board, Washington, DC. TRB/TRR-686, 1978, 48p; Paper copy also available from Transportation

Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418, PC\$3.00.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298099/3ST

46 304236 URBAN SYSTEM OPERATION AND FREEWAYS. Contents: Alternative objectives in arterial-traffic management; Optimization of large traffic systems; Public reaction to priority lane for buses and car pools in Miami; Role of parking in transportation system management; Freeway incident-detection algorithms based on decision trees with states; Field evaluation of messages for real-time diversion of freeway traffic for special events; Analysis of driver responses to point diversion for special events; Incident detection--A Bayesian approach; Distance requirements for frontage-road ramps to cross streets--Urban freeway design; Stimulus-response lane-changing model at freeway lane drops; Stimulus-response lane-changing model at freeway lane drops; Derivation of freeway speed profiles from point surveillance data; Development of efficient procedure for recreating and analyzing traffic flow patterns on urban freeways; Application of freeway-corridor assignment and control model; Queen Elizabeth Way freeway surveillance and control system demonstration project; Evaluation of reduction in minimum occupancy for car pools that use a priority freeway lane; Methodology for evaluation of alternative low-cost freeway-incident management techniques; Traffic-condition grade--evaluation of concept; and Predicting effectiveness of transportation system management measures.

Jovanis, PP May, AD Gershwin, SB Ross, P Gartner, N ; Transportation Research Board, Washington, DC. TRB/TRR-682, 1978, 121p; Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418, PC\$6.40.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-298101/7ST

46 308023 WORKSHOP ON AREA TRAFFIC CONTROL. BRISBANE, AUGUST 1978. PROCEEDINGS. This report contains the papers presented at and discussion record of a workshop on area traffic control held in Brisbane in August 1978 as part of the 9th ARRB Conference. The theme was devoted to current problems and research priorities in ATC. Amongst the topics discussed were: the merits of the Sydney Co-ordinated Adoptive Traffic (SCAT) system; the need for on-line measurement of effectiveness; the importance of catering for various road user groups; the use of transit as an evaluation tool with user-defined performance indices; and a discussion of modern traffic control equipment and application in an ATC system to be installed in Manila. It was recognised that there is a need for a second appraisal of scat's improvement over a fixed-time control system on a grid type network. Priority should be given to research in the feedback of traffic flow information through vehicle detectors to a central site for accurate monitoring and improvement of the performance of an ATC system. (TRRL)

Luk, JYK, Editor ; Australian Road Research Board Monograph ARR No. 92, May 1979, 118 p.; Proceedings from Workshop on Area Traffic Control, Brisbane, August 1978.; ACKNOWLEDGMENT: TRRL (IRRD 239301)

46 308063 TRAFFIC CONTROL-OBJECTIVES AND METHODS. The history of traffic management is briefly reviewed, the currently available facilities are listed and ways in which they may be used to achieve particular objectives are described. The objectives of urban traffic control are to reduce journey time, improve utilization of the road network, minimize waste of energy resources, reduce pollution and improve safety. The coordination of traffic signals is discussed and details of the following are briefly reviewed: real-time or predetermined modes of control, central compiler or hierarchical systems, pedestrians and bicycle problems, priority to public transport and emergency service vehicles, and special programs for congestion. An assessment of urban traffic control systems in Great Britain is summarized. Other control systems outlined have included broadcasting, route guidance, and safety measures. Restraint of access to urban areas is also discussed and include physical restraint, parking restraint, and fiscal restraint.

Permanent International Association of Road Congr Sept. 1979, pp 35-51; Technical Committee Report on Roads in Urban Areas presented at the 16th World Road Congress held in Vienna, September 16-21, 1979.

46 308085 CONSUMER PREFERENCES RELATIVE TO THE PRICE AND NETWORK CAPABILITY OF SMALL URBAN VEHICLES. Preferences of consumers for small urban vehicle concepts differing only with respect to their hypothetical purchase prices and network capabilities (i.e., whether they are capable of operating on expressways, major arterials or local streets) are analyzed using statistical techniques based on psychological scaling theories. Results from these analyses indicate that a vast majority of consumers are not readily willing to give up the accessibility provided by conventional automobiles. More specifically, over the range of hypothetical prices considered here, network capability dominates as a determinant of preferences for vehicle concepts. Also, the ability to operate vehicles on expressways is of utmost importance to consumers. (Transportation)

Burns, LD (General Motors Research Laboratories) *Transportation (Netherlands)* Vol. 8 No. 3, Sept. 1979, pp 219-236, 10 Tab., 3 Ref.

46 308580 EMPIRICAL ANALYSIS OF THE INTER DEPENDENCE OF PARKING RESTRICTIONS AND MODAL USE. The relation between modal use and parking restrictions was analyzed by examining changes in travel behavior over time during a period of substantial change in parking restrictions, transit service, and transit fares. The situation examined was choice of travel modes to a major trip generator, the campus of the University of Wisconsin-Milwaukee. This area has major parking-congestion problems that have been partially alleviated by special transit services and remote parking lots. These systems have also been developed in conjunction with changes in parking restrictions. From an analysis of modal choices over time, it was found that shifts to transit use have occurred as a result of tighter parking restrictions and the shifts away from transit have occurred as a result of fare changes. Carpoolers seem to be most sensitive to changes, while the drive-along category showed less sensitivity. An analysis of respondents' reactions to probable future situations also indicated similar results. /Author/

Lueck, CC (Arizona Department of Transportation) Beimborn, EA (Wisconsin University, Milwaukee) *Transportation Research Record* No. 722, 1979, pp 40-48, 4 Fig., 14 Tab., 11 Ref.; This paper appeared in TRB Record No. 722, Urban Systems Operations.; ORDER FROM: TRB Publications Off

46 309574 CONTROL INSTRUMENTS FOR TRAFFIC RESTRAINT IN THE CITY CENTRE OF STOCKHOLM [Styrmedel foer begransning av biltrafiken i stockholms innerstad]. This report describes the motives for decreasing the traffic flow in Stockholm and how much it has to be decreased to obtain certain purposes. Available control means, how they can be used and their effects on the traffic flow of the city centre are also described. Every day about 230000 vehicles pass in to and out of the city centre. The traffic causes noise, air pollution, accidents, sometimes queues and difficulties for the commercial traffic to operate. A reduction of the traffic flow would mean longer trips and that suburban road users accessibility to the city centre's service, culture and commercial offer would decrease. The report presents how a successive decrease of the traffic flow in the city centre of 20 per cent can be realized, the measures that have to be taken and what the traffic reducing effects are. Some of the measures that already have been taken, are for example supervision of parking areas, moving of vehicles and raised parking fees. The parking control measures only give less improvements of the environment in the city centre. The traffic flow can be further reduced by introducing journey charges, relieving traffic routes, raising of the contributions for the public transport, etc. The effects of the desirable reduction of the traffic flow by 20 per cent are expected to be: the air pollution will be reduced. The traffic safety will increase. The buses to and in the city centre will get higher trafficability. People, who change over to public transport, will have lower costs but the journey time will be longer. The energy consumption will decrease by 10 per cent for the journeys to work. The municipality of Stockholm will have a profit of at least 60 million skr per year. (TRRL [Swedish])

Stockholms Kommun, Sweden Monograph Feb. 1979, 97 p., 8 Fig., 12 Tab., 4 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 243188), National Swedish Road & Traffic Research Institute

46 310162 VILLAGES WHERE WALKERS ARE VIP'S. The author traces the history of two pedestrianisation schemes in Cornwall. One park-and-ride scheme has been operating in Polperro for the last 12 years, the other in St Ives has been operating since 1974. The schemes have been adopted to remove congestion in main streets which were designed for pack animals and could not cope with the demands made on them by tourist traffic. After initial opposition from local traders, the scheme at Polperro has been very successful. Vehicles were restricted in the town centre of St Ives between the hours of 9 am to 5 pm, from 1st June to August 31st. Signs are provided at the main cordon points directing traffic to peripheral car parks. In 1975, a park-and-ride service was operated using four midi-buses from the largest car park. A successful rail park-and-ride service has been operating since 1978 from a car park some three miles east of the

town centre. Revenue is shared between rail and the car park operators. (TRRL)

Pitts, R *Surveyor - Public Authority Technology* Vol. 154 No. 4562, Nov. 1979, pp 7-9, 7 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 244474)

46 310703 USE OF THE GRAVITY MODEL FOR PEDESTRIAN TRAVEL DISTRIBUTION. Knowledge of pedestrian travel behavior is very important to attempts to improve congestion problems in central business districts. This paper describes the results of the use of a traditional gravity model for predicting pedestrian trip distribution. The model is calibrated by using a data set from downtown Chicago. The results indicate that the traditional gravity model closely reproduces the characteristics of pedestrian trip distribution and might be a useful tool in the analysis of downtown travel. (Author)

Rutherford, GS (Rutherford (GS) and Associates) *Transportation Research Record* No. 728, 1979, pp 53-59, 7 Fig., 1 Tab., 6 Ref.; This paper appeared in TRB Research Record No. 728, Passenger Travel Forecasting.; ORDER FROM: TRB Publications Off

46 312256 URBAN TRANSPORTATION INNOVATION: ADOPTING AND IMPLEMENTING AUTO RESTRAINT POLICIES. To explain political and institutional opposition to auto restraint measures, this paper argues that they are "fragile" policy initiatives which face particularly difficult obstacles in (1) building a supportive political constituency, (2) securing necessary approvals from decisionmakers, and (3) being implemented by public agencies. Although these problems afflict any auto restriction proposal to some degree, specific restraint options vary in feasibility depending on features of the policy design, the restrictions already in force, and the requirements of state and local law. (Author)

Howitt, AM *Urban Planning Policy Analysis and Administration* Dis Paper D78-15, Mar. 1979, 31 p., 30 Ref.; Grant DOT-MA-11-0007

46 312467 INSTITUTIONAL FACTORS IN THE IMPLEMENTATION OF AUTOMOBILE-RESTRICTIVE MEASURES. PART 2: TRAFFIC RESTRAINTS IN THE SAN FRANCISCO BAY AREA. Implementation experience with five different transportation system management measures in the San Francisco Bay Area is examined: neighborhood traffic restrictions, road and congestion pricing, toll increases, parking management, and ramp metering. The conclusions are that proposals to restrain automobile use have had little success when proposed by planning agencies, but when implemented at the initiative of local government, they have gained substantial (if not unanimous) acceptance. Although automobile-restraint measures may have adverse differential community impacts, it should not be assumed that automobile restraints are always unacceptable to the public and that it will not be possible to develop the community support necessary to succeed. (Author)

Deakin, E (Cambridge Systematics, Incorporated) *Transportation Research Record* No. 731, 1979, pp 58-61, 3 Ref.; This paper appeared in TRB Record No. 731, Evaluating Transportation Proposals.; ORDER FROM: TRB Publications Off

46 312468 INSTITUTIONAL FACTORS IN THE IMPLEMENTATION OF AUTOMOBILE-RESTRICTIVE MEASURES. PART 3: EXPERIENCE OF THE SERVICE AND METHODS DEMONSTRATION PROGRAM WITH AUTOMOBILE-RESTRICTIVE MEASURES. Findings are presented from the perspective of the Urban Mass Transportation Administration's Service and Methods Demonstration Program on the implementation of various physical or operational strategies designed to either alter the supply of road space available to vehicular traffic or to reallocate the supply of road space among different classes of vehicles. These findings include the need for objective technical information on the impacts of similar strategies in other locales and the early and continuous involvement of potentially affected groups, the importance of a quick response to any early construction or operational problems, and the importance of the relationship of enforcement to the political feasibility of a project. (Author)

Heaton, C (Transportation Systems Center) *Transportation Research Record* No. 731, 1979, pp 61-62, 1 Ref.; This paper appeared in TRB Record No. 731, Evaluating Transportation Proposals.; ORDER FROM: TRB Publications Off

46 312553 THE REDISCOVERY OF THE PEDESTRIAN. TWELVE EUROPEAN CITIES. This book, an outgrowth of the More Streets for People public information program, evaluates pedestrian experiments in 12 selected European cities. It is addressed to community groups and individuals involved in promoting the creation of traffic-free areas in their cities. The cross section of European experiments represents a variety of goals and a diversity of urban scales. While the creation of urban pedestrian malls in America has focused primarily on downtown economic revitalization, a close look at European efforts reveals a number of reasons for implementing traffic free zones. The goals sought by European planners have ranged from strictly functional ones dealing with traffic control strategies to improve downtown mobility to humanistic ones dealing with conservation of urban areas and improvement of residential conditions in central areas. The scale of the cities with pedestrian precincts also provides a useful overview for the advocate. Cars have been banned from central areas of small villages to increase tourist appeal or simply to preserve traditions of outdoor living. They have also been banned from the congested cores of cities with over a million inhabitants that possess national commercial prominence. The diverse planning context, legal methodology, and financial strategy of each specific case also provide a broad, critical picture of the process of converting vehicular roads to pedestrian thoroughfares. Some cities were chosen for their historic relevance because they clearly illustrate a variety of goals for their traffic strategies, for their focus on historic preservation, or for their innovative approach to planning and design. Although this book is not intended to furnish methodological indications tailored to the American reality, it does provide a viable

Brambilla, R Longo, G ; Institute for Environmental Action, Incorporated, Columbia University, New York, Department of Housing and Urban Development, National Endowment for the Arts, President's Council on Environmental

Quality HUD/PDR-192/2, Dec. 1976, 123 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-109903

46 312555 BANNING THE CAR DOWNTOWN. SELECTED AMERICAN CITIES. This book presents an indepth analysis of 16 North American pedestrianization experiments, providing information on the process which each city underwent in converting vehicular roads into malls. Some of the projects were very successful, while others represent failures. The range of results has been examined within the context of the complexity of pedestrian planning. The physical factors to be considered in the creation of a traffic-free area relate to the design of the mall and to the solution of city circulation and parking problems. These factors must be viewed in light of creating a traffic-free zone that increases not only the quality of the shopping environment but the social and recreational appeal of the area as well. The institutional side of mall implementation also affects the success of the project, because legal problems may arise in changing the use of an existing right-of-way. Legislation, which may be necessary at the local or State level, can also relate directly to financing methods. The major goal of almost every North American pedestrianization effort has been the revitalization of declining downtown retail economy. The reasons for such decline have varied from city to city. The cities considered here were selected because they represent a cross section of sizes and geographic locations. They also provide examples of the various reasons for and approaches to the implementation of traffic-free areas. Taken together, these 16 case studies offer a broad view of the aspects of pedestrian zoning in North America. Each city is considered individually, and photographs are included.

Brambilla, R Longo, G ; Institute for Environmental Action, Incorporated, Columbia University, New York, Department of Housing and Urban Development, Graham Found for Advanced Studies in the Fine Arts, Guggenheim Foundation HUD/PDR-192/3, Dec. 1976, 149 p.; Paper copy available from the Sup. of Docs., Stock number 023-000-00375-9; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-109929

46 313010 PARKING. NORTH SIDE NEIGHBORHOOD PRESERVATION STUDY. Part of the Iowa City, Iowa, North Side Neighborhood Preservation Study, this report focuses on parking problems in the north side area and suggests and evaluates possible remedies. Because the north side is located near the downtown area and the University of Iowa, there is a large demand for parking space in the neighborhood. Multifamily structures often contain several car owners per dwelling, and this coupled with the demands of other competing parkers has led to overcrowding of the available parking and other negative effects. The study found several factors to be primarily responsible for the excess of parking demand: (1) commuter parking due to the neighborhood's convenient location in relation to downtown, Mercy Hospital, the university, and bus lines; (2) storage of cars belonging to students living in nearby university dormitories; and (3) inadequate off-street parking space for area apartment units, rooming houses, fraternities, and single family residences. The most innovative of several possi-

ble remedies are: (1) a parking permit system--attaching a price to curbside parking or allowing preferential parking for residents and charging a small fee would serve a dual purpose of channeling some parkers back into municipal and university-provided facilities and forcing those who continue to park on the street to assume the costs of its undesirable side effects; (2) a usable open space requirement--specified amounts of usable space, incorporated into site requirements, would work together with parking and building area specifications to indirectly control the number of dwelling units that could feasibly share a lot; and (3) the reduction of parking demand at Mercy Hospital--because parking is a free benefit at the hospital, removal of this incentive would encourage employees to carpool or seek alternative transportation. Maps, tables, and references are included.

Williams, V ; Iowa University, Department of Housing and Urban Development HUD-0000533, Rpt 6, HUD-0000533, May 1978, 47p; Grant HUD-B-76-SI-19-0001; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-136047

46 313209 BOSTON AUTO RESTRICTED ZONE DEMONSTRATION EVALUATION PLAN. The Boston Auto Restricted Zone Demonstration Project, to be implemented in September 1978, represents an attempt to rationalize auto, transit and pedestrian circulation patterns in the central business district of a major U.S. city. The demonstration includes such elements as the restriction of autos from certain streets, major re-routing of traffic, improved bus service into the area, improved sidewalk facilities, additional goods movement and loading areas, and a relocation of taxi stands. The demonstration site is located in the Boston central business district, in which roughly 120,000 people are employed and in which roughly 25% of the city's retail trade is conducted. There are a number of objectives associated with the Boston ARZ project, which includes increased retail sales, increased transit ridership, increased transit productivity, increased pedestrian activity, and improved environmental quality.

Loudon, WR Pecknold, WM Kern, CR ; Cambridge Systematics, Incorporated, Urban Mass Transportation Administration Final Rpt. UMTA-MA-06-0049-79-4, Mar. 1979, 419p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-148463

46 314373 CENTER CITY CIRCULATION. The report provides an overview of the problems associated with Center City circulation, as seen by this country's largest metropolitan areas. Specific topics covered by the document include factors for consideration in development of center city policies, programs to implement these policies, and the role the private sector can play. Options discussed include transitways, fare-free zones, priority techniques for transit, parking programs, pedestrian malls, and carpool-vanpool programs.

Public Technology, Incorporated, Department of Transportation DOT-I-78-4, Oct. 1978, 35p; Prepared for Urban Consortium for Technology Initiatives. Transportation Task Force.; Contract DOT-OS-60076; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-184997

46 315189 SIMULATION OF THE PARKING SYSTEM [Parkeren gesimuleerd]. The impact of parking infrastructure on urban transport and development seems so important that a study of the parking process itself is desirable. Parking can be defined as the search for a parking place by visitors to an area, positioning the car on the chosen facility and leaving the parking place again after the duration of stay. The parking system is described by a simulation model which makes it possible to test parking policies such as changing parking rates, increasing or decreasing capacity, the development of parking structures or the introduction of park and ride. The description does not cover impacts of the parking situation on modal split, distribution or urban development. However, the resulting picture of the parking situation and the difficulties of finding a parking place, expressed in searching times, costs and walking times, are an indication of the effects on other aspects of transport like mode choice and distribution. (Author/TRRL) [Dutch]

Meijer, HER *Verkeerskunde* Vol. 31 No. 1, Jan. 1980, pp 8-9, 1 Fig., 2 Phot., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246611), Institute for Road Safety Research

46 319340 INITIAL REACTIONS TO A CENTRAL BUSINESS DISTRICT BUS TRANSIT MALL IN HONOLULU. The city and county of Honolulu have recently adopted a plan designed to eventually convert a central business district street to a bus transit mall. The first phase of the plan, which was the imposition of turning restrictions on private automobiles, was implemented in February 1979. This paper presents the results of a study that investigated the reactions of the daytime population of the central business district toward the mall and that population's perceptions of the mall's impact on congestion, noise, air quality, safety, convenience, speed, pedestrian circulation, and the general downtown environment. The study was based on an interview survey administered to 170 persons. The major findings of the study were as follows. The mall has caused 26 percent of the automobile users to change their circulation patterns. All factors examined were thought to be enhanced by the mall. Chi-square tests showed that, at the 0.05 level, purpose and arrival time explain the perceptions of congestion and safety impacts but in different ways; mode of travel strongly affects the experience of convenience and speed; the vast majority (85 percent) of the respondents were favorably disposed toward the mall concept. These findings should be useful to urban transportation planners and decision makers because they may represent a shifting of public attitudes toward favoring the preferential treatment of high-occupancy vehicles, in general, and urban bus systems, in particular. (Author)

Papacostas, CS Schnell, GS *Transportation Research Record* No. 746, 1980, pp 43-47, 3 Fig., 2 Tab., 4 Ref.; This paper appeared in TRB Record No. 746, Bus Transit Management and Performance.; ORDER FROM: TRB Publications Off

46 319379 AUTOMOBILE-RESTRICTIVE MEASURES IN CENTRAL BUSINESS DISTRICTS: SOME RECENT FINDINGS AND VIEWS. Increasing concern about the need to enhance the quality and economic vitality of urban areas, especially the downtown, has fostered interest in a broad set of transportation strategies that involve the restriction of automobile traffic. The Service and Methods Demonstration Program of the Urban Mass Transportation Administration has been examining two concepts of this type: automobile-restricted zones and transit malls. Background information is presented on various traffic-restriction projects that have been sponsored and/or evaluated under the program, and selected findings regarding the planning and implementation process, operations, and impacts of the projects are discussed. Experience with these concepts has been generally positive and encouraging. They have proved to be feasible to implement, workable in terms of traffic circulation and other operational aspects, and beneficial to transit users and pedestrians and have been well received by the public. They also appear to be compatible with broader public and private efforts aimed at revitalizing the downtown. (Author)

Heaton, C Goodman, J *Transportation Research Record* No. 747, 1980, pp 24-29, 1 Fig., 2 Tab., 5 Ref.; This paper appeared in TRB Research Record No. 747, Economic and Social Aspects of Transportation.; ORDER FROM: TRB Publications Off

46 322260 BOSTON'S DOWNTOWN CROSSING: ITS EFFECTS ON DOWNTOWN RE-TAILING. The effects of an Urban Mass Transportation Administration's (UMTA)

project on the fabric of downtown are beginning to surface both in physical and psychological terms: auto traffic has been removed from 11 blocks; four blocks have been resurfaced in brick; lighting fixtures have been installed; banners defining the area have been placed at 4 entry points; 6 bus routes have been extended into the heart of downtown; pedestrian volumes were up 5%; sales volumes went up 5% to 10%; auto use decreased and transit use increased; traffic has been rerouted with no appreciable increase in congestion; and merchant, press and public attitudes have been positive. The new shopping environment is examined more closely and the increased convenience, new shopping environment is examined more closely and the the new merchandising image, and the importance of foot traffic and market research are noted. noted.

Algmin, J (Boston Redevelopment Authority) *Transit Journal* Vol. 6 No. 2, 1980, p 15; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

46 323068 FINAL REPORT: LIVING WITH TRAFFIC IN TOWNS AND VILLAGES [Eindrappport verkeersleefbaarheid in steden en dorpen]. When houses and other buildings are constructed, the situation and layout must consider the mixing of residents and traffic. This takes place in an area for pedestrians, cyclists, residents and traffic within a residential area. Local authorities must clearly indicate where the residential areas are and where the vehicle traffic can drive unhindered. The residential area appears to full advantage as a "Woonerf". In two Dutch cities, Rijswijk and Eindhoven, demonstration projects have been started. In cooperation with the residents some residential areas have been given a new layout. Furthermore research will be undertaken in fourteen cities on the quality of living in the vicinity. The reconstruction of the main road network, the division into regions, the construction of cycle tracks and footways, the construction of a route for public transport, the need for parking and the possibilities for parking in existing streets are discussed. (TRRL) [Dutch]

Ministerie van Volkshuisvesting en Ruimtelijke Monograph Jan. 1980, 83p, Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 247462), Institute for Road Safety Research

47 051578 AN OVERVIEW OF URBAN GOODS MOVEMENT PROJECTS AND DATA SOURCES. A review of major efforts undertaken in American cities to study urban goods movement activity is presented. Study programs, methodologies and surveys are identified, described and classified. Selected cities are Chicago, St. Louis, New York, San Francisco, and Baltimore.

Bolger, FT Bruck, HW ; Massachusetts Institute of Technology June 1973, 146 pp; Contract DOT-OS-10058; ACKNOWLEDGMENT: NTIS (PB-224997/7); ORDER FROM: NTIS, Repr PC, Microfiche; PB-224997/7, DOTL NTIS

47 052072 IN PLACE OF CONGESTION. The likely developments in freight transport technology in Britain during the coming 10-15 years are investigated by the author. Emphasis is placed on the need for careful planning to prevent further congestion. It is suggested that the distribution of freight in urban areas would be facilitated by the setting up of consolidation centers at strategic peripheral locations within urban areas, with the use of rapid transit routes in off peak hours. The author further subscribes to the widely held view that technology readily available at the present time could be more freely applied to the railways.

Bonwit, R ; Loughborough University of Technology Book 112 pp; ORDER FROM: Loughborough University of Technology, Loughborough, Leicestershire, England Repr PC

47 052109 THE URBAN TRANSPORTATION PLANNING APPROACH TO URBAN GOODS MOVEMENT. This report deals with what the Chicago Area Transportation Study (CATS) labels the Freight Mode of transportation. (There are three parts to the article.) The first describes the rationale for including a freight element as an addition to the Urban Transportation Planning Approach program (U.T.P.A.). The second describes the process being utilized to model the movement of commodities and their respective vehicles. The third section describes the manner in which the CATS intends to address real world investment problems.

Blaze, JR Halagera, RT Miller, MS *CATS Research News* Vol. 15 No. 4, Dec. 1973, pp 1-7, 4 Fig; ACKNOWLEDGMENT: CATS Research News; ORDER FROM: Chicago Area Transportation Study, 230 North Michigan Avenue, Chicago, Illinois, 60601 Repr PC

47 071752 URBAN GOODS MOVEMENT. A wide range of topics involving the broad field of urban goods movement is covered in this series of 12 papers. The role of trucking is undisputed and various facets of the local distribution problem are examined. Included are demand for urban goods movement, desirability of terminal consolidations, the volume of vehicles and their emission production, the location of distribution centers, and identification of the data needed for urban goods transportation analysis.

Transportation Research Record Vol. N No. 96, 1974, 114 pp, Figs., Tabs., Refs. Twelve reports prepared for the 52nd and 53rd Annual meeting of the Highway Research Board. This also available from NTIS, PB-235948/7ST, pricing is PC \$5.25 and Microfiche \$2.25.; ORDER FROM: TRB, Repr. PC

47 072283 THE URBAN COMMODITY FLOW DATA COLLECTION PROJECT. Relatively little research has been devoted to the Urban goods movement industry, which is responsible for 40 percent to 50 percent of all urban transportation costs. Costs in Canada are expected to rise from \$2 billion in 1966 to \$10 billion annually by the year 2000. Estimates predict that cost can be reduced up to 15 percent, representing an annual national savings of \$1.5 billion. More than 70 percent of this can be realized through direct improvements to the urban trucking system. TDA has developed a multi-phase plan whose primary objective is to obtain input data for simulation of goods distribution at Marco (network) and Micro (endpoint) levels. The phases are (1) description of problem, background information, preparation of initial computer mathematical simulation models (completed 9/72); (2) collection of field data of goods movements and truck operations in Calgary; (3) application of Calgary data to computer model for testing and calibration, improvement and refinement; and (4) collection and testing of additional data to ensure general usefulness of model and integrate in with larger network approach for entire Canada. Figures include generalized land-use map of Calgary, major links in its transportation system, and a plan of transportation system, and a plan of transportation districts.

Piegrass, EB Morrall, JF ; Calgary University, Canada ; ACKNOWLEDGMENT: TSC

47 080247 FACTORS AFFECTING CARGO LIABILITY PROBLEMS IN URBAN GOODS MOVEMENT AND PROPOSED SOLUTIONS. The report explores the liability problems associated with the intermodal movement of goods into, out of, and through urban areas. It focuses on loss, damage, delay of shipments, and stresses the susceptibility of small shipments to loss, damage and delay. The relationship of liability to the urban area is particularly strong since approximately 85 percent of the loss and damage occurs at the interfacing terminals in the urban area. The inadequacies of present recovery practices and procedures are discussed, as well as the need for uniform standards of liability for intermodal cargo shipments.

Kenkel, JJ ; Consortium of Universities, Urban Mass Transportation Administration Res. Rpt. UTC-74-03, May 1974, 93 pp; Contract DOT-UT-394; ACKNOWLEDGMENT: NTIS (PB-235671/5ST); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235671/5ST, DOTL NTIS

47 081631 INTERCITY FREIGHT MOVEMENT BY RAIL AND HIGHWAY. The four authors examine various aspects of rail freight service, especially in comparison to movement by truck. Morton examines the changing markets that characterize the American economy and their effects on rail freight transportation. Deboer looks at ways in which railroads might improve service and capital utilization without increasing long-run total costs. Blaze examines the rail plant and traffic trends in city areas, using the Chicago region as a case study. Fuller discusses the abandonment of railroad lines from the standpoint of state government, suggesting a role for states in analyzing both major and minor abandonment proposals.

Transportation Research Record No. 511, 1974, 44 pp, Refs., 1 App.

This publication is compiled of 4 reports prepared for the 53rd Annual Meeting of the Highway Research Board.; ORDER FROM: TRB, Repr. PC

47 081635 RAIL AND RAIL-TRUCK TERMINALS: AN OPPORTUNITY IN URBAN TRANSPORTATION PLANNING. This paper examines the rail plant and traffic trends in city areas. The 4,800-square mile Chicago region is used as a case study for railroads in urban markets. The location of railroad piggyback facilities is the principal topic covered since it is the author's hypothesis that the modernization of urban railplant can best be planned by the conscious implementation of stronger intermodal rail services and government policies toward such services.

Blaze, JR (Chicago Area Transportation Study) *Transportation Research Record* No. 511, 1974, pp 20-28, 3 Fig., 1 Tab., 9 Ref.; This is one of four articles contained in the TRB publication "Intercity Freight Movement by Rail and Highway", RRIS #081631.; ORDER FROM: TRB, Repr. PC

47 094142 URBAN GOODS MOVEMENT DEMONSTRATION PROJECT DESIGN. A PRIMER ON URBAN GOODS MOVEMENT. The study examines problems encountered in urban goods movement. The report is divided into 7 sections. Section I presents a discussion of urban goods related transportation as compared to the nation's total transportation. Section II provides estimates, of the characteristics and amounts of transportation currently used to move goods in our major cities. Section III presents estimates of the impact of this transportation on cities in terms of cost, congestion, energy consumption, air pollution, noise pollution and land use. Section IV focuses on each of these impacts as viewed by several identifiable interest groups in the community: commuters, consumers, goods haulers, shippers/receivers, etc. Section V presents an attempt to isolate fundamental causes of urban goods movement related problems and Section VI discusses nearly 100 possible solutions to them. Section VII presents several recommendations for further action.

Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration, Voorhees (Alan M) and Associates, Incorporated, (UMTA-IL-06-0030) Final Rpt. Phases 1&2, UMTA-IL-06-0030-75-1, Dec. 1975, 264 pp; Prepared in cooperation with Voorhees (Alan M.) and Associates, Inc., Cleveland, Ohio. Paper copy also available in set of 5 reports as PB-249 318-SET, PC\$34.00.; Contract DOT-UT-40007; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249319/5ST

47 094143 URBAN GOODS MOVEMENT DEMONSTRATION PROJECT DESIGN STUDY. APPENDIX B. BIBLIOGRAPHY AND LITERATURE ABSTRACTS. The study included the consideration of past proposed solutions and the methodologies used to develop them. To do this, a portion of the study's resources were devoted to identifying and reviewing available Urban Goods Movement Demonstration Project Design, Study.

Kearney (AT) and Company, Incorporated, Voorhees (Alan M) and Associates, Incorporated, Voorhees (Alan M) and Associates, Incorporated,

porated, (UMTA-IL-06-0030) Final Rpt. Phases 1&2, UMTA-IL-06-0030-75-2, Dec. 1975, 179 pp; Prepared in cooperation with Voorhees (Alan M.) and Associates, Inc., Cleveland, Ohio. Paper copy also available in set of 5 reports as PB-249 318-SET, PC\$34.00.; Contract DOT-UT-40007; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249320/3ST

47 094144 URBAN GOODS MOVEMENT DEMONSTRATION PROJECT DESIGN. APPENDIX C. DISTRIBUTION LOGISTICS ANALYSIS AND FINDINGS. The purpose of the Urban Goods Movement Demonstration Project Design study was to identify and test solutions to urban goods movement problems. In order to effectively accomplish this, it was first necessary to expand the existing knowledge and understanding of urban goods movement characteristics. One part of this effort was to break urban goods movement into logical parts, called 'segments,' and to analyze each segment's physical distribution process and the associated logistics of providing its goods or services to urbanized consumers. That analytical process, known as 'segment analysis,' is reported in this Appendix.

Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration, Voorhees (Alan M) and Associates, Incorporated, (UMTA-IL-06-0030) Final Rpt. Phases 1&2, UMTA-IL-06-0030-75-3, Nov. 1975, 220 pp; Prepared in cooperation with Voorhees (Alan M.) and Associates, Inc., Cleveland, Ohio. Paper copy also available in set of 5 reports as PB-249 318-SET, PC\$34.00.; Contract DOT-UT-40007; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249321/1ST

47 094145 URBAN GOODS MOVEMENT DEMONSTRATION PROJECT DESIGN STUDY. APPENDIX D. CONGESTION ANALYSIS. APPENDIX E. ENERGY ANALYSIS. APPENDIX F. AIR POLLUTION ANALYSIS. APPENDIX G. NOISE ANALYSIS. The report contains four technical appendices developed as part of Phase I and Phase II of the Urban Goods Movement Demonstration Project Design. In the first task phases of the study, the primary objectives were to define qualitatively and quantitatively the contribution and impact of goods movement in urbanized areas to: traffic congestion, energy consumption, air pollution, noise pollution, inefficient land use, and cost of urban goods movement. From the analysis, problems associated with urban goods movement and their fundamental causes were identified and plausible solution to the problems were generated. Primary attention was focused on solutions which could be demonstrated and implemented in a 5-year timeframe and would require modest capital investment.

Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration, Voorhees (Alan M) and Associates, Incorporated, (UMTA-IL-06-0030) UMTA-IL-06-0030-75-4, Nov. 1975, 203 pp; Prepared in cooperation with Voorhees (Alan M.) and Associates, Inc., Cleveland, Ohio. Technical Supplement to Final Report on Phase 1&2. Paper copy also available in set of 5 reports as PB-249 318-SET, PC\$34.00.; Contract DOT-UT-40007; ACKNOWLEDGMENT: NTIS, UMTA;

ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249322/9ST

47 094146 URBAN GOODS MOVEMENT DEMONSTRATION PROJECT DESIGN. APPENDIX H. POTENTIAL SOLUTIONS TO URBAN GOODS MOVEMENT PROBLEMS. The Appendix presents the findings of the Phase II process of the study. Solutions to urban goods movement problems are grouped according to the fundamental or secondary cause of each problem. The solutions are grouped into the following sections: Fundamental causes of cost; secondary causes of cost; fundamental causes of congestion; secondary causes of congestion; fundamental causes of energy consumption; secondary causes of energy consumption; fundamental causes of air pollution; secondary causes of air pollution; fundamental causes of noise pollution; secondary causes of noise pollution; fundamental and secondary causes of inefficient land use; miscellaneous solutions.

Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration, Voorhees (Alan M) and Associates, Incorporated, (UMTA-IL-06-0030) Final Rpt. Phases 1&2, UMTA-IL-06-0030-75-5, Nov. 1975, 155 pp; Prepared in cooperation with Voorhees (Alan M.) and Associates, Inc., Cleveland, Ohio. Paper copy also available in set of 5 reports as PB-249 318-SET, PC\$34.00.; Contract DOT-UT-40007; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-249323/7ST

47 099840 DEPARTMENTAL ACTION PLAN AND REPORT TO THE SECRETARY. This report on urban goods movement contains two main sections (1) a "Departmental Action Plan" and (2) a "Report to the Secretary," which were prepared by the Urban Goods Movement Task Force established in 1972. The "Department Action Plan" has been approved by the Secretary and is intended to deal with the organizational and structural aspects of the Department's role in urban goods movement. It addresses the questions of decentralization, intergovernmental and interagency relations, and the broad responsibility for initiative and oversight to insure continued momentum and coordination in urban goods movement activities at all levels. The "Report to the Secretary" is intended to provide an overview of urban goods movement, the associated problems, and related Department of Transportation activities.

Department of Transportation June 1973, 22 pp, 1 Tab., 1 App.; ACKNOWLEDGMENT: DOT; ORDER FROM: DOT, Repr. PC

47 099843 GOODS TRANSPORTATION IN URBAN AREAS. A five-day conference to explore issues in urban goods movement was organized by representatives of the American Society of Civil Engineers, Highway Research Board, Institute of Traffic Engineers, and the U.S. Department of Transportation. Five areas were studied and reported by Probe Groups, namely (1) urban goods movement considerations in urban transportation planning, (2) use of local regulatory and police power in facilitating goods movements, (3) freight terminal relocation, (4) issues in urban rail relocation, and (5) consolidation of pickup and delivery services. Each Probe

Group report presents recommendations for action to improve urban goods movement. Eleven keynote, summary, and resource papers are presented covering such topics as Federal, State, and local programs for goods movement facilitation; terminal location and consolidation; improvement of intermodal transfer; regulation; and energy requirements for trucking. Five case studies describe ongoing regional programs in Dallas-Fort Worth, St. Louis, New England (Boston and Maine Railroad regional impact), northern New Jersey, and the New York City Garment Center.

Engineering Foundation Conferences Final Rpt. FHWA32-01-23(RFP379), Feb. 1974, 415 pp, Figs., Tabs., 6 Ref., 4 App.; Proceedings of the Engineering Foundation Conference, Academy, So. Berwick, Me., August 5-10, 1973. Sponsored by the Department of Transportation Federal Highway Administration.; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS, Repr. PC

47 130896 SIMULATION STUDY EXAMINING THE BENEFITS OF AN URBAN CONSOLIDATED TERMINAL. This paper is concerned with the movement of commercial vehicles in central cities and examines the potential benefits of the establishment of a consolidated freight terminal in a medium sized city: Syracuse, New York. Using original data on the movement of freight shipments within the central business district of Syracuse, simulation analysis is employed to estimate the efficiency gains and cost reduction which could be anticipated by central city freight movers as a result of their use of a consolidated freight terminal. Principal among the findings reported are a possible annual savings of \$1.6 million, and a 93 percent reduction in freight vehicle movement time.

McDermott, DR (Syracuse University); American Society of Mechanical Engineers N 75-ICT-8, 1975, 9 pp, 28 Ref.; Prepared for meeting, Intersoc Conf on Transp, Atlanta, Georgia, July 14-18, 1975.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

47 134326 ISSUES IN URBAN GOODS MOVEMENT PLANNING. Urban goods movement has not been subjected to a significant amount of investigation and research until very recently. In this paper, the main issues and problems associated with urban goods movement are reviewed and discussed from the viewpoint of urban transport planning. Nine types of issues which are relevant from this viewpoint are identified: (A) the characteristics of urban goods movement, (b) the interaction between goods and passenger traffic, (C) social and environmental effects, (D) the interaction between goods movement and urban development, (e) the technology of goods movement, (F) terminal and shipping facilities, (g) vehicle operating costs, (h) the operation and management of the transport industry, and (I) the regulation and control of the transport industry. Some preliminary results of an investigation of the characteristics of urban goods movement in Melbourne in 1964 are presented. The investigation is concerned with analysing truck characteristics, truck trip characteristics, and the characteristics of consignments of goods. /Author/TRRL/

Ogden, KW (Monash University, Australia) *Australian Road Research Board Conference Proc* Vol. 7 No. 3, 1975, pp 186-205, 12 Tab., Refs.;

ACKNOWLEDGMENT: TRRL (IRRD 218049)

47 137348 URBAN GOODS MOVEMENT DEMONSTRATION PROJECT DESIGN PHASES I AND II. EXECUTIVE SUMMARY. The specific tasks of the Urban Goods Movement Demonstration Project Design Study which are addressed in this report are: (1) To define quantitatively and qualitatively the impact of goods movement in urban areas on goods movement cost, traffic congestion, energy consumption, air pollution, noise pollution, and land use; (2) to identify problems associated with urban goods movement and their basic or fundamental causes; and (3) to generate plausible solutions to these problems. Other tasks of the study, not yet complete, are to analyze the potential solutions, to identify those which are particularly desirable and to propose and design demonstration projects to test and/or implement the proposed solutions. This executive summary provides a brief overview of the entire study.

Kearney (AT) and Company, Incorporated, Urban Mass Transportation Administration, (UMTA-IL-06-0030) UMTA-IL-06-0030-76-1, 60 pp; See also report dated December 1975, PB-249319; Contract DOT-UT-40007; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS; PB-254854/3ST

47 139311 CONSTRAINTS AFFECTING THE USE OF A PUBLIC TRANSHIPMENT DEPOT. A group of 172 companies selected from the "Time Top 1000 Companies" were asked to complete a questionnaire concerning possible constraints on the use of a public transshipment depot. The group was not necessarily representative of the "Top 1000" but included manufacturers, wholesalers and retailers. The 93 completed questionnaires received have been analysed to help to improve understanding of the decisions of potential users. The study also indicates the very wide range of services that would need to be provided by a public transshipment depot, and argues that there should be increased liaison between local authorities and industry, in order to ensure practical solutions to the problems of HGVs in towns. /Author/

Smith, KJG ; Newcastle-Upon-Tyne University, England, (ISSN 0306-3402) Work Paper No. 19, Mar. 1976, 39 pp, Figs., Tabs., 16 Ref., 3 App.; ORDER FROM: Newcastle-Upon-Tyne University, England, Director of Transport Operations Research Group, Newcastle-Upon-Tyne, Northumberland, England

47 146463 MOBILITY OF PEOPLE AND GOODS IN THE URBAN ENVIRONMENT FACILITATION OF URBAN GOODS MOVEMENT. Field data and interviews performed indicate that goods movement in the city center is constrained by several factors, and distinct goods-movement patterns were identified and documented. For typical downtown land uses, goods activity, truck activity, internal distribution and other facets of goods distribution were evaluated. These evaluations documented several aspects of downtown goods movement including: trip generation rates, operating characteristics, parking patterns, dwell-time components, goods descriptions, delays, arrival patterns, engine idling, and others. Preliminary procedures are included to suggest methods of using the data in

this report to facilitate local goods movement in downtown areas.

Crowley, KW Habib, PA Loebel, SA Pienataro, LJ ; Polytechnic Institute of New York, Department of Transportation Final Rpt. TR-74-503, DOT/TST-75/102, Oct. 1975, 116 pp; (PC A06/MF A01); Contract DOT-OS-30095; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259533/8ST

47 147620 THE SASKATCHEWAN COMMON-FOR-HIRE CARRIER INDUSTRY: A RATIONALIZATION APPROACH. The purpose of this paper is to describe the Saskatchewan portion of a national study to evaluate urban trucking rationalization techniques. The objective of the study is to establish a methodology for the evaluation of truck rationalization and locally it is intended to evaluate the possibilities of applying various rationalizing techniques to problems in the local-for-hire trucking industry.

Horosko, AT (Transportation Center) Bergan, AT (Saskatchewan University) ; Roads and Transportation Association of Canada Report Number 4, Sept. 1975, pp 1-3, 1 Fig.; This paper was prepared for the Annual Conference held in Calgary, 1975.; ACKNOWLEDGMENT: Roads and Transportation Association of Canada

47 158990 GOODS TRANSPORTATION IN URBAN AREAS. PROCEEDINGS OF THE ENGINEERING FOUNDATION CONFERENCE HELD AT SOUTH BERWICK, MAINE, ON AUGUST 5-10, 1973. A five-day conference to explore issues in urban goods movement was organized by representatives of the American Society of Civil Engineers, Highway Research Board, Institute of Traffic Engineers, and the U.S. Department of Transportation. Five areas were studied and reported by Probe Groups, namely (1) urban goods movement considerations in urban transportation planning, (2) freight terminal relocation, (3) issues in urban rail relocation, and (4) consolidation of pickup and delivery services. Each Probe Group report presents recommendations for action to improve urban goods movement. Eleven keynote, summary, and resource papers are presented covering such topics as Federal, state, and local programs for goods movement facilitation; terminal location and consolidation; improvement of intermodal transfer; regulation; and energy requirements for trucking. Five case studies describe ongoing regional programs in Dallas-Fort Worth, St. Louis, New England (Boston and Maine Railroad regional impact), northern New Jersey, and the New York City Garment Center.

Fisher, GP ; Engineering Foundation, Federal Highway Administration Final Rpt. FHWA-32-01-23-RFP397, Feb. 1974, 401 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-267738/3ST

47 167103 URBAN GOODS MOVEMENT SPACE ALLOCATION GUIDELINES [Final rept.]. Detailed goods vehicle-related data was collected for a range of typical city center land uses. Information acquired included goods vehicle trip generation rates, dwell time patterns, parking patterns, etc. Using this information, augmented by the literature, cost-effective space allocation methodologies were developed for planning for space allocation both on and

off-street. Space allocation methodologies have been exercised to provide tables of recommended curbside and off-street goods vehicle space allocation guidelines. This report can assist in the rational, objective provision of the appropriate number of spaces, at the curb or at loading docks, which will minimize total costs.

Crowley, KW Habib, PA ; Polytechnic Inst. of New York, Brooklyn. Dept. of, Transportation Planning and, Engineering.*Department of Transportation,, Washington, D.C. Office of Univ. Research. TR-77-500, DOT/TST-77/51, May 1977, 45p; Contract DOT-OS-30095; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271328/7ST

47 169217 MOBILITY OF PEOPLE AND GOODS IN THE URBAN ENVIRONMENT. FACILITATION OF URBAN GOODS MOVEMENT. Conflicts between trucks and other vehicles in the downtown area cause delays to the motoring public and result in inefficient goods movement. Reducing these conflicts requires a quantitative understanding of the operating procedures of goods movement vehicles as well as a qualitative appreciation of why they occur as they do. Field data and interviews performed in both years of this study indicate that, land use is the dominant variable controlling goods movement patterns in the City Center. Goods activity, truck activity, internal distribution and other facets of goods distribution were conducted for a range of typical urban center land uses. The study documented several aspects of urban goods movement including: goods vehicle trip generation rates, generating characteristics, parking patterns, dwell-time, delays, etc. Based on the results of the two years of study general guidelines have been developed for facilitating goods movement in the urban center.

Crowley, KW Habib, PA ; Polytechnic Institute of New York, Department of Transportation Final Rpt. DOT-TST-76-90, TR-75-503, Dec. 1975, 109 pp; See also First Year Report Oct 74, PB-259 533.; Contract DOT-OS-30095; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-274570/1ST

47 173552 ANALYSIS OF URBAN COMMODITY FLOW. The author discusses that most analyses of urban freight have been concerned with aspects of the supply of freight transport services, such as truck trip or truck fleet characteristics. This paper is concerned with the demand for urban freight, and presents an analysis of the characteristics of commodity consignments. These characteristics are analyzed using data for Melbourne, Australia. It is shown that over one-half of internal freight tonnage was accounted for by six commodity groups: sand, rock, soil and gravel; bricks, pottery, glass and cement products; waste; processed food and beverages; metals and metal products; and petroleum products. The balance was spread over a wide range of commodity items. The paper also reviews the characteristics of the mass of consignments and the length of consignments, by commodity and land use.

Ogden, KW (Monash University, Australia) *Transportation Planning and Technology* Vol. 4 No. 1, Sept. 1977, pp 1-9, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

47 179085 FREIGHT MOVEMENT: A CRUCIAL COMPONENT OF TRANSPORTATION SYSTEM MANAGEMENT. This paper points out how important freight movement is to the functioning of the urban economy, how urban development can be encouraged by including freight movement in the urban transportation planning process, and how the inclusion of freight movement is both logically and legally supported. It is appropriate to apply planning funds to freight movements if these activities are included in the unified planning work program. Thus, the types of freight planning activities considered appropriate can be as varied as the cities that apply for those funds as a portion of their unified planning work programs. The important role of freight planning in the transportation system management (TSM) element is explored. Examples are given of TSM actions that can significantly improve the flow of both freight and people by reducing the conflicts between these essential activities. /Author/

Goette, D (Federal Highway Administration) Cadotte, ER (Tennessee University, Knoxville) *Transportation Research Board Special Report No. 172, 1977, pp 37-43, 1 Fig., 21 Ref.*; From TRB Special Report No. 172, Transportation System Management, proceedings of a conference held November 7-10, 1976, conducted by the Transportation Research Board, and sponsored by the Urban Mass Transportation Administration and the Federal Highway Administration of the U.S. DOT in cooperation with the Institute of Transportation Engineers.; ORDER FROM: TRB Publications Off

47 182975 GOODS TRANSPORTATION IN URBAN AREAS--GTUA III. A five-day conference to explore contemporary issue in urban goods movement (UGM) was organized by representatives of the Transportation Research Board, American Society of Civil Engineers, Institute of Transportation Engineers, and the Federal Highway Administration. Five specific topics were probed and reported upon by work-teams, namely (1) traffic engineering and design to facilitate UGM, (2) impact of local government regulations, (3) interface between Federal regulation and UGM, (4) UGM in regional system planning, and (5) locating and servicing major urban freight generators. In addition to Probe Group reports and recommendations, there are presented 40 keynote, summary and resource papers covering such topics as data requirements, time value of cargo, service trucks, terminal design and location, transportation system management, planning methodology and case studies, intermodal transfer, freight regulation and economics. /FHWA/

Fisher, GP ; Engineering Foundation Conferences Final Rpt. FHWA-PL-78-012, June 1978, 823 pp; Proceedings of the 3rd Engineering Foundation Conference, Sea Island, Georgia, December 4-9, 1977.; Contract PO 8-3-0020; ACKNOWLEDGMENT: Federal Highway Administration; ORDER FROM: NTIS; PB-286105/2ST

47 183440 A NOTE ON THE ROAD PRICING OF COMMERCIAL TRAFFIC. With renewed interest being shown in the UK in the introduction of road pricing as a means of restraining urban traffic, the article assesses its possible effect on urban freight transport. Two cases are examined in which (1) the only effect of road pricing is

to increase haulage costs, and (2) any beneficial effects of reduced congestion resulting from road pricing are also considered. Although comprehensive road pricing may have little effect on total urban freight traffic flow, it might encourage more efficient methods and the retiming of deliveries and collections. The long-term effects of a road-pricing policy are considered as well as criticisms of its application such as increased haulage rates and the possibility of causing more frequent trips by smaller vehicles. /TRRL/

Button, KJ (Loughborough University of Technology, England) *Transportation Planning and Technology Vol. 4 No. 3, May 1978, pp 175-178, 2 Tab., 15 Ref.*; ACKNOWLEDGMENT: TRRL (IRRD-234542)

47 186387 PROCEEDINGS OF THE WORKSHOP ON URBAN FREIGHT CONSOLIDATION. The Urban Freight Consolidation Workshop discusses the desirability and practicality of establishing programs to consolidate the pickup and delivery of small shipments in highly concentrated urban areas. After presentation of an overview paper, Institutional Issues in Urban Freight Consolidation, by Ernest R. Cadotte and Robert A. Robicheaux, the following papers were given: Consolidation and Distribution--The Broad Picture, John T. Norris; Transportation Facilitation Center Concept, Irwin Blatner; The Regulatory Issues of Small-Shipment Consolidation, A. Daniel O'Neal; Chicago's Perspective of Urban-Freight Consolidation, Charles W. Lustig; Freight Consolidation in New York City, Samuel D. Kahan; Baltimore's Perspective of Urban-Freight Consolidation, Siegbert Schacknies; Small-Shipper Perspective, Richard A. Whitty; The Perspective of a "Big Shipper," William K. Smith; A Receiver's Viewpoint of Consolidation, William P. McDaniel; For-Hire Motor-Carrier Perspective of Urban-Freight Consolidation, John L. Reith; Private-Carrier Perspective of Urban-Freight Consolidation, H. E. Manker; Union Perspective, M. R. Nensel; Urban-Freight Distribution Myopia, Carl S. Rappaport; Freight-Service Expectations, Performance, and Tradeoffs in Urban Areas: A Survey, Robert A. Robicheaux and Ernest R. Cadotte; and Freight Consolidation--Can It Be Successfully Implemented, James F. Robeson. (ERA citation 03:048187)

Department of Transportation, Federal Energy Administration, Tennessee University, Knoxville, Department of Energy June 1978, 178 p.; Urban Freight Consolidation Workshop, Knoxville, Tennessee, January 13, 1976.; ACKNOWLEDGMENT: NTIS; ORDEP FROM: NTIS; CONF-760165

47 188006 EFFORTS TO IMPROVE GOODS MOVEMENT IN DALLAS. The paper discusses a study that developed alternative solutions to the goods distribution problem in the CBD. The project was specifically designed to: provide immediate solutions for some of the problems encountered by delivery and service vehicles presently serving downtown Dallas, and identify alternative means of serving those vehicles whose function may not be compatible with the long-range truck tunnel plan. The project was an effort designed to identify solutions, evaluate those alternatives, and implement some of the more viable solutions.

Kelly, RW (Off of Transp Programs, City of Dallas, Tex) Holder, RW ; Institute of Transportation Engineers 1977, pp 394-403; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

47 188010 INNOVATIONS IN URBAN GOODS MOVEMENT. This paper looks at innovations in urban goods movement in the context of economic and political reality. It overviews dimensions of the urban goods movement problem as it relates to urban growth and economy; identifies impacted groups; and analyzes real and pseudo-solutions. The paper suggests better street traffic management; auto-free zones rather than truck-free zones; and selective construction of truckways and truck streets. It calls for consolidated shipping and receiving areas in office buildings; increased cargo containerization; and strategic development of transportation facilitation centers.

Levinson, HS (Smith (Wilbur) and Associates) ; Institute of Transportation Engineers 1977, pp 404-412; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers at the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

47 189342 URBAN FREIGHT CONSOLIDATION: LEGAL ATTITUDINAL, AND OPERATIONAL CONSIDERATIONS ASSOCIATED WITH IMPLEMENTATION. The problem of transporting small shipment of general freight by motor carrier within an urban center has become an important U.S. transportation problem today. Of the several alternatives proposed to solve the urban congestion/small shipment problem, the concept of freight consolidations is pointed out herein as having the greatest merit. This study examines the issues associated with implementing the concept of urban freight consolidation. It includes an analysis of the legal implications of alternative forms of ownership and the impact which ownership might have on operating rights. In addition, it reports the findings of a national survey conducted to determine the attitudes toward urban freight consolidation held by consignees, consignors, transport agents, public warehousemen, and planning agents. It also examines the concerns expressed by each of the proceeding publics relative to implementing and operating a consolidation terminal or series of terminals. The primary focus of this research is to investigate the economic and social impact which an urban small shipment consolidation terminal might have on a typical metropolitan area such as Columbus, Ohio. This report concludes that: urban goods consolidation is economically feasible and socially desirable; there are no apparent legal restrictions that cannot be overcome; and the attitudes toward consolidation by the publics are favorable. A set of conclusions stating how urban terminal consolidation might best proceed is also included. /UMTA/

Robeson, JF ; Ohio State University, (OH-11-0001) Final Rpt. UMTA-OH-11-0001-78-2, May 1978, 122 p.; Sponsored by the Department of Transportation, Urban Mass

Transportation Administration. Related reports: "The Economic Feasibility and Social Desirability of an Urban Goods Consolidation Terminal," PB-239853; "An Analysis of Constructing and Operating an Urban Goods Consolidation Terminal," PB-238854; and "Modeling the Urban Goods Consolidation Terminal, Site Selection Decision," PB-249529; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-286547

47 189343 THE LOCATION AND SIZING OF URBAN FREIGHT TERMINALS WITH MULTIPLE PLANNING PERIODS: THE URBAN TERMINAL INVESTMENT MODEL (UTIM). The purpose of this research was to develop and test an Urban Terminal Investment Model (UTIM) for use in the design decisions required to locate, construct, and operate a network of terminal facilities. Several overall criteria are presented as guidelines to produce a model and a solution procedure which permits terminal planning on a routine basis. This research has led to a design methodology which is currently operational for use by transportation planners. The methodology is implemented with computer programs collectively called UTIM. This document contains an investigation of the economic advantages of consolidation terminals for the distribution of small-shipment freight in large metropolitan areas. Planning models for two different system operating rules which assign freight flows to terminals are developed. The models are designed to identify least cost terminal system configuration which are valuable in assessing the economic attractiveness of freight consolidation relative to other goods movement methods. The UTIM models are nonlinear integer programs which are solved with new partial enumeration methods developed in this research. The research results included realistic evidence for potential economic superiority of multiple terminal networks over a single facility, namely, for cities whose metropolitan areas are characterized by spread out commercial zones and concentrated truck carrier locations. Application of the UTIM models was tested, using data for the Columbus, Ohio, area. For this analysis, the least cost configuration was a single consolidation facility which was estimated to permit significant cost savings over the current goods movement system. /UMTA/

Clark, GM Ashton, WB ; Ohio State University, (OH-11-0001) Univ Res. UMTA-OH-11-0001-78-3, Dec. 1977, 232 p.; Sponsored by the Department of Transportation, Urban Mass Transportation Administration. Other reports: "A Methodology for Determining Characteristics of Small Shipments," PB 279-649; "An Analysis of Constructing and Operating an Urban Goods Consolidation Terminal," PB 239-854; "Modeling the Urban Goods Consolidation Terminal, Site Selection Decision," PB 249-529.; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS; PB-286490

47 189858 SPACE ALLOCATION GUIDELINES FOR OFF-STREET LOADING FACILITIES. ABRIDGMENT. This report summarizes the results of the third and final year of a study related to the facilitation of urban goods movement. The first year of study dealt with data acquisition, the second year developed and validated the methodology, and the third

year sought to develop guidelines for the efficient allocation of curbside and off-street space for urban goods movement. Brief descriptions of the data sources and the developed methodologies and a detailed description of the guidelines with application examples for off-street loading requirements, primarily in downtown areas, are presented here. The basic premise in the space allocation guidelines is that goods movement is a part of a total transportation system. Space allocation for goods movement must recognize and accommodate other urban transportation needs. Consequently, the procedure in this space allocation model is to find the number of off-street berths that minimize total annualized cost in dollars for all impartial groups.

Habib, PA (Polytechnic Institute of New York) Crowley, KW (Pennsylvania State University, University Park) *Transportation Research Record* No. 668, 1978, pp 7-9, 3 Tab., 7 Ref.; This paper appeared in TRB Research Record No. 668, Freight Movement and Demand.; ORDER FROM: TRB Publications Off

47 196834 THE ROLE OF THE TRAFFIC ENGINEER AND TRANSPORT PLANNER IN URBAN FREIGHT. This paper reviews developments in freight planning and research over recent years, it presents a framework within which freight considerations might be conceptualized, and discusses some specific ways in which the transport planner or traffic engineer can tackle problems created by freight movements, or take steps to facilitate such movements. (A) /TRRL/

Ogden, KW ; Monash University, Australia, (0156-2126) Monograph Working Paper 78/10, Nov. 1978, 9 p., 14 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 237003), Australian Road Research Board

47 196895 CONSOLIDATED GOODS DISTRIBUTION SYSTEMS IN URBAN AREAS [Varudistribution i taetort. System foer samordnad varudistribution]. The objective of this work was to analyse possible systems for consolidation of goods distribution. Mainly the study has been limited to the link of distribution between wholesaler and retailer. The present structure of goods distribution and connected problems are reported together with distribution statistics and deficiencies in data. Development trends are dealt with and criteria which concern the construction of and choice between consolidation alternatives. Properly, there are only two theoretical principles for the consolidation of physical distribution of goods: route driving and transfer terminals. These two principles have resulted in consolidation models. The models were tested regarding required number of vehicles, driving distance with load and empty, ton-kilometres produced, capacity ton-kilometres utilized, time used on route and at terminal, costs on route and at terminal. The calculations show that the most economical model is a "mobile terminal", i.e. sorting on the vehicle. Nevertheless, models with stationary terminal and separate or combined routes for pick-up and delivery are more interesting in practice. Also more complex models with practical connections have been designed and calculated. One result indicates that a relatively great number of destinations and delivery sizes under 50 kilograms are required as a basis for a profitable transfer terminal. /TRRL/ [SWEDISH]

Vattenbyggnadsbyraan Monograph Slutrapport 37/36-42, Sept. 1977, 115 p., Figs., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 240385), National Swedish Road & Traffic Research Institute

47 263352 SOME FALLACIES IN URBAN GOODS MOVEMENT (ABRIDGMENT). This paper explores some misconceptions in the field of urban goods movement. These fallacies include the following: (1) All trucks are used to move goods; (2) Goods movement-generated congestion in the CBD is on the increase; (3) Consolidation of urban goods movement will produce major benefits to all concerned; (4) Consolidation of urban goods movement will relieve downtown congestion; and (5) Urban goods movement can be improved by using rail rapid transit facilities during off-peak hours.

Mohr, E (California University, Berkeley) *Transportation Research Record* No. 496, 1974, pp 105-108, 1 Tab.; ORDER FROM: TRB, Orig. PC

47 300128 INNER SYDNEY TRUCK ROUTE STUDY. The adverse environmental impacts of motor vehicles and particularly heavy trucks have increasingly become a matter of public concern. In Sydney some local councils have reacted by restricting heavy vehicles or through traffic from using local streets. Yet trucks perform an important commercial duty and an efficiently functioning road system is important to the entire community. This trade-off between environmental and road user needs is most pronounced in the inner Sydney area. Prohibiting trucks from using all but classified roads in this area is a possible extension of present programs. The expected results and implications of such an action are discussed. /Author/TRRL/

Leavens, R ; New South Wales Ministry of Transport, Australia, (0313-6655) Conf Paper 1979, pp 50-62, 2 Tab., 10 Ref.; From the Papers of the Fifth Australian Transport Research Forum, Sydney, 18-20 April 1979.; ACKNOWLEDGMENT: TRRL (IRRD 239207), Australian Road Research Board

47 300255 URBAN GOODS MOVEMENT IN SYDNEY. Urban goods movement has been disregarded in transport planning and policy formulation within Australia. As a result there is little information available on which to base a case for reducing the generalised social cost of urban goods movement. While this composite figure can be separated into costs associated with transport operation, externalities, the community and urban structure, we lack knowledge on these cost components and how they interact with each other in a system setting. These inadequacies prompted this study to focus on an understanding of the urban goods process as its prime objective; they also suggested the adoption of an incremental planning approach as its context. Within this general framework the Sydney case study is directed to identifying and locating the urban goods movement system's deficiencies, after a preliminary assessment of the magnitude of the task in terms of commercial vehicle trips. These shortcomings are separated into operational, spot network and major network deficiencies and a matching set of strategies are developed including projects that can be implemented with certainty of success-an emphasis that results in most of the suggestions being characterised by flexibility and low cost positive benefits. /TRRL/

Rimmer, PJ (Australian National University); Australian Government Publishing Service, (0 642 03688 8) Monograph Occasional Paper 17, 1978, 84 p., 8 Fig., 10 Tab., Refs.; Published for the Bureau of Transport Economics, Australia.; ACKNOWLEDGMENT: TRRL (IRRD 238054), Australian Road Research Board

47 301288 URBAN GOODS MOVEMENT. A DISAGGREGATE APPROACH. The recommended approach to the developing of techniques which will allow urban goods movements to be adequately included in the urban transportation planning process is two-pronged. First, research should begin by using all the available knowledge that has been developed in the analysis of the movements of people. The model system developed to represent and forecast passenger movements is a logical point of departure for an attempt to design a model system to represent the movements of goods. Second, since we start in a state of extreme ignorance, a detailed analysis of goods movements is called for. This detail will be preserved if a disaggregate approach is taken. The remainder of the book is devoted to a description of a study which takes this approach in a preliminary attempt to build a goods movement generation model. Chapter 2 presents background material on both the disaggregate approach and previous work on commercial trip generation. Chapter 3 describes the objectives of the study, the study area, and the data collection effort. Chapter 4 presents and describes the data in a case study type analysis of the firms observed and their goods movements. Chapters 5 and 6 describe the statistical analysis of the truck and shipment movements, respectively. Chapter 7 examines relationships between the truck and shipment models. Chapter 8 is a digression on the application of disaggregate techniques to intercity freight movements. Chapter 9 is a summary of the conclusions of the study and recommendations for further research. /Author/

Watson, PL (International Bank for Reconstruction & Development); Heath Lexington Books, (0-669-92528-4) 1975, 110 p., Figs., Tabs.

47 301699 ESTIMATING TRUCK TRAFFIC FOR ANALYZING UGM PROBLEMS AND OPPORTUNITIES. Based upon an assessment of the nature of urban goods movement (UGM) problems and opportunities identified in small urban areas, the paper examines simplified demand estimation techniques. The potential usefulness of several truck travel estimation techniques for evaluating different types of UGM problems and opportunities are discussed.

Chatterjee, A (Tennessee University, Knoxville) Wegmann, FJ Brogan, JD Phiu-Nual, K *ITE Journal* Vol. 49 No. 5, May 1979, pp 24-32, 18 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

47 302501 URBAN GOODS MOVEMENT IN CANADIAN CITIES. This report presents the results of phase I of a multi-phased program aimed at improving urban goods transportation in Canada. The objectives of phase I have been: to identify the character and importance of the urban goods transport problem; and to develop and test an analytical methodology for calculating the effectiveness of potential improvements to the urban goods transport system. /TRRL/

Urban Goods Movement Report Series Mono-

graph Vol. 2 Dec. 1978, 314 p., 16 Fig., 49 Tab., 23 Ref. ACKNOWLEDGMENT: TRRL (IRRD 242055), Roads and Transportation Association of Canada

47 302524 URBAN TRANSPORTATION PLANNING FOR URBAN GOODS AND SERVICES. A REFERENCE GUIDE. The urban transportation of goods and services can be defined as the movement of things (as distinct from people) within urban areas. Virtually all of this movement is accomplished by motor truck. Traffic engineers and planners have not given extensive attention to truck operations in urban areas. It is the primary intent of this reference guide to address short-range traffic engineering and transportation planning needs associated with urban trucking. Incorporating urban goods movement into the urban transportation planning process can result in significant improvements in the transportation system and can create corresponding benefits to the community. Currently, the procedures and data needed to evaluate urban trucking problems are generally not available. This guide documents data, techniques, and methodologies that can be used by traffic engineers and planners to both identify the nature of the problems and to evaluate alternative problem solutions. In addition to presenting data pertaining to urban trucking, techniques are documented that can be used to collect site-specific data for use in "spot-checking" the applicability of the data presented to the problem being evaluated. (Author).

Christiansen, DL; Texas Transportation Institute, Federal Highway Administration June 1979, 71 p., Figs., Tabs., Photos., Refs., Apps.

47 303078 A FRAMEWORK FOR URBAN GOODS MOVEMENT INFORMATION IN CANADA. This volume is the last in a series of nine volumes on urban goods movement (UGM). The study reported here identifies the available research projects in Canada on UGM issues, develops a classification scheme on the basis of identified UGM projects, and assesses the Canadian UGM as consistent with the classification scheme. The study attempts to devise a unified UGM information framework in Canada, in a comprehensive manner sufficient to disseminate to all interested groups. A data-identification survey collected all available study reports together with some notes and verbal information. Each study was then summarized and data classifications were prepared. This report presents the data classification structure and describes the motivation for its form. It also presents the actual inventory of the available data. Urban goods movement research information is discussed in the light of the data inventory. Reviews of the UGM studies are appended. The title of the eight other volumes are: Urban Goods Movement Research-A Framework and Results; Urban Goods Movement in Canadian Cities; A Profile of Urban Goods Flow in Calgary; Myths and Realities of Urban Pickup and Delivery Operations; Evaluation of Urban Trucking Rationalization in Vancouver; Potential Energy Conservation in Urban Commodity Flow; Consolidated Building Receiver Demonstration; and Study of Off Street Urban Trucking Endpoint Facilities.

Bhattacharyya, SK Kuhn, TE Bates, M Ferguson, JR Belanger, R Farmer, M; TEE Consulting Services, Incorporated, Transport Canada, Cana-

dian Surface Trans Admin Vol. 9 TP 1837, Mar. 1979, 291 p., Figs., Tabs., Apps.

47 304174 GREENWICH-LEWISHAM FREIGHT STUDY. The study was undertaken to obtain a clear understanding of the working of the freight transport system in a sample sector of London. The study area chosen contains a wide variety of land uses and suffers many of the environmental and traffic problems common in conurbations. The surveys were designed to provide a general description of freight movements and the activities giving rise to them together with an understanding of the transport requirements and objectives of firms and their likely reactions to possible controls on goods vehicle movements. The data collected demonstrate the complexity of conurbation freight operations and have been used by the Greater London Council in its study of lorry routing and large-area controls. The results indicate that such restrictions can only be supported if adequate alternative roads are available to accommodate the diverted traffic.

Hasell, BB Christie, AW; Transport and Road Research Lab., Crowthorne, (England). 07 TRRL-SUPPLEMENTARY-4, c1978., 43p; Also pub. as ISSN-0305-1315; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297459/OST

47 304749 REQUIREMENTS AND SPECIFICATIONS FOR OFF-HOURS DELIVERY. The research examines the feasibility of off-hours delivery- delivery of goods and services between 6 p.m. and 6 a.m.- as a technique for reducing the adverse impact of delivery vehicles on urban traffic. The state-of-the-art of off-hours delivery and its financial and institutional constraints are presented. The information analyzed in this report was obtained through personal interviews with elected officials, planning officials, traffic engineers, union representatives, and a broad cross-section of businesses which serve the central business districts of Washington, D.C.; Denver, Colorado; Atlanta, Georgia; and San Francisco, California. Many businesses already use off-hours pickups and deliveries and are quite content with such operations. Enough carriers provide off-hours service that there is little difficulty in obtaining such pickups and deliveries. Should there be a gradual shift toward more off-hours operations, the carriers would probably continue to maintain adequate service. Most of the interviewees recognized the advantages of efficiency and avoidance of congestion that are inherent with off-hours operation but felt that they are offset by increased labor and management costs. The interviewees could foresee no certain economic advantages to be gained with off-hours pickups and deliveries; the societal advantages associates with reduced congestion were viewed as remote.

Organization for Environmental Growth, Inc, Federal Highway Administration Final Rpt. FHWA-RD-79- 60, Apr. 1979, 130 p.; Contract DOT-FH-11-9327; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-102130

47 307680 RESEARCH CONDUCTED IN A LARGE CITY SELECTED WITH A VIEW TO SETTING UP AN INNER-CITY GOODS SUPPLY SYSTEM USING THE RAPID TRANSIT RAILWAY [Untersuchungen in einer ausgewählten Grosstadt zur Realisierung eines innerstädtischen Güterversorgungssystems unter Einbeziehung von Stadtschnellbahnen]. The article describes the results of a study of a system to supply 520 t of goods a day to the centre of Hamburg using 2 metropolitan railway lines. Due to the volume of passenger traffic in existing metropolitan stations, it would be necessary to envisage new construction. For the transport of goods, special containers are used, whilst the transport between station and ships is carried out either by underground conveyors, or by electric vehicles at street level. The cost of such a system is only slightly higher than transport by lorry, but it appears that the particularly favorable conditions encountered in Hamburg cannot easily be provided in other cities. [German]

Heckler, W *Internationales Verkehrswesen* Vol. 31 No. 4, July 1979, pp 195-197; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

47 308074 EVALUATION OF URBAN TRUCKING RATIONALIZATION IN VANCOUVER-PHASE 1 AND PHASE 2, VOLUME 5. A 2-part-study was performed to provide an overview of the goods distribution system throughout the city and to provide a detailed examination of the benefits and costs of establishing a consolidated terminal and consolidated delivery to serve a certain range of commodities to and from certain specified areas. The study estimated the total quantity of goods and the approximate breakdown among a range of goods categories, determined the number of truck trips, their origin and destination and trip distribution, evaluated the city truck route system, provided a new data base, and formulated a transportation model which could be used to test alternative solutions to specific problems. The second phase of the study used the data produced by the model in evaluating a consolidated terminal and delivery system, analysed the benefits and cost of the above innovative solution, and evaluated the objectivity and effectiveness of regulations governing the urban goods transportation industry. The transportation model consists of logical statements grouped into components and embedded in computer programs. It was concluded from use of the model that the results from the sample of truck movements represent a fraction of the total truck traffic. Expansion factors were used to transform sample data. A comparison of screen line counts with the factored values in the trip table showed a maximum difference of 15%. A generation component was calibrated. Further conclusions and recommendations regarding the model are included. Details of the existing freight transport infrastructure in greater Vancouver, the data collection procedures, the transportation model, overview of the truck system, and the evaluation of the truck routes are also included.

Swan Wooster Engineering Company, Limited TP 1836, Mar. 1979, v.p., Figs., Tabs., Refs., 2 App.; Prepared for the Urban Transportation Administration, Transport Canada.; ORDER FROM: Canadian Surface Transportation Administration, 1000 Sherbrooke Street West, Urban

Transp Research Branch, Montreal, Quebec H3A 2R3, Canada

47 311942 DELIVERY TRANSPORT--AN ESSENTIAL ELEMENT IN URBAN TRAFFIC. Roads to and from towns must be readily accessible to all, for it is only in this way that economy and trade can flourish. It may be said with justification that the quality of life of a city stands or falls by its traffic flow. The logical meaning of the flow of goods is an uninterrupted transport chain extending from the producer to the consumer, and city officials have a duty to ensure that the flow of goods does not come to a halt, and that delivery and distribution traffic has enough time to fully satisfy the requirements of customers. The author applauds the efforts of city authorities to clear city centers of traffic as far as possible, but warns that it is possible to go too far. City centers must not always consist of prohibitions, he says, advocating that priority should be allocated to commercial transport, with "no parking" and "no stopping" areas for other traffic, and specified loading areas or loading streets, provided that such measures are well thought out and provision made for maintenance of commercial traffic. (IRF)

Schober, R; International Road Transport Union Conf Paper No Date, 4 p.; Presented at the Fourth IRF African Highway Conference, Nairobi, Kenya, January 20-25, 1980. For individual papers see TRIS Accession Numbers 311921 through 311971.; ORDER FROM: International Road Federation, 1023 Washington Building, Washington, D.C., 20005

47 317025 SHORT-RANGE PLANNING FOR URBAN GOODS MOVEMENT. This article presents an overview of urban goods movement (UGM) problems and opportunities and focuses on short-range, low-cost opportunities for improving the UGM system. A strategy for identifying short-range opportunities and their implementation is discussed. The facts and findings are applicable primarily, although not limited to, small-and medium-sized urban areas of less than 750,000 population.

Chatterjee, A (Tennessee University, Knoxville) Robicheaux, RA Cadotte, ER Wegmann, FJ *Traffic Quarterly* Vol. 33 No. 3, July 1979, pp 381-395, 6 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

47 319701 STUDIES IN A SELECTED CITY ON THE REALISATION OF AN INNER CITY FREIGHT TRANSPORT SYSTEM WHICH UTILIZES RAPID TRANSIT RAILWAYS [Untersuchungen in einer ausgewählten gross-stadt zur realisierung eines innerstädtischen güterversorgungssystems unter einbeziehung von stadtschnellbahnen]. An attempt was made, by means of a model, to show the possibilities of using an existing rapid railway in inner city freight transport. The example is the city area of Hamburg where two underground railway lines are being used to deliver about 529 tons of goods daily. It is necessary to fit this into dense passenger transport without disturbing operations. The existing underground railway stations cannot be used because they are used to capacity by passenger transport; this means that new structures are necessary. Control of operations is by electronic data processing. Special

containers are used for the freight transport, and either subterranean transport or surface electric vehicles are used to transport the goods from the stations to the city shops. The total costs of this type of alternative delivery system are only a little higher than the costs of conventional lorry transport. This however implies complete transition from lorries to the rapid railway system. The particularly favourable conditions in Hamburg cannot be generally applied to the solution of similar problems in other towns. [German]

Internationales Verkehrswesen Vol. 31 No. 4, 1979, pp 195-197; ACKNOWLEDGMENT: TRRL (IRRD 311622), Federal Institute of Road Research, West Germany; ORDER FROM: Federal Institute of Road Research, West Germany, Bruhlerstrasse 1, Postfach 510530, D-5000 Cologne 51, West Germany

47 322573 URBAN ACTIVITY ALLOCATION UNDER CRITERIA OF TRANSPORTATION ENERGY EFFICIENCY. A linear programming optimization technique is applied to the problem of allocating new land using activities in an existing urban area. While it is recognized that energy is not yet as decisive a factor in the determination of household and firm locational patterns as other factors such as accessibility and time costs, the model attempts to resolve land allocation problems by means of minimizing total transportation energy costs alone. Such an analysis may serve as a benchmark against which other policies and their energy repercussions could and should be measured.

Romanos, MC (Illinois University, Urbana) Hatmaker, ML *International Journal of Energy Research* Vol. 4 No. 1, Jan. 1980, pp 1-10, 24 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

47 326373 MANHATTAN GARMENT CENTER URBAN GOODS MOVEMENT STUDY. PHASE I [Final rept]. The City of New York, with the U.S. Department of Transportation and the U.S. Environmental Protection Agency, has embarked on the Manhattan Garment Center Urban Goods Movement Study in order to better understand the goods movement process, to develop techniques to alleviate the difficulties of urban goods movement, and to implement these techniques. This Garment Center study represents the first major effort to investigate the goods movement problems existing in a major, highly urbanized environment. The project is a comprehensive study of urban goods movement and is organized to meet several objectives: (1) to be accessible and responsive to the community; (2) to develop, design, evaluate, and implement short-term, low capital improvements for the goods movement system; and (3) to identify long-term solutions to goods movement difficulties. This report presents a summary of Phase I of the Manhattan Garment Center Urban Goods Movement Study. Phase I consists of the development of a data base, analysis of the goods movement problem, and the implementation of short-range proposals to improve the movement of goods and people. It addresses such issues as the economic structure of the garment industry; pattern of land use; volume and patterns of traffic and curbside parking; air and noise pollution levels associated with the garment industry; and the implementation of a program of short-range low capital improvements. This Phase I report

states that the analyses, policy recommendations, and experiences of this project are appropriate for a study of urban goods movement in any area, particularly small metropolitan areas.

New York City Transportation Administration., Office of the Administrator.*Urban Mass, Transportation Administration, Washington, DC. UMTA-UPM-02-80-1, June 1976, 179p; ñSee also Appendix Volume 1, PB81-109266. ñ Also available in set of 5 reports PC E99, PB81-109241.; Contract DOT-OS-30053.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-109258

47 326374 MANHATTAN GARMENT CENTER URBAN GOODS MOVEMENT STUDY. PHASE I. APPENDIX VOLUME I. The Appendix Volume I, provides a detailed description of the activities and analyses conducted during Phase I of the Manhattan Garment Center Urban Goods Movement Study. Volume I provides an overview of the Garment Center including goods movement and the apparel industry; basic traits and industry trends of the apparel industry; outward movement of contractors; future trends; and an appendix discussing the Standard Industrial Classification System. The report also discusses the apparel industry questionnaire including method of data collection; summary of observations; general characteristics; location of contractor's facilities; characteristics of freight; and exhibits charting the apparel industry questionnaires. The third part of this volume discusses land use and economic data, including building analysis; zoning; assessed value; employment; rents and vacancy rates; and sample block segments.

New York City Transportation Administration., Office of the Administrator.*Urban Mass, Transportation Administration, Washington, DC. UMTA-UPM-02-80-2, June 1976, 167p; ñSee also Phase 1, PB81-109258 and Appendix Volume 2, PB81-109274. ñ Also available in set of 5 reports PC E99, PB81-109241.; Contract DOT-OS-30053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-109266

47 326375 MANHATTAN GARMENT CENTER URBAN GOODS MOVEMENT STUDY. PHASE I. APPENDIX VOLUME II. This

report is Appendix Volume II of the Phase I Final Report of the Manhattan Garment Center Urban Goods Movement Study. In this report, the observations made about the difficulties of goods movement in the Garment Center are manifested in the traffic volumes and the characteristics observed, namely, the high traffic volumes (185,000 vehicles traverse the district daily). This report deals with the characteristics of vehicular traffic in the area, including apparel-related and non-apparel related traffic, pedestrian and hand-cart movements, and their relationship on vehicular activity and congestion. Two graphic models are also presented in this report. The micro model shows the volumes, modes, and times spent per segment of the apparel making process by the typical firm; and the macro model indicates the type and volume of commodities entering, leaving, and circulating within the Center. Costs of the Goods Movement System are also presented, including direct/indirect transportation costs, service costs, and potential cost reductions.

New York City Transportation Administration., Office of the Administrator.*Urban Mass, Transportation Administration, Washington, DC. UMTA-UPM-02-80-3, June 1976, 179p; ñSee also Volume 1, PB81-109266 and Appendix Volume 3, PB81-109282. ñ Also available in set of 5 reports PC E99, PB81-109241.; Contract DOT-OS-30053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-109274

47 326376 MANHATTAN GARMENT CENTER URBAN GOODS MOVEMENT STUDY. PHASE I. APPENDIX VOLUME III. The report is Appendix Volume III of the Phase I Final Report of the Manhattan Garment Center Urban Goods Movement Study. The environmental effort of this study includes an analysis of the public costs of goods movement in terms of air and noise pollution and accidents. The public costs of goods movement also include an analysis of carbon monoxide emissions; estimation of the health costs of air pollution; ambient noise conditions; and the relationship of vehicular activity and congestion to accident costs in the New York City Garment Center. This report also presents some of the tools developed during the course of this study for the collection of data. The

report contains a bibliography that includes previous Garment Center studies as well as a list of readings.

New York City Transportation Administration., Office of the Administrator.*Urban Mass, Transportation Administration, Washington, DC. UMTA-UPM-02-80-4, June 1976, 157p; ñSee also Volume 2, PB81-109274 and Phase 2, PB81-109290. ñ Also available in set of 5 reports PC E99, PB81-109241.; Contract DOT-OS-30053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-109282

47 326377 MANHATTAN GARMENT CENTER URBAN GOODS MOVEMENT STUDY. PHASE II [Final rept]. This Final Report is the culmination of a pioneering effort in the field of urban goods movement (UGM). It is an intensive study of the character and the transportation aspects of New York City's premier manufacturing industry. The study was undertaken to examine and recommend goods movement improvements in the Manhattan Garment Center. The purpose was to relieve traffic congestion and its harmful effects, and thereby strengthen the garment industry's economic ability to function. Many of the proposals examined in the course of this pioneering effort in the field of UGM are potentially applicable to other apparel manufacturing areas as possible solutions to goods movement problems in general. Phase I of this study developed an understanding of the Garment Center's goods movement problems, as well as the implementation of several low capital improvements. Phase II, this report, expanded the knowledge and experience gained to Phase I and developed and recommended a series of significant improvements, both short and long-range.

New York City Transportation Administration., Office of the Administrator.*Urban Mass, Transportation Administration, Washington, DC. UMTA-UPM-02-80-5, Dec. 1979, 311p; ñSee also Appendix Volume III, PB81-109282. ñ Also available in set of 5 reports PC E99, PB81-109241.; Contract DOT-OS-30053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-109290

48 041668 THE OIL CRISIS: THIS TIME THE WOLF IS HERE. It was a popular belief in the 1960s that the supply of oil was abundant. As late as 1970, it was believed that the U.S. could remain essentially self-sufficient in oil. Recognizing the dangers of dependence on oil from the Eastern Hemisphere, a Presidential Task Force recommended that imports from the Eastern Hemisphere be limited to 10% of total U.S. oil consumption, a level expected to be reached in the mid-1980s. These projections were spectacularly wrong. Imports from the Eastern Hemisphere amounted to 15% of consumption in 1972, and are expected to rise to 20% in 1973. The source of these errors were: (1) overestimates of domestic capacity, and (2) the decline of natural gas supplies and its impact on oil demand. Most of the world's proven oil reserves are in Arab hands. We must recognize that previous political threats on restriction of oil have been directed against the U.S. alone, not against our allies. By 1980, we will be even more dependent on oil from the Middle East. The present price agreements are defined only through 1975. Production is leveling off in the Middle East. The only alternative to shortfall before 1980 will be Saudi Arabia, and its projected production seems improbably high. The U.S. has discussed a two-pronged approach to consumer cooperation: (1) development of new forms of energy, and (2) an international authority to avoid cutthroat competition in times of shortage. In the long run, the only satisfactory position for the U.S. must be alternative sources of energy. Effective mass-transit systems could do much to limit our present profligate use of energy in the form of oil.

Akins, JE *Foreign Affairs* Vol. 51 No. 3, Apr. 1973, pp 462-490; ACKNOWLEDGMENT: Foreign Affairs; ORDER FROM: Council on Foreign Relations, Incorporated, 58 East 68th Street, New York, New York, 10021 Repr PC

48 043884 LECTURES IN TRANSPORTATION NOISE. This textbook comprehensively reviews the theory and practice in assessment of transportation noise problems at a level geared to the needs of practicing acousticians and transportation engineers. Starting from a traditional source-path-receiver analysis of sound, the author develops these concepts in relation to today's major transportation noise sources-aircraft, sonic boom, automobiles, trucks, and rail vehicles. This book is designed to be a self-study introduction to a field of growing importance, a textbook at the level of college seniors or graduate students, or a source book of data and engineering formulae for the practicing professional. Along with outdoor sound and sonic boom, propagation, interior noise in aircraft cabins, automobiles, trucks, and rail transit vehicles, and transmission into rooms and buildings are treated.

Lyon, RH (Massachusetts Institute of Technology); Grozier Publishing, Incorporated 1973, 252 pp, 244 Fig, 1 App; ORDER FROM: Grozier Publishing, Incorporated, 81 Grozier Road, Cambridge, Massachusetts, 02138

48 046380 ENERGY-INTENSIVENESS OF TRANSPORTATION. Historical, present, and possible future patterns of energy consumption in the transportation sector are examined for intercity freight and passenger traffic and for urban passenger traffic. The energy-efficiencies among

the various transport modes are quite variable. Airplanes are relatively inefficient; cars and trucks are slightly more efficient; and railroads, waterways, pipelines, mass transit, and buses are quite efficient. The energy implications of changes in modal mix for freight and passenger transport are explored using two hypothetical futures.

Hirst, A *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE1, 9558, Feb. 1973, pp 111-122; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

48 046702 ENVIRONMENT AND RAPID TRANSIT CONSTRUCTION. Rapid transit systems must be constructed in a hostile environment. The space required for construction is already crowded. Hinderance of traffic must be avoided or minimized. Existing utility systems and adjacent structures must be maintained and remain useful during construction and must be restored to as good as, or better than, original condition upon completion. Care must be exercised to minimize imitation or harm to the public. All these factors cost extra expense and time, but the effect may be lessened by preparatory work, by vigorous public relations, by working closely with governing officials, and by timely acquisition of real estate.

Kline, GO *ASCE Journal of Transportation Engineering* Proceeding Vol. 99 No. TE2, 9751, May 1973, pp 367-70; ACKNOWLEDGMENT: ASCE; ORDER FROM: ESL, Repr PC, Microfilm

48 046831 TRANSPORTATION AND ENVIRONMENTAL PROTECTION. A change is coming in American transportation. Some optimists say that by the end of this century, 16-year-olds becoming eligible to drive may not even want to because mass transit will offer far greater convenience. And those vast parking lots that pave over many of our cities will have been replaced by green urban gardens. During the last several years the American people have embraced a new environmental ethic inspiring serious, hard, unprecedented planning and also to a greater willingness to accept innovation. Much of this new effort at grappling with the pervasive with the pervasive transportation problem results from federal legislation requiring controls on air pollution.

Ruckelshaus, WD, Administrator (Environmental Protection Agency) *Traffic Quarterly* Apr. 1973, p 173; ACKNOWLEDGMENT: ORDER FROM: Eno Foundation for Transportation, Incorporated, Saugatuck, Connecticut, 06880 Repr PC

48 046850 NOISE AND VIBRATION LEVELS SUIT BALLASTLESS TRACK FOR UNDERGROUND RAILWAYS. Trials on Paris RER with Stedef RS sleepers on concrete bed compared with conventional track carried out in co-operation with SNCF technical services and results obtained show favourable results with direct rail fastenings and the slightly higher noise level may be alleviated by distributing a blanket of gravel aggregate along the sleepers.

Rail Engineering International Vol. 3 No. 5, June 1973, 5 pp, 9 Fig; ACKNOWLEDGMENT: Rail Engineering International; ORDER FROM: Broadfields (Technical Publishers) Limited, Little Leighs, Chelmsford, Essex CM3 1PF, England Repr PC

48 046887 RELATIONSHIP OF TRANSPORTATION AND LAND USE TO AIR QUALITY: A SYSTEMS APPROACH. A systems framework for investigating the relationship of urban transportation and land use to air quality is set forth in this paper. The nature and interrelationships of the major components of the flow of airborne residuals are outlined, and the residuals management process is examined in terms of its components and their attributes. Part II consists of the analysis of the problem of mobile source emissions in the context of the general framework suggested in Part I. Possibilities for modeling the emissions-transportation system-land use interface are briefly explored and some alternative solutions are suggested.

Conner, HC, Jr (Environmental Protection Agency) Dzurik, AA (Florida State University, Tallahassee) *Journal of Environmental Systems* Vol. 3 No. 1, Apr. 1973, pp 69-84; ORDER FROM: Baywood Publishing Company, 1 Northwest Drive, Farmingdale, New York, 11735 Repr PC

48 047535 NOISE IN TRANSIT SYSTEMS. The Hamburg (80 decibels) and Toronto (85 decibels) transit systems, both of which are "steel-on-steel," prove that proper design and maintenance can provide a pleasantly quiet system and, in fact, can be quieter than a rubber-tired system. The average levels in New York trains, by contrast, are between 95 and 100 decibels. Some of the techniques used successfully to reduce noise levels are sound-absorbing materials on ceilings and walls in stations; sound-absorbing concrete blocks between rails in stations; lubricated rails on curves; rubber suspensions on cars; damped and isolated car-body design; continuous welded rail; special wheels, either damped or resilient; and air springs.

Huss, MF McShane, WR *Traffic Quarterly* Vol. 27 No. 2, Apr. 1973, pp 239-253; ORDER FROM: Eno Foundation for Transportation, Incorporated, Saugatuck, Connecticut, 06880 Repr PC

48 050058 ENERGY REQUIREMENTS FOR PASSENGER GROUND TRANSPORTATION SYSTEMS. A study is made of the amount of energy expended by an individual traveling by different ground transportation modes. Three typical trips are examined, namely: the Intraurban Commute, the Suburban/Urban Commute, and the Intercity Trip. The study begins with a look into the current and potential transportation energy resource situation, followed by a presentation of the transportation/energy efficiencies of a wide variety of ground transportation systems. Finally, a breakdown of the energy consumed by an individual making the three typical trips is presented. A variety of multimodal trips are compared with single modal trips from the basis of energy consumed. It is concluded that information of this type should be made available to the general public to illustrate an individual's impact upon our limited petroleum based energy resources.

Goss, WP McGowan, JG; Massachusetts University, Amherst 73-ICT-24, Sept. 1973; Presented at the Intersociety Conference on Transportation, September 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

48 050320 IS RAPID TRANSIT ON THE RIGHT TRACK? This article discusses the air pollution and traffic congestion which the automobile has brought to American cities, and then discusses rapid transit alternatives. The article covers the several types of transit systems being developed, including 'People Movers'. The article also covers existing and newly completed rapid transit systems including Chicago's system, BART, and the PATCO Lindenwold Line, and it discusses Los Angeles needs for rapid transit of some kind.

Barnett, C *Mainliner* Vol. 11 No. 10, Oct. 1973, pp 30-36; ORDER FROM: East/West Network, Incorporated, 5900 Wilshire Boulevard Suite 300, Los Angeles, California, 90036 Repr PC

48 051399 INTEGRATION OF ENVIRONMENTAL ISSUES IN THE URBAN TRANSPORTATION PLANNING PROCESS. During the past decade, environmental degradation has been increasing in our urban areas at a fast pace. A major cause of this degradation is attributed to our transportation systems and to the lack of perception and consideration of the environmental issues in the transportation planning process. These issues and problems are analyzed and suggestions are made as to how solutions can be integrated in the different phases of the planning process. These suggestions are in the form of institutional and methodological changes dealing with the planning process.

Mouchaboir, GE Arrillaga, B (Mitre Corporation); American Society of Mechanical Engineers Paper 73-ITC-51, Sept. 1973, 15 pp, 5 Fig, 4 Tab, 9 Ref; Contributed by the Intersociety Committee on Transportation for presentation at the Intersociety Conference on Transportation, Denver, Colo., Sept. 23-27, 1973.; ACKNOWLEDGMENT: ASME Journal of Mechanical Engineering; ORDER FROM: ESL, Repr PC, Microfilm

48 052073 TRANSIT PLANTING: A MANUAL. Public transportation environments in urban areas could look more attractive and function more efficiently by careful attention to ecological and horticultural factors. Various landscapes are introduced in which highly reliable, all-season plants would be a prime contributor to the design. The manual can strengthen citizen support and stimulate local action aimed at "greening up" urban environments. Judgments on the suitability of specific plants in specific environments are based on ecological adaptability, taking into account such factors as climate, the plant's ability to resist pollution, and the amount of care required to maintain the specific plant. Besides an analysis of national zones and alphabetical lists of plants according to scientific and common names, specific applications are discussed in relation to bus stops, suburban terminals, and downtown stations.

American Horticultural Society, (UMTA-VA-06-0006-73-1) June 1973, 68 pp; ORDER FROM: NTIS, Repr PC, Microfiche; PB 223570, DOTL NTIS

48 052164 AERODYNAMIC AND THERMODYNAMIC VALIDATION TESTS IN BERKELEY HILLS TUNNEL. VOLUME I. A milestone report has been prepared on the project 'Ventilation and Environmental Control in Subway Rapid Transit Systems,' one of many such

reports leading to the final product--a 'Subway Environment Design Handbook.' The report describes a series of field tests conducted on the Bay Area Rapid Transit (BART) system in California for the purpose of validating analytical tools developed for the project. The document is the first volume in a two volume set.

Transit Development Corporation, Incorporated, (UMTA-DC-06-0010) Final Rpt June 1973, 123 pp; Prepared in cooperation with the Associated Engineers/A Joint Venture. See also Volume 2, PB-226 897.; ACKNOWLEDGMENT: NTIS (PB-226898/5); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226898/5, DOTL NTIS

48 052165 AERODYNAMIC AND THERMODYNAMIC VALIDATION TESTS IN THE BERKELEY HILLS TUNNEL. VOLUME II. The report describes the validation of a subway environment simulation (SES) computer program. This validation was done by field test in the Berkeley Hills tunnel of BART. Volume 2 contains the detailed pressure measurements made inside the tunnel, on-board six-car trains and at the tunnel portal. Pressure measurements involve entry and exit transients and pressure fluctuation inside the tunnel caused by both train and emergency fan operations.

Transit Development Corporation, Incorporated, (UMTA-DC-06-0010) Final Rpt June 1973, 63 pp; Prepared in cooperation with the Wilson, Ihrig, and Associates, Oakland, Calif. See also Volume I, PB-226 898.; ACKNOWLEDGMENT: NTIS (PB-226897/7); ORDER FROM: NTIS, Repr PC, Microfiche; PB-226897/7, DOTL NTIS

48 053988 ENERGY INTENSIVENESS OF PASSENGER AND FREIGHT TRANSPORT MODES: 1950-1970. Previous work at ORNL evaluated the energy consequences of changes in freight and passenger traffic levels and shifts in modal mix for the period 1950 to 1970. The research reported here extends this work to include an analysis of changes in energy intensiveness for individual modes during this period. Examination of individual modes shows that airplanes are energy-intensive and that cars and trucks are less so. Buses, mass transit, railroads, pipelines, and boats are relatively energy-efficient. Railroad energy intensiveness dropped sharply during this 20-year period because of the shift from steam engines to diesel engines. On the other hand, airplane energy intensiveness increased rapidly because of increased speed. Other modes generally showed slight increases in energy intensiveness. Energy intensiveness of inter-city freight declined during this period because of the large drop in railroad energy intensiveness. However, passenger transport became more energy intensive because of shifts to airplanes and autos and because of a general increase in energy intensiveness for all passenger modes. Results derived here are summarized in a number of ways to highlight important shifts in energy use patterns for transportation.

Hirst, E ; Oak Ridge National Laboratory ORNL-NSF-EP-44, Apr. 1973, 39 pp, 8 Fig, 12 Tab, 26 Ref, Apps; IA NSF 40-237-70; ACKNOWLEDGMENT: Oak Ridge National Laboratory; ORDER FROM: Oak Ridge National Laboratory, Oak Ridge, Tennessee, 37830 Repr PC

48 054348 MEASUREMENT OF SOUND PROPAGATION IN BODIES AND THE AIR ON UNDERGROUND RAILWAY LINES [KORPERSCHALL UND LUFTSCHALLMESSUNGEN AN UNTERIRDISCHEN SCHIENENBAHNEN]. The results obtained from these tests to measure sound propagation in bodies, carried out with various types of track construction, show that sound propagation in bodies is reduced in neighbouring buildings as well as by special track constructions, and building methods used for tunnel construction. Details are given about the various factors affecting the extent of propagation, in the air, of sounds coming from vehicles passing through tunnels. To reduce traffic noise in stations, it is recommended that they be equipped with special noise absorbing material. [German]

Hauck, G Willenbrink, L Stuber, C *Eisenbahntechnische Rundschau* Vol. 22 No. 7, 1973, 12 pp, 15 Fig; ACKNOWLEDGMENT: UIC (1246); ORDER FROM: Hestra-Verlag, Hernichel und Dr. Strasse, Darmstadt, West Germany Repr PC

48 054684 LEAD POISONING PERILS CREW RAZING EL. The men who are doing work as part of the demolition of the Third Avenue elevated line in the Bronx have run into a danger they had not anticipated--lead poisoning. As they burned through the huge beams coated with an 83-year accumulation of lead-containing paint, the workmen have been apparently inhaling large amounts of lead fumes.

Brody, J *New York Times* May 1974, p 33; ORDER FROM: New York Times Company, 229 West 43rd Street, New York, New York, 10036 Repr PC

48 054758 TOWARD MORE TRANSPORTATION WITH LESS ENERGY. Proposals for shifting intercity and urban traffic to modified systems with better energy efficiency are developed. With these, per capita transportation could be maintained or increased and door-to-door travel convenience could be maintained or improved within the hypothesized constraint. A table shows how the author would provide under what he calls a "semi-austerity" transport energy budget nearly twice the total of passenger-and ton-miles of transport by 1995 with no increase in petroleum consumption. The plan calls for considerable increase in the traffic carried by intercity passenger buses and trains, urban buses, and railway piggy-backing of road trailers. Two new developments are projected--a sizable fleet of urban passenger automobiles and a fleet of intercity passenger-carrier auto-trains to give these urban automobiles intercity capability.

Rice, BA *Technology Review* Vol. 76 No. 4, Feb. 1974, pp 45-53; ORDER FROM: ESL, Repr PC, Microfilm

48 056742 STATISTICAL ANALYSIS OF CONTINUOUS DATA RECORDS. Simple stochastic techniques described permit efficient utilization of information contained in continuous data records. Statistical parameters are analogous to corresponding random variable quantities. Evaluation of autocovariance functions provide approximate results for a large number of physical phenomena. Simple hypothesis testing techniques follow directly from the procedures presented. Actual subway noise data illustrate application of the techniques.

Corotis, RB (Northwestern University, Evanston) *ASCE Journal of Transportation Engineering* Vol. 100 No. TE1, Proc Paper 10362, Feb. 1974, pp 195-206, 5 Fig., 1 Tab., 5 Ref., 2 App.; ACKNOWLEDGMENT: EI (EIX740500642); ORDER FROM: ESL, Repr PC, Microfilm

48 056751 DEVELOPMENT OF ENERGY NEEDS FOR PUBLIC TRANSPORTATION IN A LARGE CITY AND TECHNICAL MEANS FOR SATISFYING THEM [L'EVOLUTION DES BESOINS EN ENERGIE DES TRANSPORTS EN COMMUN D'UNE GRANDE VILLE ET DES MOYENS TECHNIQUES EMPLOYES POUR LES SATISFAIRE]. Power requirements of the different transport systems in Paris, France, such as bus routes, urban metro and regional express metro, are discussed, along with technical developments related to their growth. Special features of autonomy, safety and automation of the metro power supply network are considered. Prospects of the various methods used for power conversion are described. [French]

Guieysse, L ; World Energy Conference, 8th ; ACKNOWLEDGMENT: EI (EIX740505279); ORDER FROM: ESL, Repr PC, Microfilm

48 056809 NOISE IN GROUND TRANSPORTATION SYSTEMS. Passage of the Noise Control Act of 1972 has given added impetus to the drive for noise reduction. Section 17 of the Act empowers the Environmental Protection Agency to issue railroad noise standards which will be enforced by the Federal Railroad Administration (FRA). FRA's High Speed Ground Transportation R&D program has a goal of substantially increasing the speed of ground passenger travel. Without improvements in the state-of-the-art of noise suppression and noise avoidance higher speeds will inevitably mean higher noise levels. Therefore, the new systems developments are forced to include good acoustic designs by specifications of maximum permissible noise levels. Data on the wayside noise levels of various rail, transit and tracked air cushion vehicle systems are tabulated, and for comparison the noise specification used for developing the DOT ground vehicles is shown. Noise sources for guided ground transportation are discussed with respect to steel wheels, railroad yards, tunnels, elevated guideways, aerodynamics, propulsion, tracked air-cushion vehicles, tracked magnetically levitated vehicles, and tube vehicles. It is indicated where research and development can contribute to noise abatement.

Ward, EJ (Stanford University) *High Speed Ground Transportation Journal* Vol. 7 No. 3, 1973, pp 297-305, 8 Ref; ACKNOWLEDGMENT: EI (EIX740304464); ORDER FROM: ESL, Repr PC, Microfilm

48 056953 DEVELOPMENT OF AN ACOUSTIC RATING SCALE FOR ASSESSING ANNOYANCE CAUSED BY WHEEL/RAIL NOISE IN URBAN MASS TRANSIT. A number of recent studies of the impact of train noise on the community are reviewed. From this information and the results of other noise-annoyance studies, a scale for rating the annoyance of urban transit system operators and patrons, as well as the surrounding community, caused by wheel/rail noise is recommended. In general, the peak A-weighted sound-pressure level for the

given exposure should be used, with an additional 5 dB if there are pure tones present (squeal). If in comparing the different kinds of train noise (squeal, impact, wheel roar, etc.) the total exposure is to be assessed, an additional term, 10 log T, should be added to the mean peak noise (where T is the total exposure in seconds during any 24-hour period).

Schultz, TJ ; Transportation Systems Center Intrm Rpt DOT-TSC-UMTA-74-3, Feb. 1974, 60p; Prepared by Bolt Beranek and Newman Inc., Cambridge, Mass.; Contract DOT-TSC-644; ACKNOWLEDGMENT: NTIS (PB-231363/3); ORDER FROM: NTIS, Repr PC, Microfiche; PB-231363/3, DOTL NTIS

48 057649 TASSIM: A TRANSPORTATION AND AIR SHED SIMULATION MODEL, VOLUME 1. CASE STUDY OF THE BOSTON REGION. The TASSIM model integrates an urban transportation planning model, vehicle emission factors, and simple air diffusion models in a simulation framework that can be used to analyze the air quality effects of transportation policies. The model is spatially disaggregated, and it is compatible with data sources available in many metropolitan areas. This volume briefly describes the structure of the model and then analyzes several model applications that simulate for Boston the air quality effects of transportation control land use, and stationary source policies. The transportation control policies are evaluated in a cost effectiveness framework. The final sections consider possible extensions of the model and outline the model's computational aspects.

Ingram, GK Fauth, GR ; Harvard University Final Rpt. May 1974, 107 pp; See also PB-232934, RRIS 057650; Contract DOT-OS-30099; ACKNOWLEDGMENT: NTIS (PB-232933/2); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232933/2, DOTL NTIS

48 057650 TASSIM: A TRANSPORTATION AND AIR SHED SIMULATION MODEL, VOLUME II. PROGRAM USER'S GUIDE. The TASSIM model integrates an urban transportation planning model, vehicle emission factors, and simple air diffusion models in a simulation framework that can be used to analyze the air quality effects of transportation policies. The model is spatially disaggregated, and it is compatible with data sources available in many metropolitan areas. Designed to aid others in using TASSIM, this volume describes the computer programming steps in the model, the input data required by various subprograms, and the procedures used to calibrate the model to a metropolitan area. The volume also includes an outline of the programming changes needed to simulate various policies, and a listing of the model's FORTRAN code.

Ingram, GK Fauth, GR Kroch, EA ; Harvard University Final Rpt. May 1974, 201 pp; See also PB-232933, RRIS 057649; Contract DOT-OS-30099; ACKNOWLEDGMENT: NTIS (PB-232934/0); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232934/0, DOTL NTIS

48 057877 BART: A POSITIVE ENVIRONMENTAL IMPACT. Bay Area Rapid Transit is having a significant effect on the environment in four areas--energy consumption, air pollution, noise production and in its impact on the develop-

ment of the land. BART offers substantial advantages or savings over the automobile in all but one of these--noise production, and even here, though a well-muffled automobile will produce slightly less noise than a BART train, the train is less noisy than freeway traffic. In terms of overall energy consumed, the savings over the automobile transportation will be large.

Passenger Transport Vol. 31 No. 41, Oct. 1973, p 18 ORDER FROM: American Transit Association, 465 L'Enfant Plaza West, SW, Washington, D.C., 20024 Repr. PC

48 071805 NOISE AND VIBRATION OF RESILIENTLY SUPPORTED TRACK SLABS. An analytical model is developed for the dynamic response, vibration isolation, and sound radiation of a resiliently supported track slab for subway trains. The general relations for response and radiation of the floated slab are considered in conjunction with rail vibration data to predict slab performance. Results show that the slab is a very effective vibration isolator but is a sounding board at low frequencies.

Bender, EK (Bolt, Beranek and Newman, Incorporated) *Acoustical Society of America, Journal of* Vol. 55 No. 2, Feb. 1974; ACKNOWLEDGMENT: EI (EIX740806345); ORDER FROM: ESL, Repr PC, Microfilm

48 071840 NOISE IN RAIL TRANSIT CARS: INCREMENTAL COSTS OF QUIETER CARS. U.S. rail rapid transit systems, car operations, and the car building industry are described in relation to the procurement of quieter cars. The noise environment of passengers in rapid transit cars is discussed and the major noise sources and paths of noise transmission into cars are delineated. For essentially all combinations of car noise-control modifications deemed technically and economically feasible for implementation in new vehicles, estimates are presented of the associated noise reductions, initial costs, and operating costs. It is concluded that significant reductions in in-car noise under typical operating conditions can be achieved at incremental costs that are small percentages of the total car costs.

Ungar, EE ; Bolt, Beranek and Newman, Incorporated, Environmental Protection Agency Final Rpt. June 1974, 45p; Contract EPA-68-01-1539; ACKNOWLEDGMENT: NTIS (PB-234992/6); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237992/6, DOTL NTIS

48 071989 NOISE-CON 73. Following is a list of titles and authors of the papers presented: Control of Noise and Vibration in Buildings Adjacent to Subways, by Anthony W. Paolillo. Effect of Noise Control Legislation on the Operation, Maintenance and Expansion of the New York City Transit System, by John T. O'Neill. Noise Exposure Study of the Massachusetts Bay Transportation Authority Rapid Transit System, by Edward G. Apgar and Thomas J. Trella. New York City Transit Noise, by R. Gerson and F.C. Hart. Methodology for Determining Minimum Cost Rapid Transit Noise Control, by Robert Lotz and Leonard G. Kurzweil. RCE Exhaust Noise Characteristics and Control, by Arnold A. Bergson. Automobile Tire Noise; A Review of the Open Literature, by William A. Leasure, Jr. Exhaust Systems for High-Performance, Four-Stroke Engines, by Larry J. Eriksson. Truck Tire Noise/Vibration, by W.F. Reiter, A.C. Eberhardt and L.J. Harper.

Paolillo, AW O'Neill, JT Apgar, EG Trella, TJ Gerson, R Hart, FC Lotz, R Kurzweil, LG Bergson, AA Leasure, WA Eriksson, LJ Reiter, WF Eberhardt, AC Harper, LJ ; National Conference on Noise Control Engineering Proceeding; ACKNOWLEDGMENT: EI (EIX740902465); ORDER FROM: ESL, Repr PC, Microfilm

48 072184 THE ENERGY CONSUMPTION OF MEANS OF TRANSPORT. A COMPARATIVE SURVEY. This report offers information on the energy consumed by various means of transport currently used for transporting people and goods. It briefly considers the energy consumption of some new and future transport systems. As regards passenger transport, a distinction is made between urban and inter-city transport. Where passenger transport in urban areas is concerned, a comparison is made between walking, using a bicycle, moped, car or bus and travel by rail. Where goods transport is concerned, no distinction is made between urban and inter-city transport. The comparison here refers to carriage by waterway, pipeline, rail, road, and air. With regard to road transport, consideration will be given to the effect of weight, speed and load factor. Little information is as yet available on the energy consumption of new means of transport. As regards new means of urban transport, the forecasts of energy consumption are relatively optimistic, especially if they are compared with the energy consumption of current urban systems. A comparative table shows the various characteristics of current and future energy sources. The calorific value of the various fuels and the specific density and total efficiency as a function of the type of motor are given.

Tuininga, EJ ; Institute for Road Vehicles TNO 1974, 121 pp, Refs.; ACKNOWLEDGMENT: TSC; ORDER FROM: Institute for Road Vehicles TNO, The Hague, Netherlands Repr. PC

48 080416 AMERICAN TRANSIT ASSOCIATION RAIL TRANSIT CONFERENCE. WAYS AND STRUCTURES DIVISION SESSION. NOISE AND VIBRATION CONTROL PROGRAM. Noise and vibration control has been a primary consideration in the design of the Metro system. Consultants were engaged to provide basic acoustical designs and guidelines to assure patrons of quiet and comfortable environment on and off cars. Minimal impact of system construction on the community is planned. Operation through continuous maintenance program and good acoustical design is planned. WMA-TA's noise and vibration control objectives are to minimize transmission of noise and vibration to adjacent buildings and structures, and to maintain noise levels in transit vehicles and stations within acceptable limits. Notable acoustical improvements have been made since the building of early transit systems and these are listed.

Keyes, GW ; Washington Metropolitan Area Transit Authority WMATA/ATA-74/2, Apr. 1973, 19p; Presented at Rail Transit Conference of American Transit Association.; ACKNOWLEDGMENT: NTIS (PB-237249/8SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237249/8SL, DOTL NTIS

48 080418 STUDIES IN URBAN TRANSPORTATION. TRANSPORTATION SYSTEMS: NOISE GENERATION AND ABATEMENT. This report deals with the amount and intensity

of transportation systems noise generation, along with efforts used to lessen the impact of noise. An introductory discussion of the physics of noise and noise measurement is given to help the reader in understanding how noise impact is analyzed. Transportation planners and designers must be aware of noise assault any proposed system will have on environment. The mandate for this stems from the National Environmental Policy Act of 1969 and the Federal-Aid Highway Act of 1970; the first requires assessment of all Federally funded projects to determine any adverse impacts on environment and the second, aimed at highways that are Federally funded, requires noise abatement of any proposed road that hasn't received approval before July 1, 1972. (Modified author abstract)

Hartl, FB ; Wisconsin University, Milwaukee, Urban Mass Transportation Administration, (UMTA-WI-11-0003) Feb. 1974, 143p; ACKNOWLEDGMENT: NTIS (PB-236681/3SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-236681/3SL, DOTL NTIS

48 080423 BART IMPACT PROGRAM: THE SOCIAL CONSEQUENCES OF BART'S ENVIRONMENTAL IMPACT. SOME PRELIMINARY CONSIDERATIONS AND HYPOTHESES. The paper draws attention to some of the social consequences of environmental perturbations caused by the construction of the Bay Area Rapid Transit System (BART). A series of hypotheses is developed to illustrate the interaction of environmental perturbations and the development of attitudes and behavior that enhance the self-perceived status of individuals. Further research on environmental impacts taking the identified social factors into account is recommended.

Nasatir, D ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, (WP-7-1-75) MTC-WP-7-1-75, Oct. 1974, 17p; Working Paper; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS (PB-237356/1SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-237356/1SL, DOTL NTIS

48 080473 BICYCLES, CARS, AND ENERGY. This article estimates the energy requirements for bicycling, including those to produce the additional food consumed by cyclists, to manufacture and sell bicycles and tires, to repair and maintain bicycles, and to construct bikeways. As part of these energy calculations, the dollar costs of cycling are also estimated. These energy and dollar costs are then compared with similar data for urban automobile travel. Finally, potential energy and dollar savings due to a shift of some urban automobile travel to bicycles are estimated. /HSRI/

Hirst, E (Oak Ridge National Laboratory) *Traffic Quarterly* Vol. 28 No. 4, Oct. 1974, pp 573-584, Tabs.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-52054)

48 081302 URBAN RAIL SUPPORTING TECHNOLOGY PROGRAM-FISCAL YEAR 1973 YEAR END SUMMARY. The Urban Rail Supporting Technology Program, being conducted for the Department of Transportation Urban Mass Transportation Administration (UMTA) is described for the 1973 Fiscal Year

period. Major areas covered include program management, technical support and application engineering, facilities development, test and evaluation and technology development. Specific technical discussion covers track geometry measurement, UMTA facilities development at the High Speed Ground Test Center at Pueblo, Colorado, rail car test and evaluation, especially of the State-of-the-art-Car (SOAC) and of Boston's MBTA Green Line, instrumentation for data acquisition and processing, noise abatement methodology, and tunneling and crashworthiness studies.

Madigan, RJ ; Transportation Systems Center, (DOT-TSC-UMTA-74-15) Final Rpt. UMTA-MA-06-0025-74-9, Oct. 1974, 64 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238602/AS

48 081394 THE FUEL CONSUMPTION OF AUTOMOBILES. The necessity for fuel consumption is clear. Automobiles, as users of nearly 60% of transportation energy (1/4 of total energy consumption), is a prime target for consumption measures. The author here suggests ways by which auto efficiency can be increased at least 40% by 1980. Use of mass transit would reduce the fuel used on short trips (those less than 10 miles), which account for nearly 1/3 of vehicle miles traveled. Use of freeways and computerized signal control reduces traffic delay, a cause of poor mileage. Apart from enforcement of the 55-mph limit and the essentially voluntary measures listed above, more efficient autos are the best source for fuel savings. The author cites statistics regarding fuel consumption of the various weight classes of cars. Weight is a factor both at low and high speeds: in the former tire pressure and suspension systems contribute to rolling resistance, which absorbs approximately 24.7% of engine power; at higher speeds, approximately 25% of engine output is absorbed by aerodynamic drag. Exterior design of autos can reduce the impact of these factors. The author also considers more efficient accessories and warm-up. In the area of engine efficiency, the author discusses diesel, stratified-charge and hydrogen admixture engines, with attention given to emission standards. The use of catalytic converters and subsequent lowered compression ratios due to the use of unleaded fuels is considered, as is the possibility of electric cars. The DOT-EPA report "Potential for Motor Vehicle Fuel Economy Improvement" is cited, and graphs and charts accompany the article.

Pierce, JR *Scientific American* Vol. 232 No. 1, Jan. 1975, pp 34-44, 15 Fig.

48 082954 TASSIM: AN APPLICATION TO LOS ANGELES. The TASSIM model integrates an urban transportation planning model, vehicle emission factors, and simple air diffusion models in a simulation framework that can be used to analyze the air quality effects of transportation policies. This report briefly reviews the structure of the model and then describes how it was applied to the Los Angeles region. The application required the tailoring of certain components of TASSIM to the peculiarities of the Los Angeles area and the calibration of the model to the regional data. The performance of the model in Los Angeles was then compared with previous experience with Boston for the simulation of the air quality effects of policies that alter the

emission rates of automobiles, the character of the transportation system, and the pattern of land use.

Kroch, E ; Harvard University, Office of the Secretary of Transportation Nov. 1974, 58 pp; Supplement to Volume 1, PB-232 933 and Volume 2, PB-232 934.; Contract DOT-OS-30099; ACKNOWLEDGMENT: NTIS (PB-238270/3SL); ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238270/3SL

48 082996 SUBURBAN SPRAWL AND THE ENERGY SITUATION. The energy situation may produce extremely significant, long-reaching effects upon the country's population movement history. An examination of population movements in the United States indicates three major trends. The first of these is the migration from the central portions of the country to the coasts. The second is the increasing move toward metropolitan areas away from rural areas, which has skyrocketed since 1920. The final trend is the migration from the center city to the suburbs, which has been in increasing evidence since 1940. Since travel and home heating costs are basically the same in all sections of the country, the effect of the energy-situation on the first of the migration trends mentioned is likely to be inconsequential. The trend toward choosing urban living over rural should not be affected in any greater degree either, since the higher cost of commuting puts pressure transportation. Statistics show that the impact upon the trend of moving from center city to suburbs will also be moderate. A possible trend toward increasing employment opportunities in the suburbs may occur. This would provide jobs located near residences, which would be as effective in cutting work trip costs as a return to the center city to be near employment.

Brown, GH *Conference Board Record* Vol. 11 No. 11, Nov. 1974, pp 35-38

48 082999 THE BIG OIL SQUEEZE AND MASS TRANSIT. The need is indicated for a unified energy policy, and one of the first sectors targeted for change by policymakers is transportation. The price of oil is seen as an incentive for mass transport must, however, be considered carefully and always on a "benefit-cost" basis. Not only is an increase in efficiency of the automobile called for, but also a reduction in its reliance by improving transportation alternatives. The latter could be realized by building or upgrading subways, reviving tracked trolley systems, making bus routes speedier and more flexible, and curbing unneeded expressway construction. Selling the services to the public would call for price incentives, and advertising. To upgrade the quality of the transit systems, a reevaluation of the cost accounting for automobile transportation would be necessary. The federal government, it is expected, will push rigorously with efforts to increase the use of carpools and mass transit. A conservation program which relies on the voluntary reduction of unnecessary driving and turning the automobile into a mass transit vehicle is put forward, and the opinion is expressed that for the bulk of U.S. cities, the mass transit solution lies in better bus systems and better traffic management than in massive hardware building programs.

Wiese, NA *Mass Transit* Vol. 2 Feb. 1975, pp 7-9, 2 Phot.

48 083290 ACOUSTICAL STUDY OF A RAPID TRANSIT SYSTEM. Noises generated by trains of the Chicago Transit Authority (CTA) were recorded and analyzed. The over-all sound pressure levels of the noises within the moving cars of the CTA trains vary from 60 to 115 dB. The characteristics of these noises depend on a number of factors, including: type of car, type of tracked construction, time of operation, window conditions, shape of track, and train speed. The data was used to evaluate the hazard of noise exposure among crew members and passengers and the extent of speech interference between passengers. The results indicated that some crew members and passengers may develop small amounts of temporary threshold shift in hearing sensitivity and that the probability of incurring permanent hearing loss from exposure to this source is very low. Speech interference among passengers was extensive in most cases.

Chang, HC Herman, ER *American Industrial Hygiene Association, Journ of* Vol. 35 No. 10, Oct. 1974, pp 640-653

48 083709 ENERGY UPDATE: ECOLOGY TAKES BACK SEAT. In this review of the ninth World Energy Conference (WEC), several interesting developments which took place at the WEC are discussed. One such development was the decidedly back seat which was taken by the auto industry, although sessions were devoted specifically to auto problems. When automobiles were discussed at the WEC, it was largely in the context of an assumed switch to more public transit. Another development concerned President Gerald R. Ford's statement on energy policy where he called for a combination of independence and interdependence, terms which were left open to interpretation by the Organization of Petroleum Exporting Countries (OPEC). This statement, coupled with an earlier speech and that of Secretary of State Henry A. Kissinger to the United Nations (in which they linked U.S. food policy to OPEC oil policy), were interpreted by the Arab nations as threats of concerted action against OPEC rather than real attempts as international cooperation. Another development was the arrangement of priorities, whereby environmental considerations took second place to energy matters. This was apparent by the call for less environmental constraints. Secretary of Interior Rogers Morton indicated that the U.S. government was softening its stand on strip mining and moving to increase leasing rights to oil on federal lands and for off-shore drilling. An auto industry delegate, John J. Ricca, indicated that attention at the WEC was directed to the technical aspects of the best ways to utilize energy and take advantage of coal and nuclear power resources.

Whiteside, DE *Ward's Auto World* Vol. 10 No. 11, Nov. 1974, pp 27-30

48 083813 PROGRAMMING ENVIRONMENTAL IMPROVEMENTS IN URBAN TRANSPORTATION PLANNING (1930-1973) A SELECTED RESEARCH BIBLIOGRAPHY. This bibliography contains 175 selected references published chiefly during the period 1930-1973. Part one contains the listing of books and monographs, and part two is a listing of articles and periodicals. The references cover such topics as urban land use, traffic engineering, planning for pedestrians, socioeconomics and

urban transportation, decision making, and various other factors involved when taking environmental considerations into account in urban transportation planning.

Sharma, PC (North Alabama University, Florence) ; Council of Planning Librarians #724, Jan. 1975, 13 pp, 175 Ref.; ORDER FROM: Council of Planning Librarians, P.O. Box 229, Monticello, Illinois, 61856 Orig. PC

48 084116 ENVIRONMENTAL IMPACT OF SUBWAY RAPID TRANSIT SYSTEMS. This paper presents a discussion of the general levels of noise and vibration impact to be expected from new underground rail transit system facilities with examples of the typical levels newer facilities are producing. Also presented is some specific information on the spectrum and level of ground-borne vibration and noise produced by underground transit trains and a proposed procedure for reducing the ground-borne noise from new subway systems.

Wilson, GP (Wilson, Ihrig and Associates, Inc) Murray, RJ (Toronto Transit Commission) ; Institute of Noise Control Engineering 1974, pp 235-240, 5 Fig.; Presented at the International Conference on Noise Control Engineering held in Washington, D.C., September 30-October 2, 1974.; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601 Repr. PC

48 084117 PREDICTION OF WAYSIDE NOISE FROM RAIL TRANSIT VEHICLES. This paper focuses on the prediction of wayside noise from rail vehicles. The prediction procedure, taken from work sponsored by the Urban Mass Transportation Administration, consists of: (1) prediction of the maximum A-weighted pass-by noise level at a distance of 50 ft (15 m) from the center line of a continuously welded at-grade track; (2) application of correction factors that take into account wheel and rail condition, radiation from elevated structures, and track design; and (3) application of correction factors that take into account the distance from the track to the observer, the train length, and the intervening terrain.

Manning, JE (Cambridge Collaborative, Incorporated) Kurzwil, LG (Transportation Systems Center) ; Institute of Noise Control Engineering 1974, pp 265-268, 4 Fig., 10 Ref.; Presented at the International Conference on Noise Control Engineering held in Washington, D.C., September 30-October 2, 1974.; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601 Repr. PC

48 084135 ASSESSMENT OF COMMUNITY NOISE IMPACT WITH THE INTRODUCTION OF A SUBSIDIZED BUS TRANSIT SYSTEM. A subsidized bus transit system was the main feature of a federally funded demonstration project carried out at the University of Massachusetts in Amherst. A fleet of 13 buses were used for no-fare service on headways of from 5 to 10 minutes on intracampus circulation routes serving dormitories, commuter parking lots, and housing adjacent to the campus. On the basis of measurements taken and analyses made, it appears that truck noise dominates and tends to mask the effects of large increases in either automobile or bus traffic. It also may be seen that increased bus service, even at a 30:1 utilization

rate, tends to increase the L10 noise level. This in turn suggests that while buses may have a negative air pollution environmental impact on a gram per passenger mile basis, they may well have a noise pollution impact in terms of L10 levels. /HRIS/

Russell, GA Goss, WP ; Intern Noise Conference 1974, 4 pp; International Conference on Noise Control Engineering, Washington, D.C. 1974.; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601 Orig. PC

48 084299 FHWA AND UMTA CONTRIBUTE TO THE NATIONAL ENERGY CONSERVATION ACTION PLAN. The Federal Highway and Urban Mass Transportation Administrations are emphasising low cost improvements in urban transportation. This means full use of existing facilities and reduced urban congestion. These projects are the basis for the FHWA-UMTA action plan for energy conservation. The plan has three parts; encouragement by local authorities by immediate development of carpool transit and taxi services. The second part is aimed to continue annual preparation of short range multiyear transportation programs containing DOT funded projects. The third part involves development of ways to provide funding and other incentives. Optimizing the use of existing urban transportation can be done by applying traffic management techniques to person trips on the transportation system, encouraging the use of buses on freeways, providing downtown parking strategies and making street improvements. FHWA and UMTA funds are available. Programs have shown progress, some examples are the exclusive bus lane on Shirley Highway in Virginia and contra-flow lanes on 495 to the Lincoln Tunnel in New Jersey.

Highway and Urban Mass Transport Sept. 1974, pp 2-4, 2 Phot.

48 090101 A COMPARATIVE ANALYSIS OF THE ENERGY CONSUMPTION FOR SEVERAL URBAN PASSENGER GROUND TRANSPORTATION SYSTEMS. The energy consumption rates, or efficiency, of the urban passenger ground transportation modes are compared. In addition, the efficiency of new transit systems being developed including large and small-vehicle PRT's and Dual Mode, are estimated. Various measures of actual and potential efficiency are used. On an average load basis, mass transit (transit bus and rapid rail) is from 2 to 3 times more efficient than the predominant personal modes (light truck and passenger car) and on a crush load basis, 4 times more efficient.

Lieb, JG ; Mitre Corporation, Urban Mass Transportation Administration Final Rpt. MTR-6606, Feb. 1974, 95 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238041/8ST, DOTL NTIS

48 090103 NOISE ASSESSMENT AND ABATEMENT IN RAPID TRANSIT SYSTEMS. REPORT ON THE MBTA PILOT STUDY. A methodology is described for assessing the noise climate and for selecting the combination of abatement techniques which reduces the existing noise to user specified levels for minimum cost. This methodology, developed in a pilot study of the Massachusetts Bay Transportation Authority (MBTA) rapid transit lines, takes into account the large number of interrelated

acoustic and economic considerations present in rail transit systems. Noise sources include several types of wheel-rail noise, propulsion, power pick-up, auxiliary equipment and braking noise. Noise propagation paths include airborne and structure-borne components establishing both direct and reverberant sound fields in tunnels, stations, transit cars, and communities. In the pilot application to the MBTA, minimum-cost noise control options were determined for noise level goals in the range 75 to 90 dBA.

Kurzweil, LG Lotz, R Apgar, EG ; Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-74-13, MA-06-0025, Sept. 1974, 116p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238113/5ST, DOTL NTIS

48 090164 A PROCEDURE FOR ESTIMATING AUTOMOBILE FUEL CONSUMPTION ON CONGESTED URBAN ROADS. An estimated procedure is proposed that is designed to be particularly sensitive to automobile fuel consumption in congested, peak hour traffic. This procedure is based upon vehicle attributes and roadway operating conditions. Vehicles are classified by weight and model year. The proposed roadway classifications are expressway, arterial, and local street. For each vehicle type category, base fuel consumption rates are determined. These base consumption rates are then modified by adjustment factors which reflect the roadway operating conditions. The rates are multiplied by the vehicle miles of each vehicle category and summed over all categories to compute the total fuel consumption on the road under analysis. An example application of the procedure including sensitivity analyses is presented.

Levinsohn, DM McQueen, JT ; National Bureau of Standards, Urban Mass Transportation Administration, (NBS-4314371) Final Rpt. NBSIR-74-595, Aug. 1974, 20 pp; Contract DOT-AT-400010; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; COM-75-10057/8ST

48 090173 ENERGY STATISTICS. A SUPPLEMENT TO THE SUMMARY OF NATIONAL TRANSPORTATION STATISTICS. This annual report is a compendium of selected time-series data describing the transportation, production, processing, and consumption of energy. The report is divided into three main sections. The first, entitled Energy Transport, contains such items as the revenues and expenses of oil pipeline companies, number and capacities of U.S. tank ships, and the total crude oil transported in the U.S. by method of transportation. The second section, entitled Reserves, Production, and Refining, reveals the growth over time of the U.S. oil and natural gas reserves, refinery capacity, and yields. Trends in the demand for fuel and power are displayed in the third section, entitled Energy Consumption. Throughout this part, the transportation sector is emphasized. Included are the gasoline and oil costs of automobiles of different sizes, the consumption of petroleum by type of product, the electrical energy consumed by the local transit industry, and other important statistics describing the supply and demand for energy.

Gay, WF ; Transportation Systems Center Final Rpt. DOT-TSC-OST-74-12, Aug. 1974, 140 pp;

ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238767/8ST, DOTL NTIS

48 090855 TRANSPORTATION ENERGY CONSERVATION: A PROGRAM PLAN OF POLICY-ORIENTED RESEARCH. The Office of Transportation Research (OTR) of the Federal Energy Administration (FEA) is responsible for developing, coordinating, and managing a research program to explore transportation energy use and alternative government policies related to transportation energy conservation. This report reviews transportation's role in energy conservation, describes the role of OTR, and presents OTR's proposed research program, totalling 31 projects in six research areas for three fiscal years. Project descriptions include estimated cost, suggested scheduling, priority designation, interrelationships with other projects and programs, and detailed task descriptions.

Fraize, WE Lenard, M Lieb, J ; Mitre Corporation, Federal Energy Administration Final Rpt. MTR-6843, Jan. 1975, 77 pp; Contract FEA-C-04-50065-00; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-240734/4ST, DOTL NTIS

48 090857 ENVIRONMENTAL REGULATIONS AND URBAN TRAFFIC. The study considers four broad categories of emission control programs: Federal Emission Standards; local emission control for vehicles; traffic flow improvements; and mass transit incentives. Local automotive pollution control options are analyzed and compared in terms of their cost and their emission reductions in a sample urban area. The Chicago metropolitan area is the sample region selected for the study.

Croke, KG Zerbe, R ; Chicago University, National Science Foundation, Argonne National Laboratories 1974, 14 pp; Prepared in cooperation with Argonne National Lab., Ill. Energy and Environmental Systems Div.; Grant NSF-AG-352; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-240697/3ST

48 091162 IMPACT OF FUTURE USE OF ELECTRIC CARS IN THE LOS ANGELES REGION: VOLUME III. TASK REPORTS ON IMPACT AND USAGE ANALYSIS. Volume 3 of a three volume report on possible impacts due to various levels of urban electric car use describes the DIFKIN computer model and linear rollback for analyzing future air quality in the South Coast Air Basin, forecasts stationary and vehicular pollutant emissions with and without electric cars, analyzes possible reductions of community noise from electric car use, projects life cycle costs of alternative electric cars in comparison with conventional cars as well as changes in employment and payroll in industry segments impacted by electric cars, and analyzes 1967 data to determine distributions of daily driving.

Hamilton, WF Cattani, JA Eisenhut, JC Markovich, FJ Martinez, JR ; General Research Corporation, Environmental Protection Agency Final Rpt. Oct. 1974, 447 pp; Paper copy also available in set of 3 reports as PB-238 876-SET, PC\$24.00.; Contract EPA-68-01-2103; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238879/1ST

48 091163 IMPACT OF FUTURE USE OF ELECTRIC CARS IN THE LOS ANGELES REGION; VOLUME II. TASK REPORTS ON ELECTRIC CAR CHARACTERIZATION AND BASELINE PROJECTIONS. Volume 2 of a three volume report projects future characteristics of electric cars and of the Los Angeles region in which they would be used. It postulates electric vehicle performance requirements, projects area population by county and age group, studies Los Angeles freeway and transit networks for auto usage, and fuel consumption, forecasts employment and income for the South Coast Air Basin, and the payroll of businesses involved in production, distribution, and maintenance of automobiles and parts, and notes the energy available for electric car recharging and its basic sources.

Hamilton, WF Eisenhut, JC Houser, GM Sjo-vold, AR ; General Research Corporation, Environmental Protection Agency Final Rpt. Oct. 1974, 331 pp; Paper copy also available in set of 3 reports as PB-238 876-SET, PC\$24.00.; Contract EPA-68-01-2103; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238878/3ST

48 091164 IMPACT OF FUTURE USE OF ELECTRIC CARS IN THE LOS ANGELES REGION. VOLUME I. EXECUTIVE SUMMARY AND TECHNICAL REPORT. Impacts of the use of electric cars in the Los Angeles region in 1980-2000 were projected for four-passenger subcompact electric cars using lead-acid and advanced batteries, with urban driving ranges of about 55 to 140 miles, respectively. Data from Los Angeles travel surveys shows that such cars could replace 17-74 percent of future Los Angeles autos with little sacrifice of urban driving. Adequate raw materials and night-time recharging power should be available for such use in the Los Angeles Region. The electric subcompacts would appear to be 20-60% more expensive overall than conventional subcompacts until battery development significantly reduces battery depreciation costs. This volume makes an overall review.

Hamilton, WF ; General Research Corporation, Environmental Protection Agency Final Rpt. Oct. 1974, 322 pp; Paper copy also available in set of 3 reports as PB-238 876-SET, PC\$24.00.; Contract EPA-68-01-2103; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-238877/5ST

48 091310 BART IMPACT PROGRAM: ENVIRONMENT PROJECT PRELIMINARY FINDINGS-BARRIERS. The construction of the BART system inevitably resulted in changes to patterns of vehicular and pedestrian movement. This preliminary analysis assesses the effect of BART facilities on the ease and hindrance of vehicular and pedestrian movement in areas adjacent to BART lines and stations. The assessment describes and quantifies the relationship between BART and other transportation facilities (freeways, railroads and arterials) acting as barriers. It also includes a description of the extent and locations where BART has created new barriers to pedestrian and vehicular movement patterns, and goes on to describe how BART has tried to mitigate barrier impact.

Metropolitan Transportation Commission, Department of Transportation, Department of

Housing and Urban Development, Gruen Associates, Incorporated, De Leuw, Cather and Company Tech. Memo MTC-TM-12-4-75, Mar. 1975, 45 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241287/2ST, DOTL NTIS

48 091404 ENVIRONMENT PROJECT. PRELIMINARY FINDINGS REGIONAL AIR EMISSIONS. This study presents findings relative to changes in the emission of automobile generated pollutants (CO, HC and NO_x) resulting from VMT changes associated with the use of BART. The effect of changing VMT on emissions of pollutants is assessed for both the total 9-county Bay Area airshed and for the 3-county BART service area. The findings are related to the Control Strategy Plan for the San Francisco Bay Area.

Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Gruen Associates, Incorporated, De Leuw, Cather and Company Tech. Memo MTC-TM-14-4-75, Mar. 1975, 17p; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241697/2ST

48 091405 PRELIMINARY FINDINGS SOUND. THE ENVIRONMENT PROJECT BART IMPACT PROGRAM. This report presents early aspects of a measurement and analysis program to assess the acoustic impact of the Bay Area Rapid Transit system (BART) on its surrounding environment. It covers findings relative to simultaneous recordings of sound levels taken on-board BART trains and at wayside positions adjacent to the BART tract. These early findings will be combined with measurements of adjacent community ambient sound levels to arrive at an overall assessment of BART acoustic impact on its surroundings.

Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development, Gruen Associates, Incorporated, De Leuw, Cather and Company Tech Memo MTC-TM-13-4-75, Mar. 1975, 46 pp; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241699/8ST, DOTL NTIS

48 091620 ENERGY USE OF PUBLIC TRANSIT SYSTEMS. The amount of energy used by a variety of transit modes operating under different conditions is determined. Projections of energy availability in California through 1985 and 1990 are reviewed and the implications for transportation are discussed. A short summary of the ways in which vehicles use energy, and an analysis of the resulting implications for energy-limiting or conserving strategies are given. Energy consumption data for a wide variety of vehicles operating in a number of modes are compared in a way that allows the reader (planner) to know relative energy requirements of different systems.

Healy, TJ ; California Department of Transportation, Santa Clara University Final Rpt. DMT-002, Aug. 1974, 64 pp; Prepared by Santa Clara Univ., Calif. Includes addendum.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241351/6ST

48 091850 URBAN AIR POLLUTION (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1970-Jun 75]. Cited are reports on urban air pollution and its abatement. These studies were selected to be of general interest to urban planners in order to allow them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (Contains 172 abstracts).

Lehmann, EJ ; National Technical Information Service July 1975, 177 pp; Supersedes NTIS/PS-74/104. See also NTIS/PS-75/544.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PS-75545/4ST

48 091892 COST EFFECTIVENESS OF TRANSPORTATION CONTROL STRATEGIES FOR CARBON MONOXIDE. This report summarizes the existing data and analyses related to the emission reduction effectiveness, costs, and feasibility of implementing several alternative strategies for reducing carbon monoxide in the Chicago central business district. An attempt made to develop combinations of strategies designed to achieve the National Ambient Air Quality Standards for carbon monoxide based upon a proportional or rollback model using 1973 air quality data.

Norco, JE Raufer, RK Croke, KG ; Environmental Technology Assessment, Incorporated, Illinois Institute for Environmental Quality, (IIEQ-10.032) Final Rpt. Oct. 1974, 124p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-241583/4ST

48 091908 EFFECTS OF ENERGY SHORTAGES ON THE WAY WE LIVE. Energy use in personal transportation and residential buildings is briefly discussed along with methods that consumers have to reduce the impact of higher energy prices or scarcity of supplies. Government policy alternatives for energy conservation are noted.

Morris, DN ; Rand Corporation P-5377, Dec. 1974, 25p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; AD-A010938/9ST

48 092327 VISUAL IMPACT OF PERSONAL RAPID TRANSIT. PRT systems offer on-demand, non-stop service from origin to destination over extensive networks of guideways. To date, these guideways have been portrayed as elevated above grade, minimizing network costs and interference with other circulation systems, but maximizing the visual impact on neighborhoods they pass through. This study does not attempt to present a design solution to these problems, but rather it lays a foundation for developing PRT visual impact design criteria on which future design decisions can be predicted. The key lies in finding effective communications media through which the visual impact of PRT can be conveyed to the public at large. The study explores the effectiveness of three graphic communication techniques.

Lavine, L Peterson, R Bulbulian, F ; Minnesota University, Minneapolis, Urban Mass Transportation Administration Final Rpt. UMTA-MN-11-0037-74-2, Nov. 1974, 35p;

ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244459/4ST, DOTL NTIS

48 092332 JOINT STRATEGIES FOR URBAN TRANSPORTATION, AIR QUALITY AND ENERGY CONSERVATION. JOINT ACTION PROGRAMS. This report develops an integrated approach for resolving problems created by traffic congestion, air pollution, and petroleum shortages. In Part I, the basic relationships among the strategies and actions are summarized in a matrix display. Each item is ranked to access its impact on six subgoals, or phenomena, in the near or long term: improved auto alternative, improved vehicular flow; reduced auto use; reduced travel demand; reduced vehicular emissions; and reduced vehicular petroleum consumption. Two synergistic joint action programs are presented. Part II contains an information review of experience, impacts on goals (mobility, air quality, energy conservation), and an overall evaluation of 54 specific actions.

Krzyckowski, R Henneman, SS Hudson, CL Putnam, ES Thiesen, DJ ; Interplan Corporation, Urban Mass Transportation Administration, Naval Underwater Systems Center, (UMTA-RI-06-0005) 7346-R, UMTA-RI-06-0005-75-1, Dec. 1974, 378p; Prepared in cooperation with Naval Underwater Systems Center, Newport, R.I.; Contract N00140-74-C-6026; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244473/5ST, DOTL NTIS

48 092337 NOISE PREDICTION MODELS FOR ELEVATED RAIL TRANSIT STRUCTURES. The report presents the theoretical development of a model for the prediction of noise radiated by elevated structures on rail transit lines. In particular it deals with noise and vibration control for urban rail transit track and elevated noise and vibration control for urban rail transit track and elevated structures. The model allows for the prediction of both the vibration transmission between elements of the structure and the resulting noise radiation from each major structural element, in terms of design parameters for the different elements. Thus the potential effectiveness of various alternative methods for noise control can be evaluated. Results of a field study of three different types of elevated structure on the MBTA Rapid Transit System are also summarized. These results support the validity of the prediction model. The engineering application of the prediction model is discussed in another report.

Manning, JE Hyland, DC Fredberg, JJ Senapati, N ; Cambridge Collaborative, Urban Mass Transportation Administration, Transportation Systems Center Final Rpt. DOT-TSC-UMTA-75-13, Aug. 1975, 249p; Contract DOT-TSC-643; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244509/6ST, DOTL NTIS

48 092345 COMPARISON BETWEEN COMPUTER SIMULATIONS AND SCALE MODEL TESTS OF SUBWAY TUNNEL AIR FLOW. The purpose of this report is to describe the validation of the aerodynamic theory in the subway environment simulation (SES) computer program, using data from the subway aerody-

amic and thermodynamic test (SAT) scale-model facility. Direct comparisons of measured and theoretical vehicle aerodynamic drag and piston-action air flows are presented for both single train and bi-directional train operations, with and without tunnel venting.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Associated Engineers/A Joint Venture, (DC006-0010) Tech. Rpt. UMTA-DC-06-0010-74-3, Feb. 1974, 60p; Prepared by Associated Engineers/A Joint Venture, New York.; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244567/4ST, DOTL NTIS

48 092419 STATE-OF-THE-ART OF ENVIRONMENTAL IMPACT STATEMENTS IN TRANSPORTATION. The National Environmental Policy Act of 1969 (NEPA) is a direct outgrowth of the significance Congress has attached to environmental impacts of government actions and policies. The Council on Environmental Quality (CEQ) has written guidelines for Federal agencies to follow when establishing policies concerning the environment. These guidelines also instruct agencies as to the content of impact statements, which may have a wide variation of content. In order to determine how well transportation impact statements conform to NEPA, forty statements were randomly selected, reviewed and summarized in this report. Sites chosen were both urban and rural, magnitudes ranged from statewide to local, modes included highway and mass transit, and report sizes were from a few pages to a few hundred.

Johanning, J Talvitie, A ; Oklahoma University, Urban Mass Transportation Administration, (HPR) UMTA-OK-11-0016-74-2, Nov. 1974, 75 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244539/3ST, DOTL NTIS

48 092729 FUEL CONSERVATION MEASURES: THE TRANSPORTATION SECTOR. VOLUME II. The magnitude of total transportation fuel consumption in Texas is discussed and that portion of total transportation fuel used for intercity travel is identified. Intercity movement of people and goods is covered along with the fuel efficiency of the intercity travel modes. An estimate is provided of existing and future passenger-miles and ton-miles of intercity travel in Texas. From these data, estimates of fuel consumption are formulated. Indications of the magnitude of fuel savings that might result from modal shifts are also presented.

Holder, R ; Texas Governor's Energy Advisory Council, National Science Foundation, Texas Transportation Institute, (S/D-9) Final Rpt. NSF/RA/N-74-230, Jan. 1975, 97p; Prepared in cooperation with Texas Transportation Inst., College Station. See also Volume 1, PB-243 324.; Grant NSF-GI-44085; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-243335/8ST, DOTL NTIS

48 093067 THE PUBLIC'S ATTITUDES TOWARD AND KNOWLEDGE OF ENERGY-RELATED ISSUES. HIGHLIGHT REPORT. VOLUME XI. This report is part of a series of studies dealing with general public behavior and attitudes towards energy conservation. It concentrates on attitudes toward nuclear

power plants, the impact of school programs on home energy consumption, factors affecting the public's use of mass transit, and company efforts at energy conservation. Some of the following questions are considered: role of the school in emphasized energy conservation; efforts of children to conserve at home; efforts of children to recycle; car pooling in relationship to long distance mass transit; availability of public transportation; interest in public transit for shopping; drawbacks to using public transportation; likelihood of using buses if special lanes were provided for them; impact of increased travel time; type of mass transit most needed; and money for mass transit vs. highways.

Rappeport, M Labaw, P ; Opinion Research Corporation, Federal Energy Administration FEA/D-75/511, June 1975, 32 pp; See also Volume 10, PB-244 988, and Volume 13, PB-244 990.; Contract DI-14-01-0001-1714; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-244987/4ST, DOTL NTIS

48 093819 PASSENGER NOISE ENVIRONMENTS OF ENCLOSED TRANSPORTATION SYSTEMS. To determine the extent to which noise environments of enclosed transportation systems are deleterious to passenger health, an analysis was made of both information collected by past transportation studies and of new data collected for this project. The analysis consisted of identifying trends among various transportation modes, noting areas of data deficiency, calculating the effect of noise exposure on health under various assumptions of travel duration and workplace noise exposure levels, and assessing measurement methodologies.

Environmental Protection Agency EPA/550/9-75/025, June 1975, 155 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-245409/8ST

48 093945 ANALYSIS OF BART'S ENERGY CONSUMPTION FOR INTERIM SYSTEM OPERATIONS. The Bay Area Rapid Transit (BART) System is the first areawide rail rapid transit system to be built in the United States in 50 years. This system includes 71 miles of track, 34 stations, and such technological advancements as a regenerative braking system plus light, all aluminum cars designed for high acceleration and maximum speeds of 80 miles per hour. This study investigates the historical energy consumption of the BART System, estimates BART's energy consumption for ultimate design service levels (approximately twice the present level), and compares BART's energy consumption to that of other rail rapid transit systems and alternate modes.

Cohn, SG Ellis, RH ; Metropolitan Transportation Commission, Department of Transportation, Urban Mass Transportation Administration, Peat, Marwick, Mitchell and Company, (UMTA-CA-09-0025) WP-14-3-75, June 1975, 30 pp Prepared by Peat, Marwick, Mitchell and Co., Burlingame, Calif.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS, UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-248118/2ST, DOTL NTIS

48 094405 VENT AND STATION TEST (VST) FACILITY-SPECIAL AND COMPLEX VENT SHAFT TESTING. This report has been prepared under the Transit Development Corpo-

ration, Inc. (TDC) project, 'Ventilation and Environmental Control in Subway Rapid Transit System' and is one of many such reports leading to the final product a 'Subway Environmental Design Handbook.' The purpose of this particular report is to present and describe the testing of special and more complex vent shafts. A generalized theory is formulated as an extension of this and previous VST work. Comparison between theory and experiment, according to the authors, is good.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Departmental Science, Incorporated, (UMTA-DC-06-0010) UMTA-DC-06-0010-73-5, Dec. 1973, 230 pp; Prepared by Departmental Sciences, Inc., City of Industry, Calif. Aerospace Technology Div. See also PB-212 335; Contract DOT-UT-290; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249048

48 094412 COMPARISONS OF COMPUTER MODEL PREDICTIONS AND FIELD MEASUREMENTS OF SUBWAY ENVIRONMENT IN THE MONTREAL METRO. This technical report has been prepared under the Transit Development Corporation (TDC) project 'Ventilation and Environmental Control in Subway Rapid Transit Systems.' This report describes a series of field tests conducted in the Montreal METRO system for the purpose of validating the Subway Environment Simulation (SES) Computer Program developed pursuant to the TDC project. The report also presents direct comparisons of experiment and theory, demonstrating the applicability of the SES computer program to full scale, multiple-track, bi-directional rapid transit systems.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, De Leuw, Cather and Company, Kaiser Engineers, Parsons, Brinckerhoff, Quade and Douglas, Inc. (UMTA-DC-06-0010) UMTA-DC-06-0010-75-3, Aug. 1975, 224 pp; Prepared in cooperation with De Leuw, Cather and Co., Inc., Washington, D.C., Kaiser Engineers, Los Angeles, Calif., and Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249119/9ST, DOTL NTIS

48 094697 ENERGY CONSERVATION POTENTIAL OF URBAN MASS TRANSIT. The report examines the period 1950-1973 with respect to urban travel and its energy use, discusses the relative energy intensiveness of different automobile and transit services, evaluates several recent experiments with improved transit service, and estimates possible future energy impacts of expanded and improved transit.

Stuntz, MSJ Hirst, E; Federal Energy Administration FEA/D-75/621, Conservation Paper-3, Dec. 1975, 33 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-249336/9ST, DOTL NTIS

48 095282 TRANSIT SYSTEM ENERGY REQUIREMENTS. The importance of energy conservation has been recognized by the engineering profession for some time, although this has been apparent to the general public only in recent months. As an alternative to the private automobile, the more extensive use of public transit is recognized as a conservation measure. This paper

analyzes various transit systems as to energy required per Passenger-kilometer, based on average trip length, both on a theoretical basis and from operating statistics. An equivalent is developed for comparing energy from fuels and electrical power supplies.

Sulkin, MA Holden, WHT (Daniel, Mann, Johnson, & Mendenhall); Institute of Electrical and Electronics Engineers Conf Paper C-75-353-8-IA, Mar. 1975, 7 pp, 1 Fig., 3 Tab., 9 Ref., 1 App.; A paper recommended by the IEEE Land Transportation Committee of the IEEE Industry Application Society for presentation at the 1975 Joint ASME/IEEE Railroad Conference, San Francisco, Cal., April 13-16, 1975.; ACKNOWLEDGMENT: IEEE; ORDER FROM: ESL, Repr. PC, Microfilm

48 095851 ENERGY CONSERVATION THROUGH URBAN TRANSPORTATION PLANNING. A large number of techniques for conserving energy in urban passenger transport are described. A systems approach for evaluating these simultaneously in order to formulate area-wide passenger transportation energy policy is presented. It consists of a simple computer technique for estimating the conservation value of various schemes. The program is also of value in assessing the energy impact of individual energy conserving programs. Because only local planners are familiar with the economic, environmental, and political constraints on policy and programs, the tool is intended for use in urban regions. It is, however, written in general terms and as such, if used in all urban areas in the U.S. Could offer realistic national estimates of urban passenger transportation energy requirements in the short term (0-10 yr). /Author/TRRL/

Carrier, RE *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 493-501, 6 Tab., 15 Ref.; Monograph Final Research Report PTI-7515, available from NTIS PB-245214/2ST. Repr. PC \$7.00, Microfiche \$2.25.; ACKNOWLEDGMENT: TRRL (IRRD 211658), NTIS

48 095853 THE EFFECTS OF ENERGY PRICE ESCALATIONS ON URBAN TRANSIT BALANCE. The forthcoming shortages in transit fuels and electricity resources were the basis for forecasts that bus fuel prices will quadruple by 1980, while transit electricity will have doubled in cost. One effect of these energy price escalations on urban transit planning is to shift downward the economic balance between buses-on busways and trains-on rails, from the current 12,000 passengers per hour to half of this value by the beginning of the 1980's. A program is proposed to achieve better balanced, all-electric bus/rail urban transit systems that minimize capital and energy consumption. /Author/TRRL/

Hoffman, GA *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 343-348, 4 Fig., 2 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 211650)

48 096048 POTENTIAL FOR ENERGY CONSERVATION IN THE UNITED STATES: 1974-1978, TRANSPORTATION. This report is the result of a study conducted by six task groups under the Coordinating Subcommittee of the Committee on Energy Conservation which was established by the National Petroleum Council. Four of the task groups represent end-use sectors: Industrial, Residential/Commercial,

Transportation, and Electric Utility. The other two are a Patterns of Consumer/Energy Demand Task Group and a Consumer Task Group. The end-use sector task groups made analyses of potential energy conservation measures or procedures in the immediate short term period through 1978. The findings the Transportation Task Group are presented in chapter four of this report. In summation, this group determined that areas offering major conservation opportunities, in relative order of importance, are: (1) more small cars; (2) increased car-pooling; (3) modified exhaust emissions and gasoline regulations; (4) improved auto design; (5) reduced speed limits; and (6) improved vehicle maintenance. As far as air transportation is concerned, reduced flights to increase the load factor offers the best potential savings, followed by improvement of operating inefficiencies. Other observations made by the Transportation Task Group are that: (1) Total railway, waterway, mass transit, pipeline and other miscellaneous transportation uses account for less than 20 percent of the energy consumed by the transportation sector, thus offering a more limited potential for energy conservation over the short term; (2) mass transit systems will not contribute significantly to conservation in the near-term period, and evaluation of such systems should commence immediately in order to have longer-term effects; and (3) Individual choice in transportation should be maintained, but a compromise must be effected wherein the individual motor fuel-burning unit becomes more efficient and at the same time the individual exercises more judicious choice in the utilization of the unit.

Heydinger, ER; National Petroleum Council Sept. 1974, 129 pp, 14 Fig., 24 Tab., 4 App; ORDER FROM: National Petroleum Council, 1625 K Street, NW, Washington, D.C., 20006 Repr. PC

48 096526 FUEL IN TRANSPORT. The types of fuel used to provide energy for transport are discussed and measures of the efficiency of fuel use of different modes of transport are presented. Probable trends in fuel costs are outlined and predictions made of the effects of different rates of increase on perceived motoring costs and public transport fares. Various uses of oil are then discussed. In conclusion, some implications for transport planning are discussed: the greater the fuel efficiency of public transport, the likelihood that the cost of electricity will rise less than that of oil, and the effect of large increases in the cost of fuel on modal split. /TRRL/

Harman, RG (Voorhees (Alan M) and Associates, Incorporated) *Traffic Engineering and Control* Vol. 15 No. 10/1, Feb. 1974, pp 477-499, 1 Fig., Tabs.; ACKNOWLEDGMENT: TRRL (IRRD 211604); ORDER FROM: ESL, Repr. PC, Microfilm

48 097031 PARK-AND-RIDE LOCATION STUDIES. This park-n-ride study represents a joint effort of Federal, State, Regional, and local governmental bodies to improve mass transit and to demonstrate their commitment to achieving federal air quality standards in the Denver area. The feasibility study for the development of park-n-ride sites included looking at similar facilities in other cities: Seattle, Washington; Rochester, New York; Atlanta, Georgia; Los Angeles, California; Milwaukee, Wisconsin; and Miami,

Florida. Planning guidelines for initial site selection in the Denver region have been developed; listed are macro criteria to be used in determining the areas to be served by park-and-ride facilities and micro criteria used to identify a specific site, sites will be chosen which afford maximum reduction in VMT and thereby improve regional air quality. Future transportation plans and future growth areas will be identified and included as factors in location analysis. Park-and-ride lots will be designated to accommodate the bicyclist, pedestrians, and the handicapped.

Kohrs, S ; Regional Transportation District
Tech Memo Task 8.426, Feb. 1975, 23 pp

48 098055 ENERGY FOR TRACTION. Transport is a key industry in the health of any nation and it is important that scarce and costly resources are used to the best advantage in advancing transport services by land, on the sea or in the air. Since oil supplies 97% of all transport energy it is vital that maximum efficiency must be achieved in use of energy in this sector in view of declining oil reserves. Fuel price escalation, the evolution of transport, consumption by various modes, and matching of mode to requirement are all discussed. The remaining quarter of the century must be concerned with conversion of transportation from oil power to electric operation based on non-fossil fuels. Some of the new energy sources are considered, but electrified railroads are seen as having a major role in any case.

Masefield, P *Railway Engineering Journal* Vol. 4 No. 2, Mar. 1975, pp 39-49, 7 Fig., 1 App.; ACKNOWLEDGMENT; ORDER FROM: ESL, Repr. PC, Microfilm

48 099734 THE WORLD ENERGY CRISIS AND ITS EFFECT ON THE OPERATION OF PUBLIC TRANSPORT. The historical background to the crisis is briefly reviewed (with special reference to the impact of crude oil prices, the balance of payments and the role of public transport) and its impact on public transit is examined with reference to transit usage, capacity, operating cost, construction costs and environmental concerns. Public transport's short term and long term responses to the crisis are discussed. Significant usage increases were noted in the height of the crisis, and no system was subject to capacity restraints in accommodating the passengers. High operating and construction costs have also stemmed from the energy crisis. Internal conservation efforts, technological improvements, improved service with maximum penetration into target markets, incentive fares, informational services to promote ridership, and public policy steps to discourage automobile usage are identified as short term responses to the crisis. Established standards on energy usage, vehicle (public transit and automobile) design, elimination of redundant services, and standardization of equipment could be among several other longer term effects of the crisis.

Ronan, WJ (Port Authority of New York and New Jersey) ; International Union of Public Transport No. 7a, 1975, 13 pp

48 099735 URBAN TRANSPORT IN THE PARIS REGION AND THE INCREASED COST OF PETROLEUM PRODUCTS. The total consumption of light fuels and diesel oil in

the Paris region and the RATP motorbus network consumption are examined, and a comparison is made of the unit consumption of private cars (in towns) and of motorbuses. The consequences of a continuing crisis in the supply of petroleum products are discussed, and steps that could be taken to reduce fuel consumption in the Paris region are set forth. These include the increase of light fuel prices, the restriction of parking and the increase of parking charges. Short-term actions that could be adopted by the bus network and rail network, and short term measures to be taken as part of a medium-term plan of action are outlined. The possible reduction of energy consumption by the RATP is also considered.

Bourgoin, M ; International Union of Public Transport No. 76, 1975, 7 pp, Tabs.

48 099745 THE REVIEW AND EVALUATION OF THE ECONOMIC AND TECHNICAL RESULTS OF THE AUTOMATION OF METROPOLITAN RAILWAYS. EFFECT OF THE ENERGY CRISIS ON THEIR OPERATION. A summary is presented of a questionnaire survey relating to the degree of automation attained in signalling, track equipment and local signal boxes, termini operations, timetable compensation for disturbances, monitoring and control posts, and rolling stock. Automation seems inevitable in the management of station operations. The objectives in the automation of metropolitan railways are examined with reference to economics, quality of service, working conditions, and employment problems. The need is indicated for analyses based on multiple criteria. A study of the possible repercussions of the energy crisis on the running of metropolitan railways in London, New York, Paris, Stockholm and Munich, involved the analysis of replies to a questionnaire survey. The questionnaire investigated the impact, of the crisis on urban transport, and the combined effect on road traffic and traffic on public transport networks. The study concludes that the decision to automate cannot be based solely on economic criteria. Precise evaluatory methods, modern management and operation techniques and analysis of the extent to which the undertaking's objectives are attained must determine the expediency of automation.

Essig, P (Regie Autonome des Transports Parisiens, France) Berry, FT (New York City Transit Authority) ; International Union of Public Transport Conf Paper 3a, 1975, 11 pp; Presented at 41st International Congress of the International Union of Public Transport, Nice, France, 1975.

48 125010 TRANSPORTATION SOLUTIONS TO THE ENERGY "CRISIS". Several suggestions are discussed for increasing transportation efficiency and improving fuel economy. These suggestions include the following: expand rail transit; expand transit bus services; improve traffic controls on major urban expressways; commuter carpooling; use smaller automobiles; eliminate inefficiency in commercial airline operations; expand intercity rail passenger service; expand intercity bus service; substitute rail for trucks on longer distance intercity freight hauls; and remove other regulatory restrictions of transport.

Meyer, JR (Harvard Graduate School of Business Administration) *Management Review* Vol. 64 No. 8, Aug. 1975, pp 50-53, 1 Phot.; Condensed from national Bureau Report Supplement #14

(February 1975).

48 125023 FUTURE TRANSPORT-THE IMPORTANCE OF SAVING FUEL. In an article on future forms of public transportation, the author presents his views on a possible course of transport development in the UK. Systems now being developed for long-term use should in general be based on more efficient use of fuel and environmental improvement. Potentially the railways could be the most advanced form of transport and, within the next decade, this method of transport is likely to be developed as an energy-conserving, computer-controlled way of moving people and freight, thus reducing dependence on road transport. In such a system the car would cease to be privately owned and would be used only at the beginning and end of long rail journeys on a hire basis and would probably be electrically propelled. Following a brief discussion of the economics of high-speed flight and whether the energy so used is fully justified, the author advocates the use of more efficient and accessible energy conserving forms of public transport such as a form of tramcar for city centre use. /TRRL/

Symes-Schlutzmann, R *Design Engineering* Sept. 1974, pp 16-19, 2 Fig., 3 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 213053); ORDER FROM: ESL, Repr. PC, Microfilm

48 125029 A LOOK AT THE FUTURE OF FUELS AND MOTOR-CARS, AND ITS INFLUENCE ON ROAD SAFETY. The present fuel crisis has given the world timely warning that its fossil fuel reserves are limited. Over the long term alternative sources of energy must be developed. Any alternative must, however, cope with the many decades of refinement of today's motor-car, psychological factors involved in car ownership, and massive investment in both the public and private sectors. At present public attention is focussed largely on technological developments for decreasing dependence on oil based fuels. These include electrically driven cars, and alternative portable fuels such as hydrogen. Another development avenue is increasing the availability of petrol for motor-cars by exploitation of new oil sources producing oil from coal and using other energy sources, particularly nuclear energy, for generating electricity, and so release more oil for transportation. The really spectacular developments in electronics and computers could have a major impact on control systems and communications. An interlocking system of public transport could provide much of the versatility and usefulness of the private motor-car which could appreciably diminish in number. Implications for road safety are technological changes will be influenced by conditions in overseas countries rather than in south Africa; petrol could become plentiful again over the medium term and speed restrictions will need another justification if it is to be continued; electronic innovations could reduce accidents significantly; replacement of private motor-cars with public transport will depend on a complex system of interrelationships. (A) this paper was presented at the 1974 symposium on "the Impact of Fuel Saving Laws on Road Safety", held in Pretoria, South Africa. The covering abstract for the symposium is IRRD abstract no. 213021. /TRRL/

Morkel, AT *Robot* No. 74, June 1974, pp 98-101; ACKNOWLEDGMENT: TRRL (IRRD 213029)

48 125030 THE EFFECTS OF FUEL CONSERVATION MEASURES ON TRAFFIC LAW ENFORCEMENT AND COLLISIONS IN PRETORIA. The recently introduced fuel-conservation measures in the form of lower speed limits have undoubtedly had an enormous impact on all facets of road traffic in South Africa. Initially intended solely to cut down on the use of oil and petroleum products, it appears that these measures have been the major contributing factor responsible for the reduction in traffic collisions recorded, particularly those mishaps which involve serious injury and death. The purpose of this paper is mainly to present the available data and to venture a few personal opinions, whereafter it will be left to the applicable panel to attempt to formulate any possible conclusions. Basic collision totals for Pretoria for the period immediately before and after the introduction of these measures are examined, and these are then compared to the figures for the present situation. A close look is taken at some of the types of collisions to determine whether there has been any significant reduction in collisions of one or two specific types only, with a possible increase in others, or whether there has been an overall reduction in collisions of all types and degrees. Figures relating to public transport usage in Pretoria, are presented, in order to ascertain whether there has been any significant change. The influence of the new measures on traffic law enforcement activities has undoubtedly been the placing of extra emphasis on speed checking. The paper will deal with the result of stricter speed limit enforcement measures and heavier penalties, and simultaneously look at the possible influence on some other driving offences such as traffic light and stop sign disobedience, etc. Finally the findings of a public opinion and attitude survey, dealing with a number of related issues including the lower speed limit(s) and reduced collision rate, are included. (a) this paper was presented at the 1974 Symposium on "the Impact of Fuel Saving Laws on Road Safety," held in Pretoria, South Africa. The covering abstract for the symposium is IRRD abstract no. 213021. /TRRL/

Bolhuis, H (Pretoria City Council, South Africa) *Robot* No. 74, June 1974, pp 53-84, 17 Fig., 10 Tab., 9 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 213036)

48 125078 THE EFFICIENT AND ECONOMIC USE OF EXISTING URBAN ROAD NETWORKS HAVING REGARD TO CONSIDERATION OF THE ENVIRONMENT. This thesis examines the implications of congestion and the means by which it may be avoided. It begins by examining current urban transport planning philosophy, which the author writes is derived largely from the Buchanan report. The focus is on methods of influencing demand and the advantages and disadvantages of each are examined in turn. These include permits and licences, road pricing, parking control, and improving public transport along with land use controls. Concluding that none of these will be practical or effective the author suggests that the results of unplanned restraint or congestion should be explored. A theory of congestion is given which includes personal characteristics,

activities, trip characteristics, the subjective assessment of congestion and costs and benefits. A number of options that individuals may take to avoid congestion follow from this and these are listed. Decision levels are identified and the interrelationships between the options explored in detail with an assessment of the ability to control the options added. A section on implications examines the effects of altering design standards from peak to average daily flow and the potential of environmental management. The author argues that the latter type of scheme has been unsuccessful for a variety of reasons. Research is suggested so that the implications and characteristics of congestion may be better understood. The author concludes that a problem which is national and social in nature is being tackled with solutions which are local and technical. /TRRL/

Collins, MS (Norwick Planning Department, England) *Institution of Municipal Engineers, Journal of* Vol. 101 No. 10, Oct. 1974, pp 262-268, 1 Fig., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 212669)

48 125572 TOMORROW'S TRANSPORT. The energy crisis and its effects on transport is examined by each of the two authors from a different viewpoint. The practical questions of the pattern of fuel consumption, the sensitivity of travel modes to fuel price, and alternative fuels are discussed. In addition each author looks at planning objectives and the measures to be taken to achieve them in both the long and short-term. The long-term goals of both authors are similar but their suggestions for short-term measures are divergent with regard, for example, to both company cars and taxation. Both however see the day of bicycles and public transport to be near at hand. They conclude that transport policies and programmes are, as yet, ineffective but see hope that energy crises will stimulate government and regional policy makers to a more radical approach to transport planning investment. /TRRL/

Roberts, J Barrell, D *Built Environment* Vol. 4 No. 1, Jan. 1975, pp 38-40, 4 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-212625)

48 126313 EFFICIENCY AND EQUITY CONSIDERATIONS IN THE FINANCING OF NOISE ABATEMENT ACTIVITIES AT AIRPORTS. This paper reviews a set of taxing alternatives to finance actions intended to reduce noise around airports and discusses cost differences in administering these alternatives as well as the various degrees of their incidence. In evaluating these alternatives, particular attention is devoted to their economic efficiency and equity implications. Assuming that the price system can provide incentives for airlines, airport authorities or public agencies at different levels to reduce noise exposure, the author states that a better approximation to efficiency and an equity standard which imposed the costs on the offending parties could be achieved by use of a marginal cost pricing scheme thus favoring a form of financial arrangement which includes the efficiency gains of a decibel landing charge and the relatively modest administration costs of an impacted airport head tax. /DOT/

Straszheim, M *Revista Internazionale di Economia dei Trasporti* Vol. 2 No. 1, Apr. 1975, pp 3-15

48 126314 COST AND EFFECTIVENESS OF EMISSION REDUCTION AND TRANSPORTATION CONTROL POLICIES. This paper analyzes a variety of transportation control policies which include expanded use of public transportation, better traffic controls in central areas, relocation of workplaces and residences, restrictions on automobile parking and use in central business districts. An attempt is made to predict the potential impact of such policies in Boston and Los Angeles, two cities with significantly different transportation systems and land use patterns. The aim of the study is to clarify the potential role of transportation control policies in air quality improvement programs, comparing them—within a cost effectiveness framework—with programs for achieving emission rate reductions from automobiles. By using the Transportation and Air Shed Simulation Model (TASSIM) the analysis shows that the effectiveness of several of the transportation control policies is somewhat similar in the two cities. A major conclusion suggests that although transportation controls can achieve significant improvements in air quality in limited portions of an air quality region they probably cannot yield an air quality improvement as large as that resulting from the reduction in emission rates presently envisaged. /DOT/

Ingram, GK Fauth, GR Kroch, E *Revista Internazionale di Economia dei Trasporti* Vol. 2 No. 1, Apr. 1975, pp 17-47

48 126413 NOISE INSIDE STREETCARS [Il rumore acustico all'interno delle vetture tranviarie]. The noise in three-car streetcars belonging to A.T.M. (Milan Public Transport) has been measured and its level compared with that in streetcars belonging to transit authorities in a Swiss and a German town. It was found that the maximum level of noise inside the German car was 70 dBA, and inside that A.T.M. car 84 dBA. The "nuisance" loudness of the A.T.M. vehicle was about double that of the German car. [Italian]

Campolongo, G Capponi, G *Ingegneria Ferroviaria* Vol. 30 No. 3, Mar. 1975, pp 19-24; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Repr. PC, Microfilm

48 127859 ENERGY CONSIDERATIONS IN URBAN TRANSPORTATION PLANNING. Energy consumption of urban transportation systems may soon be a major factor in planning—a situation which has not been explicitly considered to the present. Urban transportation energy demand is expected to increase substantially and remain heavily dependent upon petroleum-based fuels. The modal-split models in this article establish what the choice should be to achieve a specified level of energy consumption and to define modal split to minimize energy consumption while satisfying accessibility standards. The article also proposed use of curves of energy use which vary with passenger load factors and modal-splits to analyze the energy consequences of alternative transportation plans, policies and programs.

Yunker, KR Sinha, KC *Traffic Quarterly* Vol. 29 No. 4, Oct. 1975, pp 571-592, 6 Fig., 4 Tab.; ACKNOWLEDGMENT: Traffic Quarterly; ORDER FROM: ESL, Repr. PC, Microfilm

48 128572 ENERGY, LAND USE AND THE ENVIRONMENT: THE IMPACT ON TRANSIT. The worldwide origins of the transportation energy shortage are reviewed, the direct impact of these energy developments on the consumer and by implication on transit are examined, and the long-term impact of higher energy prices on travel are discussed. Acting through transportation costs, energy costs might directly effect model splits because of economic pressure to reduce trips for energy-saving reasons. This primary effect will boost transit ridership. The secondary effect, which will take a decade or more to realize its full potential, is that transportation energy costs will influence land use patterns. Traffic count data on rural, suburban and urban travel during the energy crisis period is reported, and comments are made on the elasticity of demand for gasoline. Data show that if Americans cut back on travel, it will be the commute trip, not the shopping trip that gets cut. Future land use planning and zoning processes will develop cities so that citizens are able to utilize transit, and powerful factors will impact favorably on public transportation.

Sansom, RL (Energy and Environmental Analysis, Incorporated) *Transit Journal* Vol. 1 No. 4, Nov. 1975, pp 6-20, 1 Fig., 8 Tab.

48 128812 TRAVEL IMPACTS OF FUEL SHORTAGES AND PRICE INCREASES. This attempt to document the impact of the energy crisis on travel behavior in 3 cities, studied trends in values for each variable by calculating absolute changes and percent changes for corresponding months of previous years, and predicted 1974 values by extrapolation of the trends where possible. Where no data existed before 1973, or where there were only weak trends, 1973 data were used as the projected 1974 values and other times only absolute comparisons to 1973 were made. Changes in air quality, gasoline sales, auto volumes, mass transit ridership, gasoline price, and auto occupancy are correlated with vehicle miles traveled. After each variable was collected. Price elasticity and cross-elasticity were used to determine the data relationships where possible. The study results for Washington, D.C., Boston and Denver are detailed. It was found that the above mentioned variables are adequate to describe short term reactions to increased gasoline taxes and/or gasoline allocations. These variables are currently reported at different states of aggregation with localized conditions masking the relationships. It was also noted that these variables are not adequate for formulation of air quality programs.

Curry, JP Rutherford, GS (De Leuw, Cather and Company) Piske, WE Scardino, C (TRW Environmental Services) *Institute of Traffic Engineers, Proceedings* Vol. 45 Aug. 1975, pp 27-37, Figs., Tabs.; Proceedings of the 45th Annual Meeting held in Seattle, Washington, August 17-21, 1975.

48 129368 PARKING AND THE ENVIRONMENT: WHERE ARE WE NOW? The Clean Air Act of 1970, is discussed particularly as related to the parking regulations which were proposed soon after passage of the act. Two types of regulations were planned: indirect source review, and parking management regulations. The Clean Air Act required that each state implement its own plans for both the attainment of ambient air quality standards by certain deadline dates

and continue to maintain such standards once attained. Studies indicate that rigid indirect source review regulations are required, as well as further transportation plans to accomplish the task. Such plans include parking management regulations, mass transit improvements, inspection and maintenance programs, carpool matching programs, exclusive bus and carpool lanes, incentive programs, and the retrofit of older automobiles with emission control devices. Opposition to the act and resultant regulation proposals are reviewed and congressional action in this area is briefly discussed.

Hunnicut, JM (Hunnicut and Neale, Incorporated) *Traffic Engineering* Vol. 45 No. 11, Nov. 1975, pp 11-13, 1 Phot.

48 129638 GETTING AT THE BIG FACTS IN TRANSPORTATION. Since the private automobile has been found to be responsible for the greatest oil energy consumption among the various travel modes, a suitable alternative must be found. The potential of public transit to reduce this oil consumption has thus far been underestimated by engineers. Studies of certain transit efficiencies fail to point out the real capabilities of public transit in that they tend to ignore certain time periods that are more efficient, and ignore the ability to effect large oil savings. Besides the fact of concealing the potential of public transit to save energy, these accounting methods conceal a greater fact the need for engineering improvements to effect energy savings. The computing of energy consumption by commuter trains is another area that is guilty of concealing the need for technological improvement. Planning for optimum use of public transit should include route selection by computer mapping based on census data. Where potential for energy savings is found, public transit must be expanded. Reluctance to do this is partly due to transit deficits. This can be avoided, however, by increasing operations during the most energy-conserving period-rush hour. If the Federal government becomes more involved in this need for development, and engineers become involved in technological research to avoid energy waste, public transit can become the most effective means of energy-conserving transportation.

Christensen, D Pikarsky, M (Chicago Transit Authority) *Astronautics and Aeronautics* Vol. 13 No. 9, Sept. 1975, pp 46-53, 2 Fig., 4 Tab., 27 Ref.

48 129657 ENERGY RESEARCH PART C. TRANSPORT AND COMMUNICATIONS [Energiforskning, Transporter och Samfaerdse]. A description is given of the development of public and freight transportation in Sweden and prognoses for the future are presented. The current distribution of the transportation work over different modes of transport in Sweden is presented. A survey is made of the different energy sources available now and prognoses for the future are presented. A comparison is made between different modes of transport concerning energy effectiveness. A survey is made of the current R&D in the energy field. Suggestions for future research in Sweden are presented and guidelines for this research for the next ten years. /TRRL/ [Swedish]

Royal Swedish Ministry of Industry R&D Rept. SOU 1974:75, 1974, 77 pp, 17 Fig., 1 Tab., 20 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL

(IRRD 215385); ORDER FROM: Royal Swedish Ministry of Industry, Fack, Stockholm 2, Sweden Repr. PC

48 129952 THE URBAN TRANSPORTATION PROBLEM. This critical examination of the Urban Mass Transportation Act of 1964 attempts to identify the urban transportation problem and focuses on 3 aspects of the Act: the plight of the transportation disadvantaged; congestion; and the "journey to work". The social costs of automobile commuting are analyzed with particular reference to the social evils of pollution, energy waste, accidents and the misallocation of urban land. The optimal solution to the problem would discourage automobile commuting and would act to improve the attractiveness of the urban area. Such a solution implies the problem is one of land planning. The adoption of a system of zoning streets for particular categories of use with a view toward discouraging automobile commuting and improving the attractiveness of the urban area is seen as the present task. Implementation of the land planning solution will require a lawyer's skills and mastery of a complex body of real property law.

Verbit, GP (Boston University) *University of Pennsylvania Law Review* Vol. 124 No. 2, Dec. 1975, pp 368-489

48 129975 ENERGY-CONSUMPTION OF DIFFERENT TRANSPORT SYSTEMS [ENERGIEVERBRUIK VAN VERSCHILLENDE TRANSPORTSYSTEMEN]. The transport sector depends on fifty-nine percent of oil products for fuel. Until recently the consumption of fuel was a relatively unimportant factor of cost in the exploitation of transport vehicles. Currently, however, interest in the energy components of transport systems is markedly increasing. With the help of a literature survey a comparison is made of the fuel consumption of different transport systems, for instance lorry, bus, metro, railway, rapid transit system, aerotrain, hovertrain and future transport modes. /TRRL/ [Dutch]

Tuininga, EJ (Afdeling Industrieel Contact) Sloten, P Rijkeboer, RC (Institute for Road Vehicles, TNO, Netherlands) *TNO-Project* Vol. 3 No. 7/8, July 1975, pp 291-300, 12 Fig., 7 Tab., 39 Ref.; ACKNOWLEDGMENT: Institute for Road Safety Research, TRRL (IRRD 215311); ORDER FROM: Redaktie TNO-Project, 148 Juliana van Stolberglaan, 'S-Gravenhage, Netherlands Repr. PC

48 130416 ENERGY OPTIMIZATION FOR RAIL PUBLIC TRANSIT SYSTEMS. Energy optimization for rail public transit systems is discussed from the viewpoint of an integrated systems approach. This approach considers the interaction of all the major subsystems of a total rapid transit system rather than each subsystem independently as has often been done previously. Some of the major subsystems examined include vehicles and their major propulsion, braking and auxiliary systems, train operations, environmental control facilities, and civil and structural facilities. The major factors that may significantly affect an overall energy evaluation are identified, and the ways in which each of these factors may be controlled to effect overall maximum efficiency of energy use are discussed. Energy evaluation

techniques include a new strain performance simulation computer program developed by Parsons, Brinckerhoff, Quade and Douglas, Inc., as part of a 4-year subway environment research project. This paper notes that the procedures for evaluation on a total systemwide basis are applicable for any rail transit system and can be used to extend or modify existing rail transit systems and the design of new systems.

Danziger, NH (Parsons, Brinckerhoff, Quade and Douglas, Inc) *Transportation Research Record* No. 552, 1975, pp 31-39, 1 Tab., 3 Ref.; ORDER FROM: TRB Publications Off

48 130417 TOTAL ENERGY REQUIREMENTS OF THE BAY AREA RAPID TRANSIT SYSTEM. The paper concerns the energy requirements of the Bay Area Rapid Transit system in five areas: traction energy, station energy, maintenance energy, construction energy, and impact energy. Vehicle traction energy is bounded by a probable lower bound of 3.2 kW-h/car-mile (7.2 MJ/km) and a probable upper bound of 5.5 kW-h/car-mile (12.4 MJ/km). When the station and maintenance energies are added, it is expected that the eventual total operating energy cost will lie between 6 and 7 kW-h/car-mile (13.5 and 15.7 MJ/km). The construction energy is calculated through the use of energy input-output analyses and is approximately equal to the total operation energy over a 50-year projected system life. The impact energy of Bay Area Rapid Transit, that is, the energy associated with other systems built because of the existence of Bay Area Rapid Transit, is discussed. There are not as yet sufficient data available to make an estimate of this energy. The important problem of energy dependence on loading is studied, and it is found that there is a nearly inverse (hyperbolic) relation between energy intensity (kW-h/passenger-mile (joule/kilometer)) and the vehicle loading factor.

Healy, TJ Dick, DT (Santa Clara University) *Transportation Research Record* No. 552, 1975, pp 40-56, 2 Fig., 7 Tab., 5 Ref.; ORDER FROM: TRB Publications Off

48 130838 THE CURRENT STATUS OF MEASUREMENT AND EVALUATION TECHNIQUE FOR STRUCTURE-BORNE SOUND MEASURED AT THE TRACK. This paper described the investigation which has led to the suppression of noise pollution produced by rail transport systems. A common noise problem for subway systems lies in the production of structure-borne sound in structures erected in the vicinity of the tunnel. Suppression of noise transmission begins at the point of origin of structure-borne sound, i.e., at the railroad track. The problem for the track engineer is thus one of developing track types with maximum sound-insulation properties. Dr. Steinbeisser described a solution proposed, and the methods and instrumentation utilized, in a tunnel of the S-Bahn (rapid transit system) in Frankfurt. Insulating effects were based upon the insertion of a buffer mass between the floor of the tunnel and the vehicle. It was indicated that great influence can be exerted on the suppression of structure-borne sound by structural measures. The paper discussed the tools of measurement technology which provide a comparison of various track structures with regard to their sound insulating properties.

Steinbeisser, L (Technical University of Munich, West Germany); Princeton University 76-TR-1, Oct. 1975, pp 19-20; This article is extracted from Symposium on Railroad Track Mechanics, RRIS 01 130826, Publication 7602. The complete volume is \$3.75, Microfiche \$2.25.; Contract DOT-FR-54175; ACKNOWLEDGMENT: Princeton University; ORDER FROM: NTIS

48 130861 EVALUATING AIR POLLUTION IMPACTS OF TRANSPORTATION. The transportation literature of the past few years contains much on air pollution. While the majority of articles deal with the subject qualitatively, there is a significant amount of material concerned with quantitative analysis. The quantity and great diversity of this material makes it difficult to determine the extent to which existing methodology actually provides useful tools for use by transportation planners. Recognizing this difficulty, the ASCE Urban Transportation Division Task Committee on Urban Transportation Economics undertook this state-of-the-art survey of air pollution impact evaluation. The major conclusion is that there now exist a number of useful analysis tools that should be adopted for regular use by transportation planning agencies. However, more attention should be given to strengthening the role of formal evaluation methodologies, such as cost effectiveness analysis, in dealing with these issues.

Sullivan, EC (California University, Berkeley) *ASCE Journal of Transportation Engineering* Proceeding Vol. 101 No. TE4, ASCE #11721, Nov. 1975, pp 763-780, 8 Fig., 46 Ref.

48 131053 OTA REPORT ASSESSES IMPACT OF MASS TRANSIT STRATEGIES IN DEALING WITH ENERGY AND ECONOMIC PROBLEMS. This news release summarizes the findings of an OTA report entitled "Energy, the Economy, and Mass Transit." Among the findings in the report are the following: the most effective way to promote energy conservation in urban transportation is a combined strategy incorporating both transit incentives and automobile disincentives; investment in mass transit results in about 80 man-years of employment per million dollars invested; and it is not likely that increased expenditures on rapid transit construction will have significant employment effects within two years due to the long lead time required for planning, design and financing.

United States Congress Feb. 1976, 3 pp; Copies of "Energy, the Economy, and Mass Transit" are available at the Government Printing Office, \$2.00, 052-003-000132-2.

48 131232 ENERGY STATISTICS. The supplemental report, Energy Statistics is a compendium of selected time-series data describing the transportation, production, processing, and consumption of energy. The statistics have been assembled from a wide variety of sources, such as the U.S. Department of the Interior, the Interstate Commerce Commission, and the American Petroleum Institute. The report is divided into three main sections. The first, entitled "Energy Transport", contains such items as the revenues and expenses of oil pipeline companies, number and capacities of U.S. tank ships, and the total crude oil transported in the U.S. by method of transportation. The second section, entitled "Reserves,

Production, and Refining", reveals the growth over time of the U.S. oil and natural gas reserves, refinery capacity, and yields. Trends in the demand for fuel and power are displayed in the third section, entitled "Energy Consumption". Throughout this part, the transportation sector is emphasized.

Transportation Systems Center 1975; ACKNOWLEDGMENT: TSC; ORDER FROM: GPO, Repr. PC; 050-000-00-1024

48 131580 TRANSPORTATION ENERGY CONSERVATION POLICIES. This exploration of the extent to which certain significant forces (the oil embargo, gasoline and automobile prices, federal mass transit programs and funds) will operate on traditional forms of personal travel and land use, examines the period 1950 to 1972, reviews the relative energy efficiencies of different urban and intercity passenger systems, discusses several policies for reducing transportation fuel use, and compares the energy savings likely with each of these policies in 1980 and 1985. Four policies are discussed: improving mass transit, increasing carpooling, raising gasoline prices, and improving new car fuel economy standards. It is pointed out that although the short term energy conservation potential of increased mass transit is slight, it should not be abandoned; changes in urban travel patterns require about a decade. Studies have shown that parking incentives for car pools and major increases in parking costs substantially reduce the amount of solo driving and increase both carpooling and mass transit use. It is also shown that the major response to higher gasoline prices is an increase in new car fuel economy rather than a decline in auto travel. Gasoline savings due to improvements in new car fuel economy are substantial and even higher than those due to the 20 percent gasoline price increase. The studies suggest that in the next decade, attention should be focused on technological means to reduce transportation fuel use.

Hirst, E *Science* Vol. 192 No. 4234, Apr. 1976, pp 15-20, 5 Fig., 4 Tab., 19 Ref.

48 131593 SAVING HIGHWAY FUEL-THE ENGINEER'S ROLE. The dilemmas of the current energy shortage are identified, approaches directed toward reduction of oil imports are outlined, and the engineers responsibilities in this area are pointed out. Administration proposals for reduced oil consumption are based on price mechanisms while congressional proposals favor import quotas, allocation, rationing and massive taxes on automotive gasoline. The principal difference in the two approaches is that the administration would spread the cost and thus the incentive to conservation across all petroleum uses, while the congress would concentrate all conservation efforts on automotive travel. If the administrations goals are to be realized by a reduction in automotive travel, it would require a 30 percent decrease in auto use. The largest single use of automotive fuel is commuting from home to work. Work trip carpooling is a proven, effective energy conservation measure that can be implemented at little or no cost. Typical of the successful carpool programs is the vanpool program initiated by the 3M Company in St. Paul (Minn.). Roadway incentives for carpools and programs to improve urban traffic flow also merit consideration as fuel conservation measures. Factor (tune-ups, speed reduction) which aid better

mileage are noted, and fuel efficiency factors which affect various urban passenger transportation modes are reviewed. It is the highway and traffic engineers responsibility to see that these conservation efforts are implemented.

Robinson, CC, Executive Vice President (Highway Users Federation for Safety and Mobility) *Purdue University Engineering Bulletin* No. 146, 1975, pp 99-112, 7 Fig.; Proceedings of the 61st Annual Road School, Purdue University, March 11-13, 1975.

48 133109 ADDITIONAL TRAFFIC ASSIGNMENT OPTIONS FOR THE TASSIM MODEL. The TASSIM model integrates an urban transportation planning model, vehicle emission factors, and simple air diffusion models in a simulation framework that can be used to analyze the air quality effects of transportation policies. The model is spatially disaggregated, and it is compatible with data sources available in many metropolitan areas. This report evaluates extensions of the basic model, including several alternative capacity-restrained assignment procedures and the addition of a more detailed spider network. The costs and impacts of the modifications are explored by examining simulations of several air quality improvement policies.

Fauth, GR Kroch, E; Harvard University, Office of the Secretary of Transportation Final Rpt. DOT-TST-76-53, Nov. 1975, 183 pp; Contract DOT-OS-30099; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251065/9ST

48 133222 BART IMPACT PROGRAM. IMPACTS OF BART ON THE NATURAL ENVIRONMENT; INTERIM SERVICE FINDINGS. The report documents the study done on the impacts of BART on the natural environment. The general subject area is divided into three categories which define its limits and organize its many aspects. The categories are: (a) Biota (Wildlife and Vegetation) (b) Soils and Geology, and (c) Drainage and Water Systems. Since almost the entire area traversed by BART is urbanized and fully developed, this natural environment was not a major topic of study. However, a comprehensive review of BART's possible impacts was performed because impacts on the natural environment are often not apparent even when they are quite significant from an ecological point of view.

Department of Transportation, Department of Housing and Urban Development, De Leuw, Cather and Company Tech. Memo MTC-TM-17-4-76, Mar. 1976, 99 pp; Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Prepared by DeLeuw, Cather and Co.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251571/6ST, DOTL NTIS

48 133304 UNDERPLATFORM EXHAUST TESTS IN THE TORONTO SUBWAY. The technical report has been prepared under the Transit Development Corporation (TDC) project 'Ventilation and Environmental Control in Subway Rapid Transit Systems.' The underplatform exhaust system is a subway environmental control feature designed to remove train generated heat within the confines of stations and thereby improve environmental conditions. To evaluate the performance of this system, a full-scale test

facility was constructed in a station of the Toronto subway. This report describes the facility design and the experimental program. A presentation of test results and interpretations is included, leading to the development of a quantitative design versus performance relationship for use by subway environmental engineers.

Transit Development Corporation, Incorporated, Urban Mass Transportation Administration, Parsons, Brinckerhoff, Quade and Douglas, Inc, De Leuw, Cather and Company, Kaiser Engineers Tech. Rpt. UMTA-DC-06-0010-75-5, 203 pp; Prepared by Parsons, Brinckerhoff, Quade and Douglas, Inc., New York, DeLeuw, Cather and Co., New York, and Kaiser Engineers, Los Angeles, Calif.; Contract DOT-UT-290; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-251728/2ST, DOTL NTIS

48 133707 WEIGHTED DIGRAPH MODELS FOR THE ASSESSMENT OF ENERGY USE AND AIR POLLUTION IN TRANSPORTATION SYSTEMS. This paper describes extensions, to weighted and double-weighted digraphs, of the author's earlier work on building and analyzing energy-demand signed digraphs. Several weighted and double-weighted digraphs are built to provide a test of the construction methodology, to provide a test of the methods of analysis of such digraphs, and to illustrate the type of analysis one can make using such digraphs as models of complex systems. The digraphs are constructed within the context of the transportation system of a hypothetical metropolitan area, similar to the county of San Diego, California. The digraphs are used to compare fuel consumption and air pollution under two scenarios: the nominal case, where clean air standards are met by some retrofitting of cars with smog control devices; and the bus case, where cars are banned and an expensive wide-ranging bus system is introduced. It is concluded that weighted and double-weighted digraphs can be constructed relatively inexpensively and that at least weighted, and probably double-weighted, digraphs can be used at an early stage of a policy-making task to set directions for further research. (A) /TRRL/

Roberts, FS (Rutgers University, New Brunswick) *Environment and Planning* Vol. 7 No. 6, 1975, pp 703-724, 8 Fig., 2 Tab., 13 Ref.; ACKNOWLEDGMENT: TRRL (IRR2-216915)

48 134003 IMPACT OF THE ENERGY SHORTAGE ON TRAVEL PATTERNS AND ATTITUDES. This paper examines the effect of the energy shortage on transportation patterns and attitudes in the automobile-oriented, suburban Dutch Fork area in Columbia, South Carolina. Data from several nationwide surveys and selected transit operations are also used. The findings from the Dutch Fork area show that the energy shortage did not appreciably reduce (10 to 15 percent) the amount of automobile travel and did not substantially affect transit patterns or attitudes. Traffic volumes decreased primarily on weekends; there was less decline on weekdays. Travel was reduced by driving slower and limiting social-recreational and shopping trips. Shifts in travel behavior were moderate, although people expressed an interest in public transit. Gasoline supply more than price appears to have greatly affected travel habits, although the effect of price appears to be reflected in the buying of more

small cars. In other words, people did not move away from relying on the car but rather adjusted their driving behavior to conserve gasoline. Data from national surveys also show this pattern. Possibly, local public transit will not realize appreciable comparative advantage against the automobile on the basis of price, and this further emphasizes the inability of transit to serve a substantial ridership. In addition, failures of public transit to capture and hold a greater part of the market during the energy shortage are a product of poor service quality. The one favorable result for public transit is the verbal support given to transit as a method for dealing with the energy shortage. Public transit can benefit from this support by garnering greater governmental resources, although there are still many reservations about the likelihood of converting public support and governmental investment into substantial patronage increases.

Sacco, JF Hajj, HM (South Carolina University, Columbia) *Transportation Research Record* No. 561, 1976, pp 1-11, 1 Fig., 9 Tab., 5 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

48 134005 ENERGY SAVINGS FOR WORK TRIPS: ANALYSIS OF ALTERNATIVE COMMUTING PATTERNS FOR NEW JERSEY. This paper analyzes energy consumption for work trips in New Jersey. Prepared as an aid to the New Jersey Task Force on Energy, it develops a methodology to quantitatively compare alternative transportation policies intended to reduce energy consumption. Data were obtained on work trip distribution, transit patronage, and modal split for each of the 21 counties in New Jersey for 1970. From these data, work trip lengths and automobile and transit occupancy rates were calculated. Based on these as inputs to a model that predicted total work trip energy utilization, the total daily energy consumption was computed for work trips of New Jersey residents. Modal split, energy per vehicle mile (kilometer), and vehicle occupancy rates were then varied to test alternative strategies for reducing energy consumption. In general, the results of this analysis showed that, given current work trip patterns, greater savings in energy could be achieved by using automobiles than by increasing public transit patronage. Specific policy recommendations were then outlined for automobile and public transit planning.

Lutin, JN (Princeton University) *Transportation Research Record* No. 561, 1976, pp 23-36, 5 Fig., 8 Tab., 8 Ref.; ORDER FROM: TRB Publications Off, Repr. PC

48 134054 COMPARATIVE ENERGY COSTS OF URBAN TRANSPORTATION SYSTEMS. Several urban transportation systems are compared on the basis of the energy resources consumed in the manufacture of their vehicle and guideway systems and in their operation. Four systems, the auto, bus, rapid rail and personal rapid transit, are extensively analysed, while the energy characteristics of dial-a-ride systems and the motorcycle are estimated. Analyses of bicycling and walking are also included for a comparison of motorized modes with human propulsion systems. For each system the energy required to manufacture a vehicle, the energy required to manufacture the guideway, and energy of operation are estimated. The manufacture contribu-

tions are amortized over component lifetimes and added to the energy of operation to give an estimate of total energy consumed per vehicle-mile by a system. To provide a measure of the potential energy efficiency of the systems, the average energy consumed per available seat-mile is calculated to compare the systems when they are operating at capacity. An example containing assumed average occupancy levels gives a more realistic comparison on the basis of energy consumed per passenger-mile. (A) /TRRL/

Fels, MF (Princeton University) *Transportation Research* Vol. 9 No. 5, Oct. 1975, pp 297-308, 1 Fig., 12 Tab., 34 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217347); ORDER FROM: ESL

48 134055 SIMPLE PREDICTION EQUATIONS FOR WAYSIDE NOISE FROM TRAINS. In work being undertaken to assess the noise impact of a new urban railway system, it was found desirable to formulate one or two simple equations predicting wayside noise which are given in this short report. The equations were derived by looking at the curves obtained from experimental results of other researchers and they were tested against measured data. The equations refer to a ground level road bed at zero grade with a flat surrounding area free from reflecting or attenuating surfaces. /TRRL/

May, DN (Ontario Ministry of Transportation & Communic, Can) *Journal of Sound and Vibration* Vol. 43 No. 3, Dec. 1975, pp 572-574, 2 Fig., 12 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 217351); ORDER FROM: ESL

48 134075 THE UNDERGROUND RAILWAY AND THE BUS CAN REPLACE PRIVATE CARS [Le metro et l'autobus peuvent supleer la voiture particuliere]. The author considers the effects of a possible energy crisis on urban transport in the Paris region, and the role that public transport would have to play to fulfil part of the demand normally fulfilled by the private car. Various solutions are proposed, depending on the form the energy crisis would take. The capacity of buses not being fully utilized, traffic conditions could be improved by staggering working hours and improving parking facilities. /TRRL/

Giraudet, P (Institut de Recherche des Transports) *UITP Revue SERIAL* Vol. 23 No. 1, Jan. 1974, 6 pp; ACKNOWLEDGMENT:

48 134262 EIGHTH ICA SYMPOSIUM ON NOISE IN TRANSPORTATION. The following are some of the papers presented at this symposium: Assessment of Community Noise, Eldered, KM; The Future Transportation Noise Environment in the United Kingdom, Richards, EJ; The Control of Noise from Surface Transport, MacMillan, RH; Motor Vehicle Noise Abatement through Economic Incentives, Alexandre, A and Darde, J-P; The Effect of Operating Parameters on Sources of Vehicle Noise, priede, T; Noise Control of High-Speed Railways, Ban, Y and Miyamoto, T; and Air-and Structure-Borne Noise of Railways, Stueber, C. Discussions of some of the paper are /TRRL/

Journal of Sound and Vibration Vol. 43 No. 2, Nov. 1975, pp 137-156, Figs., Tabs., Photos., Refs. ACKNOWLEDGMENT: TRRL (IRRD-217350)

48 134730 ENERGY CONSERVATION IN URBAN TRANSIT SYSTEMS. Though urban transit systems are currently an energy efficient means of transporting people, this presentation will outline strategies to make these systems more efficient as well as to reduce total regional transportation energy consumption through greater reliance on these systems. This paper focuses on near-term improvements and on the initial steps essential for far-term solutions. Because of this focus, the improvements suggested work with current technologies and modifications of these technologies. In any transportation system the strategies for saving energy can be broken into five categories. They are network improvements, operational changes, demand reductions, modal shifts and vehicel technology. This presentation suggests improvements within the framework of these categories and demonstrates their potential energy savings.

Bernard, MJ, III LaBelle, S ; Chicago Transit Authority, Chicago University, Argonne National Laboratories TR-7506, Dec. 1975, 17 pp, Figs., Tabs., 9 Ref.; Proceedings of the Energy Conservation: A National Forum, 1-3 Dec. 1975, Ft Lauderdale, Florida.; ACKNOWLEDGMENT: Highway Safety Research Institute (HSRI-34078)

48 134743 URBAN TRANSPORTATION PLANNING AND AIR QUALITY. This report discusses four main areas of interest concerning air pollution: legislation, information, standards, and analysis techniques. It briefly discusses the Clean Air Act Amendments of 1970 and summarizes general information on the pollutants: carbon monoxide, hydrocarbons, nitrogen oxides, lead, particulates, and photochemical oxidants which result from highway vehicles. A discussion of the relationship between the vehicle emission standards and national ambient air quality standards is included with comments on how transportation planning is involved in meeting the air quality standards. Various techniques for analyzing the effects of highway travel on air quality including emission and diffusion models are presented.

Blow, PW ; Federal Highway Administration Tech Rpt. Technical Rpt. #33, Apr. 1974, 27 pp, 7 Fig., 4 Tab., 14 Ref., 1 App.

48 136412 ENVIRONMENTAL IMPACT ON ELECTRONIC EQUIPMENT. The paper discusses problems faced by EARTD maintenance staff caused by the San Francisco Bay Area environment. The areas covered are the effect of heat on the wayside train control, the gophers eating buried control cables, moisture and dirt contamination of the destination signs and electrical noise of the destination signs and electrical noise of the communication cables.

Engle, CH (Bay Area Rapid Transit District) ; American Transit Association ATA/RT-74/1,2,3, 1974, pp 12-25; Presented at the Am Transit Assoc Rail Transit Conf, San Francisco, Calif., Apr. 14 and 16, 1974, Power and Signals Sess. NTIS Nos. PB-234 824; PB-234 825 and PB-234 825.; ACKNOWLEDGMENT: EI; ORDER FROM: NTIS

48 136577 POLICIES TO REDUCE TRANSPORTATION FUEL USE. This paper reviews historical trends in passenger traffic and energy use since 1950. Overall, transportation fuel use grew from 8.9 Qbtu in 1950 to 18.3 Qbtu in 1974

with an average annual growth rate of 3.0%. Energy use grew more rapidly than did traffic during this period because of shifts from energy-efficient to energy-intensive modes and increases in energy-intensiveness for most modes (due both to declining load factors and reduced vehicle fuel economy). A number of alternatives exist for reducing transportation fuel use. This paper discusses the energy savings possible due to expanded and improved urban mass-transit services, increases in new car fuel economy, increases in the price of gasoline, and increases in commute-auto occupancy (carpooling). Expanded mass transit is likely to save only small quantities of energy during the next five to ten years, primarily because of the very low fraction of urban passenger travel now carried by transit. Legislating increases in new-car fuel economy and/or higher gasoline prices can save substantial quantities of fuel both in the short and long run. Policies to induce higher auto occupancy during peak periods are unlikely to save much energy both because of their political infeasibility and individual reluctance to change habits.

Hirst, E ; Oak Ridge National Laboratory No Date, 24 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; CONF-751120-1, DOTL NTIS

48 136614 ENERGY, THE ECONOMY AND MASS TRANSIT. The report examines: (1) the probable effects of changes in energy supplies and prices on transit patronage and the transit industry; (2) the potential role of public mass transit programs in stimulating a depressed economy; and (3) the effect on the economy and on urban transit if transit funds were sharply reduced. The study also evaluates alternative transportation policies for responding to various economic and energy conditions and examines within this framework the effect of transit incentives and automobile disincentives on transit patronage and automobile use. This assessment was performed in response to a request from the Committee on Appropriations, U.S. Senate.

United States Congress, Skidmore, Owings and Merrill, System Design Concepts, Incorporated OTA-T-15, Dec. 1975, 161 p., Figs., Tabs., Photos., 21 Ref., 4 App.; Prepared in cooperation with Skidmore, Owings and Merrill, Washington, D.C., and System Design Concepts, Inc., Washington, D.C.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, GPO; PB-250624/4ST, DOTL NTIS, GPO 052-070-03479-3

48 137367 ASSESSING THE RELATIONSHIP BETWEEN URBAN FORM AND TRAVEL REQUIREMENTS: A LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK. An interest in the development of long-range policy for energy conservation motivates the investigation into the relationship between urban form and transportation energy consumption. The report reviews previous studies which have attempted, either directly or indirectly, to cast some light on this relationship. A thesis of the paper is that study of the relationship has been hampered by a lack of an operational definition for the concept of urban form. Addressing itself to this need, it is proposed that urban spatial structure be measured in terms of size, shape, and activity distribution of the urbanized area. The review of literature classifies previous studies according to the aspect of urban form

which was investigated. Travel requirements appear to increase as urban area population increases, but beyond this finding, no clear relationship between urban form and total urban travel requirements has yet been established in the literature.

Clark, JW ; Washington University, Seattle, Urban Mass Transportation Administration Res. Rpt. UMTA-URT-3-75-6, UMTA-WA-11-0003-75-2, Aug. 1975, 47 pp; Contract FWPCA-WA-11-0003; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-254988/95T

48 137553 TIME TO REDUCE THE TRAFFIC! WE CANNOT MANAGE THE AIR POLLUTION [Dags att Daempa Trafiken! Luftfoeroreningarna Klarar vi Inte AV]. Carbon monoxide mainly occurs in petrol exhaust. Its long-term effects such as increased frequency of heart attacks and effects on the central nervous system can be proved at concentrations as small as 5-10 ppm, i.e. along moderately trafficked roads. Oxides of nitrogen attack lung tissue and weaken the defence mechanism of the lungs. Nox are very active in acidification of precipitation. Sulphur dioxide has similar effects but only at concentrations much higher than those due to vehicular traffic. Hydrocarbons and nox are involved in reactions which form photochemical smog. Polyaromatics, particularly 3, 4-benzopyrene, are highly carcinogenic. The sizes of polyaromatic particles in diesel exhaust are particularly unfavourable from the cancer viewpoint. Problems due to polyaromatics will increase due to rise in diesel traffic. Lead is an environmental problem, but may be subordinate to polyaromatics and nox. Since cuts in one exhaust component usually result in an increase in some other component, traffic must be restricted, particularly in towns. Public transport must be made electric in the form of trolley-buses and trams, which are environmentally favourable. For the present, heavy traffic must be kept out of towns and parts of town centres must be set aside for pedestrians only. /TRRL/ [Sweden]

Gunnarsson, SO Persson, B *Kommunal Tidskrift* Vol. 9 No. 18, 1975, pp 812-814, 2 Fig., 1 Phot., 11 Ref.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-218382); ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

48 137573 THE FUTURE ENERGY SUPPLY OF TRANSPORT [Transporternas Framtida Energifoersorjning]. Energy consumption in the transport sector is dominated by the car. According to OECD forecasts, in 1980 there will be 373M cars in the world, and in 2000, 524M. A car weighing 1300 kg needs about 30000 kwh in manufacture, and uses about the same in two years. World oil production in 1974 was 27000 twh. The size of reserves is open to discussion, but one estimate says oil reserves will suffice for 40 years. Alternative forms of energy are coal and oil in shale; the latter is expensive to exploit and environmentally inimical. Methyl alcohol, which can be made from coal, refuse, wood etc, has good potential as fuel. Road traffic can be made more efficient in its use of fuel by: 1. Greater use of public transport, 2. Lower specific fuel consumption, 3. Improvement of the conventional car's fuel efficiency, 4. New types of engine or transmission. 3 and 4 have greater practical potential than

1 and 2. 20% of total energy consumption goes on transport. In the USA where 50% of oil consumption is in the transport sector, improvements will have a great effect on total oil consumption; in Sweden where the corresponding figure is 15%, the benefits will not be so great. /TRRL/ [Swedish]

Sjoeberg, LE *Vag-Och Vattenbyggaren* Vol. 21 No. 12, 1975, pp 27-28, 1 Fig., 3 Tab.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute, TRRL (IRRD-218409); ORDER FROM: National Swedish Road & Traffic Research Institute, Fack, S-581 01 Linköping, Sweden

48 137800 CONTROL OF NOISE FROM CONVENTIONAL DIESEL ENGINES. The noise from diesel engines fitted to trucks and public service vehicles may be reduced in 3 ways: (1) control rapid rise of cylinder pressure upon combustion, plus reduction of mechanical noise; (2) reduce response of engine structure to vibration exciting forces of mechanical impact and combustion; (3) install engine in a soundproof box with suitable ventilation. A study of the vibration mode shapes of the crankcase and cylinder block castings of several in-line engines has shown that there are certain modifications which may be incorporated into conventional engine crankcases which will reduce the noise emitted by their surfaces, and yet allow these castings to be machined on the existing transfer line. Such modifications, combined with isolation and damping treatments applied to the sump, valve gear covers, crankshaft pulley and all other noise-emitting areas of the engine, have given noise reductions of 5 dba on the four engines treated to date.(a). /TRRL/

Russell, MF (CAV Limited) GIBBS, HG(ED) (Lucas (Joseph) Limited) Richards, TH (UNDERWATER CONSTRUCTION) ; Applied Science Publishers Limited, Wiley (John) and Sons, Incorporated Proceeding 1975, pp 201-215, 10 Fig., 4 Ref.; Papers presented at the Annual Conference of the Stress Analysis Group of the Institute of Physics held at the University of Ashton, Birmingham, England; ACKNOWLEDGMENT: TRRL (IRRD 219572)

48 139348 TRANSPORT ENERGY USE ARGUMENTS QUESTIONED. A study of pollution and energy use by transportation has found that the automobile is not as it is frequently thought to be. The study which focused on the load factor in transportation, found that the automobile with a nationwide average of 2.2 persons has a load factor of 25 to 30 percent while on buses and electric transit, it is somewhat less. Statistical performance records, however, show that the urban bus is roughly twice as energy efficient as the typical auto. The main reason for this is that buses use high-pressure tires and are powered by efficient diesel engines. It is suggested that the energy efficiency of autos with small engines and high pressure tires would be almost equal to that of buses.

World Highways Vol. 27 No. 3, Mar. 1976, p 8

48 139504 ENERGY THRIFT IN URBAN TRANSPORTATION: OPTIONS FOR THE FUTURE. Various energy-reducing strategies are examined and presented in tabular and graphical form. Travel data, decentralization patterns, and

weight-engine type-energy consumption relationships are considered in appendices.

Fels, MF (Princeton University) Munson, MJ ; Ballinger Publishing Company 1975, pp 7-104, 71 Ref.; Energy Conserv. Pap.; ACKNOWLEDGMENT: EI; ORDER FROM: Ballinger Publishing Company, 17 Dunster Street, Harvard Square, Cambridge, Massachusetts, 02138

48 139506 ENERGY, EMPLOYMENT AND DOLLAR IMPACTS OF ALTERNATIVE TRANSPORTATION OPTIONS. Intercity transport modes considered are the railroad, the airplane, and the automobile. The bus and the automobile are the urban transport modes considered. Each travel mode is treated as an entire system of passenger transportation. The costs are evaluated in units of dollars. British thermal units (Btu) and man-years of labor, which are required, both directly and indirectly, to provide each unit of transportation service. Data are tabulated.

Hannon, B (Illinois University, Urbana) Herendeen, R Puleo, F Sebald, A ; Ballinger Publishing Company 1975, pp 105-130, 19 Ref; Energy Conserv. Pap.; ACKNOWLEDGMENT: EI; ORDER FROM: Ballinger Publishing Company, 17 Dunster Street, Harvard Square, Cambridge, Massachusetts, 02138

48 139647 ISSUES IN OXIDANT MODELING. Basic questions about oxidant control facing transportation planners and others responsible for formulating and implementing public options are considered, the problems of estimating the magnitudes of the directionality of oxidant changes are discussed, and issues relating to urban-based oxidant models and control strategies are addressed. The questions relating to what kind of emissions should be reduced in order to reduce oxidant concentrations, are addressed in papers presented in this special report. The papers conclude that ambient air quality standard for oxidant in urban areas requires substantial reductions of emissions of hydrocarbons and other reactive organics in the area. Although reduction in nitrogen oxide emissions may be needed in urban areas, excessive reduction may increase the difficulty of controlling urban oxidant concentrations. Papers are also presented which describe 4 techniques for the estimation of changes in oxidant concentrations resulting from changes in precursor emissions: linear or nonlinear rollback methods; smog chamber models; statistical models; and diffusion models. Recent findings that oxidant can be transported over distances of at least 30 miles and that high concentrations exist in rural areas have led to questions regarding urban oxidant models and control strategies. These questions are addressed in papers which conclude that elevated rural oxidant concentrations are attributable to man-made emission sources. However it was suggested at a workshop that the natural contribution may be a significant factor.

Horowitz, JL (Environmental Protection Agency) *Transportation Research Board Special Reports* No. 167, 1976, pp 5-7; Presented at the Conference on the State of Art of Assessing Transportation-Related Air Quality Impacts, Washington, D.C., October 22-24, 1975.; ORDER FROM: TRB Publications Off

48 139650 ACCURACY OF PREDICTION OF URBAN AIR POLLUTANT CONCENTRATIONS BY DIFFUSION MODELS. Projections of future transportation-related air quality impacts require the use of mathematical models that relate emissions to air quality. Whereas the derivation and use of such models have received much attention (at least for inert pollutants, such as CO), much less attention has been paid to questions of the interpretation of the concentrations these models predict and how the predictions relate to real atmospheric quantities. Concepts of validity and accuracy must be carefully defined for any model that is to be used in order that the predictions from the model can be properly evaluated. The purpose of this paper is to formulate the concepts of validity and accuracy for atmospheric air pollutant diffusion models and to suggest numerical experiments that can be used to test both the validity and the accuracy of the models. /Author/

Seinfeld, JH (California Institute of Technology) *Transportation Research Board Special Reports* No. 167, 1976, pp 34-45, 2 Fig., 3 Tab., 37 Ref.

Presented at the Conference on the State of the Art of Assessing Transportation-Related Air Quality Impacts, Washington, D.C., October 22-24, 1975.; ORDER FROM: TRB Publications Off

48 141065 TRANSPORTATION ENERGY CONSIDERATION IN THE URBAN ENVIRONMENT. A number of means for conserving fuel including alternative fuels, alternative modes, and various economic incentives are discussed. The discussion and graphic representations of present energy uses and future energy demand point out that petroleum consumption rates must be reduced, and raise questions concerning how much total reduction is required, where different proportions should occur, and the consequences of different procedures. It is noted that there are a large number of possibilities with significant potential for fuel saving, and that it is important that each be developed promptly and to the fullest extent. Transportation fuel efficiency is discussed and figures are used to show the percentages of highway fuel that would be saved compared to the proportion of usage of various conservation means. Improving auto miles per gallon is one of the means for conservation having the highest potential. In the short run, improvement in consolidation (car pooling or combining truck shipments) of trips has a high potential. Other possibilities include switching to a motorcycle or transit for the trip to work. The management of highway finances and other resources for projects which encourage fuel conservation such as car-pool-bus lanes, and which reduce fuel wasting congestion, grades and stops can achieve quick results at moderate cost.

French, A ; Federal Highway Administration Oct. 1975, 31 pp, Figs., 3 Tab., 18 Ref.; Presented at Session 4, Urban Transportation, the Urban Environment, Annual Meeting of the American Society of Civil Engineers, Kansas City, Missouri, October 21, 1974.; Contract HPR-40; ORDER FROM: GPO

48 141403 ISSUE-ORIENTED APPROACH TO ENVIRONMENTAL IMPACT ANALYSIS. An approach for better organization of significant portions of the urban transportation planning process is presented. A corridor-plan-

ning project from the Dallas-Fort Worth region in the form of an environmental impact analysis for a proposed urban tracked air-cushion vehicle facility is used as a case study. The issue-oriented approach is built on 3 broad concepts. First, the early identification and analysis of major impact issues in relation to regional or local goals and objectives should be a major element on which transportation planning studies are structured. Second, the planning and evaluation process should be phased, and each successive phase or cycle should address additional, more detailed service and impact variables, but for a smaller number of alternatives. Third, required environmental impact statements should be viewed as a reorganization of the results of environmental impact analyses already well integrated in the planning process.

Larwin, TF (Barton-Ascham Associates, Incorporated) Stuart, DG *Transportation Research Record* Conf Paper No. 583, 1976, pp 1-14, 5 Fig., 3 Tab., 14 Ref.; Prepared for the 54th Annual Meeting of the TRB held in Washington, D.C.; ORDER FROM: TRB Publications Off

48 141502 WHEEL/RAIL NOISE-PART 1: CHARACTERIZATION OF THE WHEEL/RAIL DYNAMIC SYSTEM. Field and laboratory measurements of the point impedance, response, radiation efficiency, and directivity of rapid transit steel wheels and rails are presented and compared with appropriate analytical models. The rail impedance can be well modeled by the impedance of an infinitely long beam with the same bending stiffness. Measurements of the wheel impedance in the radial direction are closely approximated (up to about 1000 Hz) by the impedance of a mass equivalent to that of the wheel plus one-third of the axle mass. Above 100 Hz, the wheel impedance is approximated by the impedance of an infinite beam with the same cross-section as the wheel tread without the web. At low frequencies (below 1000 Hz), the decay of vibration along the length of a rail away from the point of excitation is rapid enough so that most rail vibration occurs within a few feet of the exciting wheel. Measurements of the wheel radiation efficiency agree with predictions that are based on the radiation efficiency of a rigid disk with the same radius vibrating in the axial direction. The directivity of radiation from the wheel and rail is approximately uniform. TRRL/

Remington, PJ (Bolt, Beranek and Newman, Incorporated) *Journal of Sound and Vibration* Vol. 46 No. 3, June 1976, pp 359-370, 17 Fig., 2 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 220736); ORDER FROM: ESL

48 141503 WHEEL/RAIL NOISE-PART 2: WHEEL SQUEAL. A model is presented for the intense pure-tone noise generated by American subway cars and German trams when traversing tight curves. Squeal is presumed to arise from lateral crabbing of the wheels across the rail head, which results from the finite length of the truck (or bogie). This lateral sticking and slipping causes vibrations in the wheel to increase until a stable amplitude is reached. The stick-slip mechanism is described by a negative damping coefficient that varies with vibration amplitude. The model is used to predict the intensity of wheel squeal as a function of train speed, curve radius,

and truck length. Damped and resilient wheels were tested and found effective at reducing wheel squeal. /TRRL/

Rudd, MJ (Bolt, Beranek and Newman, Incorporated) *Journal of Sound and Vibration* Vol. 46 N June 1976, pp 381-94, 7 Fig., 5 Ref.; For abstracts of Parts 1, 3, 4 and 5 of this series see IRRD Nos. 220732 and 220736.; ACKNOWLEDGMENT: TRRL (IRRD 220735); ORDER FROM: ESL

48 141505 WHEEL/RAIL NOISE-PART 4: ROLLING NOISE. In this paper (part IV of a series on "wheel/rail noise") analytical formulas for predicting wheel/rail rolling noise in urban rail transit systems are developed based on the characterization of the wheel/rail dynamic system developed in part I and the roughness spectra on the running surfaces of the wheels and rails. Measured values of wheel and rail roughness spectra taken on an operating rapid transit system are used with these formulas to predict the rolling noise at the wayside. These predictions prove to agree well with published data on the wayside noise from that system. In addition, measurements of the wheel roughness spectra on a small personalized rapid transit (PRT) vehicle and the rail roughness spectra on a section of the test track for that vehicle, when used in the analytical formulas, yield predictions of the wayside noise during passage of the PRT vehicle that agree well with field measurements of that noise. /TRRL/ Remington, PJ (Bolt, Beranek and Newman, Incorporated) *Journal of Sound and Vibration* Vol. 46 No. 3, June 1976, pp 419-36, 14 Fig., 2 Tab., 1 Phot., 5 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 110733); ORDER FROM: ESL

48 141566 RAPID TRANSIT ENERGY DEMAND. This article describes the effect of rapid transit train performance on power and energy demands to put into perspective how important the cost of energy may be in determining the basic design and operation of any rapid transit system. High acceleration requires greater energy with limited service advantage as station intervals increase. Strict control of station stop times can effectively reduce overall journey timing. Optimum steepness of grades is defined in relation to energy demand and to stopping at stations.

Grant, JC (Mott Hay and Anderson) *Railway Engineer* Vol. 1 No. 4, Aug. 1976, pp 14-16, 7 Fig.; ORDER FROM: Mechanical Engineering Publications, Penthouse 1, 15 West 55th Street, New York, New York, 10019

48 141871 ENERGY CONSUMPTION, POLLUTANT PRODUCTION, AND DOLLAR COSTS. The results presented in this report are based on data obtained from Chicago's three largest diesel commuter railroads. Those aspects of their operations that relate to energy and pollution are described. Service characteristics, such as average occupancy and average trip distance, are presented. Energy consumption results are presented and discussed. With energy efficiency measured in passenger-miles per Btu, it is found that trips by diesel commuter train are 3.5 times more energy efficient than Chicago Central Area auto trips. The total trip from home to suburban station, then by train to a downtown terminal, is found to be 2.2 times more energy efficient than Chicago Central Area auto trips. Pollutant production rates are presented for five

pollutants. For every pollutant except sulfur oxides, trains are found to be less polluting per passenger-mile than autos. Per passenger-mile pollutant emissions from trains are, overall, less damaging by a factor of 5.5 than the per passenger-mile emissions from autos. Travel on these diesel commuter trains is less costly to society than auto travel (1972 suburban-based autos). This is the case whether one compares the train trip alone with an auto trip or the home-to-suburban-station-then-to-a-downtown-terminal trip with a home-to-downtown auto trip. /Author/ Walbridge, EW (Illinois University, Chicago) *Transportation (Netherlands)* Vol. 5 No. 3, Sept. 1976, pp 285-307, 2 Fig., 5 Tab., 42 Ref.

48 142368 ASSESSMENT OF TRANSPORTATION SYSTEM PERFORMANCE IN 1980. The interrelationship of changes in regional land development, transportation systems and air quality was explored in a 1972-1982 time frame. The study assessed the transportation impacts of the interim 1980 households and employment forecasts, assessed the effectiveness of the current Transportation Improvement Program in satisfying demand, and analyzed the transportation-related air quality impacts for 1980. Between 1972 and 1980, the regional employment and households are anticipated to grow by 21 and 18 percent respectively; more than 95 percent of this will occur in the suburbs. The Metrorail System which is scheduled for significant operations in the 1980's will improve job access throughout the metropolitan area, particularly in suburban employment centers. Household growth in the suburbs will result in large increases in intrasuburban travel. The need for research in this area is indicated. Urban background concentrations of carbon monoxide (CO) will be at or below standards in 1980. The study concludes that in order to maximize the investment in the regional rail system, the potential for development around Metro stations needs to be encouraged.

Metropolitan Washington Council of Governments Aug. 1976, 56 pp, 23 Fig., 19 Tab., 3 App.

48 142567 THE ROLE OF URBAN TRANSPORTATION AIR QUALITY CONTROL PLANS IN IMPROVED TRANSPORTATION. Transportation air quality control plans has helped improve the decision making process and management policies of government transportation officials, who moved quickly and positively, shifting emphasis from one area to another, and obtaining new legislation and additional funding. Some policies adopted by Federal government transportation officials to decrease mobile air pollution emissions call for improvement of, and greater funding for public transit facilities: better utilization of highway capacity; more emphasis on paratransit modes; increased technical assistance; encouragement of car pooling; greater emphasis on short-range and intermodal planning; and greater funding for research and development activities, among other policies, strategies, and tactics.

Wallerstein, LB ; Atlantic Economic Society Sept. 1975, 9 pp; Remarks before Third Annual Meeting, Atlantic Economic Society, September, 1975. 92115 7702; ORDER FROM: DOT

48 143641 ECONOMIC WELFARE IMPACTS OF URBAN NOISE. The basic purpose of this project was to develop a conceptual framework

for estimating the social welfare gains or benefits of reducing current noise levels in urban environments. The project has concentrated on developing economic welfare theory and empirical techniques to assess willingness-to-pay by individuals for noise avoidance. Particular attention was paid to noise produced by motor vehicles and noise produced by operations at construction sites. The theoretical effect of the localized nature of noise on people's willingness-to-pay to control noise was investigated. An efficient pricing scheme for aggregate noise disturbance was devised, based on people's willingness-to-pay for noise reduction. A questionnaire was developed to elicit responses on the physical and psychic costs of noise in urban areas. The attempts to assign dollar values to the costs of noise pollution by determining people's willingness-to-pay to control or reduce noise.

Thorpe, R Holmes, T ; QEI, Incorporated, Washington Environmental Research Center Final Rpt. 5531, EPA/600/5-76/002, May 1976, 216 pp; Contract EPA-68-01-2634; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256411/OST, DOTL NTIS

48 144191 EFFICIENT ENERGY USE AND WELL-BEING: THE SWEDISH EXAMPLE. Energy use has always been related to a country's standard of living as measured by the Gross National Product (GNP) ratios of several countries, however, it was found that Sweden maintains as high a standard of living as the U.S. while at the same time using only 60 percent as much energy. This article takes a look at both countries in detail in an attempt to define energy-savings strategies. Physical and economic comparisons are made between the two countries, as well as a comparison of energy use, with tables to illustrate the factual data. In analyzing the differences in energy consumption, the following conclusions are reached: higher energy prices in Sweden contribute to more efficient use of energy; energy-conserving construction is reflected in Swedish building codes; public passenger transport is better in Sweden and costs of owning an automobile are high. This maintains the standards of public transport and affects living patterns: people tend to concentrate in cities, making apartment living more common which saves fuel through more efficient heating systems, and makes trips shorter. So although higher energy prices are an important factor, institutional and social factors cannot be overlooked. It is also necessary to consider the levels of energy intensive activity. Sweden is now operating in a more energy-efficient manner than the U.S., but the U.S. can increase its efficiency without damaging its economy by optimizing to higher energy prices. Swedish methods of conservation could possibly bring about a savings of about 30% in the energy of the U.S. while still allowing it to maintain its standard of living.

Schipper, L Lichtenberg, AJ (California University, Berkeley) *Science* Vol. 194 No. 4269, 761203, pp 1001-13, 5 Fig., 12 Tab., 70 Ref.

48 145328 PUBLIC POLICY DEVELOPMENT: THE MATRIX FOR DECISION MAKING (ABRIDGMENT). This paper is concerned with policy analysis and largely with the social acceptability dimension. It focuses on a specific policy issue: energy conservation in urban

transportation. The purpose is to examine the implications of the more subjective considerations in policy development and to suggest a means for including these dimensions in the larger policy development process. The process described, furthermore, represents an attempt to provide evaluative information to public decision makers in a form and content responsive to their needs. The process is based on two assumptions. One is that data and their analysis should be open rather than closed. The second assumption is that public policy making has an essential linking function between the society and its decision making. Because of matters of social concern attitudes and values determine the acceptability of policy alternatives, some measures of these attitudes and values are essential criteria for the policy making process.

Michaels, RM (Illinois University, Chicago Circle) *Transportation Research Record* No. 592, 1976, pp 35-37, 1 Fig., 1 Tab., 2 Ref.; ORDER FROM: TRB Publications Off

48 145775 SUBURB-TO-SUBURB INTERCITY TRAVEL: ENERGY, TIME AND DOLLAR EXPENDITURES. The effect of adding suburb to terminal and terminal to suburb travel is examined. The energy consumed in entire trips was estimated. The total energy costs are compared with total travel times, and dollar costs to the traveler. Trips between origins in seven suburbs of Newark, New Jersey and destinations in two Washington, D. C. suburbs are analyzed. (Author)

Fels, MF ; Princeton University NASA-CR-137911, REPT-76-TR-10, June 1976, 70 pp; Grant NSG-2037; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N76-29064/2ST

48 145902 TRANSPORTATION ENVIRONMENTAL REVIEW PROCESS [Transportation research record]. The ten papers report on the indirect sources of air pollution, a comparison of automobile emissions based on trip type in two metropolitan areas, evaluation of air and noise pollution impacts during highway system planning stage, evaluation and comparison of three air pollution prediction models, assessment of transportation noise, prediction of wayside railroad noise, evaluation and modification of traffic noise prediction procedure, socioeconomic factors as determinants of noise prediction, a vehicle noise survey, and apartment tenant response to expressway noise.

Roberts, JB ; Transportation Research Board, Washington, D.C. TRB/TRR-580, 1976, 104p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-256973/9ST

48 146598 BIBLIOGRAPHY FOR TRANSPORTATION ENERGY CONSERVATION. A listing is given of 578 reports, books, articles, and conference papers on transportation and energy. Coverage is primarily on U. S. developments and research from 1970 to 1975. Following a section of citations of general works on energy, the bibliography contains two main parts: "Energy for Transportation" and "Transportation of Energy." Within each of these topics the arrangement is multimodal (at the urban, regional, national, or international level), then by mode. Selected information sources are listed in the last part. Within each section, entries are arranged alphabetically by author or, lacking an author, by

title. References were drawn from the Transportation Center Library collection and other libraries in the Northwestern University system. An earlier bibliography, *Transportation and Energy*, compiled by the Transportation Center Library in March 1974, forms the basis for the arrangement and provides coverage from 1970 to 1973. (ERA citation 01:026008)

Argonne National Laboratories, Energy Research and Development Administration May 1976, 64 pp; Contract W-31-109-Eng-38; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; ANL-76-XX-7, DOTL NTIS

48 146656 PUBLIC ATTITUDES AND BEHAVIOR REGARDING ENERGY CONSERVATION: DETAILED TABULATIONS BY U.S. POPULATION AND POPULATION SEGMENTS, WAVES 30 AND 31. (ENDING MAY 23, 1975). This report contains tabulations of results of telephone interviews conducted by Opinion Research Corporation on the public's attitudes toward vacation and business travel, beverage containers, and reasons for using mass transit. The interviewing period for Waves 30 and 31 extended from May 7 to May 23, 1975. There were 905 interviews gathered.

Rappeport, M Labaw, P ; Opinion Research Corp., Princeton, N.J.*Federal, Energy Administration, Washington, D.C. Office of, Energy Conservation and Environment. FEA/D-76/251, May 1975, 63p; See also PB-244 969 and report dated Oct 75, PB-259 341.(PC A04/MF A01); Contract DI-14-01-0001-1714; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259346/5ST

48 146658 PUBLIC ATTITUDES AND BEHAVIOR REGARDING ENERGY CONSERVATION: DETAILED TABULATIONS BY U.S. POPULATION AND POPULATION SEGMENTS, WAVES 14 AND 15. (ENDING OCTOBER 13, 1974). This report contains tabulations of results of 1,210 telephone interviews conducted between September 15 and October 15, 1974. The survey covered the public's attitudes towards such issues as reliability of energy information sources; reasons for the energy shortage; use of public transportation; gasoline tax policy; foreign trade policy; home lighting; home heating; natural resource availability; and desirability of minimum miles per gallon by legislation.

Rappeport, M Labaw, P ; Opinion Research Corp., Princeton, N.J.*Federal, Energy Administration, Washington, D.C. Office of, Energy Conservation and Environment. FEA/D-76/248, Oct. 1974, 46p; See also PB-244 980 and report dated Feb 76, PB-259 344.(PC A03/MF A01); Contract DI-14-01-0001-1714; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-259343/2ST

48 147366 ASSESSING TRANSPORTATION-RELATED AIR QUALITY IMPACTS [Special rept]. The proceedings include the conference papers given on transportation-related air quality impacts. These papers give up-to-date information on service and the state of the art in modeling. The first seven papers deal with photochemical oxidant models and the last twelve deal with nonreactive models.

Transportation Research Board, Washington,, D.C.*Environmental Protection Agency, Wash-

ington,, D.C.*Federal Highway Administration, Washington,, D.C. TRB/SR-167, ISBN-0-309-02478-1, 1976, 206p; Proceedings of a conference conducted by the Transportation Research Board, 22-24 Oct 75 sponsored by Environmental Protection Agency, Washington, D.C. and Federal Highway Administration, Washington, D.C. Library of Congress Catalog Card No. 76-20621.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-261196/OST

48 147505 URBAN TRANSPORT PLANNING AND ENERGY: A REVIEW. This paper examines the way in which policy making and planning for urban transport are affected by the previously neglected relationship of transport and energy. It is centrally concerned with appraising the existing methodology in the light of energy considerations. There are four main sections: section 2 examines in general terms the transport-energy relationship, section 3 outlines the methodology normally used in urban transport policy-making at present, and a critique of this is given in section 4. Some conclusions are presented in the final section. /TRRL/

Maltby, D Monteath, IG Lawler, KA ; Salford University, England Mong Ser. Working Paper 1, Aug. 1975, 80 pp, 68 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 222326)

48 147860 RAW MATERIAL SOURCES AND TRANSPORT. This paper commences by reviewing the development of primary energy consumption and the dependence on imported energy in Europe, the USA and Japan. Energy requirements and the use of petroleum products in the transport sector is then analysed, as is the cycle of world oil production from 1900 onwards, forecasting trends up to 2100. Finally, transport policies are discussed in relation to energy consumption, and the implications in fuel and cost saving measures such as improved car technology, changes in passenger and freight modal splits, and physical constraints such as fuel rationing and changes in the internal organisation of individual modes. The number of the covering abstract for the symposium is IRRD no. 221684. /TRRL/

Bayliss, B (Bath University, England) ; OECD Publications Office Conf Paper 92-821-1036-2, 1976, pp 107-43, 2 Fig., 12 Tab., Refs.; Presented at the Sixth International Symposium on Theory and Practice.; ACKNOWLEDGMENT: TRRL (IRRD-222850); ORDER FROM: OECD Publications Center, 1750 Pennsylvania Avenue, NW, R1207, Washington, D.C., 20006

48 148659 STATE AND LOCAL ROLES IN TRANSPORTATION CONTROL PLANNING. Numerous problems have arisen in the planning and implementation of transportation controls developed under the Clean Air Act. These problems include constraints imposed on the planning process by strict statutory deadlines and limited resources; uncertainties about the nature and severity of the air pollution problems facing metropolitan areas and about the effects on health and welfare of air pollution; incomplete information about the effectiveness, costs, and implementability of transportation control options; lack of explicit investigation of social and economic effects of proposed transportation control strategies; insufficient public involvement in,

and understanding of, transportation control planning; and failure to adapt the transportation control planning process to the existing institutional framework. Despite these problems, transportation controls can have multiple benefits, not only improvement of air quality but also more efficient use of the existing transportation system, energy conservation, increased safety, spurred transit development and better transit services, and more rational use of scarce urban land. Thus, carefully planned transportation controls can meet multiple objectives and support community goals. Steps that can be taken by states and localities now include (a) requiring that certain decisions be made by the organization responsible for adopting a regional transportation plan; (b) coordinating the roles of all levels of government in development of transportation plans; (c) facilitating public involvement in transportation control planning; (d) requiring full impact analysis; (e) undertaking and monitoring experiments and innovations in transportation controls; and (f) requiring periodic evaluation and update of transportation control plans.

Harvey, GW Deakin, EA (Massachusetts Institute of Technology) *Transportation Research Record* No. 599, 1976, pp 1-6, 11 Ref.; Sponsored by Committee on Transportation Programming, Planning, and Evaluation.; ORDER FROM: TRB Publications Off

48 148664 ENERGY ANALYSIS FOR URBAN TRANSPORTATION SYSTEMS: A PRELIMINARY ASSESSMENT. This paper discusses and evaluates the capability of conventional urban transportation planning system (UTPS) procedures in dealing with energy issues. Central energy-related issues for planning are identified as (a) reevaluation of long-range plans, (b) modal alternatives, (c) investment needs, and (d) funding flow. The UTPS process is capable of dealing quite well with certain energy policies (e.g., speed reductions, increased vehicle efficiency) but generally is a weak tool for addressing other policies (e.g., rationing, Sunday driving bans, urban activity redistributions). Generally the sensitivity analysis capability of UTPS appears stronger than its ability to predict actual impacts. Specific information on gasoline price elasticity of travel by trip purpose, as well as trip priorities, would greatly increase the prediction power of the system.

Hartgen, DT (New York State Department of Transportation) *Transportation Research Record* No. 599, 1976, pp 31-34, 3 Tab., 3 Ref.; Sponsored by Committee on Energy Conservation and Transportation Demand.; ORDER FROM: TRB Publications Off

48 148668 RELATIONSHIPS BETWEEN TRANSPORTATION ENERGY CONSUMPTION AND URBAN STRUCTURE: RESULTS OF SIMULATION STUDIES. If the urban transportation planning process is to deal with the problem of providing transportation in a future characterized by fuel shortages, a long-term perspective is needed. The study described documents the relationships between energy consumption in urban passenger travel and the spatial structure of cities, which is an important determinant of travel demand. Experiments were conducted with 37 hypothetical cities in which combinations of urban form, transport network, and resulting travel patterns were varied

in order to identify structural characteristics contributing to increased energy consumption. Preliminary findings suggest that structural changes in transportation and land use patterns can produce significant reductions in energy consumption for urban passenger travel.

Edwards, JL (Minnesota University, St Paul)
Schofer, JL (Northwestern University, Evanston)
Transportation Research Record No. 599, 1976, pp 52-59, 7 Fig., 1 Tab., 15 Ref.; Sponsored by Committee on Transportation Systems Design.; ORDER FROM: TRB Publications Off

48 149018 KEEP SETTLEMENT OUT OF THE TRANSPORT TRAP. The author states that if car ownership continues to increase and population densities to fall, the dispersed development pattern which results will require a great deal of energy to service it. If energy supply problems occurred in Britain in the 1990s, the changes in land use could not be reversed quickly and individual hardship would be suffered by people living in areas of low population density. It is suggested that the need to move out of areas of high population density should be minimised, an essential part of such an approach being the support of alternatives /TRRL/

Hamer, M *Surveyor - Public Authority Technology Analytic* Vol. 148 No. 4405, Nov. 1976, p 16, 2 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 223357)

48 149049 ADVISORY COUNCIL ON ENERGY CONSERVATION. PAPER 2 PASSENGER TRANSPORT: SHORT AND MEDIUM TERM CONSIDERATIONS. This discussion paper is a survey of passenger traffic, its energy usage, and their bearing on transport and energy policies. Energy usage is illustrated by some new statistics giving the primary energy consumption by passenger modes and types of traffic. Generally energy savings would result if passengers transferred to public transport. However the great superiority of the private car in terms of availability, convenience and flexibility counteracts this. Transport environmental and fiscal policies related to passenger transport often help to conserve energy. Some environmental pressures however tend to go the other way. Policies restricting financial help for public transport may result in short term transfer of passenger journeys to car using more energy. The private use of business cars on a subsidised basis is often likely to lead to a greater use of the car. /TRRL/

Her Majesty's Stationery Office, (0 11410287)
Monog Rpt. Energy Paper 10, Apr. 1976, 16 pp, 7 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 222742)

48 149273 POTENTIAL OF THE DUAL-MODE TRANSIT SYSTEM TO CONSERVE ENERGY. The energy efficiency of the dual-mode transit system is compared with that of the following urban passenger transportation vehicles: motorcycle, light truck, passenger automobile, school bus, commercial bus, trolley bus, streetcar, and rail rapid transit vehicle. These modes account for 33 percent of the total energy consumed by the transportation sector in the United States in 1971 and 8 percent of the total energy consumed by the entire country. The automobile consumes 95 percent of urban trans-

portation energy. The transit bus and rail rapid transit vehicles are from 2.4 to 2.6 times as efficient as the standard-sized passenger automobile, but, because these modes consume only 1.5 percent of the total energy, they have little effect on the energy situation. The estimate of dual-mode transit efficiency is based on simplified dynamic equations and an assumed vehicle duty cycle. Dual-mode transit is expected to be from 10 to 20 percent less efficient than the transit bus and rail rapid transit vehicle and, by providing a high level of service, has the potential of attracting significant numbers of people who are currently using the energy-intensive automobile. To achieve this promise, a dual mode system must be designed with careful attention to energy-related design details (particularly vehicle weight and must provide the type of service necessary to produce high average vehicle load factors. /Author/

Lieb, JG (Mitre Corporation) *Transportation Research Board Special Reports* No. 170, 1976, pp 127-134, 9 Fig., 5 Tab., 16 Ref.; This paper appears in Dual Mode Transportation, which is a publication containing the proceedings of a conference conducted by the Transportation Research Board, May 29-31, 1974.; ORDER FROM: TRB Publications Off

48 149364 NEGATIVE ENERGY IMPACT OF MODERN RAIL TRANSIT SYSTEMS. An analysis of data from the Bay Area Rapid Transit (BART) System is outlined, and it is concluded that rail transit is an energy waster. Improvement of the efficiency of transportation systems could only be achieved by emphasis on the development of more efficient automobiles and the development of bus-oriented transit systems. In this analysis, the criterion of passenger-miles per British thermal unit (PM/Btu) is used to evaluate the relative efficiencies of rail transit and highways. A comparison of construction energy costs reveals that BART used 25.2 times as much energy as required to construct an urban freeway. The operating-energies of BART, buses, and cars are 4740, 2900, and 8310 Btu/PM respectively including both propulsion energy and a pro rata share of the energy involved in constructing the vehicle. BART like all rail transit systems attracts passengers from existing bus systems. Although BART has a high auto-diversion, its net energy saving is only 680 Btu/PM.

Lave, CA (California University, Irvine) *Science* Feb. 1977, pp 595-596, 7 Ref.

48 149946 A NOTE ON THE ENERGY EFFICIENCY OF VARIOUS MEANS OF TRANSPORT. Briefly summarizes the results of an investigation of the energy efficiency of various means of transport, based on statistics from Goeteborg, Sweden for 1970-1974. Tables give the data, energy consumption per place kilometre, energy efficiency and actual energy efficiency (in terms of imported oil) for tramways, buses and cars. The period covered is from 1970 to 1974. Figures illustrate losses in the course of energy flow from source to consumer for electricity (and hot water), diesel oil and petrol. The investigation shows that public transport is the most energy-efficient means of transport in Goeteborg. The relative proportions being 1:3:6 respectively for tramways, buses and cars. Decreases in the energy consumption of trams and buses over the period (1970 to 1974) is attributed to improved rights-of-way for trams and new faster bus ser-

vices. It is also concluded that the increased use of public transport and the replacement of buses on the major routes by trams will result in substantial savings in energy. /TRRL/

Gunnarsson, SO Persson, B (Chalmers University of Technology, Sweden) *Traffic Engineering and Control* Vol. 17 No. N10, Oct. 1976, pp 418-419, 3 Fig., 3 Tab., 3 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 224058); ORDER FROM: ESL

48 149987 URBAN MASS TRANSIT ENERGY USE AND CONSERVATION POTENTIAL. Presently bus and rail systems carry only 2.5% of the urban passenger traffic. Although mass transit carries only a tiny fraction of urban traffic, existing bus and rail systems are two to three times as energy efficient as automobiles. Transit efficiencies vary widely depending on city size, time of day, and type of route. Based on the limited data presented here, it appears that transit efficiency improves with increasing metropolitan area population. Bus system efficiency also depends strongly on both time of day and direction of flow. The energy implications of a number of recent transit improvements are discussed. Unfortunately, the energy impacts are slight-in part because transit now carries so few people relative to the total and in part because the increased ridership only slightly reduces automobile traffic. Thus the short-term energy-saving potential of improved and expanded transit service is small relative to the savings possible through measures that directly affect the automobile and its use.

Hirst, E (Oak Ridge National Laboratory)
Stuntz, MS, Jr *Energy Systems and Policy* Vol. 1 No. 4, 1976, pp 391-406, 17 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 151216 AESTHETIC AND ENVIRONMENTAL CONSIDERATIONS IN THE DESIGN OF ELEVATED TRANSPORTATION STRUCTURES. This report addresses issues related to assessing or anticipating visual impacts of elevated transportation structures upon urban settings. Two alternative approaches are outlined for assessing negative impacts of elevated structures upon different settings. The compatibility matrix approach cross-references characteristics of an existing or proposed structure with features of a particular setting to identify conflicts. The case study approach graphically portrays each setting with and without the existing or proposed structure in place to illustrate comparative changes (impacts). Nine hypothetical case studies are presented as examples. Various considerations of ways to improve existing elevated transportation structures are offered, including general restoration noise control and lighting. Considerations are also offered for ways to improve the conditions of elevated train stations and pedestrian skyways. Recommendations for planning new elevated structures are presented.

Silver, ML Bell, LS; Illinois University, Chicago, Illinois University, Urbana, Department of Transportation Final Rpt. DOT/TST-76/16, June 1975, 134 pp; Prepared in cooperation with Illinois Univ. at Urbana-Champaign. Dept. of Industrial Engineering.; Contract DOT-OS-30092; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263158/8ST, DOTL NTIS

48 151322 ASSESSMENT OF FUEL-CONSERVATION POTENTIAL OF A GROUND-TRANSPORTATION SYSTEM DUE TO FULL UTILIZATION OF ITS MASS TRANSPORTATION CAPABILITIES. During a fuel shortage situation, low production/fuel consumption areas must be identified and their fuel saving capability (quantitative) must be estimated in order that correct and effective emergency relief measures be proposed. This study first discusses an overall fuel-conservation potential model of a ground transportation system, then focuses its attention on a less comprehensive and manageable problem of assessing the fuel conservation capability of a ground transportation system due to full utilization of its mass transportation mode. The approach is experimental rather than theoretical. A selected city, in this case Kansas City, Kansas was evaluated. The specific works include the estimation of existing excessive mass transit capacity, the auto trips that potentially can be diverted to use mass transit, and the fuel savings due to such diversions. Results are felt to have an acceptable accuracy, and the procedures developed are felt to be useful for assessing fuel saving capability of a ground transportation system under an emergency situation. A manual describing the general use of the developed procedures is included.

Lee, J ; Center for Research, Incorporated, National Science Foundation Final Rpt. CRINC-2620-01, Jan. 1977, 134 pp; Grant NSF-KO-42151; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-262125/8ST

48 151721 JOINT EPA/UMTA/FEA STRATEGY FOR URBAN TRANSPORTATION AND AIR QUALITY. VOLUME 2. PUBLIC-PRIVATE URBAN TRANSPORTATION MODAL MIXES. The objective of this four-volume study is to formulate a basis for the design of a joint interagency action program which would simultaneously improve urban mobility and air quality and conserve petroleum resources. This second volume presents an algorithm for calculating the impacts on transportation energy use and pollutant emissions of alternative urban transportation mixes. The algorithm is used to compare the change in national urban energy use and pollutant emissions implied by the maximum conceivable diversion of 1990 urban auto travel to bus, rail and para-transit compared to the no-diversion case. This exercise is supported by appendices showing the derivation of the methodology and of the database. The volume also includes a discussion of issues, tradeoffs, and methodologies relevant to the local determination of a balanced modal mix in an individual metropolitan area.

Krzyczkowski, R Dei Rossi, JA Henneman, SS Putnam, ES Usowicz, TW ; Interplan Corporation, Naval Underwater Systems Center, Urban Mass Transportation Administration, Environmental Protection Agency UMTA-RI-06-0005-74-1, 7346-R-Vol-2, Dec. 1974, 92 pp; See also Volume 1, PB-244473. Prepared in cooperation with Environmental Protection Agency; Contract N00140-74-C-6026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263841/9ST, DOTL NTIS

48 151723 JOINT EPA/UMTA/FEA STRATEGY FOR URBAN TRANSPORTATION AND AIR QUALITY. VOLUME 4. INFORMATION DATA BASE: STATUS OF URBAN CONGESTION, AIR POLLUTION, AND ENERGY USE. The objective of the study is to formulate a basis for the design of a joint program which would simultaneously improve urban mobility and air quality and conserve petroleum resources. This fourth volume contains INTERPLAN's initial definition of the transportation-related urban problems now faced by UMTA, EPA, and FEA, and their authority to cope with these problems. The current status of transportation-related urban congestion, air pollution, and energy usage is analyzed on a national level, and the future status likely to obtain if present trends continue unchecked is projected. Congestion and air pollution is also examined in four cities: Los Angeles, Philadelphia, Seattle, and Baltimore.

Krzyczkowski, R Henneman, SS Putnam, ES Usowicz, TW ; Interplan Corporation, Naval Underwater Systems Center, Urban Mass Transportation Administration, Environmental Protection Agency UMTA-RI-06-0005-77-1, 7346-R-Vol-4, Dec. 1974, 272 pp; See also Volume 3, PB-263 842. Prepared in cooperation with Environmental Protection Agency, Washington, D.C.; Contract N00140-74-C-6026; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263843/5ST, DOTL NTIS

48 151766 TRANSPORTATION FACILITY PROXIMITY IMPACT ASSESSMENT. This study provides techniques for the assessment of proximity impacts related to transportation facilities. The examination of proximity impacts included those related to highways and freeways, busways, and special operational improvements, transit, and new modes of transit. Proximity impacts are those direct and indirect effects which represent a significant change from existing or future community conditions. A two-stage evaluation was developed for the assessment of the following impact indicators: noise, air quality, traffic volume and accident experience, parking availability, pedestrian safety, land use, local fiscal effects, aesthetics, access/barrier, and neighborhood/community disruption. The report also includes an illustrative application of the assessment procedures to a candidate transportation project.

Booz-Allen and Hamilton, Incorporated, Gruen Associates, Incorporated, Bolt, Beranek and Newman, Incorporated, California Department of Transportation, Federal Highway Administration Final Rpt. BAH-GA-BBN-76-01, Mar. 1976, 296 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-264160/3ST, DOTL NTIS

48 152439 COMPUTER-ASSISTED PLANNING FOR RAIL TRANSIT NOISE CONTROL. This paper describes a computer assisted methodology for planning rail system noise control. Noise control usually involves several sequential stages of planning and design. At each stage, interactions with other design factors are clarified, the number of design options is usually reduced, and the level of detail is increased for analysis of costs and performance. In contrast with highway planning, urban rail system planners and managers can control a very wide range of system design elements, e.g. both on vehicle and guideway.

Lotz, R (Transportation Systems Center); Institute of Noise Control Engineering Proceeding 1976, pp 221-224, 3 Fig., 2 Tab., 2 Ref.; Presented at the 1976 International Conference on Noise Control Engineering, Washington, D.C., 5-7 April 1976.; ACKNOWLEDGMENT: Institute of Noise Control Engineering; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601

48 152441 THE ANALYSIS AND CONTROL OF ROLLING NOISE IN URBAN RAIL TRANSIT SYSTEMS. When an electric-powered steel wheel transit vehicle moving on straight, continuously welded rail passes an observer, the predominant noise heard is rolling noise. This is the noise produced by small-scale roughness on the running surfaces of the wheels and rails. The minute peaks and valleys of the surface roughness excite both the wheels and the rails, which in turn radiate a characteristics broadband noise. Before cost-effective control of this noise can be developed, the mechanism for its generation must be clearly understood. The study reported here undertook to develop analytical empirical formulas for the prediction of rolling noise that contain all the important parameters describing the wheel/rail dynamic system.

Remington, PJ (Bolt, Beranek and Newman, Incorporated); Institute of Noise Control Engineering Proceeding 1976, pp 233-236, 4 Fig., 1 Ref.; Presented at the 1976 International Conference on Noise Control Engineering, Washington, D.C., 5-7 April 1976.; ACKNOWLEDGMENT: Institute of Noise Control Engineering; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601

48 152442 SUBWAY TUNNEL ACOUSTICS-INFLUENCE OF SOUND ABSORPTION TREATMENT OF TUNNEL WALLS. One way of decreasing the noise level in subway systems is to treat the subway tunnel walls with sound absorption material. This has been done in some sections of the Washington Metropolitan Area Transportation System. The treatment has consisted of Pyrok spray-on on the lower parts of the walls. Totally the treatment covers approximately 20% of the circumference. To study the benefit of the treatment tests have been performed with a cannon as a sound source. The time history of cannon shots at different distances from the source has been evaluated.

Kihlman, T (Chalmers University of Technology, Sweden) Wilson, GP (Wilson, Ihrig and Associates, Incorporated); Institute of Noise Control Engineering Proceeding 1976, pp 229-232, 2 Fig., 2 Ref.; Presented at the 1976 International Conference on Noise Control Engineering, Washington, D.C., 5-7 April 1976.; ACKNOWLEDGMENT: Institute of Noise Control Engineering; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601

48 152443 NOISE AND VIBRATION IMPACT OF THE MBTA SUBWAY EXTENSION AT HARVARD SQUARE. Federal guidelines for preparation of noise and vibration portions of environmental impact statements for rail transportation projects are minimal. Discussions could result in a more uniform approach to the preparation of these statements. Analysis of the noise and vibration environmental impact

that may result from extension of a rapid transit line of the Massachusetts Bay Transportation Authority in Cambridge, Mass., is presented.

Wittig, LE Hanson, CE (Bolt, Beranek and Newman, Incorporated) ; Institute of Noise Control Engineering Proceeding 1976, pp 225-228, 4 Fig., 4 Ref.; Presented at the 1976 International Conference on Noise Control Engineering, Washington, D.C., 5-7 April 1976.; ACKNOWLEDGMENT: Institute of Noise Control Engineering; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601

48 152444 RAIL RAPID TRANSIT ASSOCIATED NOISE ANALYSIS. This paper presents a simple analytical model for predicting wayside noise levels attributed to moving rail rapid transit trains. The physical problem treated by the model is defined as follows: given the receptor location relative to the rail track, the characteristics of passing trains (e.g., speed, length, headway, and the type of train), the rail track configuration (e.g., with or without sound barrier, and at-grade, elevated, or depressed roadbed), and the time period of interest, find the cumulative noise distribution at the receptor. The model provides a convenient method for analyzing potential community rail noise impacts for use in the planning and design of rapid transit projects.

Chen, TC Michalove, RA (Parsons, Brinckerhoff, Quade and Douglas, Inc) ; Institute of Noise Control Engineering Proceeding 1976, pp 217-220; Presented at the 1976 International Conference on Noise Control Engineering, Washington, D.C., 5-7 April 1976.; ACKNOWLEDGMENT: Institute of Noise Control Engineering; ORDER FROM: Noise/News, P.O. Box 1758, Poughkeepsie, New York, 12601

48 152975 TRANSPORTATION, ENERGY, AND COMMUNITY DESIGN. This article which notes that 25-30 percent of the world population lives in urban areas, and consumes a disproportionate amount of energy, also points out that by the year 2000, most of that population will be more urban than rural. The activities to which the urban population desires to gain access are considered, and it is emphasized that if the possibilities of urban design are fully exploited, travel volumes can be reduced, material and human energies conserved, time and other resources saved, and a more desirable urban community can be achieved. Current trends in transportation are considered and examples of planned communities are described. A national policy for urban growth is discussed and experience in foreign countries is quoted. The need is expressed for a global programme of city-building and cooperative research and development aimed at bringing about the integration of urban design and transport.

Owen, W *Futures* Vol. 8 No. 2, Apr. 1976, pp 94-103, 10 Ref.

48 153120 ENERGY: VIEWS OF A STATE DEPARTMENT OF TRANSPORTATION. This description of the impact of the recent energy crisis on New York State identifies the actions taken by the State Department of Transportation (NYDOT) as a supplier of transportation facilities (and as a consumer of energy), discusses the transportation planning under energy constraints, and points out needed improvements in the planning process for both short-and

long-term decision making. The improvement and expansion of public transportation systems, faster and more extensive intercity and rural bus service, improved rail service, carpooling and vanpooling, and traffic operational projects are among the NYDOT's approaches to reduce energy usage. The NYDOT has also implemented several changes in its highway construction specifications resulting in fuel conservation and the improvement of the quality of the road.

Campbell, EW (New York State Department of Transportation) *Traffic Quarterly* Vol. 31 No. 1, Jan. 1977, pp 21-31

48 153205 LOAD LEVELING WITH ELECTRIC VEHICLES IN THE URBAN ENVIRONMENT. Forecasts of vehicle populations and degree of electrification are made. Also, electrical load curves, for the two seasons of summer and winter are forecast upon which vehicles recharge is superimposed. It is shown that unless very significant changes in mass transit occur, the personal automobile will dominate any load-leveling effect a city might experience, by 1990, this paper forecasts 52 percent conversion of personal cars to electric propulsion. The study shows the possibility of increasing the daily load factor or low/high power ratio by 10-20 percentage points which could cause a reduction in the production cost of electricity since the most efficient units are used. However, this does not require the addition of new generation capacity since the need comes during off-peak hours and would not seriously exceed, if at all, daytime peaks, at least through 1990.

Jerabek, EC ; Society of Automotive Engineers SAE 769065, Sept. 1976, pp 382-389, 14 Ref.; Proceedings of the 11th Intersociety Energy Conversion Engineering Conference, September 12-17, 1976.; ACKNOWLEDGMENT: EI (EIX770300161); ORDER FROM: ESL

48 153393 AERODYNAMICS AS A SUBWAY DESIGN PARAMETER. A parametric sensitivity study has been performed on the system operational energy requirement in order to guide subway design strategy. Aerodynamics can play a dominant or trivial role, depending upon the system characteristics. Optimization of the aerodynamic parameters may not minimize the total operational energy. Isolation of the station box from the tunnel and reduction of the inertial power requirements pay the largest dividends in terms of the operational energy requirement.

Kurtz, DW *High Speed Ground Transportation Journal* Vol. 10 No. 3, Sept. 1976, pp 247-254; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

48 154081 PERFORMANCE CHARACTERISTICS OF A DIESEL ENGINE USING LOW- AND MEDIUM-ENERGY GASES AS A FUEL SUPPLEMENT (FUMIGATION). The use of low-and medium-energy gases derived from solid waste is investigated. Gases that simulate those gases that could be derived from refuse were injected into the air inlet of a 298-kilowatt (400 horsepower) diesel engine as a fuel supplement. This process is called fumigation. Three different gases with thermal-energy contents of 6.11 MJ/cu m (164 Btu/cu ft), 18.1 MJ/cu m (485 Btu/cu ft), and 18.8 MJ/cu m (505 Btu/cu ft, respectively, were used at rates ranging

as high as 20 percent of the normal fuel oil energy at four different engine load points. The test results indicated approximately 100 percent gas energy utilization with no observable deleterious effect on the engine.

Monford, LG ; National Aeronautics and Space Administration., Lyndon B. Johnson Space Center, Houston, Tex. NASA-TM-X-58188, JSC-11404, Oct. 1976, 23p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; N77-14955/7ST

48 154401 IMPACT OF A SUBURBAN RAPID TRANSIT LINE ON FUEL CONSUMPTION AND COST FOR THE JOURNEY-TO-WORK. ANALYSIS OF THE PHILADELPHIA-LINDENWOLD HIGH-SPEED LINE. The Philadelphia-Lindenwold High-Speed Line, a modern park-n-ride rail rapid transit system, may be regarded as a prototype of transit systems being evaluated by several U.S. metropolitan areas. Two analyses of the line are presented which are potentially useful for evaluating the potential of similar transit systems for conserving energy. First, the electrical energy consumption, fuel consumption and fuel cost per passenger-mile and car-mile are estimated from operating data, and compared with estimates for auto and bus modes. Second, these estimates are applied to the 1970 Census journey-to-work data to estimate person-miles of travel, fuel consumption and fuel cost by mode, origin and destination for an actual commuting situation. Interpretation of the results and a brief policy assessment of the role of such systems in energy conservation conclude the report.

Boyce, DE Nguyen, K Noyelle, T Webb, K ; Pennsylvania University, Philadelphia, Federal Energy Administration Final Rpt. FEA/D-77/023, Dec. 1975, 74 pp; Contract DI-14-01-0001-1700; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-263048/1ST, DOTL NTIS

48 156885 FLYWHEELS: ENERGY-SAVING WAY TO GO. In operation on subway cars today, flywheel technology may be used on private cars tomorrow to help reduce pollution. Recent developments in flywheel technology are discussed such as flywheel regenerative braking, and the flywheel-heat engine hybrid. Efficiency estimates are cited.

Environmental Science and Technology Vol. 10 No. 7, July 1976; ACKNOWLEDGMENT: EI (EIX770400147); ORDER FROM: ESL

48 157256 TRANSIT'S ENERGY EFFICIENCY: MAKING A GOOD THING BETTER. An attempt is made to point out several areas where energy conservation is possible, specifically, in existing public transit systems and in general urban passenger transportation systems, through the more effective use of these systems. The paper focuses on short-term solutions and the initial, but essential steps to long-term solutions. Current direct energy consumption statistics for the standard transit modes (city/suburban transit bus-usually diesel fueled, and the rail modes such as light rail, rapid transit and commuter rail) as compared to the urban automobile. Three changes that can be made to the transit system itself to improve its efficiency are discussed. These changes include vehicle technology improvement and two types of relatively low-cost network improvements. It is noted

that current technology allows a shift to electrical power. Staggered working hours would allow system utilization to rise greatly without heavy capital expenditures. Traffic management schemes and proper pricing of energy intensive modes will increase transit ridership levels of service which will create a feedback loop to further increase ridership, levels of service, and reduce regional energy consumption.

Bernard, MJ, III (Regional Transportation Authority) LaBelle, SJ (Argonne National Laboratory) *Transit Journal* Vol. 3 No. 2, 1977, pp 41-52, 4 Fig., 2 Tab.

48 157676 RAILROAD AND RAIL TRANSIT NOISE SOURCES. The railroad or rail transit system design team must predict A-weighted, or preferably, octave band sound pressure levels near passing trains. This is the first step in estimating noise over any area of potential impact and in subsequent selection among noise abatement design alternatives. In this paper recently reported measurements of locomotive and railcar noise emission are reviewed and presented for use in making such design predictions.

Lotz, R (Transportation Systems Center) *Journal of Sound and Vibration* Vol. 51 No. 3, Apr. 1977, pp 319-336, 37 Ref.; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

48 157680 MEASURES AGAINST NOISE IN SUBWAY STATIONS. With the construction of the Viennese Subway several noise control problems arose, among these the problem of noise control in the stations. One model station was constructed in advance and several sound absorbing measures performed step by step from 1974 to 1976, in order to measure the effect of various sound absorption measures and to derive criteria for the required noise control in further stations.

Lang, J Stani, M *Journal of Sound and Vibration* Vol. 51 No. 3, Apr. 1977, pp 365-367; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

48 157685 PREDICTION AND CONTROL OF NOISE FROM RAILWAY BRIDGES AND TRACKED TRANSIT ELEVATED STRUCTURES. This paper reviews the current approaches to the prediction and control of noise radiation from railroad bridges and elevated rail transit structures. The results of noise measurements near a variety of bridge and elevated rail structures are summarized and these structures are rank ordered according to their sideline noise levels. Methods for the control of elevated structure noise are discussed and the results of actual field applications of these treatments are summarized. This article also describes a new analytical model capable of estimating the effects of structural parameters on both vibration transmission within, and noise radiation from, an elevated structure. A sample application of this model is used to evaluate several methods for noise abatement on a composite concrete deck, steel plate girder structure. The paper concludes with a set of recommendations for further research.

Kurzweil, LG (Transportation Systems Center) *Journal of Sound and Vibration* Vol. 51 No. 3, Apr. 1977, pp 419-439, 24 Ref.; ACKNOWLEDGMENT: British Railways; ORDER FROM: ESL

48 157790 PROVIDING FOR AIR QUALITY AND URBAN MOBILITY. The process of incorporating air quality considerations in planning, the basic relations between transportation and air pollution, techniques for achieving air quality, and the institutional difficulties of implementing transportation control techniques are discussed in this exploration of ways in which air pollution considerations might be incorporated in the decision-making process. The air quality problem related to transportation is not solely a function of vehicle emissions, and the planner must understand how factors such as direction and speed of wind, time of day, and physical barriers affect the problem. Primary and secondary air quality standards established by federal and state governments are discussed and tabulated. The relation of vehicle technology and the effects of speed, travel mode, and operation mode on the emission of pollutants are set forth. Techniques of air quality control are grouped into programs oriented toward vehicles, traffic flow, and reduction of pollution concentration. There is a need for improvement of communications between DOT and EPA, and obstacles that may arise are noted. The report shows that transportation control techniques may be used to achieve air quality (some of these may infringe on mobility goals and others may not). It is suggested that short-term actions aimed at ameliorating air pollution must aim at fostering communication among responsible agencies. Long-term actions require research and more analytical information. /Author/

Bellomo, SJ (Voorhees (Alan M) and Associates, Incorporated) *Highway Research Record* No. 465, 1973, pp 1-13, 8 Fig., 7 Tab., 15 Ref.; This article appeared in *Highway Research Record* No. 465, Air Pollution Controls for Urban Transportation.; ORDER FROM: TRB Publications Off

48 157792 SHORT-TERM TRANSPORTATION CONTROL STRATEGIES FOR AIR POLLUTION CONTROL. Seven short-term transportation control strategies are identified as likely candidates to provide for short-term reductions in carbon monoxide emissions for motor vehicles and attainment of primary standards for carbon monoxide for the 1975 deadline: inspection, maintenance, and retrofit; conversion to gaseous fuels; traffic flow techniques; bypassing through traffic; improvements in public transportation; motor vehicle restraints; and workschedule changes. For each of these candidates, the paper describes the air pollution control potential, the maximum feasible emission reduction, and the institutional feasibility. The findings are based on an EPA-sponsored study of Chicago, Denver, Los Angeles, New York, San Francisco, and Washington, D.C. Emphasis was placed on identifying transportation controls that could be available within a period of 3 years, realistically subject to implementation by state and county governments and institutionally and technically feasible. In addition, three of the control strategies (inspection, maintenance, and retrofit; traffic flow controls; and motor vehicle and public transport improvements) were tested through simulation methods applied to each of the six cities. The paper summarizes the primary results of these tests as isopleths of pollution concentration for carbon monoxide, hydrocarbons, and oxide of nitrogen for the 1-and 8-hour

periods of maximum VMT for a base year projected to 1977 under both uncontrolled (no transportation control strategy) and controlled conditions. /Author/

Revis, JS (Institute of Public Administration) *Highway Research Record* No. 465, 1973, pp 21-45, 11 Fig., 5 Tab., 11 Ref.; This article appeared in *Highway Research Record* No. 465, Air Pollution Controls for Urban Transportation.; ORDER FROM: TRB Publications Off

48 157911 VENTILATION IN THE METRO [L'atmosphère du métro]. The Paris Transport Authority, which conveys 4 million passengers per day on lines most of which are underground, has set 4 objectives for air-conditioning its installations. In summer, the temperature should not be more than 5 deg C higher than outside temperatures, air in tunnels should be renewed 4 times every hour, the speed of air currents must not exceed 5 m/s, and humidity must remain between 30 and 70 percent. Better ventilation systems will be installed, as well as air vents, equipment for air renewal and for ventilation in vehicles; biological climatic, thermal and aerodynamic studies will be carried out with the view to energy retrieval. [French]

Sutton, D Flahaut, J *Bulletin de Documentation et d'Information--RATP* Sept. 1976, 69 pp, 30 Fig., 7 Tab., 34 Phot., 4 App.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Regie Autonome des Transports Parisiens, 53 ter. Quai des Grands Augustins, B.P.70-06, 75271 Paris, France

48 158699 MANAGEMENT OF TRANSPORTATION AND ENVIRONMENTAL REVIEW FUNCTIONS [Transportation research record]. The 11 papers in this report deal with the following areas: Administering state mass transportation programs in Pennsylvania; innovations in management of research and development; state departments of transportation: a perspective; managing highway safety; educational requirements for administering highway safety programs; state of the art of environmental impact statements in transportation; urban regional environmental impact studies: some recent experience; examination of some implicit assumptions of noise-impact analysis techniques; statewide transportation planning: the North Carolina experience; transportation management strategies: prospects for small cities; and research in urban traffic management.

Poister, TH ; Transportation Research Board, Washington, D.C. TRB-TRR-603, 1976, 61p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-265876/3ST

48 163018 BERKELEY ENVIRONMENTAL SIMULATION LABORATORY: A TOOL FOR TRANSPORTATION PLANNING (ABRIDGEMENT). This laboratory was designed to improve the general quality of environmental simulation and to carry out basic research on the issues of public communication facing the environmental and planning professions. The laboratory uses a dynamic environmental simulator that enables one to visually walk or drive through small 3-dimensional scale models of urban and natural environments. A remote-controlled television camera that is equipped with tiny viewing attachments moves through scale

models of the environment and continuously projects eye-level views on closed circuit television screens. Trips through miniature environments can be displayed live to a large audience. Color films and videotape can also be made for comparative feedback, permanent records, and later presentation. The laboratory has model and film-making facilities. Five potential uses of the simulator are described. The development of realistic simulations, and the environmental qualities that could be simulated are discussed, and comments are made on truth and deception in simulation.

Appleyard, D Craik, KH (California University, Berkeley) *Transportation Research Record* No. 617, 1976, pp 31-34, 2 Fig., 2 Ref.; This article appeared in *Transportation Research Record* No. 617, Social and Economic Factors in Transportation Planning.; ORDER FROM: TRB Publications Off

48 163250 THE S6 CONSTRUCTION SECTION FOR THE RHINE/MAIN S-BAHN. A PARTICULAR CHARACTERISTIC OF THE FRANKFURT DOWNTOWN [Das Baulos S6 der S-Bahn Rhein-Main eine Besonderheit im Frankfurter Raum]. A certain section of the line on the "Rhine-Main" S-Bahn network in a tunnel between Frankfurt Central Station and the town centre, has been fitted with special composite insulation. The use of this method, that is new to the DB, offers advantages but also gives rise to many practical problems. [German]

Ludes, K *Eisenbahningenieur* Vol. 28 No. 2-4, Feb. 1977, 22 pp, 6 Fig., 6 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Dr Arthur Tetzlaff-Verlag, Nid-dastrasse 64, Frankfurt am Main, West Germany

48 163297 ENERGY SAVING PUBLIC TRANSPORT. The extent of the current British Rail Great Northern suburban electrification scheme comprises 111 route km and 365 single track km. The Outer Suburban part of the system uses a 25 kv single-phase overhead system; the Inner Suburban part, which must run in tunnels, is equipped with a 750 v dc third-rail system. The rolling stock consists of Class 312 four-car electric multiple units for the Outer Suburban service from King's Cross to Royston and Class 313 three-car electric multiple units providing the Inner Suburban service between Moorgate and either Hertford North or Welwyn Garden City. The Class 312 cars have a maximum speed of 90 mph, and a maximum acceleration of 0.9 mph/sec. Normal braking is about 1.8 mph/sec, with 2.2 mph/sec for emergency application. The Class 313 units have a maximum speed of 75 mph with rheostatic braking to 12-16 mph, using air-operated disc brakes to effect the final stop. Waste heat from rheostatic braking is used for warming the passenger accommodation. The Class 313 design enables electric current to be collected from either the 25 kV ac. overhead line equipment or from the 750 volts dc third rail systems. Changeover between overhead contact and conductor rail operation is controlled manually by the driver from the operative driving cab. When the 750 volts D.C. system is selected, the vacuum circuit breaker is locked open and the pantograph system physically locked in the down position. Indicator lamps show the system selected. If a train should run on to a live conductor rail section with the overhead contact equipment

connected, or vice-versa, a buzzer sounds continuously until all the train equipments are correctly switched to the appropriate system.

Energy Digest Vol. 6 No. 1, Feb. 1977, pp 28-29
ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 163869 THE IMPLICATIONS OF OIL RESOURCES DEPLETION FOR URBAN PASSENGER TRANSPORT INVESTMENT. An investigation into the implications of energy consideration for long-term urban transport planning is reviewed. The results obtained were reported in a series of working papers on urban transport planning and energy, and a monitoring study of rail commuting on Merseyside with particular reference to the effects of increases in the price of petrol. These working papers are discussed. It is suggested that of the many areas considered for further study, long-term aspects of transport energy should be investigated with a view to developing the techniques employed in the study. For the work into short-term aspects, it is considered that monitoring could be further developed as an addition to the formulation of urban transport policy. /TRRL/

Maltby, D (Salford University, England) *Traffic Engineering and Control Analytic* Vol. 18 No. 4, Apr. 1977, pp 206-207, 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 226760); ORDER FROM: ESL

48 163873 HOW MUCH FUEL DOES A TRAVELLER USE? A COMPARATIVE STUDY OF THE ENERGY REQUIRED FOR PASSENGER TRANSPORT BY CAR, BUS AND RAILWAY [Hoeveel brandstof gebruikt een reiziger? Een vergelijkende studie van het benodigde energieverbruik voor reizigersvervoer per auto, bus en trein]. The energy consumption of different types of trains, buses and five cars of different price categories is studied. The question is directed towards the comparison of the energy consumption per traveller kilometer in certain traffic situations. For this reason a division is made between transport in urban areas and transport over long distances. The results presented are obtained by a computer simulation, from which the model is obtained. /TRRL/ [Dutch]

Bleecke, JA Burgt, GJ (Delft University of Technology, Netherlands); Rijwiel-en Auto-Industrie Monograph Dec. 1976, 69 pp, 23 Fig., 7 Tab., 32 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 227169), Institute for Road Safety Research; ORDER FROM: Rijwiel-en Auto-Industrie, Europaplein, Amsterdam, Netherlands

48 164195 THE EFFICIENT USE OF ENERGY IN TRANSPORT. THE CONTRIBUTION OF URBAN TRANSPORT PLANNING TECHNIQUES. Transport, either urban, inter-city or rural is a necessary though unproductive daily activity. Very large quantities of energy are used in moving people and goods from place to place. This energy consumption may be reduced through: (a) transport vehicles having increased efficiency in their use of energy, (b) maximum use of the more efficient vehicles, (c) the planned distribution of population and land use to minimize travel, and (d) the substitution of alternative means of communication to reduce the need for travel. While much is known about (a) and (b), it is only in recent years that the problems

of (c) and (d) have been tackled on a comprehensive scale. Processes used in urban transportation studies are well suited for use in this type of planning. A comprehensive transportation study is an interdisciplinary study involving analysis of the relationships between the distribution of population and land use and the resulting movements of people and goods through an area. The relationships being basic are relatively stable and suitable for forecasting travel. With this type of study several different population and land use forecasts and their transport implications can be simulated and examined. As a result, it is possible to determine which types of population distribution are likely to encourage the least travel. /Author/TRRL/

Fouby, CL (Melbourne & Metropolitan Tramways Board, Australia); Institute of Fuel, England *Analytic* 1976, 15 pp, 2 Fig., 3 Tab., 9 Ref. Conference on Energy Management, Sydney, Australia, 1976.; ACKNOWLEDGMENT: TRRL (IRRD-227251), Australian Road Research Board

48 164250 USE OF A LOWRY-TYPE SPATIAL ALLOCATION MODEL IN AN URBAN TRANSPORTATION ENERGY STUDY. This paper describes the structure of a lowry-type spatial allocation model and the results of using the model to evaluate several different hypothetical urban forms with respect to the level of transportation energy consumed in urban passenger travel. The lowry-type model was used together with simple models of trip generation, mode choice and trip assignment to produce realistic land-use patterns and characteristic travel behavior in each city. Interzonal trip matrices were computed for each of five trip purposes (work, two types of shopping or service, non-home based and social) and following the assignment of trips to the network, energy models for automobile as well as transit were utilized to assess the transportation energy consumed over all trip purposes in each of several different urban spatial structures. /TRRL/

Edwards, JL (Minnesota University, Minneapolis) *Transportation Research Analytic* Vol. 11 No. 2, Apr. 1977, pp 117-126, 11 Fig., 5 Tab., 19 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-227548)

48 164273 PERCEIVED ENVIRONMENTAL UTILITY UNDER THE INFLUENCE OF ALTERNATIVE TRANSPORTATION SYSTEMS: A FRAMEWORK FOR ANALYSIS. The view that citizens should be involved in transportation planning is now widely accepted. However, there have been few attempts to measure residents' perceptions of the effect of alternative transportation proposals on their environment. The study reported here draws up a conceptual framework for measuring firstly the perceived attributes of a residential environment, and secondly how a population evaluates such an environment under different transportation options. In each instance the conceptual framework is tested by making use of case study data. At the first stage it is demonstrated how Kelly's personal construct theory and related procedures can be applied to elicit cognised environmental components of urban places. One urban place is selected and population clusters which are "homogeneous" in socioeconomic characteristics and activity patterns are defined. The indscal model is then

specified and applied to determine whether members of each population cluster evaluate the attributes of their environment in the same way under alternative transportation proposals. The measures of environmental utility for each proposal which the model produces show considerable variation within the groups. However, the model successfully defines each group's response to the effects of different transportation options. /Author/TRRL/

Burnett, P (Texas University, Austin) *Environment and Planning Analytic* Vol. 9 No. 6, 1977, pp 609-624, 9 Fig., 8 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-227391)

48 164426 STUDY OF RAILROAD NOISE REDUCTION BY NOISE-PROOF WHEELS.

In recent years, noise pollution created by railroad vehicles has become a major problem that must be solved urgently. The Teito Rapid Transit Authority and Sumitomo Metal Industries Ltd. have received a subsidy from the Transportation Ministry of Japan to investigate the vibration and noise characteristics of several types of soundproof wheels. This paper presents the results of laboratory and field tests on the soundproof wheels, comparing them with conventional steel wheels. It is concluded that the resilient soundproof wheel can reduce noise under the car-body floor from 3 to 5 decibels, while the damping soundproof wheel can reduce it from 1 to 3 decibels. [Japanese]

Satoda, K Nishimura, S Suzuki, M Sugawara, S Takamichi, H Asano, T *Sumitomo Metals* Vol. 29 No. 1, Jan. 1977, pp 68-81, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 164997 **EVERGY CONSERVATION IN URBAN TRANSIT SYSTEMS.** Though urban transit systems are currently an energy efficient means of transporting people, this presentation will outline strategies to make these systems more efficient as well as to reduce total regional transportation energy consumption through greater reliance on these systems. This paper focuses on near-term improvements and on the initial steps essential for far-term solutions. Because of this focus, the improvements suggested work with current technologies and modifications of these technologies. In any transportation system the strategies for saving energy can be broken into five categories. They are network improvements, operational changes, demand reductions, modal shifts and vehicle technology. This presentation suggests improvements within the framework of these categories and demonstrated their potential energy savings. /Author/

Bernard, MJ, III LaBelle, S (Argonne National Laboratories); Northeastern Illinois Regional Transp Authority TR-75-06, Dec. 1975, 21 pp, 4 Fig., 2 Tab., 9 Ref.

48 165566 **AUSTRALIA'S ENERGY OPTIONS IN THE TRANSPORT SECTOR.** The paper reviews Australia's total energy requirements under a number of scenarios through to 1990. Particular attention is paid to the demand for transport fuels in the context of these economic scenarios. In spite of the oil crisis of 1973 and the efforts since then by countries such as Australia to reduce this dependence on imported oil, our continued dependence on oil in this period is shown. Within the transport sector the signifi-

cance of the energy requirements of road transport (private and commercial) is noted under all scenarios. The growth pattern of this transport fuel market is examined in the light of a number of possible changes which could occur in the use of cars, their design and the fuels they use e.g. Increased use of smaller cars, increased use of diesel engines, introduction of electric cars, pollution controls, fuel quality changes, increased use of public transport, use of non-oil based fuels. Particular attention is paid to the period up to 1990 and the impact that these changes could have together with the effect of delaying the date of their implementation. /Author/TRRL/

Bolduan, MG (Shell Company, Australia); Victoria Ministry of Transport, Australia Proceeding May 1977, 23 pp, 4 Fig., Refs.; Proceeding of the 3rd Annual Meeting of the Australian Transport Research Forum—"Getting the Best Use From the Transport Infrastructure" Melbourne, Australia, May 24-25, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227908), Australian Road Research Board

48 165580 FUEL ECONOMY IN PEAK HOUR TRAVEL.

The significance of urban road vehicles as the largest user of liquid transport fuel is pointed out. In an investigation aimed at assessing the fuel used against inertia forces (which together with rolling resistance form the most important components of energy usage in urban driving), fuel consumption and speed/time data have been obtained for a passenger vehicle travelling over a variety of routes in urban Melbourne. Fuel consumption has been related to an acceleration index (derived from the speed/time trace) which represents the acceleration conditions experienced by the vehicle. This index is proposed as a basis for a road fuel consumption test under "floating car" conditions and for determining aggregate fuel consumption on a section of arterial road. The acceleration conditions experienced by the test car were found to differ from those which would occur in the saa draft standard city cycle for petrol consumption (i.e. That prescribed by adr.27a for emissions) and these differences are illustrated. /TRRL/

Johnston, RRM Trayford, RS (Csiro Division of Mechanical Engineering) Wooldridge, MJ (Csiro Division of MEchanical Engineering); Society of Automotive Engineers (Australasia) No. 7710, May 1977, n.p., 7 Fig., 1 Tab., 14 Ref.; Paper From the Jubilee Conference of the Society of Automotive Engineers--Australasia, Melbourne, Australia, May 2-6, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227879), Australian Road Research Board

48 165581 ASPECTS OF ENERGY INTERACTIONS AND EMISSIONS IN URBAN TRAFFIC.

A vehicle emissions model has been developed which has been used in conjunction with a study of traffic patterns for four city driving types. The driving patterns are most closely explained by the halts per kilometre and average speed. Hydrocarbon emissions are closely related to average speed. The influence of acceleration/deceleration rates and frequency is a second order effect which can cause a -30% additional variation in hydrocarbon emissions. The dependence of nitrogen oxide on speed is small and acceleration variations can cause -70% variation in emissions at same speed. Traffic management as a primary nitrogen oxide control strategy

appears practical. Steady state driving would reduce nitrogen oxide emission by 90%. Reductions of 60% have been achieved in the CBD area where traffic speeds are very low 12.9-19.3 kph. A queue and cruise system involving simple traffic signalization could accomplish this. /Author/TRRL/

Hamilton, RB (Shell Company, Australia); Society of Automotive Engineers (Australasia) Analytic No. 7710, May 1977, n.p., 33 Ref.; Paper From the Jubilee Conference of the Society of Automotive Engineers--Australasia, Melbourne, Australia, May 2-6, 1977.; ACKNOWLEDGMENT: TRRL (IRRD 227880), Australian Road Research Board

48 165636 TRAFFIC AND ENVIRONMENT-CASH VALUES.

The incentive for producing a cash value of the environmental impact of traffic is in order to compare it with travel benefits and scheme costs in common units. This paper describes some early work on a new method of assessing such a cash value. The method consists of assessing the value of a place to its residents and visitors by studying people's behavioural patterns in relation to property values and trip-making respectively. The visitors value is calculated using a transportation model. Several case studies are described illustrating both the beneficial effect of traffic relief and injurious effect of "new" traffic. /TRRL/

Holmes, RW (Department of Transport, England) *Highway Engineer Analytic* Vol. 24 No. 8-9, Aug. 1977, pp 17-23, 3 Fig., 5 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-228568)

48 165677 TRANSPORTATION AND THE ENVIRONMENT.

The book examines the long term sociological effect of changes in transportation on the environment. The subject is viewed from two aspects. The first is the generation of problems such as traffic congestion, lack of parking space and the financial problems of providing bus and rail services, while the second is the changes in society due to fundamental changes in transport systems. The author discusses this aspect in the following chapters: (1) Introduction to the transport problem, (2) Some effects of transport on the environment—a historical point of view, (3) Transport investment and the environment, (4) Transport organisation and the environment, (5) Personal transport and the environment, and (6) Transport and the environment: some possibilities of the future.

Hutchins, JGB (Cornell University); Elek Books Limited, (0 236 400231) Monograph 1977, 106 pp, 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-226456)

48 166149 FUEL CONSUMPTION; TRANSPORTATION (A BIBLIOGRAPHY WITH ABSTRACTS).

Fuel consumption by automobiles, trucks, buses, and general aviation aircraft is discussed. Topic areas cover the effect of road conditions, traffic conditions, and emission controls on fuel economy; projected growth and problems facing air transportation; energy efficiency of various urban transportation modes; energy use forecasts; and projections of supply and demand in the transportation sector. Bibliographies on fuel consumption in the industrial, residential, and commercial sectors and on electric power consumption are also available. (This

updated bibliography contains 230 abstracts, 95 of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service July 1977, 235 pp; Supersedes NTIS/PS-76/0475, and NTIS/PS-75/342. Updates COM-74-11102.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0552/8ST, DOTL NTIS

48 166627 URBAN AIR POLLUTION. VOLUME 1. 1970-1975 (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1970-75]. Selected reports are cited on urban air pollution and its abatement. These citations were selected because of their general interest to urban planners, which will enable them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (This updated bibliography contains 197 abstracts, none of which are new entries to the previous edition.)

Lehmann, EJ ; National Technical Information Service,, Springfield, Va. Aug. 1977, 202p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0650/OST

48 166628 URBAN POLLUTION. VOLUME 2. 1976-JULY 1977 (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1976-Jul 77]. Selected reports are cited on urban air pollution and its abatement. These citations were selected because of their general interest to urban planners, which will enable them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (This updated bibliography contains 117 abstracts, 73 of which are new entries to the previous edition.) See also NTIS/PS-77/0650, Urban Air Pollution. Vol. 1. 1970-1975.

Lehmann, EJ ; National Technical Information Service,, Springfield, Va. Aug. 1977, 122p; Supersedes NTIS/PS-76/0584, NTIS/PS-75/545, and NTIS/PS-74/104.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0651/8ST

48 167064 GUIDELINES FOR IMPROVED RAPID TRANSIT TUNNELING SAFETY AND ENVIRONMENTAL IMPACT. VOLUME II. ENVIRONMENTAL IMPACT. Two of the major objectives of the Urban Mass Transportation Administration Tunneling Program are to lower subway construction costs and reduce construction hazards and damage to the environment. This study consists of a two-volume report and aims to develop guidelines for improved rapid transit tunneling safety and environmental impact, that is, this effort is directed toward underground construction applicable to modern transit subway systems in urban areas. Investigation of subway construction jobs shows that at least two principles underlie treatment of environmental problems. First, planning and design should consider both short-term and permanent damage to environment, and second, a need for better communication of contractor's

planned activities and public concerns so that disruptions can be minimized. Guidelines were developed along these principles and are grouped into the following categories: general, community relations, and specific environmental control techniques.

Lemer, AC Cheng, CY ; Mathews (A.A.), Incorporated, Voorhees (Alan M) and Associates, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT-TSC-UMTA-77-2-II, Jan. 1977, 138 pp; See also Volume 1, PB-271 047.; Contract DOT-TSC-802-2; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271048/1ST, DOTL NTIS

48 167323 IN-SERVICE PERFORMANCE AND COSTS OF METHODS TO CONTROL URBAN RAIL SYSTEM NOISE. TEST AND EVALUATION PLAN. This interim report is the test and evaluation plan, the second report of a study to investigate the effectiveness of four techniques for reducing wheel/rail noise in rail rapid-transit systems (resilient wheels, damped wheels, wheel truing, and rail grinding). The previous report covered experimental design. The ultimate goal is to provide sufficient information to allow a transit system with given track and car conditions and budgetary constraints to determine the mix of the available methods of control of wheel/rail noise which will result in the greatest overall benefit. The purpose of this report is to detail the methods and equipment that will be used to collect, manage, and reduce the data on both acoustic performance and costs of the four noise control methods.

Saurenman, HJ Holowaty, MC ; Transportation Systems Center, Wilson, Ihrig and Associates, Incorporated, De Leuw, Cather and Company, Urban Mass Transportation Administration Intrm Rpt., 0 DOT-TSC-UMTA-76-17, UMTA-MA-06-0025-77-1, Apr. 1977, 67 pp; Prepared in cooperation with Wilson, Ihrig and Associates, Inc., Oakland, Calif. and De Leuw, Cather and Co., Philadelphia, Pa. See also report dated May 76, PB-257 200.; Contract DOT-TSC-1053; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-272521/6ST

48 167613 CARS AND KILOWATTS. This brief review of electric and hybrid vehicle development in the U.S. and abroad, notes that while U.S. manufacturers remain uncommitted, private industry in Europe and Japan has already taken the initiative in this area. The Department of Energy is currently developing data relating to the present state of the art of electric and hybrid vehicles. Commercial vehicles such as the English Electric light delivery truck and the British-built Harbilt vans the described, and comments are made on hybrid vehicles such as the Volkswagen taxi. Electric vehicle development programs conducted in Europe and Japan contrast with approaches favored in the U.S. German projects emphasize the systems approach in which attention is divided between vehicles, batteries and support systems. The Europeans believe that urban transportation (delivery vehicles, buses) is the logical first role for these vehicles. The thrust of the Japanese national effort in this field is toward evaluating new construction and propulsion technologies. Experimental batteries and their performances are discussed. It is pointed out

that the success of future vehicles could hinge on the availability of spare parts and trained service personnel.

Schwartz, HJ (National Aeronautics and Space Administration) *IEEE Spectrum* Vol. 14 No. 11, Nov. 1977, pp 65-68, 3 Fig., 1 Tab.

48 167865 PRESIDENT CARTER'S ENERGY PROPOSALS: A PERSPECTIVE. This analysis of the Administration's energy plan concludes that the strategies proposed would be effective in reducing energy use and dependence on oil imports, but that the estimate of the magnitudes of import savings are overoptimistic. This report analyzes 5 major sets of proposals: pricing of crude oil; pricing of natural gas; conversion to coal; automobile-related proposals, and tax credits for home insulation and solar heating equipment. The long-run (the growth in oil and gas consumption exceeds the growth in reserves) and short-run problems (U.S. imports of oil have increased substantially) have created the need for a national energy plan. The major reason for dependence on imports is the system of price controls on oil and gas which have kept the domestic price of these fuels below world levels. Three strategies have been proposed to reduce dependence on imports: reduce long-term growth in energy demand by imposing excise taxes that would raise the price of petroleum; increase large industries' and utilities' use of coal instead of oil or natural gas by taxing their use of the latter fuels; and increase domestic supplies by reintroducing market pricing or near market pricing for truly new energy supplies. An important element of the proposal is the effort to raise the price of petroleum and natural gas by predictable increments so that consumers and businesses can make decisions on the basis of higher future energy prices. Energy price increases under the plan would be achieved mainly by a system of taxes to be rebated to customers.

United States Congress June 1977, 154 pp, 28 Tab.; ORDER FROM: GPO

48 167922 THE STORM OVER THE CBO REPORT. Rebuttal is given to the Congressional Budget Office report, "Urban Transportation and Energy: The potential Savings of Different Modes." Administration spokesmen, industry officials, state transportation officers and members of the academic community refute the allegation that new rail-transit systems rate poorly in terms of energy efficiency.

Ichniowski, T *Railway Age* Vol. 178 No. 21, Nov. 1977, p 32, 1 Phot.; ACKNOWLEDGMENT: Railway Age; ORDER FROM: ESL

48 168020 URBAN TRANSPORTATION AND ENERGY: THE POTENTIAL SAVINGS OF DIFFERENT MODES. Transportation in cities consumes about 10 percent of all the nation's fuel. Potential savings through shifts in urban transportation policies have generated interest in Congress and elsewhere. This paper describes the energy requirements of alternative urban transport technologies and assesses the effects on urban transport fuel consumption of various programs Congress might consider in order to save fuel. This analysis presents several measures of energy use, ranging from a narrow index of propulsion needs to a broad index of program energy savings. Attempts are made to consider energy needed to build and maintain roads and

tracks, vehicles, stations and other facilities. Considered are vanpool, carpool, bus, automobile, rapid transit, light-rail transit and commuter railroad. The authors conclude that rapid transit offers little to aid the nation's efforts to save fuel. This is based on such assumptions as the use of automobiles to reach the rapid transit station by most riders, and circuitous routings of fixed-guideway systems.

Congressional Budget Office Sept. 1977, 81 pp, Tabs., 3 App.; A study prepared by the Congressional Budget Office for the Committee on Environment and Public Works U.S. Senate.; ORDER FROM: GPO

48 168086 NOISE LEVELS ASSOCIATED WITH METROPOLITAN RAILWAYS OR URBAN RAPID TRANSPORT SYSTEMS. VDI-SPECIFICATION 2716 [Geraeusssituationen bei Stadtbahnen. VID-Richtlinie 2716]. The purpose of the specification is to provide a basis for determining the noise levels under various local operating conditions and track alignments, for use in the planning of metropolitan railway systems. The terms are first defined: metropolitan railway sound level: maximum and minimum sound levels. Both the maximum sound level for the passage of a train at a distance of 7.5 M from the track centre line under normal conditions and also the influences on the maximum level of variations in the measurements specified in the specification are described to illustrate the problems of external noise from metropolitan railway vehicles (or rapid transit vehicles) on elevated stretches. The influences covered include: speed; acceleration and braking noises; elevated construction, wheel, tires or rims; wheel construction; rails; layout of stretch; the relationship of the direction of the noise waves to the vertical plane; building development at the side of the track; acoustic screens and curves in the track. The problem of internal noise is also treated and the influences on the internal noise level caused by deviations from the specified measurement conditions of several parameters are covered: speed; tunnels; elevated construction; coach occupancy; wheel, tire or rims; construction of wheels and rails. Other factors covered are the problems of noise at underground stations, both for incoming and departing trains, the noise from moving trains in tunnels, in sections directly underneath the tracks as well as in houses near stretches of tunnel. Finally, in an appendix, mathematical formulae are developed for the calculation of maximum and median noise levels. [German]

Verein Deutscher Ingenieure Zeitschrift Monograph No. 2716, July 1975, 8 pp, 1 Fig., 5 Tab., 23 Ref. ACKNOWLEDGMENT: TRRL (IRRD-304182), Federal Institute of Road Research, West Germany; ORDER FROM: VDI-Verlag GmbH, Postfach 1139, Graf-Recke-Strasse 84, 4 Dusseldorf 1, West Germany

48 168152 TRAFFIC AND ENVIRONMENTAL MANAGEMENT. In these proceedings of the seminar, the following papers are included: Transport policy over the last decade, Collins, MS; Development of traffic management proposals for Central London, Beresford-knox, JE; Consumer response to public transport improvements and car restraint--some practical findings, Heggie, IG; A comparison of the effectiveness of

separate bus priority schemes and those affecting entire networks, White, PR, Holmes, RW; Incremental implementation of bus priority in London, King, GN; Traffic restraint in Bristol, Lamb, GM, Traffic restraint--practical experiences in Nottingham, Singleton, DS; A new technique for traffic studies, Orram, H, Wright, CC; Providing for the pedestrian in small towns, Spenceley, GS; Problems of goods movement in Chichester, Turner, CQ, Blundell, GF; Public participation and environmental management, Hodgkinson, DH, Warren, G; Environmental evaluation of traffic management schemes--a review, Gilbert, D, Jowitt, P; The effective control of traffic to minimize noise, Jackson, GM; Tara--an aid to traffic management and transportation engineers, Slatter, DAE; The uses made of accident statistics by Greater London Council, Kelly, MS, Huddart, KW; The Oxford Street accident study 1969-1975, Eburah, JW; The Carnaby Street pedestrianisation study, Myatt, PR; Signs of the times--A commentary on the international influence on the United Kingdom traffic signs, Walton, KN; Progress of urban traffic control in London, Chandler, MJH; Development and future use of the UTC system for west Yorkshire, Hawke, MJ, Franklin, P.

Planning and Transport Res and Computation Co Ltd Proceeding P139, 1976, 271 pp, Figs., Tabs., Refs.; Proceedings of Seminar K, Summer Annual Meeting.; ACKNOWLEDGMENT: TRRL (IRRD 228114)

48 168645 AIR POLLUTION ECONOMICS. VOLUME 2. 1975-SEPTEMBER 1977 (A BIBLIOGRAPHY WITH ABSTRACTS). The citations cover studies on the economics of air pollution control and management, including the economics involved with industrial waste treatment, urban planning, government planning, and automobile and mass transportation. Specific cost studies have been excluded, unless they apply to an industry or entire region. (This updated bibliography contains 205 abstracts, 133 of which are new entries to the previous edition.) See also NTIS/PS-76/0663, Air Pollution Economics. Vol. 1. 1964-1974.

Cavagnaro, DM ; National Technical Information Service Sept. 1977, 210 pp; Supersedes NTIS/PS-76/0664, NTIS/PS-75/535, and NTIS/PS-74/091.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-77/0781/3ST

48 168765 STATE ENERGY CONSERVATION PLANS: GUIDELINES FOR TRAVEL DEMAND ANALYSES OF PROGRAM MEASURES TO PROMOTE CARPOOLS, VANPOOLS, AND PUBLIC TRANSPORTATION. The manual provides worksheets and a set of simple procedures for analyzing the energy conservation potential of transportation-related measures being considered to increase carpooling, vanpooling and transit. It is intended for use by states and metropolitan planning organizations to calculate their localized energy impacts from implementation of various transportation policies.

Cambridge Systematics, Inc., Mass.*Federal Energy, Administration, Washington, D.C. Office of, Conservation Policy. FEA/B-77/331, Nov. 1976, 110p; See also report dated Jun 76, PB-263 969.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-271100/OST

48 170020 INVESTIGATION INTO THE NOISE EMISSION OF OVERHEAD RAILWAYS [Untersuchungen der Geraeussschabstrahlung von Hochbahnen]. The noise emission from overhead railways in the vertical plane shows a reduction of about 5 to 7 dba independent of vehicle speed compared to the highest emission levels for angles between 0 deg and 30 deg from the horizontal and a reduction of about 8 dba to the area below 45 deg from the horizontal shielded by the fly-over structure. Vehicle speed has the greatest influence upon noise, so that an increase of 10 km/hour in the 20 km/hour to 60 km/hour band effects an increase of 4 to 5 dba in the noise level. Above 60 km/hour the noise increase per 10 km/hour speed increase is 1 to 3 dba less than at the lower speeds. With a tram system using rails set in an aggregate bed there is about 3 dba noise increase per 10 km/hour speed increase--a lower increase than for the Rotterdam metro (4 to 5 dba)--in the 22 km/hour to 50 km/hour band. Where both sides of an overhead railway are built up, the noise level on the eleventh floor of adjoining property rises by 3 to 5 dba. An increase in the clearance to each side of the structure, from 10 m to 20 m reduces the level of noise on the eleventh floor by 1 to 2 dba. In open areas, however, the noise reduction by doubling the clearance up to 25 M is 4 dba, from 25 M to 50 M it is 5 dba and at great distances the metro acts as a point noise source with 6 dba noise reduction for each doubling of the clearance. Trams with unground wheels on unground track emit up to 3 dba higher noise levels than the same with ground wheels on ground track. [German]

Buchta, E (Dusseldorf University, West Germany) *Fortschritt-Berichte der VDI-Zeitschriften* Monograph No. 22, Nov. 1975, 72 pp, 45 Fig., 2 Tab., 6 Ref.; ACKNOWLEDGMENT: TRRL (IRRD-304759), Federal Institute of Road Research, West Germany; ORDER FROM: VDI-Verlag GmbH, Postfach 1139, Graf-Recke-Strasse 84, 4 Dusseldorf 1, West Germany

48 170446 PROCEEDINGS OF THE WORKSHOP ON RAILWAY AND TRACKED TRANSIT SYSTEM NOISE DERBY, MARCH 30-APRIL 1, 1976. The papers are grouped under 6 sections, each one including a summary: 1. Sources and mechanisms of noise: its control; parameters influencing the noise; 2. Community response to railway noise; 3. Noise in stations; criteria for acceptability; 4. Propagation of railway noise, effect of topography, barrier design; 5. Noise inside vehicles, noise control, acceptability criteria; and 6. Noise in elevated structures; vibration propagation; vibration isolation techniques.

Journal of Sound and Vibration Proceeding Vol. 51 No. 3, Apr. 1977, pp 317-450 ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Academic Press Incorporated, Berkeley Square House, Berkeley Square, London SW1, England

48 170939 RESEARCH INTO THE REDUCTION OF NOISE AND VIBRATION IN THE MOSCOW METRO [Opyt raboty po snizeniju urovnja suma i vibracii na Moskovskom metropolitene]. No Abstract. [Russian]

Bakulin, AS *Metropoliteny-Ekspluatacija i Tehniceskie Sredstva* Vol. 2 No. 6, 1977, 19 pp, 9 Fig., 2 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD;

ORDER FROM: *Metropoliteny-Ekspluatacija i Tehniceskie Sredstva, Moscow, USSR*

48 172146 AIR QUALITY CONTROL STRATEGIES: THE PUBLIC VIEWPOINT. An attempt is made to determine the amount of public support some proposed TCP (transportation control plan) strategies might receive among residents of the New York section of the Tri-State region. Existing information is assembled to show how citizen feedback can be useful in examining the wide range of issues involved in implementing air quality control measures. The study shows that the intensity of public concern for pollution in relation to other social problems has declined in the last 5 years. The public seems to prefer limitations on how and where they can drive, to the burden of financial penalties in support of traffic control strategies. The highest support is for improving public transport. Suburbanites and city residents view pollution somewhat differently, and it was observed that no single carpool incentive program stood out as being most effective. The study concludes that implementation of TCP strategies require political and administrative decision by various levels of government. The public, government, private industry and special interest groups all play a part in the implementation of TCP strategies. It is incumbent on planners and administrators to examine thoroughly the package of services offered to the public. The planner must propose strategies that meet public acceptance, or educate the public about effectiveness and desirability of his proposals.

Obinani, FC (Tri-State Regional Planning Commission) *Traffic Quarterly* Vol. 31 No. 4, Oct. 1977, pp 625-638, 4 Tab.

48 173314 ENERGY AND RESOURCE CONSERVATION. The author suggests that one of the most distressing aspects of society's use of our resources is the enormous waste often resulting from a lack of control, inefficient operation and management, or pure indifference to their value; and that this can be seen in the use of minerals, energy, dereliction of land, and the use of water and construction materials. The municipal engineer is considered to be uniquely placed to play a major role in combating resource problems through his position in public service, responsible for many of the technical and managerial aspects of energy and resource conservation. The municipal engineer's involvement in energy and resource conservation is discussed in relation to known sources of energy, and the utilisation of such energy in buildings, industry and transport. Information is presented on methods that can be applied to improve efficiency and reduce wastage and consumption. Examples are given of projects that have shown worthwhile savings in energy consumption both in the fields of buildings and transport; such as the utilisation of heat generated by the continuous operation of computers, priority lanes for carpools and buses, the recycling of water and waste. It is considered that the control of development and land use planning is of particular importance, and that the municipal engineer should be in a position to deal with such problems within a programme of planned energy and resource conservation. /TRRL/

Ratcliffe, BG (Loughborough University of Technology, England) *Institution of Municipal Engineers, Journal of Analytic* Vol. 104 No. 6, June 1977, pp 96-102, 3 Fig., 1 Tab., 3 Phot., 22 Ref.;

ACKNOWLEDGMENT: TRRL (IRRD 230669)

48 173574 IF TUBE TRAINS AFFECT TREES, WHAT DO THEY DO TO US? Underground trains in San Francisco generate magnetic fields that are 1000 times stronger than the natural background. They are so strong that they set up measurable electric currents in trees. They must also generate electric fields in people, points out the Stanford University researchers who discovered them, and may well have long-term effects. He also wonders what their effect is on migrating birds, which may use magnetic fields to navigate.

New Scientist Vol. 75 No. 1064, Aug. 1977, pp 358-359
ACKNOWLEDGMENT: General Motors Research Laboratories; ORDER FROM: IPC Magazines Limited, 66-69 Great Queen Street, London WC2E 5DD, England

48 174385 CONTROLLING ENVIRONMENT IN HONG KONG'S SUBWAY SYSTEM. The transit system proposed for Hong Kong presents factors that make proper engineering of the environmental control system (ECS) critical. Hong Kong experiences severe temperature and humidity conditions many months of the year, and the urban railway is designed to carry almost twice the maximum passenger loading of other comparable systems. The objective of the environmental control system is to provide for the comfort and safety of people and protection of equipment. Generally stated, the ECS should maintain temperature and humidity within prescribed tolerances; achieve effective control of airflow (both velocity and direction), air-quality and air-pressure transients; protect against condensation; and operate acceptable noise levels in stations, tunnels and to the external environment. The several concepts investigated by the design team are described and evaluated.

Hitchcock, WW (Parsons, Brinckerhoff, Quade and Douglas, Inc) Driver, DE *Specifying Engineer* Vol. 38 No. 3, Sept. 1977, pp 78-83, 3 Ref.;
ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 174439 PUBLIC OPINION SURVEY ON ENERGY AND TRANSPORTATION. A statewide telephone opinion poll of NYS residents on energy and transportation issues was conducted during the Fall of 1977. The survey dealt primarily with issues in planning energy-saving actions in transportation. Opinions were collected on general approaches for conserving energy and specific conservation policies. The responses were analyzed along three characteristics: residential location (NYC, large metro, small metro, rural), sex, and age. The key results are as follows: Most people feel there is, or will be, an energy problem in the U.S. NYS residents do not believe any one sector should be given the most concentration in energy planning. The support is equally split among homes, industry, business, transportation, and government. The encouragement of transit use with cities is the most preferred approach to save transportation energy. Encouraging train and intercity bus travel is the next most preferred approach, followed by getting drivers to cut gas use. NYS residents strongly support incentive programs for encouraging conservation, and do not favor tax and rebate programs. This is the case for policies in all three general approaches. Most respondents feel that the elderly and handi-

capped should be given special attention when planning energy-saving action in transportation. This group received far more support than any other group considered. /Author/

Neveu, AJ ; New York State Department of Transportation Res Rpt. 135, Dec. 1977, 47 pp, Tabs., 3 Ref., 2 App.; This report was prepared in part with the financial assistance of the U.S. Department of Transportation.

48 174442 FOURTH NATIONAL CONFERENCE EFFECTS OF ENERGY CONSTRAINTS ON TRANSPORTATION SYSTEMS: PROCEEDINGS. The major goal of the conference was to bring experts and interested participants together so that necessary information could be freely exchanged. Topics of discussion included: Energy and Transportation Facts and Figures; Long Range Planning Under Energy Constraints; Technology Assessment of Alternative Fuels; Energy Efficiency of Intercity Passenger and Freight Movement; Energy Efficiency of Intracity Passenger Movement; Federal Role; Electrification of Railroads; Energy Impact of Electric Car in an Urban Environment; Research Needs and Projects in Progress--Federal Viewpoint; Research Needs in Transportation Energy Conservation--Data Needs; Energy Intensity of Various Transportation Modes--An Overview. The conference was composed of a series of lectures, panel discussions and question and answer sessions. It is expected that the conference will help to disseminate energy data and find ways for conserving energy within the transportation sector.

Union College Proceeding CONF-770878, Dec. 1977, 544 pp, Figs., Tabs., Photos., Refs., 1 App.

This conference was held at Union College, Schenectady, New York, August 1-5, 1977 and co-sponsored by the U.S. Department of Energy.; Contract EC-77-G-01-60-67; ORDER FROM: NTIS

48 175036 TRANSPORTATION ENERGY CONSERVATION DATA BOOK: A SELECTED, ANNOTATED BIBLIOGRAPHY. EDITION 2. The 568 references in this bibliography reflect the continuing effort to compile information on energy conservation in the transportation field. The citations refer to both specific statistical information and general background coverage and were selected to be used in conjunction with the report "Transportation Energy Conservation Data Book." All references are abstracted and arranged alphabetically by author or corporate author if there is no personal author. In addition, a separate list of reports sponsored by the Energy Research and Development Administration, Division of Transportation Energy Conservation is included; indexes are provided by author, corporate author, sponsor, report number, keyword, and permuted title. (ERA citation 03:008579)

Howard, EB Barber, BY Jordan, AC Seaborn, CC ; Oak Ridge National Laboratory, Energy Research and Development Administration Oct. 1977, 261 pp; Part II of ORNL--5320.; Contract W-7405-ENG-26; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; ORNL/EIS-114

48 176185 AIR QUALITY, PUBLIC INFORMATION AND TRANSPORTATION STRATEGIES. This report summarizes the air quality activities undertaken by the Council.

These activities include conducting an areawide public information campaign, and promoting and developing various transportation control strategies designed to reduce excessive air pollution levels in the St. Louis air quality control region. (Color illustrations reproduced in black and white)

Bogart, MJ ; East-West Gateway Coordinating Council, Environmental Protection Agency Final Rpt. EWG-JB-0333.15.0, EPA-907-9-77-006, June 1977, 69 pp; Contract EPA-68-02-2531; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-279027/7ST

48 176920 POLICY ON ENERGY FOR TRANSPORTATION. The paper discusses guidelines for the development of a policy for transportation designed to satisfy a future society. Present day forms of transportation relying on an exhaustible source of energy must ultimately come to a halt. With forecasts of world oil production declining after about the year 2000, an alternative energy source is necessary with hydro- or nuclear-produced electricity an obvious choice. This would allow dwindling oil stocks to be used by petrochemical industries and air transport until converted to other forms of energy. The paper sets out guidelines for phasing out transportation by petrol-and oil-burning engines and the development of intra-city and inter-city forms of public transport.

Gamage, P *Chartered Institute of Transport Journal Analytic* Vol. 38 No. 2, Jan. 1978, pp 43-44; ACKNOWLEDGMENT: TRRL (IRRD-231775); ORDER FROM: Chartered Institute of Transport, 80 Portland Place, London W1N 4DP, England

48 177199 ENVIRONMENTAL CONTROL OF WASHINGTON METRO. A diagrammatic description of the heat flow within a station is presented. The design and functions of the air conditioning system in station and subway ventilation systems are discussed.

Greenspon, ME (Washington Metropolitan Area Transit Authority) *ASHRAE Journal* Vol. 20 No. 2, Feb. 1978, pp 30-35, 3 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 178743 ENERGY EFFICIENT RAIL TRANSIT OPERATION. The paper investigates the energy consumption characteristics of modern rail rapid transit. The paper shows the variation in energy consumption caused by different operating policies and design characteristics of the rail transit mode, and points out the energy economies of improved design and operation. Five variables are analyzed using a rail transit performance computer model that simulates the performance of a rail transit train whose operating characteristics are specified by the program user. The simulated train runs over a track segment established by the user and a performance log of train speed and acceleration along the track segment plus the rate of energy consumption and cumulative energy used are output by the train performance program. The analysis indicates that of the variables studied, the most promising ways of reducing rail transit energy consumption are to include a coasting phase with reduced maximum speeds in the trains' performance cycle and to adjust the track vertical profile. /Author/

Eash, RW (Chicago Area Transportation Study) Phelps, DR, Discussor (General Electric Company) *Transportation Research Record* No. 662, 1978, pp 1-7, 6 Fig., 4 Tab., 10 Ref.; This article appeared in the Transportation Research Record No. 662, Planning and Design of Rapid Transit Facilities.; ORDER FROM: TRB Publications Off

48 179030 THE 1973-74 ENERGY CRISIS: IMPACT ON TRAVEL. A description of urban travel behavior before and during the energy crisis of 1973-74 is developed in this paper. Using a home interview survey taken in Buffalo in the fall of 1973, just before the crisis, a view of pre-crisis urban travel patterns is developed, emphasizing the differences in gasoline use by demographic groups, in order to recognize potential hardship. Three results were uncovered: (1) men travel about 2 times as far per day as do women; (2) travel increases at a decreasing rate as auto ownership increases; (3) the middleage groups (21-50) travel significantly more than the young or elderly. A review of travel behavior changes during the energy crisis is also conducted. Several general conclusions are evident from the studies reviewed: (1) the availability of gasoline is a more important factor in determining travel demand than its price; (2) only those persons with some flexibility in travel behavior do the conserving and those travelers usually have high levels of auto ownership and income; (3) although transit ridership rose during the crisis, for most people it was not an important alternative in combatting the gasoline shortage, even in areas with good transit service. These results seem to indicate that policies using price to reduce gasoline consumption will be ineffective among the higher income households (those with the greatest potential to conserve) and severely impact the lower income families. Policies aimed at travelers with some flexibility in travel choices would be the most effective in conserving fuel, and would not impose severe hardships on any one group. /Author/

Neveu, AJ ; New York State Department of Transportation Res. Rpt. 131, Dec. 1977, 25 pp, 1 Fig., 7 Tab., 16 Ref.

48 179173 CONTINGENCY PLAN IN SUPPORT OF A TRANSPORTATION ENERGY CONSERVATION PROGRAM FOR THE CENTRAL MISSISSIPPI PLANNING AND DEVELOPMENT DISTRICT WITH EMPHASIS UPON THE JACKSON URBANIZED AREA. The primary purpose of this proposed project is to develop a contingency plan which can be implemented to serve the transportation energy needs of Central Mississippi in the event of another major oil embargo or fuel energy shortage. The project is intended to assist in expanding the Ridersharing Program. The program is designed to promote the use of carpools and vanpools. The ultimate goal of the plan is its applicability on a statewide basis whereby such a comprehensive approach could prove to be substantially beneficial to all State entities in their transportation energy conservation endeavors during a major fuel energy crisis. Public apathy towards the energy issue, the dependency of commuters upon the private automobile and their attitudes towards ridersharing, and the prevailing conditions of parking facilities and traffic flow within urban areas significantly jeopardizes the viability and likelihood of the region in the event

of another major fuel shortage. The proposed plan could be an integral component of the ridersharing program currently underway, and could provide an effective means to accommodate transportation energy demands during a state of emergency such as a fuel shortage.

Central Mississippi Plann & Development District Mar. 1978, 18 pp, 2 Fig., 1 Tab.; Prepared in cooperation with Mississippi State Highway Department and Mississippi Fuel and Energy Management Commission.

48 180378 CASE STUDIES OF TRANSIT ENERGY AND AIR POLLUTION IMPACTS. This report summarizes an analysis of the energy consumption and air pollution impacts of eight case studies of new or improved transit services. The case studies include (a) areawide bus service improvement programs involving route extensions, increased frequencies, new lines, demand responsive service, and fare reductions; (b) new corridor exclusive busway service on the Shirley Highway and San Bernardino Freeway; and (c) new rail transit service in the Philadelphia-Lindenwold corridor. Probabilistic models were developed for each of these three service improvement scenarios to account for key travel demand and transportation system factors affecting energy consumption and air pollution impact levels. Results showed that low patronage response to areawide bus improvements as well as diversion from prior bus service, carpools, etc. and extensive auto access (park-and-ride, kiss-and-ride) to corridor systems reduce expected energy and air pollution gains and may, under certain conditions found in four case studies, result in possible energy use increases. Additionally, it was found that auto use for corridor system access may worsen air quality conditions in suburban areas in the vicinity of corridor transit terminal locations.

Curry, JP (De Leuw, Cather and Company) ; Environmental Protection Agency n 60015-76-003, May 1976, 198 pp, 49 Ref.; EPA Socioeconomic Environmental Studies Series.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 180443 ENERGY PROBLEMS AND URBAN AND SUBURBAN TRANSPORT. This report is mainly concerned with measures which may bring about energy savings in the short and medium terms without significant adverse effects as regards to mobility and quality of service to the user. Three types of measures can be taken to reduce energy consumption in urban transport: Measures which have been adopted in member countries; measures which have been considered for adoption but which were not implemented; and, those measures which are currently under study for future adoption. The potential for energy conservation in road transport in view of current travel habits and the desire to retain or improve current levels of mobility are examined. The effect of energy conservation measures upon other spheres of activity and the effects of efforts to conserve energy in certain related activities upon road transport are also briefly studied. Energy conservation may also be achieved through engineering measures related to vehicle design and operations and also through long-range land use and socio-economic activity arrangements. A ranking of energy conservation measures on the basis of their impact. This information, together with conclusions and rec-

ommendations for future work, is directed toward providing policy makers with factual information regarding future actions to be taken to conserve the limited petroleum resources.

Organization for Economic Cooperation and Devel. Dec. 1977, 60 pp, 14 Tab., 53 Ref., 1 App. Prepared by an OCED Road Research Group.

48 180538 ENERGY CONSERVATION: TRANSPORTATION (A BIBLIOGRAPHY WITH ABSTRACTS). The potential to achieve fuel conservation through technology, management, and planning is discussed. Transportation as covered include urban mass transit, aviation, marine transportation, automobiles, trucks, and railroads. A few abstracts discuss public attitudes concerning conservation measures. (This updated bibliography contains 273 abstracts, 70 of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service May 1978, 279 pp; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0501/3ST

48 180795 THE IMPACTS OF URBAN TRANSPORTATION AND LAND USE POLICIES ON TRANSPORTATION ENERGY CONSUMPTION. VOLUME 1. This report explores relationships between energy consumption in urban passenger travel, land use, transportation system characteristics, and travel behavior. Findings are based on 112 experiments conducted with an integrated, equilibrium transportation-land use simulation model. This model simulates urban growth, is sensitive to a broad range of transportation and land use actions, accounts for congestion, accommodates auto and transit modes, and responds to the generalized costs of travel. Three city shapes, concentric ring, one-sided, and polynucleated, were tested.

Peskin, RL Schofer, JL ; Northwestern University, Evanston, Department of Transportation Final Rpt. DOT/TST-77/85, Apr. 1977, 209 pp; Contract DOT-OS-50118; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-282241/9ST, DOTL NTIS

48 181220 LAND USE, ENERGY FLOW, AND DECISION MAKING IN HUMAN SOCIETY--TRANSPORTATION IN A SUBURBAN AREA: A CASE STUDY OF THE NORTH-EAST SACRAMENTO COUNTY AREA, TECHNICAL APPENDICES; APPENDIX A--TRANSPORTATION: TECHNICAL SUBSTANTIATION; APPENDIX B--AIR AND NOISE POLLUTION, TECHNICAL DISCUSSION. The purpose of the case study is to review the transportation needs of the Northeast Sacramento County region, and to analyze the various modes of transportation. These technical appendices supplement the case study: Appendix A, Transportation--Technical Substantiations, includes program data on: (1) Person trips; (2) elasticities and modal split; (3) auto occupancy; (4) corridor allocation; (5) travel, energy use and vehicle emissions; (6) air pollution; and (7) program listing and data file. Appendix B, Air and Noise Pollution--Technical Discussion, presents information on: (1) Air pollution; and (2) Noise pollution.

California University, Davis, National Science Foundation NSF/RA/E-73/496, Nov. 1973, 33 pp; Grant NSF-GI-27; ACKNOWLEDGMENT:

NTIS; ORDER FROM: NTIS; PB-280047/2ST

48 181221 LAND USE, ENERGY FLOW, AND DECISION MAKING IN HUMAN SOCIETY--TRANSPORTATION IN A SUBURBAN AREA: A CASE STUDY OF THE NORTH-EAST SACRAMENTO COUNTY AREA. The purpose of the study is to review the transportation needs of the Northeast Sacramento County region and to analyze the various modes of transportation. In 1963, a network of freeways was proposed for this region, however construction was postponed to the 1980's. Citizens' groups have attempted to block future construction of the freeways, and as a result of this opposition a review of these proposed freeways was recommended. Because of this dissention, and because Sacramento County is representative of many suburban regions, it was selected as a study site. The study consists of four major elements: a brief review of the relationships between land use and transportation systems; a transportation model which permits the analysis of the broad impacts of policy decisions with respect to transportation alternatives; an analysis of incremental atmospheric and noise pollution levels due to proposed freeways; and an analysis of the fiscal impact of the freeway alternative upon the local tax base.

California University, Davis, National Science Foundation NSF/RA/E-73/495, Nov. 1973, 69 pp; Grant NSF-GI-27; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-280046/4ST

48 181223 LAND USE, ENERGY FLOW, AND DECISION MAKING IN HUMAN SOCIETY--TRANSPORTATION-ENERGY-EMISSIONS MODEL TEEM AND TEEM/TEST, TECHNICAL DESCRIPTION AND USER'S MANUAL. The Transportation-Energy-Emissions Model (TEEM) was developed to study the varying effects upon energy use and air quality due to the implementation of several alternate traffic systems in a metropolitan area. It estimates energy use and emission of SO_x, NO_x, CO, and HC. Described are the current versions of the models (TEEM and TEEM/TEST). The program TEEM is written in FORTRAN. It consists of a main program (two subroutines, an input routine CARD and an output routine DIAG) and two function sub-programs, DELAY and GCSTCY. The program TEEM/TEST considers only one link but considers it under different levels of use.

Flory, J Lee, J ; California University, Davis, National Science Foundation NSF/RA/E-73/493, Dec. 1973, 40 pp; Grant NSF-GI-27; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-280044/9ST

48 181587 URBAN NOISE POLLUTION (A BIBLIOGRAPHY WITH ABSTRACTS). Aspects of noise in the urban environment are covered. The topics were chosen for their interest to urban planners and include citizen attitudes, transportation noise, and noise abatement techniques. (This updated bibliography contains 152 abstracts, 24 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service July 1978, 155 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0686/2ST

48 181593 URBAN AIR POLLUTION. VOLUME 2. 1976-JULY, 1978 (A BIBLIOGRAPHY WITH ABSTRACTS). Selected reports are cited on urban air pollution and its abatement. These citations were selected because of their general interest to urban planners, which will enable them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation.

Cavagnaro, DM ; National Technical Information Service Bibliog. July 1978, 215 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0699/5ST

48 181596 FUEL CONSUMPTION TRANSPORTATION. VOLUME 1. 1964-1976 (A BIBLIOGRAPHY WITH ABSTRACTS). Fuel consumption by automobiles, trucks, buses, and general aviation aircraft is discussed. Topic areas cover the effect of road conditions, traffic conditions, and emission controls on fuel economy; projected growth and problems facing air transportation; energy efficiency of various urban transportation modes; energy use forecasts; and projections of supply and demand in the transportation sector. Bibliographies on fuel consumption in the industrial, residential, and commercial sectors and on electric power consumption are also available. (This updated bibliography contains 187 abstracts, none of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service July 1978, 193 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-78/0707/6ST

48 182586 ELECTRICAL ENGINEERING IN MUNICIPAL TRANSPORTATION--A WAY TO HEALTHIER LIVING CONDITIONS [Elektrotechnika v mestske dopravě--cesta k ozdravení zivotního prostředí]. The development of vehicles for mass transportation in cities is traced. Types and characteristics of electric vehicles and metropolitan railroads are described, along with the use of electronic circuits and equipment for modern vehicles. The use of fuel cells and light accumulators as power sources of future independent city vehicles is discussed. [Czech]

Jansa, F *Elektrotechnicky Obzor* Vol. 66 No. 8, Aug. 1977, pp 452-459, 21 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 182652 SHOULD NOISE BE TAXED? [Faut-il taxer le bruit]. The authors examine the principle of taxing traffic noise, discuss possible advantages and how this concept might be implemented in practice. They explain the double function which should be involved in the policies for reducing urban traffic noise: encouragement on the one hand, and integration and financing on the other hand. A fee system would serve both functions. /TRRL/ [French]

Alexandre, A Barde, PH *Nuisance et Environnement* No. 47, Jan. 1976, pp 45-48, 2 Tab., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD-106266), Central Laboratory of Bridges & Highways, France

48 182808 ENERGY CONSERVATION IN SUBWAY SYSTEMS BY CONTROLLED ACCELERATION AND DECELERATION. The 1975 electric bill for propulsion in the New York City subway system was close to 90 million dollars. This paper addresses the question of how a subway motorman should run his train in order to minimize this energy consumption. It is shown that using maximum acceleration followed at the appropriate time by coasting, and then braking at the maximum acceptable rate, gives a particularly low energy consumption for typical subway trains (although slightly different velocity profiles can be better under appropriate circumstances). This velocity profile is relatively easy to implement, and has now been proven effective in experimental tests. As a result of recommendations reported here, the New York City Transit Authority ran idealized tests of the profile, followed by recently completed tests in revenue service which demonstrated an 18.4 percent decrease in energy consumption using a daily weighted increase of 4.25 per cent in trip time. This paper also evaluates the energy saved using an alternative method involving equipment modification for field shunting in the series mode.

Viswanathan, CN (Columbia University, New York) Longman, RW Domoto, GA *International Journal of Energy Research* Vol. 2 No. 2, Apr. 1978, pp 133-151, 5 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 183102 ENERGY FORCING MAJOR CHANGES IN TRANSPORTATION MARKET BY 1995. The need to reduce energy use in transportation and changing travel habits should cause a decided shift from the plane and car to rail and local mass transit, concluded a new market research report by Frost & Sullivan, Inc. on the U.S. transportation market to 1995. /GMRL/ *Metro* Vol. 73 No. 5, Sept. 1977, pp 89-90 ACKNOWLEDGMENT:

48 183256 HOW DO ALTERNATIVE POWERPLANT COSTS COMPARE? Four power systems were studied: an advanced spark ignition engine; a battery-powered electric motor; a diesel engine; and a diesel-electric hybrid. These systems were studied via computer simulations of vehicle operation over a specific driving cycle which yielded energy consumption estimates. Two types of vehicles were considered. One was a subcompact passenger car designed primarily for urban/suburban use but capable of cruising at 100 km/h and mixing safely with suburban traffic. The second type of vehicle was a full-size car designed for comfortable interstate-highway operation as well as local driving. The electrics were based on the assumed availability of an advanced battery with an energy density about four times greater than that of present-day lead-acid traction batteries. The same type of advanced battery, reconfigured to provide maximum power, is assumed to be available for the diesel-electric hybrid. However, in the hybrid, the battery only supplements the power available from a small diesel engine during peak power demand periods (the battery is recharged from the engine through a motor/alternator). It is concluded that, for subcompacts, the all-electric propulsion system could provide an attractive vehicle for local transportation. However, the diesel and the diesel-electric hybrid may provide an alternative to the spark-ignition engine: they would be almost as inexpensive to

operate as the electric, yet would not be confined by range limitations. For full-size cars, the diesel and diesel-electric hybrid's fuel savings make them economically attractive: for example, the diesel-electric's projected fuel savings amount to more than over an advanced spark ignition engine.

Automotive Engineering Vol. 86 No. 5, May 1978, pp 39-41 ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 183323 ENERGY SAVINGS IN THE TRANSPORT SECTOR. This report deals with energy savings at two levels for private cars, lorries, domestic aviation and other transport modes in Sweden. Level 1 comprises measures which are judged to be feasible up to 1990 without negative effects on people's transport situation (stimulants, information, campaigns). At level 2 fairly strict control measures may be considered, but these measures must not affect employment and necessary travel or include fuel rationing. An assessment of these two alternatives indicates that total energy savings in the transport sector will amount to 3% (level 1) and 14% (level 2). An energy-saving program set at the level of 7% is proposed. The measures discussed in this program are directed to reducing the energy consumption by private motoring and to some extent by lorry transport. The measures considered in the program are the following: (1) information to motorists; (2) training at driving schools; (3) improved compliance with speed regulations; (4) extension of public transport in combination with reorganization of traffic environment and restrictions on use of cars, especially in larger towns; (5) increased car pooling; (6) standards for maximum permissible specific fuel consumption; (7) strictly differentiated motor vehicle tax; (8) voluntary savings program for lorry transport and (9) reinforcement of competitiveness of Swedish railways. /TRRL/

Kommunikationsdepartementet Monograph 1978, 37 pp, 6 Fig., 7 Tab.; ACKNOWLEDGMENT: TRRL (IRRD-234412), National Swedish Road & Traffic Research Institute; ORDER FROM: Kommunikationsdepartementet, Fack, Stockholm, Sweden; 78.0424

48 183326 LONGTERM ENERGY DEMAND FORECASTING. A NEW APPROACH. This paper describes a method of energy demand forecasting based on system analysis of the energy demand of a socioeconomic system and scenario description of its development. An application carried out for the French economy is briefly outlined to illustrate the feasibility and practicability of the method. Some general features of the method are reviewed to show how it might be adapted for other countries. /Author/TRRL/

Chateau, B Lapillonne, B *Energy Policy* Vol. 6 No. 2, 1978, pp 140-157, 5 Fig., 8 Tab., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-233748); ORDER FROM: ESL

48 183462 REGIONAL CONSEQUENCES OF INCREASED ENERGY CONSERVATION. CHAPTER 4. TRANSPORT [Regionala konsekvenser av en ökad energihushållning kapitel 4. Transporter]. The aim of this chapter is to study the long term effects of energy conservation on regional transport, under the headings of freight and passenger transport. The analysis was

carried out with present statistics and forecasts as a basis. The analysis shows for (a) freight transport: (1) it is doubtful whether a decrease in freight transport as a consequence of decreased production affects the various regions, (2) a change from lorry to railway transport is not shown to have any marked effect, (3) relocation as a consequence of increased energy costs is likely to be inconsiderable as the transport costs tend to play a minor part in the choice of location. (b) passenger transport: a moderate increase of transport costs will have the following effects: (1) the extent of passenger transport would not be affected and consequently the regional effects would be small, (2) a change to more energy saving transport modes would have no considerable regional effects and (3) that the effect on relocation would be small. /TRRL/ [Swedish]

Koestner, E ; Gothenburg University, Sweden Memorandum Nr 71, Oct. 1977, pp 1-19, 1 Fig., 12 Tab., Refs.; ACKNOWLEDGMENT: National Swedish Road & Traffic Research Institute (IRRD 234392), TRRL

48 183511 ENERGY-SAVING POTENTIAL OF TRANSIT. In a study initiated by the Federal Energy Administration in response to growing national concern over the rapidly expanding rate of energy use and possible fuel shortages, and analysis was done of the energy efficiencies of various urban passenger transportation modes, including automobile and bus, rail rapid and commuter rail transit, and dial-a-ride. The study was primarily concerned with the potential impacts and energy efficiencies of short-term policies designed to induce automobile drivers to shift to transit. Policies to induce such mode shifts were grouped as scenarios for evaluation. Possible transportation energy savings for urbanized areas as well as reductions in vehicle kilometers of travel were first estimated for individual representative cities and then expanded to provide a national estimate for each of four tested scenarios. /Author/

Shapiro, PS (Metropolitan Washington Council of Governments) Pratt, RH (Pratt (RH) Associates, Incorporated) *Transportation Research Record* No. 648, 1977, pp 7-14, 1 Fig., 6 Tab., 5 Ref.

This paper appeared in *Transportation Research Record* No 648, Environmental and Conservation Concerns in Transportation: Energy, Noise, and Air Quality.; ORDER FROM: TRB Publications Off

48 183518 PHILADELPHIA AIR QUALITY CONTROL REGION: NEED AND RECOMMENDATIONS FOR REVISION OF TRANSPORTATION CONTROL PLAN. The Philadelphia transportation control plan, its status and evaluation process, and the technical background on which it was based are evaluated. A summary of transportation control plan strategies is presented as well as review of their status and the major implementation problems of the plan. Legal, administrative, and technical problems are found to exist. A review and an analysis of the latest available air quality data for the Philadelphia central business district are presented. Air quality standards were found to be based on limited studies and did not take into account time of day, frequency, or duration of high concentrations of pollutants. The power of the U.S. Environmental Protection Agency to regulate the states or to require them to enforce

a regulation has been questioned. A need for revising the Philadelphia plan is established, and it is recommended that the metropolitan planning organization be involved in the revision process. Possible strategies that could be considered in revising the plan and the place of such a plan in the transportation planning process are discussed. /Author/

Latif, CA Mufti, RK (Delaware Valley Regional Planning Commission) *Transportation Research Record* No. 648, 1977, pp 59-65; This paper appeared in *Transportation Research Record* No 648, Environmental and Conservation Concerns in Transportation: Energy, Noise, and Air Quality.; ORDER FROM: TRB Publications Off

48 184194 IMPACT OF DIAL-A-RIDE ON TRANSPORTATION-RELATED ENERGY CONSUMPTION IN SMALL CITIES. Dial-a-ride is a door-to-door public transportation concept similar to taxi service except that passengers share the vehicle (usually a 12 to 20-passenger bus) with other riders. This paper examines energy consumption of dial-a-ride systems in three small Michigan cities. Fuel consumption per effective passenger kilometer (shortest distance between a passenger's origin and destination) is derived from aggregate fuel and ridership data and average trip-length data in the test cities. The analysis also predicts dial-a-ride user behavior and energy consumption in the absence of dial-a-ride. Results show that the introduction of dial-a-ride into test communities in Michigan has caused a net increase in transportation-related fuel consumption. Inducement of new trips, low vehicle occupancies, circuitous routing, poor vehicle fuel economy, and diversion of passengers from more energy-efficient modes are seen to be principal reasons for the significant energy costs of dial-a-ride. The future potential of dial-a-ride is discussed in the context of increasing energy prices, and several methods of reducing its energy intensiveness are presented. Despite the pessimistic estimates presented, energy consumption is only one of many factors that must be considered in determining the feasibility and desirability of dial-a-ride for a particular site. /Author/

Hershey, WR (Sverdrup and Parcel and Associates, Incorporated) *Transportation Research Record* No. 650, 1977, pp 14-18, 1 Fig., 2 Tab., 9 Ref.; This paper appeared in *Transportation Research Record* No. 650, Paratransit Services.; ORDER FROM: TRB Publications Off

48 184332 ENVIRONMENTAL TRAFFIC MANAGEMENT-THE END OF THE ROAD? This paper questions some aspects of the technical soundness and public acceptability of environmental traffic management scheme of the kind advocated in the Buchanan report, "traffic in towns". Practical studies have shown that in inner city areas in particular, and perhaps older built-up areas in general, the concept cannot be adequately defended against a wealth of variety of criticism from those whom it most directly affects, i.e. The public. Participation exercises have revealed public fears that the road closures associated with schemes will ruin the viability of local shops, worsen the environmental conditions along local roads chosen as distributors, cause even greater congestion on the main road network due to displaced traffic, and impede the accessibility of local people to their homes. In the light of

these, it is suggested a flexible policy be adopted incorporating changes to the forms of vehicles and the manner in which they are used as well as changes to the physical form of the road network. /Author/TRRL/

McKee, WA Mattingly, MJ *Transportation (Netherlands)* Vol. 6 No. 4, Dec. 1977, pp 365-377, 2 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 233286); ORDER FROM:

48 184548 THE PROBLEM OF AIR POLLUTION BY TRAFFIC IN TOWNS SHOULD BE CONSIDERED MORE [Das Problem der Luftverunreinigungen des Heutigen Stadtverkehrs muss mehr Beachte Werden]. Up to now there have been only limited possibilities of decreasing the emissions of otto engines or diesel engines by technical improvements. If the reduction of one component of the emissions is attempted, new components of exhaust fumes arise or there is an increase of other components. The only way at present is to decrease the traffic in urban and residential areas and to promote electric public transport. In this paper a review is presented of the problems of air pollution caused by traffic. /TRRL/ [German]

Gunnarsson, SO Persson, B; *International Federation of Pedestrians Report* 1977, pp 10-9, 3 Fig., 1 Tab., 10 Ref.; From the Conference Voice of the Pedestrian, VII.; ACKNOWLEDGMENT: TRRL (IRRD-234839), Institute for Road Safety Research

48 184585 THE POTENTIAL FOR USE OF ALTERNATIVE FUELS IN MICHIGAN'S PUBLIC TRANSIT SYSTEMS. The availability of various alternative fuels for public transit vehicles is examined, and funding opportunities for demonstration grants are discussed. The only alternative fuels that appear to be likely candidates for a demonstration grant in the near term are alcohol and synthetic fuels. The only likely supporter of a demonstration project is the U.S. Department of Energy, Division of Transportation Energy Conservation, which has tentative plans for supporting some demonstration programs of alcohol/gasoline blends in the near future. /UMTA/

Bunch, HM; *Highway Safety Research Institute Final Rpt.* UM-HSRI-78-33, July 1978, 34 p., Figs., Tabs., 51 Ref.; ACKNOWLEDGMENT: Michigan Department of State Highways & Transport; ORDER FROM: NTIS; PB-296301/5ST

48 184945 NOISE-CON 77 PROCEEDINGS: NATIONAL CONFERENCE ON NOISE CONTROL ENGINEERING, 1977. Thirty-six papers are presented. The first section of this Proceedings is devoted to reports from several organizations on the status of programs on the Federal, State and local levels. The second section deals with environmental impact and on the noise environment created by both air and surface transportation systems. The first group of papers deals with environmental impact, cost-effectiveness analysis and safety and economic considerations in tire noise control. The second group of papers deals primarily with noise environments created by rail transit systems and aircraft. The third section has been devoted to the prediction of noise levels, propagation effects and the effects of barriers and earth berms. Several papers are included on the state-of-the-art in rail transit noise, highway noise and aircraft noise. The

proceedings also include papers devoted to standards and measurements of the noise generated by transportation systems.

Maling, GC, Jr, Editor (IBM Acoustics Laboratory); *Noise Control Foundation Conf Paper* 1977, 502 p.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Noise Control Foundation, Box 1758, Poughkeepsie, New York, 12603

48 186430 POTENTIAL FOR TRANSIT AS AN ENERGY SAVING OPTION. This study was instigated in response to the growing national concern over the rapidly expanding rate of energy use in the face of possible fuel shortages. It is primarily concerned with the potential impacts and energy efficiencies of short-term policies designed to induce auto drivers to shift to public transit. The energy efficiencies of various urban passenger transportation modes are analyzed, including automobile, bus, rapid rail, commuter rail, and Dial-a-Ride transit. Policies to induce mode shifts to public transit are structured into alternative scenarios for evaluation. Possible urbanized area transportation energy savings as well as reductions in vehicle miles of travel are estimated first for individual representative cities and then expanded to a national level. Representative cost evaluations of policy actions are included as well. Finally, note is made of projected secondary or indirect impacts of policy design and implementation. Four scenarios were constructed for evaluation. Scenario I consists of modest transit enhancements, Scenario II major transit enhancements, Scenario III the same major transit enhancements combined with auto disincentives, and Scenario IV automobile disincentives alone. The analytical procedures used to estimate the travel mode shifts and energy savings that could be achieved with alternative strategies were applied in the context of actual urban conditions. As it was clearly impractical to prepare separate analyses for all urbanized areas, one representative city was chosen from each of four groupings. Collectively, these four groups covered all urbanized areas in the country. The groupings were made on the basis of transit utilization for journey-to-work purposes and the presence or lack of an extensive rail system. Four representative cities chosen for this study were Albuquerque, San Diego, Chicago, and Baltimore. (ERA citation 03:048237)

Federal Energy Administration, Department of Energy Mar. 1976, 107 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; FEA/D-76/224

48 186447 GUIDE TO REDUCING ENERGY-USE BUDGET COSTS. Conservation is a means for making good use of taxpayers' money. As the cost of energy increases, the value of conservation increases equivalently. Local government officials are not only responsible for using tax money wisely, but also have plans ready for emergency energy supplies. In this guide, the emphasis is on buildings and vehicle fleets. According to a study by ASHRAE, a 48.1% saving in school buildings and a 59.7% saving in office buildings can be achieved with modifications of insulation, wiring, ventilation, and lighting systems. An average 30% saving can be achieved by lowering driving speeds from 70 to 50 mph. Energy-saving driving habits can cut fuel consumption by as much as 20%. Chapters are entitled: The Commitment to Energy Manage-

ment; Employee Programs; Vehicle Fleets; New Buildings; and Existing Buildings. 43 references. (ERA citation 03:048131)

National Association of Counties, Washington,, DC.*National League of Cities, Washington,, DC.*United States Conference of Mayors,, Washington, DC.*Department of Energy. Apr. 1978, 101p; Contract EM-75-C-01-8516; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; HCP/U60505-01

48 186471 ENERGY IN TRANSPORT. VOLUME 2. POLICIES. REPORT NO. 27. The study identifies and evaluates realistic and practical transport policy changes in New Zealand related to fuel saving. Covered briefly in a background chapter are: transport fuel users; fuel conservation in rail, sea, and air transport; social aspects of saving fuel; policy definition and summary of results; and cost-effectiveness of short-term conservation policies. Then the report addresses in detail road-transport policies that might save fuel since, in New Zealand, 89 percent of domestic fuel consumption is for road transport; 3 percent for rail, 3 percent for sea; and 5 percent for air transport. The road-transport policies are divided into five groups, with each successive group involving measures with greater restraints on personal mobility and lifestyle. Group I merely involves increased vehicle efficiency; Group II transfers to a different vehicle type or mode of travel; Group III increases vehicle loading; Group IV suppresses trip making, such as by substitution of personal travel with remote forms of communication; and Group V changes to urban and regional land use and transport structure to reduce transport volumes. (ERA citation 03:048189)

Beca, Carter, Hollings and Ferner Limited Nov. 1977, 159 p.; U.S. Sales Only.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NP-23226

48 188015 REALISTIC APPRAISAL OF MASS TRANSIT IN REDUCING AUTOMOBILE USE, ENERGY CONSUMPTION AND AIR POLLUTION IN AMERICAN CITIES. The paper presents a methodology that provides for a regional assessment of the expectations placed on the development of transit facilities in urban areas. The methodology provides a simple analysis tool for assessing the impacts of regional transit development policies on: traffic congestion, modal split, air pollution, energy consumption, and financial requirements. It establishes an analytical relationship between the transit usage rate in a region, and the levels of exposure of the population to transit services, density of urban development, and exposure to automobile ownership. Two multiple linear regression models have been developed, using data from a number of cities in the United States.

Falocchio, JC (Polytechnic Institute of New York); Institute of Transportation Engineers 1977, pp 513-520; Compendium of Technical Papers of the 47th Annual Meeting of the Institute of Transportation Engineers and the Fourth World Transportation Engineers Conference, Mexico City, October 2-6, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 188018 SYSTEMATIC IMPLEMENTATION OF LOCAL, STATE AND FEDERAL REGULATIONS TO CONTROL TRANSPORTATION AND LAND USE CAN REDUCE ENERGY REQUIRED FOR TRANSPORTATION. This paper addresses the problem of conserving fossil fuel reserves by a program of regulations to be applied to land use and transportation. More effective city planning, improved traffic operations, less fuel waste by improved vehicle design and maintenance, and methods to increase the usage of public transportation are discussed as possible means to save fuel. Regulations to force implementation of these energy saving procedures are also reviewed.

Josey, JL (Clemson University) Clark, JE ; Missouri University, Rolla 1978, pp 358-266, 23 Ref.; From the Proceeding of the Fourth Annual University of Missouri/Missouri Department of Natural Resources Conference on Energy, University of Missouri at Rolla, October 11-13, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 188216 TRANSPORTATION AND THE URBAN ENVIRONMENT. This is a joint US-USSR report on the rational relationship between automobile and public transit development. It was developed by the US-USSR Urban Transportation Team, under a 1972 agreement on cooperation in the field of environmental protection. The US sponsors are the Department of Transportation and the Department of Housing and Urban Development. Soviet sponsors are the State Committee on Civil Engineering and Architecture (Gosstroy) and the Central Scientific Research and Design Institute (Gosgrazhdanstroy). The report notes the great difference between the urban trips mixture of automobile and public transit in the two nations. In the US, 90 percent of the urban trips are made by car and 10 percent by public transit. In the Soviet Union, the mixture is 90 percent public transit and only 10 percent car use. The report concludes that despite these significant differences, the continued development and improvement of public transport systems is an important element in preserving the urban environment in both the US and Soviet Union. The joint report is divided into two major sections, one by the US members of the project, the other by the Soviet members, together with joint conclusions. /Author/

Department of Transportation Oct. 1978, 185 p., Figs., Tabs., 29 Ref.; A Joint Report of the U.S./U.S.S.R. Urban Transportation Team under the "Agreement of Cooperation in the Field of Environment Protection." Sponsored in the United States by the Department of Transportation and the Department of Housing and Urban Development.; ACKNOWLEDGMENT: DOT; ORDER FROM: GPO; 050-000-00141-5

48 188395 URBAN FUEL ECONOMY: AN ALTERNATE INTERPRETATION OF RECENT COMPUTER SIMULATION CALCULATIONS. Estimates of the effect of different traffic control scenarios on vehicular fuel consumption in an urban network were obtained in a recent report using detailed computer simulation. In the present work it is shown that these computer simulation results are consistent with a previously developed model of fuel consumption in urban traffic systems derived by conducting experiments in street traffic.

Evans, L Herman, R *Transportation Research* Vol. 12 No. 3, June 1978, pp 163-165, 1 Fig., 1 Tab., 7 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 235542)

48 188931 AUTOMOBILE FUEL ECONOMY ON FIXED URBAN DRIVING SCHEDULES. Various fixed urban driving schedules have been defined to represent the speed-time characteristics of urban traffic. When the fuel economy of a particular vehicle is measured using a fixed urban driving schedule, the result depends on the particular schedule chosen. The paper shows that the differences in fuel economy measured using different schedules can be satisfactorily explained in terms of a simple model, relating fuel consumption to the average speed of urban traffic, previously derived by driving instrumented vehicles in actual street traffic.

Evans, L (General Motors Research Laboratories) Herman, R *Transportation Science* Vol. 12 No. 2, May 1978, pp 137-152, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 189011 TRANSPORTATION AND ENERGY: SOME CURRENT MYTHS. Some widespread ideas about public transportation are criticized. It is disagreed that good public transportation can attract people out of cars; that public transit saves energy; that transit is more economical than cars; that the decline in the railroads is due to federal subsidies of the trucking industry; and that railroads can provide economical passenger service.

Lave, CA (California University, Irvine); Pergamon Press Vol. 2 1977, pp 597-603, 11 Ref.; Energy Use Management, Proceedings of the International conference, held in Tucson, Arizona, October 24-28, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL, Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

48 189025 NOISE POLLUTION AND PROTECTION IN ELEVATED, GROUND-LEVEL AND LOWERED LEVEL S-BAHN LINES [Laermmissionen und Laermschutz bei Schnellbahnen in Hochlage, in ebenerdiger Fuehrung und in Tieflage]. No Abstract. [German]

Blenneman, F *Forschung und Praxis* No. 21, 1978, pp 135-140, 6 Tab., 8 Phot., 5 Ref.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Forschung und Praxis, Dusseldorf, West Germany

48 189466 ENERGY EFFICIENCY OF PASSENGER TRANSPORTATION MODES: A SURVEY. A survey was made to compare the energy efficiency of various modes of passenger transportation, specifically automobiles and airplanes vis-a-vis modes supported by the Public Transportation Fund Program, bus and rail. The survey is limited to domestic (usually contiguous 48 states) operations for intercity and urban transportation. The study shows that the buses and trains are potentially more fuel efficient than airplanes and automobiles in intercity and urban passenger transportation. Thirteen independent studies regarding the propulsion energy efficiency of intercity modes were surveyed and the results are summarized in figures and tables. The results of studies by the Congressional Budget Office, the Metropolitan Transit Commission (Minneapolis)

and the Pennsylvania Department of Transportation come to similar conclusions with regard to urban passenger modes, regardless of assumptions used. All forms of public transportation are ranked as more fuel efficient than automobiles except Dial-A-Ride which is ranked the lowest.

Michigan Department of State Highways & Transport Nov. 1978, 11 p., 1 Fig., 4 Tab., 6 Ref.

48 189811 ENERGY EVALUATION OF URBAN MODES AND SYSTEMS: IT ALL DEPENDS ON HOW YOU MEASURE IT. Pitfalls encountered in energy analysis are identified in this introductory overview to a conference session on Urban Transport Modes and Systems. Examples are presented both for the comparison of modes or systems, and for divergent results from different analyses. Some working definitions of urban modes and systems are suggested, along with several different criteria of comparison with caveats for what is or is not included. Requirements for the energy assessment of an urban area's transportation system--present--are summarized.

Fels, MF (Princeton University) ; Pergamon Press Proceeding 1977, pp 625-632, 17 Ref.; Energy Use Management, Proceedings of the International Conference, Tucson, Arizona, October 24-28, 1977.; ACKNOWLEDGMENT: EI; ORDER FROM: Pergamon Press, Incorporated, Maxwell House, Fairview Park, Elmsford, New York, 10523

48 190264 NORTH EAST AREA LIGHT RAIL LINE-ENVIRONMENTAL IMPACT STATEMENT. DRAFT. The primary objective of the north east area public transport review was to determine the steps that must be taken in the next five or ten years to provide the basis of a public transport system to serve the needs of the north east suburbs of Adelaide at least until the end of the century. With this objective in mind and taking into account specific engineering, social, environmental, economics and land use criteria, the objectives of the proposed action, a light rail transit line, were developed. The study findings demonstrate the need for a major improvement to the transport system in the north east area. A number of options are described and some selected for detailed evaluation. Details of the preferred action in terms of the selected route and technical and other characteristics of the system, and a summary of probable environmental effects in terms of adverse and beneficial impacts are given. In a majority of the areas an LRT system or busway all or part of the Modbury transport corridor would best meet the required criteria and offer significant advantages over other transportation systems examined.

South Australia Department of Transport, Australia Monograph No Date, 139 p., 26 Fig., 8 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD-236744), Australian Road Research Board; ORDER FROM: Australian Road Research Board, 500 Burwood Road, Vermont South, Victoria 3133, Australia

48 193808 EXTERIOR-RADIATED AERODYNAMIC NOISE OF VEHICLES AT HIGHWAY SPEEDS. Aerodynamic noise due to airflow over a vehicle moving at highway speeds has usually either been ignored, or postulated to be a negligible part of the total exterior noise of the vehicle. In part, this may have been

due to the difficulty in separating aerodynamic noise from the other components of vehicle noise. In the investigations discussed here, a technique was developed to make this separation possible. The technique was applied to a sampling of six light vehicles: four different sizes and shapes of passenger cars, a pickup truck, and a window van. The noise data for each of three major components is presented in the form of A-weighted levels as a function of vehicle type, ground-speed, and directivity. It is shown that the aerodynamic noise component is not negligible in comparison to the other two components. Various implications of this newly defined importance of aerodynamic noise are discussed including those relating to tire noise testing.

Oswald, LJ (General Motors Research Laboratories) ; Noise Control Foundation Conf Paper 1978, pp 711-714; Proceedings of the International Conference on Noise Control Engineering, Inter-Noise 1978: Design for Noise Control, San Francisco, California, May 8-10, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 193821 ANALYSIS OF BUS NOISE LEVELS FROM THE LINCOLN TUNNEL EXCLUSIVE BUS LANE IN METROPOLITAN NEW YORK. While buses ordinarily make up a very small percentage of total volume in most highway traffic streams, there are certain urban conditions where very heavy concentrations of buses dominate the noise environment. Several examples typify this condition, including the terminal garage for a transit system during the early morning hours, a large metropolitan school complex operating its own fleet of buses during the morning and afternoon hours, and a mass transit situation where special consideration has been accorded the movement of bus traffic, usually through the designation of an Exclusive Bus Lane (XBL). It is a unique example of this XBL concept that has provided a data base for the analysis of bus noise emissions and flow rates. The paper discusses measurements and analysis of bus noise emissions made at the Lincoln Tunnel XBL in northern New Jersey immediately west of New York City.

Cohn, LF (New York State Department of Transportation) ; Noise Control Foundation Conf Paper 1978, pp 869-872; Proceedings of the International Conference on Noise Control Engineering, Inter-Noise 1978: Design for Noise Control, San Francisco, California, May 8-10, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 194036 ENERGY CONSERVATION IN LAND USE AND TRANSPORTATION. This paper describes the use of the TOPAZ (Technique for the Optimum Placement of Activities into Zones) urban planning model in a study of Melbourne to compare energy consumption patterns in 1976 and 2000 under various scenarios. Topaz is a sketch planning model developed to evaluate alternative forms of urban systems in terms of infrastructure and transportation costs and benefits. A number of policy implications arise, including the need to give more attention to the possible implications of future shortages and price rises in natural crude oil. Most of the more immediately effective savings in fuel are likely to arise from modifications to existing transportation technology and its more effective use. How-

ever, urban form, density and accessibility could have an important role to play in the long term, even if the extent of this role is unclear at this stage. The fostering of changes in land-use patterns must be commenced now if they are to make an effective contribution. The modelling approach presented provides a means of studying the interactions between land use and transport and determining urban forms and transport networks of energy consumption that it can afford. The paper was presented at the Energy Conservation in the Built Environment Conference, Sydney, 15-16 March 1978. Environment Conference, Sydney, 15-16 March 1978. /TRRL/ Sharpe, R Brotchie, JF Toakley, AR ; Commonwealth Scientific & Indus Res Org, Australia Monograph 1978, 31 p., 3 Fig., 25 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236799), Australian Road Research Board

48 194049 TRANSPORT AND ENERGY OVERVIEW. This report was prepared at the request of the Australian Transport Advisory Council. The world has entered an era of higher priced energy and, in particular, higher priced oil. The world oil supply outlook is also uncertain. Australia is expected to become increasingly dependent on imports of crude oil during the 1980's. Given that after the mid-1980's there will be an escalating risk of supply disruptions and price increases and given that effective responses require long lead times, plans must be formulated now to ameliorate these risks. The most promising measures are conservation and the development of alternative liquid fuel supplies. The transport sector, as the largest consumer of oil energy, will provide a central focus for fuel conservation measures. A fuel conservation strategy should include measures encouraging more efficient design and use of cars in addition to an appropriate fuel pricing policy. Investment in public transport facilities, particularly in urban areas, is not likely to be cost effective as a fuel conservation measure.

Australia Department of Transport Monograph July 1978, 201 p., Figs., Tabs., 146 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 236824), Australian Road Research Board

48 194868 THE ENERGY EFFICIENCY OF THE SWEDISH TRANSPORTATION SYSTEM- AN INTERNAL COMPARISON. When discussing energy efficiency of the various modes of transportation one has to be very cautious about what to compare. It is obvious that there exist differences with respect to energy efficiencies, but differences also occur in the general patterns of utilization. This paper focuses on intercity transportation, of goods and passengers respectively. It contains a general discussion of what comparisons on energy efficiency ought to comprise. In short, any comparisons of the energy efficiencies of the various modes of transportation have to apply to transportation services that usually are, or at least could be, carried out by all the modes. It is also important that the energy forms used for propulsion are measured at compatible points in the applicable chains of transformations and transmissions. Further, any analyses are incomplete unless one includes energy requirements for manufacturing and maintaining carriers. Also energy requirements for constructing and maintaining infrastructures have to be considered. The results of some calculations are

demonstrated, which include all the aspects mentioned. Data that are used apply to the Swedish transportation system. The comparisons involve for freight transportation: truck, railway, and coastal shipping; and for passenger transportation: passenger cars, bus, railway, and airplane. It is difficult to draw some simple conclusions of the results obtained. The results indicate, however, that variations within each mode, under certain circumstances that are related to existing background data, are even greater than the differences between the modal averages with respect to energy efficiencies. (a) /TRRL/

Kordi, I (Royal Institute of Technology, Sweden) *Rail International* Vol. 9 No. 12, Dec. 1978, pp 951-956, 4 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 239104); ORDER FROM: ESL

48 195127 THE ENERGY-SAVING ELECTRIC CAR [Der stromsparende Triebwagen]. The three-phase electronic control motor is replacing the d.c. motor used for more than a century for suburban traffic. It has been tested since 1975 with trains in Nurnberg and since 1978 on the Vienna metro. The advantages of this motor are energy savings (up to 25%), smooth running, regenerative braking, less wear and easier maintenance because there are no collectors or carbon brushes. [German]

Nahverkehrspraxis Vol. 26 No. 10, 1978, 501 p. ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Arnold Verlag, Siegburg Strasse #5, 4600 Dortmund, West Germany

48 195410 TRANSPORTATION ENERGY CONTINGENCY PROJECT. CTS and the MIT Energy Laboratory have initiated a joint project with the US Department of Energy, to develop national energy contingency plans dealing with transportation. These plans would be put into effect in the event of a serious interruption of supplies, such as an oil embargo. The development of such plans was requested by Congress as part of the Energy Policy and Conservation Act of 1975. The project is taking a comprehensive approach to transportation contingency planning. Researchers are systematically examining a variety of contingency measures, the likely scenarios under which such measures would be taken, and the mechanisms and resources necessary to implement and enforce the plans. A set of criteria has been established to screen and evaluate possible contingency measures. These criteria refer to the following issues: impact on travel and fuel use, economic and social impacts, equitable distribution of effects, legal feasibility, resources required for implementation and political and public acceptability. Given special merit in the evaluation are strategies which could be used to achieve several aims at once, and those which would connect Federal contingency planning to related efforts already supported or underway in states and local areas. The project's evaluations have produced a group of related measures focussed on two major categories or travel: the work trip (or commuter travel) which is highly concentrated and can thus utilize public transit and ride sharing in place of private automobiles, and inessential (or discretionary) travel which can be eliminated or sharply curtailed without causing as much hardship.

CTS Newsletter 1979, pp 2-3

48 195473 DIRECT ENERGY USE IN URBAN PASSENGER TRAFFIC AND TRANSPORT IN THE NETHERLANDS AND THE UNITED KINGDOM. For a study on energy use by traffic and transport in the Netherlands a quantification is needed of the current energy consumption. In this report data are given of the 1972 direct (fuel use) consumption of energy in urban passenger traffic and transport in the Netherlands. The data of the United Kingdom are also included to make a comparison possible. The purpose of the quantification is to collect basic data on which governmental energy policies can be based. The kind of policies possible determined the level of disaggregation of the data to be collected. This level has been chosen as follows: type of energy; mode of transport; urban area and journey purpose. /TRRL/

Muijen, LGM ; Study & Information Center TNO for Applied Transp Monograph July 1978, n.p.; ACKNOWLEDGMENT: TRRL (IRRD 240231), Institute for Road Safety Research

48 195495 INNOVATIVE MANAGEMENT OF URBAN TRANSPORT FOR A BETTER ENVIRONMENT. This paper indicates that noise, fumes, the dangers of walking, the irregularity of bus services and other aspects of city life are increasingly the subject of complaints on the part of city dwellers. It is suggested that instead of building expensive metro systems and free-ways, the new approach to urban transport policy is to make better use of existing transport facilities—roads, buses, taxis, light rail etc.—through comprehensive and innovative management, building heavy infrastructure only as a last resort. Case studies carried out by OECD in Besancon (France), Brussels, Geneva, Gothenburg (Sweden), Groningen (Netherlands), London, Madison (USA), Nagoya (Japan), Nottingham (UK), Ottawa, Paris and Singapore which have adopted such comprehensive policies are reported. It is considered that scrutiny of these studies has made clear that management oriented urban transport policies, though local in inception, have implications for national policy-makers in many diverse fields—environmental protection, energy conservation, inner city revitalisation, institutional reform and finance. Reference is made to traffic management policies allied to traffic cells, zone and collar schemes, pre-metro systems, supplementary licensing and Nottingham's central zone and collar scheme is illustrated and discussed. Questions of energy use, revitalising inner cities, institutional adaptation and finance are also discussed. /TRRL/

Alexandre, A Averous, C *OECD Observer* No. 96, Jan. 1979, pp 33-37, 4 Fig., 2 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 240333)

48 195623 ENERGY IMPACTS OF TRANSPORTATION SYSTEMS MANAGEMENT ACTIONS IN NEW YORK, 1978-1980. This report documents the findings of a recent extensive study to determine the energy savings of TSM actions taken or planned in New York State of 1978-80. For those actions planned for implementation by 1980, both the direct energy savings and energy costs of construction and maintenance were quantified. The main determinants of an action's savings are its effect on vehicle-miles-of-travel and travel speeds. These changes were determined through various methods, including assignment-based techniques, traffic flow

approaches, use of transit fare and service elasticities, and case study reviews. For those categories of actions which result in a mode shift by vehicle drivers, the impact of the use of the car left home was included in the calculations. Energy costs resulted from the manufacture, construction, installation, operation and/or maintenance of the facilities and equipment required of each action. The analysis found net energy savings of 22.9, 25.5, and 28.1 million equivalent gallons of gasoline for 1978, 1979, and 1980, respectively. These figures represent approximately 0.5% of the total annual gasoline consumption in the State. Those actions which conserve the overall largest amounts of energy are: traffic operational improvements; ridersharing activities; amenities for transit passengers; computerized traffic control systems; improved transit marketing; reduced off-peak transit fares; and park-and-ride services. Certain other TSM actions, including demand responsive transit services and express bus services, have a negative net energy impact. On the average, energy costs represent approximately 15% of energy savings. Energy savings occur in all urban areas of the State with 65% of the savings found in the New York City Region. /Author/ Gross, JM Boyle, DK Cohen, GS Erlbaum, NS Kocis, MA Koepfel, KWP ; New York State Department of Transportation PRR 151, May 1979, 415 p., Figs., Tabs., Refs., 3 App.

48 195953 USING MATERIALS TO MUFFLE NOISE. Several case histories are presented, showing how appropriate use of select materials can markedly reduce noise levels of many products and, of course, its adverse effects. Extensive use of damping materials such as polyamide trim cloth, fiberglass batting, ABS plastic sheet, fiberglass insulation, and foams in helicopters, aircraft, Diesel cars and trucks, subway wheels, and office machines is shown to be quite effective in noise reduction.

Vaccari, JA *Product Engineering* Vol. 50 No. 2, Feb. 1979, pp 47-51; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 196784 ENERGY CONSUMPTION BY CATEGORIES OF AUSTRALIAN TRANSPORT. In this paper the results of a study, undertaken for the Bureau of Transport Economics, of the energy consumption by transport in Australia are reported. The role of the transport sector in the national energy economy are reviewed, and estimates are made of the primary energy consumption by its various modes and their sub-categories. Conclusions are drawn on the efficiency with which the various modes utilize primary energy in the performance of their transport task. /Author/TRRL/

Lee, JA (Melbourne University, Australia) Clark, N (Nicholas Clark And Associates) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 103-131, 12 Tab.; From: Electric Cars-Their Future Role in Urban Transport, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236964), Australian Road Research Board

48 196786 THE ENVIRONMENTAL IMPLICATIONS OF ELECTRIC VEHICLES. The paper discusses the environmental impact of electric vehicles in respect to pollutants, noise and radiation. A comparison based on in-depth

studies in the United States and Britain between electric vehicles and petrol-powered vehicles is presented. The effect on the environment of generating additional energy for electric vehicles is predicted and related to the total effects of electricity generation for all requirements. Reference is made to the trends in electricity generation and supply with the growth of consumption of electricity. /Author/TRRL/

Stenhouse, KJ (Queensland Electric Authority, Australia) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 193-219, 9 Fig., 6 Tab., Refs.; From: *Electric Cars-Their Future Role in Urban Transport*, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236973), Australian Road Research Board

48 196815 NATURE OF THE ENVIRONMENTAL PROBLEMS. The internal combustion engine is the major source of pollutants in urban air masses. Data from continuous monitoring programs are best expressed as an average pollutant concentration for some appropriate interval and follow a log normal frequency distribution. Accordingly, the frequency with which a selected concentration is exceeded can be calculated. Epidemiological studies in several countries have generated similar air quality standards and these are expressed as a limit for frequency of occurrence of concentration averaged over a stated interval. Results of monitoring programs in Canberra, Sydney and Melbourne are compared with international standards. Approaches to computer-simulation of the urban air-mass for Canberra are discussed and the future pollutant levels predicted. /Author/TRRL/

Daly, NJ Steele, LP (National University of Australia) ; Australian Government Publishing Service, (0 642 01790 5) 1975, pp 151-169, 3 Fig., 1 Tab.; From: *Electric Cars-Their Future Role in Urban Transport*, Conference Papers, Canberra, 1975.; ACKNOWLEDGMENT: TRRL (IRRD 236965), Australian Road Research Board

48 197007 EFFECTS OF TRACK CONSTRUCTION ON VIBRATION AND NOISE IN THE GLASGOW UNDERGROUND. The change from traditional ballast to concrete in the Glasgow Underground will give substantially increased noise levels. The article describes tests carried out on a section of slab track and makes suggestions for alleviation.

Brown, J Davidson, R *Railway Engineer International* Vol. 4 No. 2, Mar. 1979, pp 43-46, 12 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: ESL

48 197124 ENERGY INTENSITY OF VARIOUS TRANSPORTATION MODES. This paper is an overview of the existing literature related to the energy intensity of various transportation modes, including intracity (automobiles, buses, automated guideway transit systems, vans, and heavy and light rail transit) and intercity (airplanes, automobiles, buses, trucks, rail, waterways, and pipelines) modes for passenger and freight movement. Energy intensity has been correlated with operating conditions such as speed, load factor, and type of commodities being moved. Statistical and engineering approaches have been used to estimate energy intensity. Energy intensity values vary considerably according to operating conditions, types of hardware,

trip characteristics, load factors, and types of commodities being shipped. Suggested energy intensity values for several transportation modes are discussed. /Author/

Mittal, RK (Aerospace Corporation) *Transportation Research Record* No. 689, 1978, pp 25-31, 11 Fig., 3 Tab., 8 Ref.; This paper appeared in TRB Research Record No. 689, Energy Efficiency of Various Transportation Modes.; ORDER FROM: TRB Publications Off

48 197125 ONE APPROACH TO LOCAL TRANSPORTATION PLANNING FOR NATIONAL ENERGY CONTINGENCIES. Because of the uncertainties associated with the nation's petroleum supply and the possible effects of federally imposed fuel contingency measures on transportation, the steering committee of the Metropolitan Planning Organization in the north central Texas region directed the development of a plan to minimize the impact of federal fuel contingencies on transportation in the Dallas-Fort Worth metropolitan area. This paper summarizes the planning effort that resulted. The major objective of the plan was to minimize the impact of fuel allocation and rationing on local mobility, especially work trips, and thereby to reduce the adverse effects of a near-term energy shortage on the local economy. Through an examination of these federal regulations, the impact of the 1973/1974 Arab oil embargo, and projections of future petroleum supply and demand characteristics, alternate fuel shortage scenarios were developed and transportation-related problems identified. Potential solutions of these problems were analyzed as to their effectiveness and applicability. A set of recommendations for actions by local governments, public transit systems, and the private sector was developed from the results of these analyses. /Author/

Barker, WG Cooper, LC (North Central Texas Council of Governments) *Transportation Research Record* No. 689, 1978, pp 31-37, 6 Fig., 3 Tab., 5 Ref.; This paper appeared in TRB Research Record No. 689, Energy Efficiency of Various Transportation Modes.; ORDER FROM: TRB Publications Off

48 197126 ENERGY CONSUMPTION OF THE JOURNEY TO WORK WITH AND WITHOUT A SUBURBAN RAPID TRANSIT LINE. In an effort to provide an improved framework for evaluating alternative transportation systems with respect to energy conservation, the Philadelphia-Lindenwold rail rapid transit line was studied. The energy consumed by journey-to-work trips on the Lindenwold Line in 1970—including not only the energy required to operate the line but also the energy required for access and egress—was estimated (along with the cost of the fuel consumed by these trips). The energy that would have been consumed by these trips if the former modes of travel were used was also estimated. Comparison of these two amounts of energy consumption provides a basis for evaluating the energy conservation potential of the Lindenwold Line. It is found that (a) the slightly indirect nature of the park-and-ride mode results in longer travel distances than did the automobile and bus modes it replaced and (b) the lower energy intensiveness of park-and-ride relative to the automobile does not offset these longer travel distances because many users of the line are

former bus riders. Thus, the park-and-ride system consumes slightly more energy than did the former travel modes. It is concluded that the added travel distance of park-and-ride systems and the extent to which users of such systems are attracted from buses rather than from automobiles should be considered in evaluating rapid transit park-and-ride systems with respect to energy conservation. /Author/

Boyce, DE Ferris, ME (Illinois University, Urbana) Nguyen, K (World Bank) *Transportation Research Record* No. 689, 1978, pp 38-44, 3 Fig., 4 Tab., 9 Ref.; This paper appeared in TRB Research Record No. 689, Energy Efficiency of Various Transportation Modes.; ORDER FROM: TRB Publications Off

48 197148 EFFECT OF SMALL-SCALE TRANSIT IMPROVEMENTS ON SAVING ENERGY. This report examines the energy effects of small-scale transit improvements in New York State's 8 Metropolitan areas. Actions included in the TSM plans of the 8 MPOs are analyzed for their effects on ridership, mode shifts and energy savings, as well as the energy costs of development, implementation and operation. Each of eleven transit-related TSM actions is analyzed separately. These transit improvements result in average annual energy savings of slightly under 7 million equivalent gallons of gasoline over the period 1978-80. This is about 0.1% of the total annual gasoline consumption in New York State, but is over 2.6% of transit energy consumption in the 8 metropolitan areas. When demand-responsive services, which have high energy costs associated with them, are excluded, the average annual savings increase to 8.3 million equivalent gallons of gasoline, or 3.1% of transit energy consumption. Small-scale transit improvements can thus play a role in the energy conservation efforts in New York State but cannot be expected to have a major impact on the State's energy situation. /Author/

Boyle, DK ; New York State Department of Transportation PRR 153, June 1979, 34 p., 3 Tab., 40 Ref.

48 197150 TSM ACTIONS: A STUDY OF THE ENERGY COSTS. While TSM actions often save energy, primarily through diversion, they also incur energy costs of construction, maintenance and operation. This paper examines the magnitude of such costs. Selected TSM actions, scheduled for implementation in New York State are examined to determine the aspects of the projects that generate energy costs. Appropriate energy factors (equivalent gallons of gasoline/\$ of project cost) are given for many types of actions and there is a brief discussion of procedures for determining these factors. Estimates are provided for the cost of typical TSM projects. On the average energy costs represent approximately 15% of energy savings with actions such as encouragement of ridesharing having the smallest energy costs and actions resulting in additional transit VMT the largest. /Author/

Cohen, GS ; New York State Department of Transportation PRR 155, June 1979, 26 p., 2 Tab., 14 Ref., 1 App.

48 197151 FORECASTING ENERGY IMPACTS OF TSM ACTIONS: AN OVERVIEW. This report summarizes the findings of a recent extensive study to determine the energy savings of

TSM actions taken or planned in New York State for 1978-80. For those actions planned for implementation by 1980, both the direct energy savings and energy costs of construction and maintenance were quantified. The main determinants of an action's savings are its effect on vehicle-miles-of-travel and travel speeds. These changes were determined through various methods, including assignment-based techniques, traffic flow approaches, use of transit fare and service elasticities, and case study reviews. Energy costs resulted from the manufacture, construction, installation, operation and/or maintenance of the facilities and equipment required for each action. The analysis found net energy savings of 22.9, 25.5, and 28.1 million equivalent gallons of gasoline for 1978, 1979, and 1980, respectively. These figures represent approximately 0.5% of the total annual gas line consumption in the State. Those actions which conserve the overall largest amounts of energy are: traffic operational improvements, ridesharing activities; amenities for transit passengers; computerized traffic control systems; improved transit marketing; reduced off-peak transit fares; and park-and-ride services. Certain other TSM actions, including demand responsive transit services and express bus services, have a negative net energy impact. On the average, energy costs represent approximately 15% of energy savings. Energy savings occur in all urban areas of the State with 65% of the savings found in the New York City region. /Author/

Gross, JM ; New York State Department of Transportation PRR 156, June 1979, 23 p., 5 Tab., 17 Ref.

48 197272 METROPOLITAN WORK-TRIP ENERGY CONSUMPTION PATTERNS. This study examines the patterns of energy consumption for journeys-to-work in a metropolitan area and demonstrates the relationship between these patterns and urban structure. The study also identifies population and geographic variables that affect energy use. Cartographic and statistical analyses are performed on census data relating to distances of work trips and choice of mode in the Chicago, Illinois, area. A review of the literature on the related studies is given. Explanations of the mapping and regression techniques are provided, along with an analysis of the study results.

Soot, S (Illinois University, Chicago) Sen, A *Traffic Quarterly* Vol. 33 No. 2, Apr. 1979, pp 275-295, 14 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 197420 BART'S OPERATING ENERGY CONSUMPTION. BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco, Oakland, and other cities and communities, is the first regional-scale rapid transit system to open in the United States in over 50 years. Service began in 1972. This report is one of a series assessing the impact of BART on transportation and travel in the Bay Area. The report gives information on BART's operating energy consumption and incorporates an earlier BART Impact Program Report ('Analysis of BART's Energy Consumption for Interim System Operations', June 1975). The updated report was presented as a paper to the January 1977 annual meeting of the Transportation Research Board. It gives a historic analysis of BART'S operating energy consumption per

passenger-mile and per car-mile. BART's traction energy consumption is compared with that of (1) other rail transit systems, and (2) bus and automobile, in terms of equivalent gallons of petroleum fuel. BART's impacts on total energy consumed by BART, bus and automobile for transbay travel between San Francisco and Oakland is analyzed using data on travel patterns with and without BART. Although BART carries 20% of all passenger-trips in the transbay corridor, it has reduced overall energy consumption by only 5%. This saving is relatively small because, although BART consumes less energy per passenger-mile than automobile, it consumes more than bus. BART's ridership is drawn about equally from automobile and bus. BART has also had the effect of inducing new trips by automobile.

Sherret, A ; Metropolitan Transportation Commission, Peat, Marwick, Mitchell and Company, Department of Transportation, Department of Housing and Urban Development DOT-BIP-WP-14-3-75, Jan. 1977, 58 p.; Prepared by Peat, Marwick, Mitchell and Co., San Francisco, CA. Report on BART Impact Program, Public Policy Project. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Color illustrations reproduced in black and white.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-294839/6ST, DOTL NTIS

48 197522 URBAN RAIL NOISE ABATEMENT PROGRAM: A DESCRIPTION. This report presents the background, current activities, and future plans for the Urban Rail Noise Abatement Program. This program, sponsored by the Office of Technology Development and Deployment of the Urban Mass Transportation Administration (UMTA) was initiated in 1972 and has been technically managed since its inception by the Transportation Systems Center. The problem of urban rail noise and vibration is described and the rationale for the UMTA funded program is given. The body of the report presents a definition of the program objectives, a discussion of the program organization, and a description of past, current, and future program activities. Major accomplishments of the program to date are listed in the final section.

Kurzweil, LG Cobb, WN ; Transportation Systems Center, Urban Mass Transportation Administration DOT-TSC-UMTA-79-23, UMTA-MA-06-0099-79-1, Mar. 1979, 26 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-295545/8ST, DOTL NTIS

48 197920 ENERGY CONSERVATION: TRANSPORTATION. VOLUME 1. 1964-1977 (A BIBLIOGRAPHY WITH ABSTRACTS). The potential to achieve fuel conservation through technology, management, and planning is discussed. Transportation areas covered include urban mass transit, aviation, marine transportation, automobiles, trucks, and railroads. A few abstracts discuss public attitudes concerning conservation measures. (This updated bibliography contains 250 abstracts, none of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service Bibliog. June 1979, 257 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0557/3ST

48 198273 NOISE RATING CRITERIA FOR ELEVATED RAPID TRANSIT STRUCTURES. The purpose of this report is to recommend criteria for rating the noise radiated from elevated rapid transit structures during train passages, so that different types of structures can be inter-compared with respect to their noise impact on the immediate neighborhood, or alternatively, so that noise abatement programs for elevated structures may be developed on a rational basis. In developing these criteria, the report also summarizes information that is applicable to the rating of rail transportation noise in general. The report examines the requirements for descriptors that would be suitable for rating elevated structure noise, reviews existing noise ratings, concludes that the only suitable candidates are the average sound level (Leq) and the day-night average sound level (Ldn) and examines and resolves the possible disadvantages of these choices. The report also reviews studies that have been made to determine the impact of rail transportation noise on the community, compares subjective response to rail noise with that due to road traffic and aircraft noise, and finds these responses to be nearly the same. Finally, the report delineates and illustrates application of the so-called Fractional Impact Method to assessment of the community impact of elevated structure noise, based on the results of numerous social surveys on noise, and widely used by the Environmental Protection Agency for environment impact statements.

Schultz, TJ ; Bolt, Beranek and Newman, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0099) Intrm Rpt. DOT-TSC-UMTA-79-25, May 1979, 146 p.; Contract DOT-TSC-1531; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-297419/4ST, DOTL NTIS

48 198475 ENERGY CONSERVATION: TRANSPORTATION. VOLUME 2. 1978-MAY, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS). The potential to achieve fuel conservation through technology, management, and planning is discussed. Transportation areas covered include urban mass transit, aviation, marine transportation, automobiles, trucks, and railroads. A few abstracts discuss public attitudes concerning conservation measures. (This updated bibliography contains 69 abstracts, 52 of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service Bibliog. June 1979, 75 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0558/1ST

48 198828 ENERGY CONSERVATION AND TRAVEL BEHAVIOR. Americans use one quarter of all energy consumed in the U.S. in automobile passenger travel. This paper describes the ways Americans could reduce this energy consumption, and, using empirical data, describes the extent to which these energy-conserving behaviors are or are not being practiced. It is concluded that Americans appear to be making some progress in conserving energy in such areas as buying more-efficient cars and driving slower on the highways, but little or no progress in such other important areas as carpooling, using public transit, and reducing vacation travel. This challenge is of enormous international and domestic economic and political importance. (ERA citation 04:034023)

Milstein, JS ; Department of Energy Oct. 1977, 10 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; DOE/TIC-10035

48 198833 ENERGY CONSERVATION: POLICY ISSUES AND END-USE SCENARIOS OF SAVINGS POTENTIAL. PART 6. END-USE ENERGY CONSERVATION DATA BASE AND SCENARIOS. End-use energy conservation scenarios discussed show the combined effect on energy consumption of implementing a number of conservation measures. The scenarios serve two overall purposes. First, they provide a contrast of a series of nonconservation cases based on assumption of growth rate and appliance saturation with conservation cases based on similar assumptions. Second, they provide detailed data and documentation for the savings potential for each conservation measure, the stock affected, and the calculation of total energy savings. Included are conservation measures of both a behavioral nature and technological nature. Quantitative estimates of energy consumption and conservation potential in the major residential and commercial end uses, transportation modes, and industrial subsectors have been made. For each measure and for the total scenario, a base case and a conservation case were computed. The subsectors for which the scenarios are constructed are: residential (electric and gas appliances); commercial end uses (heating, cooling, water heating, lighting); building types retail-wholesale, office, auto-repair, education services, health services, hotel-motel); transportation (auto, truck, van, airplane, bus, railway, motorcycle); freight (truck, rail, air); and industrial subsectors (17 industries). (ERA citation 04-030518)

Department of Energy, Lab.*Department of Energy. Sept. 1978, 398 p.; Contract W-7405-ENG-48; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; LBL-7896(Pt.6)

48 199069 GUIDELINES FOR ASSESSING THE ENVIRONMENTAL IMPACT OF PUBLIC MASS TRANSPORTATION PROJECTS: EXECUTIVE SUMMARY. The report is a summary of a five (5) volume set of Notebooks designed to assist people responsible for the environmental assessment of public mass transportation projects. This summary introduces the reader to the purpose, organization, and content of the Notebooks, and to the relationship between the technical guidance presented in this series and the administrative guidance and requirements presented in UMTA, DOT, CEQ, and other Federal documents. The summary serves as an introduction for the potential user of the Guidelines for Assessing the Environmental Impact of Public Mass Transportation Project (Report No. DOT-P-79-00-003).

Lerner, AC ; Voorhees (Alan M) and Associates, Incorporated, Asst Secretary for Policy & International Affairs DOT/P-79/00/003, Apr. 1979, 23 p.; See also report dated Apr 79, PB-299 697.; Contract DOT-PS-90484; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299696/5ST, DOTL NTIS

48 199070 GUIDELINES FOR ASSESSING THE ENVIRONMENTAL IMPACT OF PUBLIC MASS TRANSPORTATION PROJECTS. NOTEBOOKS 1-5. The report is designed to assist people responsible for the

environmental assessment of public mass transportation projects with an emphasis on major fixed guideway investments. Under each of nineteen principal components of environment, the nature of impact is defined; presently available methods for impact projection are described; data needs are summarized; and measures to mitigate adverse impact are examined. General principles applicable to the environmental assessment process are discussed. An extensive bibliography is furnished.

Lerner, AC ; Voorhees (Alan M) and Associates, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. DOT/P-79/00/001, Apr. 1979, 775 p.; See also report dated Apr 79, PB-299 696. Prepared in cooperation with Daniel, Mann, Johnson and Mendenhall, and Hammer, Siler, George Associates.; Contract DOT-OS-80042; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299697/3ST, DOTL NTIS

48 199096 PATH ENERGY CONSERVATION STUDY. The national policy on conservation of energy and related resources brought about by the energy crisis of 1973 prompted the Port Authority Trans-Hudson Corporation (PATH) to develop an energy conservation program. In the accomplishment of the technical study, PATH was to review and evaluate current energy conservation practices instituted on the PATH system and to perform extensive operational planning and comparative analysis required for the implementation of additional potential energy savings measures. This report discusses in detail the five tasks which were used in carrying out the work required in the project: (1) investigation of current practices; (2) potential service modifications; (3) rail car power investigation; (4) potential long-range improvements; and (5) preparation of a final report describing the work accomplished during the project.

Port Authority of New York and New Jersey, Urban Mass Transportation Administration, (UMTA-IT-09-0069) Final Rpt. UMTA-IT-09-0069-79-2, Nov. 1978, 169 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299143/8ST

48 199098 ALLEVIATION OF PRESSURE PULSE EFFECTS FOR TRAINS ENTERING TUNNELS. This study was carried out for the Transportation Systems Center of the U.S. Department of Transportation on behalf of the Urban Mass Transportation Administration in order to determine to what degree it is possible to attenuate the effects of pressure pulses on the passengers in trains entering tunnels. The emphasis of this study is on the approach of modifying the normal, abrupt entry portal of the constant diameter single-track tunnel. In order to understand this approach, which requires the tailoring of a tunnel portal, it was first necessary to have an analytical model in which confidence exists in its capability to predict realistic pressure pulse histories of trains entering tunnels having porous and/or flared entry portals. To accomplish this, the best available theoretical information along with small-scale laboratory experiments were used to update an existing computer program. Then, this program was used to demonstrate effective portal configurations. Although reasonable modifications to the tunnel entrance portal may not decrease the magnitude of the pressure

rise, they are very effective in reducing the discomfort to the human ear by decreasing the rate of pressure rise to what the normal ear can accommodate. A brief qualitative comparison was made of this portal modification approach with other approaches: decreasing the train speed during the tunnel entry and sealing the cars. The optimum approach, which is dependent upon the conditions and requirements of each particular rail system, is likely to be the portal modification one for the subway transit system.

Dayman, BJ Holway, HP Hammitt, AG Tucker, CE, Jr Vardy, AE ; Jet Propulsion Laboratory, Transportation Systems Center, Urban Mass Transportation Administration Final Rpt. DOT/TSC/UMTA-79/28, UMTA-MA-06-0100-7910, June 1979, 235 p.; Contract DOT-RA-N-02-612-0397; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-299155/2ST

48 260271 ENERGY USE. Petroleum supplies 96% of the fuel needed by the transportation industry. Automobiles consume 55% of transportation energy with trucks second, 21%, aircraft 8% and railroads 3.3%. Most freight is moved by trucks rather than rail. The use of aircraft for passengers and freight has increased. The automobile is still the primary mode of passenger transportation. Transportation does not follow the most energy efficient path. The government aggravates the problem by favoring air and highway transport and not adequately overseeing emission control. Actions that can be taken to ease the problem include increased public awareness of energy conservation needs and transportation planning via industry, citizens groups and national programs. Promotion must be given to energy efficient transportation. A decrease in transportation demand would lighten the drain on energy. An energy efficient scenario that would reduce transportation energy by 50% anticipates shifting half the intercity freight to rail rather than truck, half the intercity passenger traffic carried by air and one third carried by automobile to bus and train and half of urban transportation shifted to mass transit. With good leadership, the support of congress and full citizen participation the task of becoming energy independent is possible.

Patterson, AG ; Western Association of State Highway & Transp Off Proceeding June 1974, pp 2-14; This report is from the WASHO Conference held in Portland, Oregon from June 2-6, 1974.

48 261577 DIESEL EXHAUST EMISSION CONTROL PROGRAM. The purpose of the report was to demonstrate a prototype of the atomic International diesel exhaust control system in a Southern California Rapid Transit District bus (a flexible coach equipped with a Detroit Diesel 6V-71N engine). The program objectives were to meet the California 1975 heavy-duty vehicle standards and to establish the economics of the system. Emission reduction objectives were attained except for the reduction of NO sub x. To meet California requirements of less than 5 gm/B-Hp-Hr of combined HC and NO sub x, larger residence times were required. The resulting muffler size may not be compatible with bus installation constraints. Alternative technologies of NO sub x control under development by diesel engine manufacturers may prove to be more cost effective. Advantages and disad-

vantages of the Atomics International diesel exhaust emission control system (DEEC) in vehicle application are discussed. Recommendations are offered and conclusions reached. Tables and figures are numerous. Appendices include the tabulation of laboratory test data, muffler performance test reports provided by the California Air Resources Board, Air Resources Laboratory, and a market analysis for the DEEC muffler.

Sudar, S Grantham, L ; Atomics International, (CA-06-0035) Final Rpt. UMTA-CA-06-0035-74-1, Jan. 1974, 150 pp; ACKNOWLEDGMENT: UMTA; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-234752/AS

48 261665 TRANSPORTATION AND THE ENERGY CRISIS. The energy crisis of 1973 had a major effect on transportation. The authors cite countermeasures and alternatives, such as mass transit and carpooling. Statistics of energy savings from these measures are given. Environmental standards, new energy sources and small cars are commented upon, and some suggestions are put forth concerning necessary research.

Cook, KE Blake, SE *Transportation Research News* No. 55, June 1974, pp 17-19; ORDER FROM: TRB Publications Off

48 261680 MOBILITY IN THE ENERGY ERA. Energy and conservation was one of the topics touched upon by the Chairman of the General Motors Corporation in his remarks to the 15th Highway Transportation Congress. He stressed the fact that while new sources of energy must be explored, those already existing must not be wasted. A balance must be achieved between energy conservation measures and the undesirable side-effects that might evolve. In the area of highway safety, much work still needs to be done to improve travelling safety on the highways. The reduction in accidents that occurred as a result of the lowering of speed limits in an effort to conserve gasoline must not be taken as an indication that safety measures can receive less attention. Public transportation has been revived in recent years and projects for the future are concerned with as many and the best modes possible to serve the needs of the public. The energy crisis has forced changes in the automobile industry, and General Motors has responded to the public's demand for more gasoline-economic cars, but at the same time pointing out the importance of having a choice of transportation mode. Growth in mobility will continue in the years ahead, and the beneficial effect of the energy crisis will be more careful planning and conservation.

Gerstenberg, RC (General Motors Corporation) Highway Users Federation for Safety and Mobility Conf Paper May 1974, 7 pp; Presented at the 15th Highway Transportation Congress, Washington, D.C., May 8, 1974.

48 261684 ENERGY, MANPOWER, AND THE HIGHWAY TRUST FUND. This article presents the net impacts on energy consumption and manpower that are likely to result from a relocation of the projected 1975 highway trust fund (\$5 billion) to six other types of government programs: railroad and mass transit development, educational facilities construction, water and waste treatment facilities construction, the law enforcement program, national health insurance

program, and tax relief program. Energy conservation could be achieved by reinvesting the highway trust fund in any of several other alternative federal programs. Total employment would increase in each alternative program examined. For example, if construction monies were shifted from highways to railroads, the energy required for construction would be reduced by about 62 percent and employment would increase by 3.2 percent. The consequences, in terms of energy consumption and employment, of shifting from car and truck transportation to railroad transportation in 1963 are also calculated.

Bezdek, R Hannon, B *Science* Vol. 185 No. 4152, Aug. 1974, pp 669-675

48 261688 GUIDELINES TO REDUCE ENERGY CONSUMPTION THROUGH TRANSPORTATION ACTIONS. This study has been put together as an aid to local planners, traffic engineers and administrators in incorporating energy conservation into the planning process especially for short range transportation planning. Ten major groups of transportation related actions to reduce energy consumption are discussed: measures to improve the flow of high occupancy vehicles, to improve total vehicular traffic flow, to increase transit patronage, to encourage use of walk and bicycle modes, to improve the efficiency of taxi service and goods movement, to restrict prices, to reduce the need to travel and transportation and energy restriction measures. The interrelationships between these actions are analyzed; what works well together and what cancels each other out. Evaluation criteria include; short lead time, minimal institutional obstacles to implementation, favorable public reaction and high energy reduction. Three sample packages are presented for different urban areas. Some of the conclusions are: carpool actions and restriction of the quantity of gasoline sales are effective measures for any size city. Carpooling may overlap with transit actions however carpooling is often easier to implement. Incentive type actions are also effective because of easy implementation. Improvements in vehicular flow can be counter productive. Taxi and truck related actions are only applicable in large urban areas. Local policies are always a factor in implementing energy conservation. Tables for this data are given.

Voorhees (Alan M) and Associates, Incorporated, (IT-06-0092) UMTA-IT-06-0092-74-2, May 1974, 132 pp, 17 Fig., 44 Ref.; Prepared for Urban Mass Transportation Administration, Department of Transportation.; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-235983

48 261697 TASSIM: A TRANSPORTATION AND AIR SHED MODEL, VOLUME 1. CASE STUDY OF THE BOSTON REGION. The TASSIM model integrates an urban transportation planning model, vehicle emission factors, and simple air diffusion models in a simulation framework that can be used to analyze the air quality effects of transportation policies. The model is spatially disaggregated, and it is compatible with data sources available in many metropolitan areas. This volume briefly describes the structure of the model and then analyzes several model applications that simulate for Boston the air quality effects of transportation control land use, and stationary source policies. The transportation control policies are evaluated in a cost effective-

ness framework. The final sections consider possible extensions of the model and outline the model's computational aspects.

Ingram, GK Fauth, GR ; Harvard University May 1974, 107 pp; Contract CN-DOT-OS-30099; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS, Repr. PC, Microfiche; PB-232933/2

48 262374 TASSIM: A TRANSPORTATION AND AIR SHED SIMULATION MODEL. VOLUME 2: PROGRAM USER'S GUIDE. The TASSIM model integrates an urban transportation planning model, vehicle emission factors, and simple air diffusion models in a simulation framework that can be used to analyze the air quality effects of transportation policies. The model is spatially disaggregated, and it is compatible with data sources available in many metropolitan areas. Designed to aid others in using TASSIM, this volume describes the computer programming steps in the model, the input data required by various subprograms, and the procedures used to calibrate the model to a metropolitan area. The volume also includes an outline of the programming changes needed to simulate various policies, and a listing of the model's FORTRAN code. Volume 1 describes and analyzes the simulated effects of transportation control, land use, and stationary source policies in Boston, generated with the TASSIM model.

Ingram, GK Fauth, GR Kroch, EA ; Harvard University Final Rpt. DOT-OS-30099-6, May 1974, 197 pp, 11 Fig., 34 Tab., Refs., 2 App.; See also Volume 1: Case Study of the Boston Region. DOT-OS-30099-5.; Contract DOT-OS-30099; ORDER FROM: NTIS, Orig. PC

48 262693 HIGHWAYS AND ENVIRONMENT: A STRATEGIC OPPORTUNITY. The opportunities open to highway engineers planning for urban areas are discussed. The scope for improved co-ordination between architectural and engineering skills, and a need for more effective communication between engineers and the public is stressed. Potential highway development cannot be considered in isolation and comprehensive analyses of traffic, economic and environmental factors are as important as route location and pavement design. Planners should demonstrate clearly the case for channelling vehicles onto routes catering adequately to their needs, with commercial traffic meriting as much attention as the commuter. As the efficiency of a road network is normally controlled by its inter-sections, continuity and consistency of design are as important as capacity. The need for a better balance of public and private traffic is recognised. While fixed-track "rapid transit" systems will be of value in selected areas in the future, most public transport will still be dependent on roads. Critical modes will be formed at interchanges between different modes, with the generation of major traffic flows. The police should be involved in discussions of design and methods of dealing with traffic problems. Highway engineers should demonstrate the economic and environmental value of the total transportation approach to the movement of people and goods.

Williams, TEH (Southampton University) *Consulting Engineer* Vol. 38 No. 1, Jan. 1974, pp 31-3; ACKNOWLEDGMENT: TRRL (IRRD 208959)

48 262700 HOW SHOULD WE RESPOND TO ENVIRONMENTAL ISSUES IN TRANSPORTATION. This paper outlines some basic principles concerning the importance of social and environmental factors in transport planning, and indicates the changes required in professional organisations and practice to comply with these principles. The planning of a major airport is used as an example to explain the application of the principles, which are also valid for highways, rapid transit and other types of transport. /TRRL/ [Italian, French/German]

Manheim, ML (Massachusetts Institute of Technology) *Automobilismo E Automobilismo Industriale* No. 5-6, May 1973, pp 8-27, 11 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 208662)

48 262951 KINETIC ENERGY STORAGE FOR MASS TRANSPORTATION. The flywheel can provide highly acceptable energy density levels that favorably influence vehicle weight and operating range. At the same time, the flywheel can provide high levels of power to propel vehicles with desirable high-acceleration performance. The overall conclusion of the flywheel study and demonstration programs is that flywheel energy storage in flywheel hybrid vehicles and pure flywheel vehicles is a practical means of propulsion suitable for many types of urban vehicles. The specific energy of present-day flywheels is sufficient to make flywheel-only vehicles practical for urban route applications with ranges up to 30 km (18.6 mi). Flywheel/heat-engine hybrid vehicles are entirely feasible for family and commuter-car applications.

Lawson, LJ *ASME Journal of Mechanical Engineering* Vol. 96 No. 9, Sept. 1974, pp 36-42

48 263211 ENVIRONMENTAL PROTECTION AGENCY RULES FOR NEW "INDIRECT SOURCES" EMPHASIZE TRAFFIC IMPROVEMENTS. EPA's rules for "Review of Indirect Sources", published in the Federal Register recently, make it mandatory that all proposed facilities that will attract substantial numbers of automobiles and thus indirectly pollute the air, must be reviewed. This article discusses the types of facilities that will come under scrutiny, and the factors, such as location and number of users that will be important. Types of chemical pollutants and delegation of responsibility are also discussed. Other forms of control of indirect sources are included; strict control in the design of new towns, methods of providing smooth traffic flow from congested areas and alternate forms of transit.

Reed, MF, Jr ; Highway Users Federation for Safety and Mobility Apr. 1974, 6 pp

48 263773 ESTIMATES OF POLLUTION FROM US NONFREIGHT HIGHWAY TRANSPORTATION. Forecasts to the end of the century on the future use of resources and the future generation of various pollutants as a result of different proportions of the use of private automobiles and public transportation are made. The effects are extended to supporting industries such as steel, cement and coal. Relative transportation pollution costs for an urban area are modeled. It is shown that even a 50% diversion of automobile commuting to bus commuting would not have a dramatic effect on overall resource utilization and pollution, but would have a marked effect on the heavy pollution costs of

central cities. A system of road-use charges is proposed. (Author)

Wilson, DG *Intl J Environmental Studies* Vol. 6 No. 1, Mar. 1974, pp 35-40

48 263900 IMPLICATIONS OF OIL RESOURCES SHORTAGE FOR URBAN TRANSPORT INVESTMENT. The paper describes an investigation, recently commenced, into the implications for urban passenger transport investment of an oil resources shortage. The investigation is financed by the U.K. Science Research Council. The paper has three main sections, each devoted to one of the objectives of the investigation namely: The effects of higher crude oil prices on passenger travel in urban areas; The energy consumption characteristics of existing and potential urban passenger transport systems; The implications for investment in urban passenger transport of an oil resources shortage. The third objective is being examined for actual investment proposals in Merseyside Metropolitan County Council, England, in co-operation with the local transport and planning authorities. Conclusions are drawn from discussion of these objectives. Finally the implications for urban passenger transport of the oil resources shortage is discussed briefly within the perspective of the division of financial resources between roads and public transport at urban level, and between transport and other sectors at national level. /Author Abstract/

Maltby, D (Salford University, England) *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 277-291, 19 Tab., 14 Ref.

48 263902 THE IMPACT OF THE ENERGY CRISIS ON AMERICAN CITIES BASED ON DISPERSION OF EMPLOYMENT, UTILIZATION OF TRANSIT, AND CAR POOLING. The impact of the energy crisis on transportation within selected American cities is analyzed. Using Journey to Work data from the 1970 U.S. Census of Population, changes are estimated in car pooling and in the use of alternative transportation modes for commutation travel. Suggestions are provided for the analysis of specific cities, and transportation planning in the Baltimore, Maryland, area is reviewed in some depth. Conclusions are drawn that, on average, limited energy shortfalls (of approximately 10 percent) should have no severe adverse impact on commutation activity. /Author Abstract/

Sagner, JS (Southern Illinois University) *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 307-316, 8 Tab., Refs.

48 263903 URBAN TRANSIT RIDERSHIP IN AN ENERGY SUPPLY SHORTAGE. The capabilities of a transit company to provide service is usually based on the existing commuter traffic. Rapid increases in commuter ridership will cause transit service to deteriorate. The transit companies' ability to respond to increased ridership is controlled by the length of travel by the new riders, the availability of additional buses and trained staff. This study found that under a situation where fuel was allowed to price itself in a free market, the transit company could face a situation of declining revenue per bus mile with increasing patronage. This comes about because those with longer commuter trips find it more

advantageous to use transit. The transit patronage increase to be expected with a five percent reduction in fuel supply is similar to that experienced by a doubling of fuel price. The more uniform change in the trips made throughout the urban area will probably not alter the average length of trip. The transit company should be able to keep the same ratio of passenger revenues to operating costs. The models used to estimate the changes in transit ridership appear to be generally applicable. The model used for the pricing scheme is similar to one used in the Tyneside-Westside Transportation Study. The experience of Seattle's Transit System over the last year and a half tends to confirm the estimates found in the gasoline rationing model. /Author Abstract/

Navin, FPD (British Columbia University, Canada) *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 317-327, 8 Fig., 7 Tab., Refs.

48 263904 A SYSTEM MODEL FOR PREDICTING THE EFFECT OF ENERGY RESOURCES ON URBAN MODAL SPLIT. Using regional and state level data, including observations during the recent energy crisis, the methodology and first generation of a system model for predicting impact levels of fuel shortages upon modal split are reported. The data to such a system model has the characteristics of an input disturbance in a steady-state trend. Of importance is the long term effect if the disturbance becomes a regular input. The specific case reported is an analysis in the Tucson (Arizona) region of the fluctuations in travel demand in relation to population, economic condition and fuel availability indicators. Of major significance is the modeling techniques' ability to detect differential shifts to public transit during the recent reduction in gasoline availability. /Author Abstract/

Nizlek, MC Duckstein, L (Arizona University) *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 329-334, 4 Tab., Refs.

48 263906 THE EFFECTS OF ENERGY PRICE ESCALATIONS ON URBAN TRANSIT BALANCE. The forthcoming shortages in transit fuels and electricity resources were the basis for forecasts that bus fuel prices will quadruple by 1980, while transit electricity will have doubled in cost. One effect of these energy price escalations on urban transit planning is to shift downward the economic balance between buses-on-busways and trains-on rails, from the current 12,000 passengers per hour to half of this value by the beginning of the 1980's. A program is proposed to achieve better balanced, all-electric bus/rail urban transit systems that minimize capital and energy consumption. /Author Abstract/

Hoffman, GA (University of Southern California) *Transportation Research* Vol. 8 No. 4/5, Oct. 1974, pp 343-348, 4 Fig., 2 Tab.

48 263919 ENERGY, ALUMINUM AND THE AUTOMOBILE. The aluminum industry is attacked because of its large consumption of electricity. While it takes a large amount of energy to produce aluminum, this material, because of its light weight reduces the need for energy when used in the manufacture of transportation vehicles. Using aluminum instead of steel in parts of an automobile that carry less load (hood, trunk, lid, doors, front fender etc.) would cut down the

average weight of a car from 3,600 lb to 2,925 lb resulting in an increase in fuel economy. Aluminum is an attractive alternative to steel because of its lesser cost. Lighter cars also need smaller engines so emission control devices would be easier to install. Aluminum could be used for trucks, ships, air transport and rapid transit cars. The energy required to produce aluminum is derived from domestic oil, gas and hydropower while the savings it provides is in oil from overseas, the the fuel with least reserves. Aluminum also have energy saving qualities of being heat reflective, and corrosion resistant. Aluminum production should be expanded rather than reduced as some environmentalists advocate.

Cochran, CN ; Aluminum Company of America June 1973, 3 pp; Synopsis of a study published in the June 1973 issue of *Automotive Engineering*, under the title "Aluminum-Villain or Hero in the Energy Crisis."

48 264168 CARS FOUND MORE ENERGY EFFICIENT THAN MASS TRANSIT. A study conducted by the Massachusetts Transportation Systems Center of DOT revealed that overall, the efficiency of cars and trucks would result in a combined energy saving of 46.3 percent in 20 years at a cost of 13 billion dollars. On the other hand, a massive shift to rail and bus transit would save only 8.1 percent in fuel over a 15-year period and cost 29.2 billion dollars. It was concluded that better utilization of buses, increased car efficiency, greater truck efficiency, car pools, and reduced travel speeds offer the best potential energy savings and at the same time require the least amount of public investment.

Automotive Information Vol. 3 No. 1, Aug. 1974, pp 1-2

48 265168 SELECTED APPROACHES TO ENVIRONMENTAL IMPACT EVALUATION OF REGIONAL ALTERNATIVES. A regional assessment of environmental impacts requires a macro-level overview of alternative policies. An integrated study program of subareas by multi-disciplinary teams is essential. Consideration should be given to the adequacy of the existing data base, the political process, the jurisdictions involved and their relationship to land use and the transportation planning process along with Federal, state and local legal actions. Community participation should be an important element. This paper discusses the complexities of the relationships involved in transportation planning at the regional level and presents two case studies. It uses Boston and Baltimore as examples of two cities who are re-evaluating their needs by making environmental impact assessment of transportation and land use programs.

Bellomo, SJ Lift, SD (Voorhees (Alan M) and Associates, Incorporated) ; American Society of Civil Engineers Proceeding May 1973, pp 273-298, 18 Fig., 8 Ref.; Proceedings of the ASCE Urban Transportation Division Environment Impact Specialty Conference, May 21-23, 1973, Chicago, Illinois.

48 300145 CAR DRIVERS AND FUEL CONSERVATION [Automobilisten en benzinebesparing]. Four possibilities for the decrease of fuel consumption are discussed, (1) limiting the mobility, (2) better use of public transport, (3) development of transport modes with a higher

profit, and (4) the increase of profit of the present-day cars. Furthermore the energy-conscious use of the car must be improved. Results of marketing research on the interest in a fuel consumption indicator are also presented. / TRRL/ [Dutch]

Box, JMF Dirken, JM Hermans, APH *Economisch Statistische Berichten* Vol. 64 No. 3192, Feb. 1979, pp 160-165, 4 Fig., 5 Tab., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 240989), Institute for Road Safety Research

48 300384 REGIONAL ENERGY REQUIREMENTS ENERGY USAGE IN TRANSPORTATION. The performance and fuel consumption by mode of travel (translated in some cases into equivalent energy usage) are tabulated, comparisons are made of transportation activity in the same sample years as are used in the study, and comparative tables are presented of energy and transportation relative to GDP per head. Transportation as an indicator of urban activity is examined, and an attempt is made to distinguish between the use of transport for "production" and for social and recreational purposes. The paper presents information on fuel consumptions in the West Midlands of England.

Borg, N (Birmingham University, England) ; Planning and Transport Res and Computation Co Ltd 1978, pp 75-86, 1 Fig., 8 Tab.; Proceedings of the Summer Annual Meeting, University of Warwick, England, July, 1978. Cosponsored by the Transportation Research Board.

48 301264 PROGRAMMING ENVIRONMENTAL IMPROVEMENT IN PUBLIC TRANSPORTATION. No Abstract.

Cantilli, EJ (Polytechnic Institute of New York) Heath Lexington Books, (0-669-87072-2) 1974, 192 p., Figs., Tabs., Apps.; ORDER FROM: Heath (DC) and Company, Department RS, 125 Spring Street, Lexington, Massachusetts, 02173

48 301430 EFFECTS OF CLIMATIC CONDITIONS ON METRO USERS [Les effets des conditions climatiques sur les usagers du metro]. The increase in the number of passengers and improvement of the performance of rolling stock have modified climatic conditions prevailing in the stations and coaches. Studies have been conducted to determine the relationship between climatic conditions and the passengers' sense of comfort. Ventilation is one of the most important aspects. [French]

Grivel, F Flahaut, J *Sciences et Techniques* No. 59, Apr. 1979, pp 36-43, 9 Phot.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Societe des Ingenieurs Civils de France, 19 rue Blanche, Paris 9e, France

48 301604 URBAN TRANSPORTATION PLANNING UNDER ENERGY CONSTRAINTS. Current knowledge concerning the impact of limited fuel availability on urban travel behavior is reviewed, and the application of this information to urban transportation planning is discussed. The 1973-1974 oil embargo is viewed as a short-term perturbation in the energy-transportation system that resulted in temporary changes in travel behavior. Short-range energy contingency planning can benefit most from the knowledge gained during this period. Energy

contingency planning should emphasize non-capital-intensive policies that can be easily and quickly implemented to conserve fuel. The information gained during the embargo does not appear to be directly applicable to long-range urban transportation plans do not appear practical at this time because of the lack of information concerning the impacts of fuel availability on travel and living patterns. It may therefore be more beneficial to develop plans that have the flexibility to include this information as it becomes available. A standardized definition of fuel availability should be determined, and a mechanism for capturing fuel allocation and consumption statistics on a disaggregate level should be established. Trends in the attitudes of consumers toward the energy situation and transportation-related behavioral changes that result from these perceptions should also be monitored. /Author/

Witkowski, JM Taylor, WC (Michigan State University, East Lansing) *Transportation Research Record* No. 707, 1979, pp 1-5, 1 Fig., Refs.

This paper appeared in *Transportation Research Record No. 707, Urban Transportation Planning, Evaluation, and Analysis*; ORDER FROM: TRB Publications Off

48 301897 THE ECONOMIC USE OF ELECTRIC ROAD VEHICLES IN A CHANGING ENVIRONMENT. The president of the Electric Vehicle Development Group explained in his opening address that the conference/demonstration for electric road vehicles had been called to examine the factors involved in the implementation of large numbers of high performance vehicles, and to draw upon the experience to date of those now operating delivery and public passenger electric vehicles. Reference was made to rising costs of fuel and shortages, alterations in patterns of land use and the need with such new technology to make sure that it is supported by thorough research, test-bed experience and cooperation between manufacturers, users and planners. Divided into five sessions papers were presented on-estimated supplies of transport fuels to the end of the century; an operator's requirements and operational experience with battery electric buses and a consideration of future developments; towards a more versatile public passenger transport system based on experience with the Leyland/Bosch/Chloride bus at Runcorn, Cheshire; the United States electric and hybrid vehicle program; operational experience with the silent karrrier delivery van and a review of marketing prospects related to total costs; potential use of vans powered by electric wheel motor units; economic prospects for electric traction for public transport operation; an outline investigation of a hybrid (combat) trolley bus; operational data and running experience in the city of Esslingen of the "duo-bus"; electric road vehicles in a changing environment; transshipment depots-a retailer's approach; some experience with electric vehicles; international activities. The discussion following each session is appended. /TRRL/

Peter Perigrinus Limited Monograph No. 15, 1978, 102 p., Figs., Tabs., Photos.; Prepared from Electric Vehicle Development Group Second International Conference, 23-24 May 1978; ACKNOWLEDGMENT: TRRL (IRRD 241237)

48 301902 ENERGY USAGE AND CONSERVATION. The paper examines the present position concerning energy consumption in New Zealand. Transport services depend entirely on liquid fuels and account for 70% of all oil consumption. A study funded by the New Zealand Energy Research and Development Committee (NZERDC) is to consider policies for medium-and long-term savings in energy use in transport. The scope for energy saving or conservation measures is likely to be small due to zero rate of economic growth. To achieve a reduction in energy use measures for the use of alternative fuels and land use and energy conservation planning policies are needed. Limits are being placed on peripheral growth of residential development and urban areas are being consolidated to reduce present energy consumption. /TRRL/

Sheppard, DN *Chartered Institute of Transport Journal* Vol. 38 No. 9, Mar. 1979, pp 261-262; ACKNOWLEDGMENT: TRRL (IRRD 241230)

48 302108 WHAT HAPPENS TO CITIES WHEN THE GAS RUNS OUT? Many suburban-urban areas will be crippled by gas rationing; commuters may be unable to get to work until emergency procedures are in place. Some far-sighted communities, however, have already created energy contingency plans. One of these areas, Dallas/Fort Worth, developed a plan in 1977 after an extensive study of commuting habits, average commutes, mass transit capabilities and alternative commuting methods. As a result, energy coordinators for 20 communities are appointed, mass transit is geared up to absorb increased ridership (which could double almost overnight) and some laws have been modified to facilitate emergency measures.

Cooper, LC (North Central Texas Council of Government) *ASCE Civil Engineering* Vol. 49 No. 8, Aug. 1979, pp 71-73; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 302117 PUBLIC TRANSPORTATION AND THE LAST DECADES OF PETROLEUM. The U.S. is now facing, and will face in the future, a petroleum supply crisis. The U.S. will face changes which will require broad political support for governmental actions. The ways in which transportation needs could be substantially reduced and ways in which transportation's dependence on petroleum could be converted to some other energy need to be examined. This article briefly examines this century's substantive changes which have affected urban transportation and petroleum usage, and discussed the future need to focus on urban transportation as the heart of a comprehensive self-help conservation strategy. During the early stages of the overall self-help strategy, the automobile will be the major target for conservation and the adroit reduction of petroleum usage for autos will be a prime achievement. Petroleum savings could also be realized by improving the traffic flow in urban areas. Long-term, self-help conservation strategies are discussed and it is observed that a stable, energy-efficient society depends on the relationship of urban living pattern and public transit. The importance of urban land use planning is noted and urban revitalization is discussed, as well as the total efficiency of the urban area and its complete transportation system. Public transportation elements of the self-help strategy must be integrated concurrently with the new direc-

tions in land management and revitalization and redesign.

Gambaccini, LJ (New Jersey Department of Transportation) *Transit Journal* Vol. 5 No. 3, 1979, pp 3-16

48 302118 ENERGY CONTINGENCY PLANNING FOR TRANSIT SYSTEMS. Transit systems must meet the basic transportation needs of the community in the event of fuel shortages. Given the likelihood of such shortages, it is prudent to now begin the preparation of energy contingency plans for transit systems. Two basic aspects must be included in any contingency plan: the transit system must have enough fuel to operate not only a normal schedule but probably an increased schedule requiring greater fuel demands; and provisions for vehicles to accommodate significant increases in ridership must be made very quickly. Some measures such as increasing fuel storage and changing fuel supplier contracts, will require relatively long lead times. Routinely made decisions such as new equipment purchases can be made such that the transit property is in a better position during a fuel crisis.

Barker, WG Cooper, LC (North Central Texas Council of Governments) *Transit Journal* Vol. 5 No. 3, 1979, pp 17-24, 1 Fig., 1 Tab.

48 302131 OECD CONFERENCE ON TRANSPORT AND ENVIRONMENT REVIEWED. Energy conservation, fiscal policy, and environmental concerns seemed to dominate the thinking at this conference; therefore, efforts to improve bicycle and foot transportation received the most attention, due to their potential as a practical and environmentally desirable method of moving in the city. At the first session, it was concluded that the most serious obstacle to the widespread use of bicycles in urban areas is their vulnerability in mixed traffic. Although, ideally, bicycles should have separate rights-of-way, separate bikeways are not always logistically possible or economically feasible. Progress has been more impressive in the area of pedestrian improvements with the advent and almost total acceptance of pedestrian streets and pedestrian malls in downtown areas. These improvements, which originated in Europe in the mid-1960's, have now been extended to cities in North America, Japan, Australia, New Zealand, and South America. The conference also included discussion of extending such traffic restrictions to residential areas. Paratransit received a significant amount of attention as a means of providing special transportation services amount of attention as a means of providing special transportation services to handicapped persons and others who are unable to use private automobiles or conventional public transportation. Also, it provides public transportation in low-density rural areas where private automobile ownership is low and it provides an alternative to the solo use of the private automobile for commuting purposes. The final sessions addressed management of transportation demand, financing, and energy.

Orski, CK *Transportation Research News* Conf Paper No. 84, Sept. 1979, pp 2-5, 3 Phot.; Summary of the OECD International Conference on Transportation and Environment in Paris, France, July 10-12, 1979.; ORDER FROM: TRB Publications Off

48 302275 ANALYSIS OF LIFE-CYCLE COSTS AND MARKET APPLICATIONS OF FLYWHEEL ENERGY-STORAGE TRANSIT VEHICLES. The Urban Mass Transportation Administration (UMTA) has recently completed the Phase I activities of its Flywheel Energy Storage Program involving an analysis of the operational requirements and the conceptual design of flywheel energy storage vehicles for transit service. Flywheel energy storage systems are being proposed as a means of reducing the energy requirements of fixed-route, multi-stop, urban transit vehicles. The Phase I studies have paved the groundwork for the succeeding program phase which include the design, fabrication, test, and evaluation of prototype flywheel storage vehicles within the urban transit industry. This report documents the results of these analyses. It examines the economic viability and the potential market applications of these proposed concepts within urban transit operations. The report presents a description of the structure, the approach, and the costs, and the annual recurring operations/maintenance costs associated with the conventional diesel bus, the trolley bus, and the three flywheel-powered vehicle systems considered in the study; describes the results of the life-cycle analysis and the sensitivity of these results due to variations of key assumed input variables; and discusses the potential demand and the market applications of flywheel energy storage vehicles within transit service operations.

Goeddel, DL Ploetz, G ; Transportation Systems Center, Urban Mass Transportation Administration, (DOT-TSC-UMTA-79-22) Final Rpt. UMTA-MA-06-0044-78-2, July 1979, 180 p.; Contract MA-06-0044; ORDER FROM: NTIS; PB-300289/AS

48 302413 ENVIRONMENTAL PLANNING AND DESIGN FOR RAPID TRANSIT FACILITIES. The National Environmental Policy Act of 1969 and related environmental laws mandated certain environmental considerations for major federal actions. The principal tool for documenting these considerations was the environmental impact statement. This requirement, interpreted and implemented by each federal agency, has given environmental planning concerning federally funded public improvements, such as transit facilities, its scope. This paper discusses the environmental planning studies and methodologies involved in preparing an impact statement for rapid-transit projects under the Urban Mass Transportation Administration. Emphasis is given to major issues, including alternatives analysis, environmental-impact analysis, and analysis of parklands and historic properties. The primary considerations in each subject area and specific approaches to an analysis that would satisfy the requirements of the National Environmental Policy Act of 1969 and related environmental directives are examined. The Metropolitan Dade County Rail Rapid Transit System is used as an example. (Author)

Muse, EC (Schimpeler-Corradino, Associates) Stewart, ST (Kaiser Transit Group) Sexton, BJ Beard, SR (Schimpeler-Corradino, Associates) Marner, A (Urban Mass Transportation Administration) *Transportation Research Record* No. 716, 1979, pp 1-8, 3 Fig., 1 Tab., 1 Ref.; This paper appeared in Transportation Research Record 716, Local and Regional Development and Transportation Needs.;

ORDER FROM: TRB Publications Off

48 302494 SUFFICIENT AND ECONOMICALLY EFFICIENT FUEL FOR ROAD TRAFFIC [Voldoende betaalbare brandstof voor het wegverkeer?]. The author gives a description of various categories of energy by type of consumer. He also indicates some ways in which the central government may be able to influence the saving of energy, i.e. by control of spatial planning, public transport, traffic and parking. He urges that there should be a steering group for the energy supply of inland transport. [Dutch]

Perie, JH *Verkeerskunde* Vol. 30 No. 6, June 1979, pp 265-267, 2 Tab., 2 Phot., 4 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 241886), Institute for Road Safety Research

48 302705 EFFICIENCY OF UTILIZATION OF TRACTION ENERGY IN URBAN PUBLIC TRANSPORTATION [Efficienza di utilizzazione dell'energia di trazione nei trasporti pubblici urbani]. The relative efficiency of utilization of traction energy by three most important means of public transportation: subway, streetcar, and bus, is considered and compared. The data on urban transportation services in Milan are analyzed. Formulas for the evaluation of efficiency of energy utilization by different modes of urban transportation are derived. It is found that the efficiencies of the bus and streetcar are about equal and amounting to about a half of that of the subway. On the other hand, the bus is the most flexible means of urban transportation. [Italian]

Mazzon, L *Ingegneria Ferroviaria* Vol. 34 No. 1, Jan. 1979, pp 44-51, 9 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 302716 IMPACTS OF URBAN RAILWAYS. Developmental and environmental impacts of railroad construction and operation in Canadian urban centres increasingly are expected to present difficult issues for planners, decision-makers and administrators. Three categories of railroad/urban development concern exists: allocation of outmoded or poorly-located rail facilities, encroachment of urban development on existing railways, and in the largest metropolitan areas, development of new light rail rapid transit. Addressing these concerns means confronting: (a) poorly developed concepts and methods for the assessment of developmental and environmental impacts; (b) inadequate integration of rail transport with land use planning and decision-making at municipal, regional and provincial levels; and (c) inadequate community consultation during such planning and decision-making, contributing to community opposition to specific project proposals. Phase I of the research examined the extent to which developmental and environmental impacts present/will present problems for urban areas in Canada; how these problems are being perceived and tackled in key centres, the state-of-the-art of assessing railway impacts, and community concerns with respect to urban railroads.

Armour, A Lang, R ; Toronto-York University Joint Program in Transp Res Rpt. No. 59, No Date, 276 p.; ORDER FROM: Toronto-York University Joint Program in Transp, 4700 Keele Street, Room 430 Osgoode Hall, Downsview, Ontario M3J 1P3, Canada

48 302984 ENERGY AND TRANSPORT: STRATEGIES FOR ENERGY CONSERVATION IN URBAN PASSENGER TRANSPORT. Before proceeding to explore potential strategies for energy conservation in urban passenger transport, this paper presents some evidence on energy efficiencies of various transport modes and on travel behaviour under energy constraints. Knowledge of the relative energy efficiencies of different modes of transport is evidently necessary for analysing and developing policies for fuel conservation. Although the automobile does appear to be significantly more energy-intensive than public transport modes, this does not automatically indicate that a policy to attract people to public transport would lead to the maximum possible fuel savings. Available evidence on travel behaviour under energy constraints indicates that the elasticity of travel demand is very small. Increasing prices, within the range expected, are not likely to result in satisfactory fuel savings, and it is therefore necessary to consider alternative strategies. The strategies to be considered here may be outlined as follows: (1) improving fuel efficiency of automobiles by modifying driving habits, reducing speeds, improving traffic flows, and keeping vehicles properly maintained; (2) increasing efficiency of automobile travel by promoting higher occupancies; (3) attracting car travellers to public transport; (4) shifting to smaller, more fuel-efficient vehicles, changing vehicle and engine designs such as to improve the inherent fuel efficiency of the automobile; (5) technological change: new propulsion systems, alternative fuels, and rapid personal transport; (6) reducing travel needs by changing land-use patterns and improving communications. These strategies are discussed in turn and, given the available information about travel patterns and behaviour, an attempt is made to assess their likely impact. Clearly those strategies should be selected which offer the maximum potential fuel savings and which can be introduced with minimum sacrifice. (a) (TRRL)

Schou, K (Macquarie University, New South Wales) *Environment and Planning A* Vol. 11 No. 7, 1979, pp 767-780, 1 Fig., 2 Tab., 49 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 242343)

48 302992 THE FORECASTING MODEL OF FUTURE TRAFFIC DEMAND-SUMMARY. Background information on the Japanese economy is provided, indicating a fourfold increase (1970 prices) in GNP over the 15 years 1955 to 1970. Similarly, the volume of domestic freight transport and domestic passenger transport is shown to have increased by a factor of 3.5 to 4 over the same time period. The relationship between economic structure, transport structure and investment strategies in each case is discussed, and the consequences following imbalance in investment policies described. The reasons behind the decision to formulate forecasting models of future traffic demand, related as they are to the energy crisis in the latter half of 1973 and the geographical nature of the country are discussed. A series of charts, tables and maps provide statistical data, and details of the model(s) are presented. (TRRL)

Japan Transport Economics Research Center Monograph Sept. 1978, 26 p., 12 Fig., 3 Tab.; ACKNOWLEDGMENT: TRRL (IRRD 242212)

48 303561 TRANSPORT AND ENERGY IN AUSTRALIA. This report was prepared for the South Australian Department of Transport. This paper reviews the current energy situation in Australia and concludes that Australia is not short of energy in any overall sense. In providing supplies of energy for transport, however, Australia is faced with both short term problems which are unique to Australia and with longer term problems which are similar to the world-wide problem. In the short term, Australia will be short of indigenous petroleum energy supplies so vital to transport while in the long term the world is heading towards a petroleum energy shortage. In the longer term, in the face of the global pool crude oil shortage, Australia must look to the availability of alternative primary sources of energy for transport. It is recommended that a) technologies such as oil from coal or methanol from natural gas for producing alternative energy sources to crude pool oil be assessed and a decision made to implement a production plant of at least pilot scale with the aim of gaining experience in their operations economies, b) the future high cost of private transport and the desirability of providing public transport be taken into account as a major factor in the planning of urban developments in Australia. (TRRL)

South Australia Department of Transport, Australia Monograph Mar. 1978, 43 p., 15 Fig., 3 Tab., 32 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239225), Australian Road Research Board

48 304101 URBAN AIR POLLUTION. VOLUME 2. 1976-1977 (A BIBLIOGRAPHY WITH ABSTRACTS). This bibliography contains citations on urban air pollution and its abatement. These research reports are of interest to urban planners, which will enable them to become aware of new abatement strategies and techniques. They included various aspects of transportation emissions as well as health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (This updated bibliography contains 170 abstracts, none of which are new entries to the previous edition.)

Cavagnaro, DM ; National Technical Information Service Bibliog. Aug. 1979, 176 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0767/8ST

48 304102 URBAN AIR POLLUTION. VOLUME 3. 1978-JULY, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS). Selected reports are cited on urban air pollution and its abatement. These citations were selected because of their general interest to urban planners, which will enable them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (This updated bibliography contains 221 abstracts, 182 of which are new entries to the previous edition.)

Cavagnaro, DM ; National Technical Information Service Bibliog. Aug. 1979, 227 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; NTIS/PS-79/0768/6ST

48 304691 A COMPUTER PROGRAM (POWREQ) FOR POWER REQUIREMENTS OF MASS TRANSIT VEHICLES. This project was performed to develop a computer program suitable for use in systematic analyses requiring estimates of the energy requirements of mass transit vehicles as a function of driving schedules and vehicle size, shape, and gross weight. The Power Requirements (POWREQ) Simulation Model is a computer program that simulates the energy requirements of a transit vehicle during its execution of a given driving schedule, and was designed to operate on the TSC DEC-10 Operating System either in batch mode or in time-sharing mode via remote terminals. The POWREQ Simulation Program was programmed in the Fortran IV compiler language for execution on the DEC-10 by a series of commands input by the user. The user is provided the capability of analyzing the effects of various types of driving schedules and road profiles on energy requirements. A CALCOMP plotting routine is provided so that the user, if desired, can request graphs illustrating the time variation of the important parameters. The graphs will be generated off-line.

Spenny, CH Clarke, JM ; Transportation Systems Center, Urban Mass Transportation Administration, (UMTA-MA-06-0044) Final Rpt. DOT-TSC-UMTA-76-2, UMTA-MA-06-0044-77-2, Aug. 1977, 68 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB-301083/2ST

48 305473 FUEL CONSUMPTION: TRANSPORTATION. VOLUME 2. 1977-OCTOBER, 1979 (A BIBLIOGRAPHY WITH ABSTRACTS) [Rept. for 1977-Oct 79]. Fuel consumption by automobiles, trucks, buses and general aviation aircraft is discussed. Topic areas cover the effect of road conditions, traffic conditions, and emission controls on fuel economy; projected growth and problems facing air transportation; energy efficiency of various urban transportation modes; energy use forecasts and projections of supply and demand in the transportation sector. Bibliographies on fuel consumption in the industrial, residential, and commercial sectors and on electric power consumption are also available.

Hundemann, AS ; National Technical Information Service Bibliog. Nov. 1979, 115 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-800451

48 307566 THE CITY STREET. A CONTRIBUTION OF CONFLICTS BETWEEN TRAFFIC AND THE BUILT ENVIRONMENT-LOCAL AND GENERAL PLANNING AIM [Bygata. Et bidrag til forståelse av konflikter mellom trafikk og boligmiljø-lokale og overordnede planleggingsmaal]. Through registration of noise, accidents, air pollution and traffic, as well as interviews and talks, school papers and children's drawings, an understanding of how it is to live in a city street in Oslo with heavy traffic is given. The situation is discussed in relation to traffic and residential plans prepared by the local municipal authorities and improvement measures on various levels. (TRRL) [Norwegian]

Kaul, S Kolbenstvedt, M Lerstang, T Thorenfeldt, T ; Norwegian Institute for Urban and Regional Res NIBR Report 38, June 1975, 40 p., 27 Fig., 2 Tab., 10 Phot., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243218), Norwegian State

Highway Laboratory

48 308005 THE TRANSPORT FUEL DILEMMA: PATTERNS OF CONSUMPTION WE CANNOT SUSTAIN. Projections of future oil supplies indicate that a tight supply situation will develop within the decade ahead. Prices of oil are expected to continue to rise, initially to levels of costs of new oil in difficult areas (e.g., deep offshore) and later to costs of substitute liquid fuels from coal, oil shale and possibly crops. This article surveys the possibilities for increasing the energy-efficiency of transport systems. Considerable improvements are possible without radical departures from the present overall pattern of vehicle use. Nevertheless future energy costs should be allowed for in urban land-use and transport planning. (TRRL)

Endersbee, LA (Monash University, Australia) *Search* Vol. 10 No. 1/2, Jan. 1979, pp 28-34, 5 Fig., 10 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 239297), Australian Road Research Board

48 308157 FACTORS AFFECTING WILLINGNESS TO CONSERVE GASOLINE. This paper explores the role of travel behavior, demographics and attitudes toward energy conservation to explain consumer willingness to conserve gasoline. Data from a telephone survey of 500 New York households were analyzed on several measures of willingness to conserve, using a statistical analysis procedure called AID (Automatic Interaction Detection). It was found that willingness to conserve gasoline is generally independent of demographics, travel behavior, and other attitudes toward energy. The mildly important factors included residence locations (NYC residents more willing to conserve) and attitudes toward U.S. use of energy. Generally, those New Yorkers most willing to conserve were those with (a) the least to lose if gasoline were curtailed, (b) the most flexibility in present travel behavior, and (c) the most additional service options available. A brief review of other recent surveys shows that the public is consistently receptive to policy which encourages gasoline conservation by increasing travel options and offering incentives for their use; punitive or restrictive measures are met with strong disfavor. Based on the specific results of this and other studies, policy suggestions include increased perception of travel options and their true costs, increased transit services, and stabilized fares. (Author)

Meyers, CE ; New York State Department of Transportation Preliminary Rpt. 167, July 1979, 39 p., 4 Fig., Tabs., 12 Ref., 2 App.

48 308484 TRANSPORTATION ENERGY CONSERVATION DATA BOOK: A SELECTED BIBLIOGRAPHY. EDITION 3. This bibliography, the second in a series of reports on energy conservation and consumption in the transportation sector, was compiled as part of the continuing technical information support provided by the Energy and Environmental Response Center (EERC) to the Energy Division of the Oak Ridge National Laboratory. The EERC maintains an on-line bibliographic data base documenting energy conservation and consumption in various economic sectors. The citations in this bibliography were selected from a comprehensive file of transportation materials. A companion volume, *Transportation Energy*

Conservation Data Book, Edition 3 (ORNL-5493), is an encyclopedia of statistical data on energy utilization by major transportation modes, research and development of alternate transportation modes and fuels (electric vehicles and alcohol fuels), and other pertinent factors influencing energy consumption in the transportation sector. These same subjects are included in this bibliography, which is a desk-top compilation of references. The data in the data book were taken from certain key research studies. Reviews of these studies are included in this bibliography: Comparison of U.S. Environmental Protection Agency Fuel Economy Ratings with On-the-Road Experience; The Congressional Budget Office's Report on Energy Used by Urban Transportation Modes; The Energy Information Administration's 1977 Annual Report to Congress; the National Cooperative Highway Research Program's Report on Energy Intensity of Transportation Modes; Oak Ridge Laboratory's Reports on Gasoline Demand; SRI's Report on Diesel Cars in the United States; SRI's Reports on Railroad Passenger and Freight Transportation; TECNET Transportation Energy Use Model, TRW's Study of Increased Diesel Car Production; and the Warton EFA Automobile Demand Model. All references are keyworded and arranged alphabetically by author or corporate author if individual authors are not cited in the document. Reports sponsored by the Transportation Energy Conservation Division of the Department of Energy are listed in a separate section. Author, corporate author, sponsor, report number, keyword, and permuted title indexes are provided. (Author)

Ehrenshaft, AR Barber, BY Carroll, PJ Plemons, LK Purnell, PA Weaver, RS ; Oak Ridge National Laboratory ORNL/EIS-146, Nov. 1978, 277 p., Figs., Tabs., Refs.; Prepared for the Office of the Assistant Secretary for Conservation and Solar Applications, Department of Energy.; Contract W-7405-eng-26; ORDER FROM: NTIS

48 308571 SURVEY AND ANALYSIS OF ENERGY INTENSITY ESTIMATES FOR URBAN TRANSPORTATION MODES. Current interest in energy conservation has resulted in a spate of divergent estimates of the energy intensity of urban transit modes. This paper critically reviews the methodologies and data sources employed by these estimates. It is shown that a very small repertory of sources and methodologies underlie the energy intensity estimates and that variance among them is primarily attributable to contradictory load-factor assumptions. Energy intensity estimates for bus and rail transit are developed, and the inadequacies of automobile data are discussed. Bus transit is shown to be more efficient than rail transit, and it is shown that the energy advantage of light rail over heavy rail lies in construction, not operation. /Author/

Chomitz, K (California University, Irvine) *Transportation Research Record* No. N726, 79, pp 8-14, 3 Tab., 35 Ref.; This paper appeared in TRB Record No. 726, Energy Policy Impact Evaluation.; ORDER FROM: TRB Publications Off

48 308787 OIL PUTS CARS ON THE SPOT. This article, adapted from the author's book "Running on Empty: The Lure of the Automobile in an Oil-Short World" discusses the lack of practical alternatives available to car manufactur-

ers. Factors affecting the supply of oil and future trends in vehicle ownership are examined. Recent oil production and pricing policies have brought about a fundamental change compared with previous trends. Oil producing countries are determined to make their resources last as long as possible. It is considered unlikely that alternative sources of fuel will take the place of petrol in the short term. The impact of oil price rises on the economies and developing car utilisation of third world countries is examined. There are serious doubts that the third world will be an expanding market. It is anticipated that a shift towards the production of smaller, lighter and less powerful cars over the next few years would reduce the fuel consumption of passenger cars in the United States by 15 per cent. The authors visualise an increased usage of public transport, which will probably need to be subsidised by the state. (TRRL)

Norman, C Flavin, C Brown, L (Worldwatch Institute) *New Scientist* Vol. 84 No. 1180, Nov. 1979, pp 429-433, 5 Fig., 5 Phot.; ACKNOWLEDGMENT: TRRL (IRRD 244145)

48 308811 SUBJECT 5: MEASURES TO BE TAKEN TO OBTAIN AN ACCEPTABLE LEVEL OF NOISE. Subject 5 comprises the following reports: General report (Bridle, RJ); Measures to be taken to obtain an acceptable noise level (Brosch, W); Measures for securing an acceptable noise level (Buna, B); Measures to be taken to obtain an acceptable level of noise (Koshi, M); Measures for securing an acceptable noise level (Krell, K); Measures to be taken to obtain an acceptable level of noise (Kuntschen, JM); Reduction of the impact of traffic noise (Lamure, G); Measures for securing an acceptable noise level (Schild, C). (TRRL)

International Automobile Federation Proceeding 1978, n.p., Figs., Tabs., Refs.; The Thirteenth International Study Week Traffic Engineering and Safety, Montreux, September 11-16, 1978.; ACKNOWLEDGMENT: TRRL (IRRD 243867)

48 308853 CHANGES IN TRAVEL IN RESPONSE TO THE 1979 ENERGY CRISIS. This paper describes recent work by the Planning Research Unit, NYSDOT, to prepare a comprehensive review of the energy-related events of 1979 and their impact on travel. The paper reviews the events of 1979 in chronological order, and then describes trends in energy and travel. These include oil and gasoline supply; prices; highway travel; transit, rail and air travel; and trends in business and the economy. Data is provided for generally 3 years by month/quarter and focuses on trends in N.Y. with appropriate parallel trends for the U.S. Two household level surveys are also reviewed, one based on a telephone sample of 1520 N.Y. residents, the other based on a sample of 712 N.Y. State Government workers living in the Albany Area. In N.Y. the 1979 shortfall peaked during the 3rd quarter at 11% and prices rose 30/gallon over the year. Traffic declined 10% in metropolitan areas, 18-20% on major rural facilities. Intercity rail traffic rose 30% while transit rose 20-25% (10% in NYC); domestic car sales fell 15% but sales of imports rose 32%. Consumer responses focused on "small but frequent" actions including driving slower, trip combining, and cuts in shop travel;

more than 40% of respondents indicated they had taken such actions. Certain major actions (fuel-efficient car purchases, vacation mode and destination shifts, carpooling, and transit use in large cities) were taken with less frequency (10-15%) but the energy saved in such actions was substantial. At higher prices or significant shortfalls (20% shortfall or more) consumers would increase focus on major actions; selection of certain minor actions (driving slower and tune-ups) would actually decline. The findings suggest that consumer responses to energy "events" will be internally rational but not necessarily consistent with planners' views. Since wide variations in response were observed by geographic and demographic groups, policy makers must take particular care to understand the nature of present and future of public responses. (Author)

Hartgen, DT Neveu, AJ Brunso, JM Banas, JS Miller, J ; New York State Department of Transportation Prel Res Rpt. 170, Dec. 1979, 95p, Figs., Tabs., Refs.

48 309586 ENERGY EFFICIENCY IN THE TRANSPORTATION OF GOODS AND PASSENGERS IN SWEDEN [Energieeffektiviteten foer person-och godstransporter i Sverige]. The study compared the energy efficiency of the most used transport means in Sweden. The basic material has been obtained from a great number of companies and organizations. The study was done against the background of the present political debate on energy which inevitably influences its aim. First the report discusses a number of American studies in this field in order to give a general view of existing results and methods. Following is a description on considerations regarding the methods and calculations the study is based on. As far as possible all important factors concerning energy consumption have been considered, and the comparison is based on as equivalent presumptions as possible. The transportation analysis has been done according to how the energy contribution in Sweden is divided between energy for propelling, energy for production and maintenance of movable material, and energy for the construction and maintenance of infrastructure. Calculations refer to the middle of the 1970's and include conversion losses in order to obtain the results as quantities of the original energy which is expressed as energy content in crude oil imported to Sweden. The transport means studied are: the private car, buses, the commuter train, underground railway, the aeroplane, lorries, trains, coastal shipping freight. The results are only applicable in context. Detailed appendices on energy consumption accompany the report in a separate publication. (TRRL) [Swedish]

Transportforskningsdelegationen TFD 1979: 1,2, 1979, v.p., Figs., Tabs., Refs.; ACKNOWLEDGMENT: TRRL (IRRD 243167), National Swedish Road & Traffic Research Institute

48 309606 SOME SOCIOLOGICAL AND ENVIRONMENTAL CONSIDERATIONS IN URBAN ROAD PLANNING STUDIES. This paper discusses several relevant sociological and environmental considerations in urban road planning studies. It then outlines the processes adopted to identify, examine, and evaluate these aspects so they can be properly considered in the planning and decision-making process in order to

arrive at a feasible and acceptable course of action. It comments on environment assessment procedures, and concludes with a brief discussion of the use of a range of disciplines in the planning team. (TRRL) presented at the institution of engineers, Australia engineering conference, 1978. Engineers: developing a better world, Melbourne, 3-7 April 1978. See IRRD abstract no. 234133.

Underwood, RT (Victoria Country Roads Board, Australia) *Institution of Engineers (Australia) Civ Eng Trans* Vol. CE21 No. 1, 1979, pp 40-44, 12 Ref.; This paper was also presented at the Institution of Engineers, Australia Engineering Conference, 1978. Engineers: Developing a Better World, Melbourne, 3-7 April 1978.; ACKNOWLEDGMENT: TRRL (IRRD 239514)

48 309642 ENVIRONMENTAL DETERIORATION DUE TO TRAFFIC [Umweltbeeinträchtigung durch Verkehr]. Starting with an analysis of the shelved traffic routes and underlying trip purposes, the requirements for the small scale mixing of urban functions (dwelling, shopping, working, recreation) are stated and an investigation made into the possibility of realizing these requirements in the Vienna area. It is suggested that there should be a better relation between working places and residential areas by the decentralisation of service and utility organisations. Noise sources from road traffic and the existing measurement and estimation procedures for motor vehicles and rail traffic are analysed and the noise from public and private transport is compared. Various possibilities of reducing exhaust emission are considered (speed, diesel-and gas-operation) and their effects upon the various exhaust components are investigated. As the third largest of the environmental burdens, the heat output and the efficiency of vehicles is investigated and it is recommended that there should be increased use of diesel vehicles and electrically driven vehicles on tracks (trams) because of their better efficiency and lesser energy requirements. Finally the suggested measures are applied to an example of a possible transportation organisation for the 6th and 7th districts in Vienna. (TRRL) [German]

Matuschka, H ; Wiener Institut fuer Standortberatung WIST-Infor 42, Sept. 1978, pp 2-8, 3 Fig.; ACKNOWLEDGMENT: TRRL (IRRD 309020)

48 309803 EFFECTS OF MOTORIZED TRAFFIC NOISE. PSYCHOPHYSIOLOGICAL AND ECONOMIC DATA [Effets du bruit de circulation automobile, donnees psychophysiologiques et economiques]. After a review of general knowledge gathered by acoustics specialists/physiologists on noise in general, the paper describes the results of physiological, psychosociological and economics studies carried out by IRT-CERN since 1972 on the effects of motorized traffic noise. Physiological effects are initially examined (hearing acuity risks, sleep disturbance), then activity disturbance (vigilance, performance, intelligibility) and the psychosociological impact of traffic noise (noise and discomfort, survey and evaluation methods, tolerance). The results of an enquiry, carried out by IRT-CERN among 965 frontagers in urban units of more than 50000 inhabitants, are then discussed. Finally the analysis elements of eco-

nomics and social costs are described (price variation of buildings and land, sound insulation and repair costs, loss of investment, estimated figures for noise impact). In conclusion noise levels and proposals for orientating the reduction of the impact of traffic noise are defined. (TRRL) [French]

Lamure, C Vallet, M Maurin, M Vernet, M Lambert, J *Rapport de Recherche* Monograph No. 28, Dec. 1977, 78 p., 20 Fig., 9 Tab., 64 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 105621), Central Laboratory of Bridges & Highways, France, Institute of Transport Research

48 309913 PROCEEDINGS OF THE SECOND WORKSHOP ON RAILWAY AND TRACKED TRANSIT SYSTEM NOISE, LYON, FRANCE, 17-19 OCTOBER 1978. The following papers were among those included in the proceedings: recent developments in wheel/rail noise research (Hemsworth, B); on the sources of wayside noise generated by highspeed trains (King, WF & Bechert, D); noise generation by railroad coaches (Fischer, HM); ground vibrations from passing trains (Dawn, TM and Stanworth, CG); ground-borne noise and vibration from underground rail systems (Kurzweil, LG); prediction of the propagation of train-induced ground vibration (Verhas, HP); comparative values of structure-borne sound levels in track tunnels (Koch, HW); vibration and structure-borne sound in the vicinity of road tunnels (Koch, HW); propagation of noise from rail lines (Kurzweil, LG, Cobb, WN and Kendig, RP); pilot study on railway noise attenuation by belts of trees (Kragh, J); retrofit noise control of rapid transit cars (Remington, PJ and Wittig, LE); railway noise and vibration annoyance in residential areas (Fields, JM); annoyance caused by different environmental noises (Ahrlin, U and Rylander, R); railway traffic: environmental noise controls for new housing sites (Clegg, JD); measurements of noise from high-speed electric trains in the US Northeast Railroad Corridor (Hanson, CE); environmental noise impact assessment of the introduction of high-speed trains in the Northeast Corridor (Hanson, CE); overall railway noise impact in the UK (Waters, DM); the importance of railway noise in France (Maurin, M); a Dutch study on railroad traffic noise (de Jong, RG).

Journal of Sound and Vibration Vol. 66 No. 3, Oct. 1979, pp 295-506, Figs., Tabs., Photos., Refs. ACKNOWLEDGMENT: TRRL (IRRD 244467); ORDER FROM: ESL

48 310076 SEMINAR 1979. URBAN TRANSPORT AND THE ENVIRONMENT, 10-12 JULY 1979. 3. OVERVIEW OF 16 CITY CASE STUDIES. This volume provides a synoptic chart of 16 city case studies of innovative urban transport schemes implemented to improve the environment in the face of the rising car ownership and use characteristic of the 1970s. This chart gives an overview of all the case studies undertaken by the OECD environment directorate in the period 1976 to 1979 including those prepared for the 1979 seminar on "urban transport and the environment". (TRRL)

Organization for Economic Cooperation and Devel Monograph 1979, 7 p.; ACKNOWLEDGMENT: TRRL (IRRD 244720)

48 310616 TRANSPORTATION PLANNERS JOIN BATTLE FOR CLEANER AIR. Under the terms of the '77 Clean Air Act Amendments, transportation planners must find ways to reduce air pollution from mobile sources. Actions must begin in 1980. The article, based on interviews with transportation planners in Los Angeles, Boston, Baltimore and Denver, discusses common actions planned, including vehicle inspection and maintenance programs, car and van pools, priority lanes, flextime and improving mass transit. Case history of New Jersey's inspection and maintenance program included.

Seltz-Petrash, A (American Society of Civil Engineers) *ASCE Civil Engineering* Vol. 49 No. 11, Nov. 1979, pp 84-88; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 310622 SPATIAL FORM AND STRUCTURE IN A POSSIBLE FUTURE--SOME IMPLICATIONS OF ENERGY SHORTFALL FOR URBAN PLANNING. Five alternate scenarios for future energy supply are developed, ranging from steady growth in supply to a decline to 75 percent of 1977 levels by the year 2000. These scenarios are applied to four models of spatial form and structure: present trends projected; general dispersion; concentrated super-city; and diversified-integrated cities. It is concluded that only the last form will be viable in the energy-short scenarios. Implications for social organization include strict limits on new construction and on the personal use of fuel-powered transportation, as well as the development of urban and suburban nodes as the prevailing spatial form. Planners are urged to consider the implications of the argument in developing plans for future spatial development.

Vantil, J (Rutgers University, New Brunswick) *Journal of the American Planners Association* Vol. 45 No. 3, July 1979, pp 318-329, 50 Ref.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 310647 NORTHEASTERN ENERGY AND TRANSPORTATION PROBLEMS: A REGIONAL PERSPECTIVE. This study compares energy and transportation problems of Northeastern States with nationwide or regional statistics and studies. Energy and transportation were selected because Federal Government policy and financing plays a leading role in these matters. The five problems most often mentioned by State officials in the Northeast were highway deterioration, high and rising mass transit operating deficits, financial and physical deterioration of freight railroads, increasing cost of energy relative to cost in other regions, and vulnerability to energy supply disruptions. These problems are complicated by factors such as the age of the region's public resources and the shrinking tax base of its cities. There are many ways to alleviate regional concerns. This study discusses some of them.

General Accounting Office PAD-79-12, Aug. 1979, 55 p., 1 App.; ORDER FROM: General Accounting Office, Distribution Section, Room 1518, 441 G Street, NW, Washington, D.C., 20548

48 311028 ENERGY CONSUMPTION ON DIFFERENT MODES OF TRANSPORT [Der Energieverbrauch der Verkehrstraeger]. Energy consumption for rail transport represents at most half of that used on road transport. This is due to

the low level of resistance of steel wheels running on rails compared to rubber wheels on a road surface. In air traffic energy consumption over a distance of 1500 km when working at full capacity is equal to the value of one private car. For short distance traffic petrol consumption for a private car is 10 times higher than that of public transport. Energy consumption for river transport is roughly equal to railways whereas on canals, for example in the transport of coal, it is four and a half times higher than for rail transport by electric traction. [German]

Kapfer, E *OBV-Journal* No. 8, 1979, pp 10-16; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Tetzlaff-Verlag GmbH, Havelstrasse 9, Postfach 4006, 6100 Darmstadt 1, West Germany

48 311051 ROLE OF ENERGY CONSUMPTION IN CHOICE OF TRANSPORT MOTIVE POWER. The paper examines energy consumption of various common urban transport vehicles, and examines other factors which may influence a move to electric transport. The vehicles considered are electric trains, trolley cars, trolley buses, and private electric vehicles.

Gerofi, JP ; Institution of Engineers, Australia Conf Paper 1979, pp 76-81, 18 Ref.; National Conference Publication Institution of Engineers Australia, n 79/2, Electric Energy Conference, Preprint Paper, Brisbane Australia, May 17-18, 1979; ACKNOWLEDGMENT: EI; ORDER FROM: Institution of Engineers, Australia, 11 National Circuit, Barton, A.C.T. 2600, Australia

48 311251 EXHAUST FUMES IN VEHICLES AND STREET ENVIRONMENT. EXPOSURE AND MEASURES [Bilavgaser i fordon och gatumljoe. Expositionslaege och atgaerd-sunderlag]. Comparative measurements of exposure to benzene, toluene, xylene and other hydrocarbons were carried out in various traffic environments. Car exhausts dominate air pollution and give characteristic patterns of analysis of different hydrocarbons. Exhaust concentrations inside cars are considerably higher than at roadsides. The concentrations rise with shorter gaps. Increased vehicle gaps in car queues at e.g. traffic signals will lower the concentrations. The exposure to exhausts in buses and trams is less than half of the exposure in taxis but considerable compared to other urban environments. Buses, and especially articulated buses show rises in concentrations of diesel hydrocarbon from their own exhausts. At pedestrian crossings the exhaust exposure could be halved by introduction of zones for vehicle spacing of 20-30 M before traffic signals. Prohibition of car traffic 50-100 M from a traffic environment exposed to exhaust will lower the concentrations to 10%. Considerable reductions of exposure would therefore be obtained by a systematic separation of car traffic from work places, bus stops, cycle tracks, footways, child nurseries, schools and residents. Individuals could also lower their exposure by avoiding car traffic and driving in urban areas. (TRRL) [Swedish]

Petersson, G ; Chalmers University of Technology, Sweden Monograph Oct. 1979, 23 p., 1 Fig., 6 Tab., 17 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 244682), National Swedish Road & Traffic Research Institute

48 312058 PROTECTION OF BUILDINGS AGAINST VIBRATIONS CAUSED BY METROPOLITAN TRAINS RUNNING ON LINES JUST BELOW GROUND LEVEL [Vibrozaschita zdaniy pri melkom zaloznii linij metropolitena]. No Abstract. [Russian]

Solov'ev, VS Bykov, BK *Zheleznodorozhnyi Transport* No. 11, 1979, pp 42-45, 4 Fig., 3 Tab.; ACKNOWLEDGMENT: International Union of Railways, BD; ORDER FROM: Kamkin Bookstore, 12224 Parklawn Drive, Rockville, Maryland, 20852

48 312466 INSTITUTIONAL FACTORS IN THE IMPLEMENTATION OF AUTOMOBILE-RESTRICTIVE MEASURES. PART 1: IMPLEMENTATION EXPERIENCE WITH TRANSPORTATION AIR QUALITY MEASURES IN THE DENVER, COLORADO, URBAN AREA. In recent years, Denver's high altitude, topography, rapid growth, and heavy reliance on the automobile have combined to cause a severe air pollution problem. According to the Colorado Air Pollution Control Commission, the principal cause of the pollutant is the use of motor vehicles. The Denver region developed an air quality plan that was submitted to the U.S. Environmental Protection Agency as part of the state implementation plan for air quality. The Denver element of the plan relies on strategies that reduce emissions at the tailpipe rather than strategies to restrict automobile use. Several institutional and attitudinal factors played a role in determining that automobile-restriction measures were not acceptable: (a) the no-problem syndrome, (b) the no-solution syndrome, (c) lack of public acceptance, (d) possibility of unequal burdens, (e) changing economic impact, (f) agency priorities, and (g) difficulty in resolving conflicts. As the Denver region moves from planning to implementation of air quality strategies, it will be important for the state to transcend parochial political interests and take the difficult stands necessary. The state must also be careful not to make decisions in a vacuum. Ascertaining the public's opinion on air quality strategies will be critical to their successful planning and implementation. (Author)

Kinstlinger, J (Colorado Department of Highways) *Transportation Research Record* No. 731, 1979, pp 54-57, 4 Ref.; This paper appeared in TRB Record No. 731, Evaluating Transportation Proposals.; ORDER FROM: TRB Publications Off

48 312518 TESTS OF TRANSFERABILITY AND VALIDATION OF DISAGGREGATE BEHAVIORAL DEMAND MODELS FOR EVALUATING THE ENERGY CONSERVATION POTENTIAL OF ALTERNATIVE TRANSPORTATION POLICIES IN NINE US CITIES. FINAL REPORT. A transportation policy analysis methodology described in Guidelines for Travel Demand Analyses of Program Measures to Promote Carpools, Vanpools, and Public Transportation, November, 1976 (EAPA 4:1921) is demonstrated. The results reported build upon the two levels of analysis capabilities (a fully calibrated and operational computer package based on a set of disaggregate travel demand models that were estimated on a random sample of urban travelers and a manual procedure or sketch planning pivot-point version of the above methodology) and have undertaken to accomplish the following objectives: transfer-

ability, testing the manual approach on actual applications, and validating the method. The first objective was investigated by examining and comparing disaggregate models that were estimated in 7 US cities by eight different organizations. The next two objectives were investigated using separate case studies: the Washington, DC, Shirley Highway preferential transit and carpool lanes; the Portland, Oregon, Banfield Highway Expressway preferential transit and carpool lanes; the Los Angeles, Santa Monica Freeway preferential Diamond Lane and ramp metering facilities for transit and carpools; the Minneapolis, express bus on metered freeway project; and the Portland, Oregon, carpool matching and promotion programs for the general public and for employer-based groups. Principal findings are summarized and results consolidated.

Cambridge Systematics, Incorporated, Department of Energy Apr. 1977, 40 p.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; DOE/TIC-10739

48 313207 BICYCLING AND AIR QUALITY INFORMATION DOCUMENT. The document summarizes major factors affecting the level of bicycle use at the local level, and outlines measures to be considered for inclusion in a comprehensive bicycle transportation strategy. Quantitative data on bicycle program effectiveness is reviewed, and evaluation of potential air quality and energy impacts of bicycle strategies is discussed. Implementation considerations are included, such as legislation, institutional structure, and funding sources. Finally, brief case studies of programs implementing bicycle strategies are presented for Davis (California), Madison (Wisconsin), Denver (Colorado), and the states of North Carolina and California.

Mayo, MF ; Abt Associates, Incorporated, Environmental Protection Agency Final Rpt. EPA-400/2-79-001, Sept. 1979, 220p; Prepared in cooperation with Department of Transportation, Washington, DC.; Contract EPA-68-01-4946; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-146863

48 313469 ENERGY POLICY IMPACT EVALUATION. The 5 papers in this report deal with the following areas: approach to assessing the impact of energy conservation policies on transportation demand; survey and analysis of energy intensity estimates for urban transportation modes; foreign oil dependence: state-level analysis; vehicle kilometers traveled: evaluation of existing data sources; and multivariate classification of automobiles by use of an automobile characteristics data base.

Mufti, RK Munson, MJ Chomitz, K Margiotta, RA Reilly, LJ ; Transportation Research Board, Washington, DC. TRB/TRR-726, ISBN-0-309-02979-1, 1979, 44p; Library of Congress catalog card no.79-607912. Also pub. as ISSN-0361-1981. Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-137953

48 314219 TRANSPORTATION IN UNDER-DEVELOPED COUNTRIES. These papers were presented in one of the Work-Sessions at the Second International Symposium of Engineering

held at 'Universidad Centroamericana Jose Simeon Canas' from the 19th to the 23rd of February 1979. The document describes problems in under-developed countries related to transportation; rapid urbanization, which leads to the development of high residential areas, and often bad-planned transportation systems. Energy expenditure in transportation is usually a high percentage of total Energy consumption; therefore, the necessity of evaluating transportation programs and planning transportation alternatives is of prime importance, especially because present trends indicate that such energy consumption is increasing.

Univesidad Centroamericana Jose Simeon Canas, Agency for Intenational Development Feb. 1979, 98p; Sponsored in part by Agency for International Development, Washington, DC.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-169105

48 314374 INTERACTIONS BETWEEN ENERGY SUPPLY AND TRANSPORTATION-RELATED ENERGY USE. VOLUME I. This report describes the structure of ENTRANS and some of its policy analysis applications. ENTRANS is a computer simulation model of the interactions between energy supply and transportation-related energy use. It includes a complete representation of the characteristics of transportation supply (public transit, carpooling, highways, and autos) and of households' travel-related decisions (car type, travel mode, trip length, and frequency choices). The model is capable of analyzing a wide range of policies designed to change automobile fuel use. The results of several detailed policy analyses are described in this report.

Adler, TJ Ison, JW Geinzer, JC ; Thayer School of Engineering, Department of Transportation Final Rpt. DOT/RSPA/DPB-50-80/7, Jan. 1980, 175p; Contract DOT-RC-82003; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-185002

48 315149 EXPOSURE TO HYDROCARBONS IN TRAMS [Exposition foer kolvaeten i spaarvagnar]. A series of tests to analyse exposure to air pollution in various traffic conditions in central and urban districts (Gothenburg) has been made. The air has been analysed with regard to certain components in vehicle exhaust fumes. The components concerned were benzene, alkylbenzenes and n-alkanes. Comparisons of concentration levels of these pollutants on trams on a major road at peak and low traffic showed up to 4 times higher concentrations at rush hour times. On tram routes of little traffic and interspersed long stretches of no traffic a result of 5-6 times lower concentrations was found in comparison to routes of dense traffic. Tests carried out on all three transport mediums simultaneously for the same route, including traffic queues, showed that benzene and alkylbenzenes reached levels of up to 4 times higher in cars than in the other two types of transport. Samples taken from a tram stop where other traffic is fairly limited in the city centre and samples from a tram stop where other traffic is close and concentrated showed a differential factor of 10 in the benzene and alkylbenzene levels. Weather conditions, especially rainfall and wind strength proved to be of major importance for the pollution concentrations. Results showed the importance of the need of measures

which must be taken in both the short and long terms. In the short term actions such as avoiding traffic lights which cause traffic queues in the vicinity of tram stops can be taken. If tram doors opened on the side away from other traffic this already has a positive effect. If tramways could be routed to one side of other traffic this would be a great advantage. Another large improvement for the tram driver and his passengers can be achieved by keeping tram routes a whole block away from the busy roads. [Swedish]

Andersson, A-M ; Chalmers University of Technology, Sweden Monograph 1979, 62 p., 11 Fig., Tabs., 21 Ref.; ACKNOWLEDGMENT: TRRL (IRRD 246653), National Swedish Road & Traffic Research Institute; ORDER FROM: Chalmers University of Technology, Sweden, Institutionen foer Teknisk Kemi, Fack, S-402 20 Goeteborg 5, Sweden; 79.1262

48 317701 ANALYTIC PROCEDURES FOR URBAN TRANSPORTATION ENERGY CONSERVATION: SUMMARY OF FINDINGS AND METHODOLOGIES. FINAL REPORT, VOLUME I. Analytical methodologies are described and illustrated for use by metropolitan planning organizations and other state and local transportation agencies in analyzing the energy conservation potential of candidate urban transportation measures. Quantitative methodologies oriented to carpooling, vanpooling, transit, pricing, traffic regulation and control, and auto ownership are provided based on the use of disaggregate behavioral travel demand models. Changes are indicated in trip frequency and distribution as well as in travel model, operating conditions, and vehicle miles of travel. Trip-based estimates of fuel consumption and vehicle emissions are included. The methodologies can be adapted to different levels and types of data availability, and can employ manual sketch planning procedures, a programmable calculator, or a fully-calibrated computer program utilizing a random sample household enumeration forecasting technique. Application of the developed methodologies has been performed in cooperation with metropolitan planning organizations representing the Dallas-Fort Worth, San Francisco, and Denver urban areas.

Suhrbier, JH Byrne, WD ; Cambridge Systematics, Incorporated, Department of Energy Apr. 1979, 40p; Contract EM-76-C-01-8628; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; CONS-8628-T1

48 317729 URBAN TRANSPORTATION ENERGY CONSERVATION: CASE CITY APPLICATIONS OF ANALYSIS METHODOLOGIES. This report demonstrates the application of a set of disaggregate travel demand methodologies to the analysis of potential energy conservation strategies in three urban areas: Denver, Colorado; Fort Worth, Texas; and San Francisco, California. The methodologies are sketch planning in nature and include the forecasting of changes in automobile ownership; work trip model shares by drive alone, shared ride, and transit; non-work trip frequency, destination, and mode choice; fuel consumption and vehicle emissions. Using concepts of market segmentation and random sample household aggregation, both computer system and manual worksheet versions of the basic approach are applied. Policies ana-

lyzed include those related as employer based ride sharing, parking management, transit, pricing, and traffic operations. Considerable variations in the potential effectiveness was found, among the three urban areas, depending in large part on the availability of alternative travel modes such as transit. Descriptions are provided of the individual policy analyses performed, the methods by which example policies were analyzed, the necessary data preparation activities, and the procedures used to adapt the set of travel demand models to the unique conditions of each of the three metropolitan areas. (ERA citation 05:005913)

Atherton, TJ Suhrbier, JH ; Cambridge Systematics, Inc., MA. *Department of, Energy. Oct. 1979, 160p; Contract EM-76-C-01-8628; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; DOE/PE/8628-1(V.3)

48 317731 URBAN TRANSPORTATION ENERGY CONSERVATION. SRGP OPERATING INSTRUCTIONS AND PROGRAM DOCUMENTATION. FINAL REPORT. SRGP is a computer program for Short Range Generalized transportation Policy analysis for use in analyzing the energy conservation potential of a broad spectrum of transit, carpooling, vanpooling, parking, pricing, and other transportation system management measures. It is intended for use in either an areawide or corridor context and in what is referred to as a sketch planning style of analysis. Outputs include changes in fuel consumption, vehicle emissions, vehicle miles of travel and modal shares for drive alone, shared ride, and transit. Changes in travel behavior are forecast relating to auto ownership, work trip mode choice, and the frequency, destination, and mode choice for both shopping and social/recreational non-work travel. Using a random sample household forecasting procedure, SRGP is a modified version of the program UMODEL, distributed by the US Urban Mass Transportation Administration as part of UTPS, the Urban Transportation Planning System.

MacMann, JF Nestle, RE ; Cambridge Systematic, Incorporated, Department of Energy Oct. 1979, 120p; Contract EM-76-C-01-8628; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; DOE/PE/8628-1(V.5)

48 317934 TRANSPORTATION AIR QUALITY ANALYSIS-SKETCH PLANNING METHODS. VOLUME I: ANALYSIS METHODS. Analytical methodologies are described (in Volume I) and illustrated (in Volume II) for use by metropolitan planning organizations and other state and local transportation agencies in analyzing the air quality potential of candidate urban transportation measures. As sketch planning techniques, the methods are designed to produce first-cut estimates of a proposed transportation measure's impact for a relatively small investment of time and effort. Quantitative methods oriented to auto restricted zones, high occupancy vehicle priorities, transit improvements, parking programs, carpool/vanpool incentives, and staggered work hours are provided. The methods use worksheet, programmable calculator, and computerized approaches to apply disaggregate behavioral models. They can be used to predict traveller demand as a function of transportation system characteristics, transportation facility operations as a function of their usage and

their physical characteristics, and special impacts including vehicular emissions, fuel consumption, and operating costs. Guidelines are provided both to those responsible for designing the transportation-air quality analysis approaches in specific local areas, and to those who will carry out these analyses. In addition, references are provided to documents which provide additional detail on the methods.

Cambridge Systematics, Incorporated, Environmental Protection Agency, Urban Mass Transportation Administration Final Rpt. EPA-400/1-80-001A, Dec. 1979, 284p; Contract EPA-68-01-4977; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-158702

48 317935 BLUEPRINT FOR SURVIVAL. A blueprint for survival through curtailment of demand is outlined using a transportation model system. Techniques available for reducing total energy demand in transportation include decreasing population size, increasing the price of gasoline, changing the "modal mix", or relative availability of different types of transportation systems, changing the spatial design of society to increase population density, increasing the interposition of places of work, living, shopping, and leisure by encouraging high-rise construction, and more efficient interaction between transportation systems and the structure and dynamics of society. Sensitivity analysis of energy consumption in transportation systems to different conservation strategies was examined using a statistical model that explains data and reflects plausible interactions.

Watt, KEF Lee, JJ ; California University, Davis, National Science Foundation NSF-RA-E-73-617, 1973, 25p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-158819

48 318631 TECHNOLOGY ASSESSMENT OF PRODUCTIVE CONSERVATION IN URBAN TRANSPORTATION. PROJECT DESCRIPTION FOR FISCAL YEARS 1980, 1981. An investigation of the potential environmental, health, and safety impacts of various alternative productive conservation strategies is presented. The technology assessment identifies internally consistent (mutually reinforcing policy or technology elements following a specific theme) productive conservation strategies which will aid in the reduction of the US dependence on petroleum in urban transportation; compares analytically the energy savings and environmental impacts of the various productive conservation strategies; and analyzes the issues and the barriers which may constrain these productive conservation strategies from becoming effective. Each strategy is discussed. Major tasks that occur during 4 phases are discussed, e.g., data collection, model assembly, impact criteria; in-place policy analysis; analysis of alternative strategies; and documentation. (ERA citation 05:019015)

Department of Energy, Washington, DC. Div. of, Technology Assessments. Dec. 1979, 32p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; DOE/EV-0070

48 318698 REGIONAL ANALYSES OF HIGHWAY ENERGY USE. Regional variation among selected factors affecting energy use in highway transportation is described and analyzed. Highway vehicle use accounts for about

95% of all motor gasoline used and a substantial portion of the diesel fuel consumed in the US. For the purposes of analysis, highway energy use can be divided into three sectoral users: household, commercial, and government. Chapter 1, Non-highway Use of Gasoline, covers agriculture, marine, aviation, industrial and commercial, construction, snowmobiles, and motorcycles. Chapter 2, Topics in Commercial Highway Energy Use, includes the following: Commercial Use of Gasoline in Highway Transportation, Automotive Fleets and Electric Vehicle Applicability; Local and Short-Haul Commercial Trucking; Inter-city Trucking; and Intracity Bus Service. Chapter 3, Selected Characteristics of Highway Energy Use by the Household Sector, includes sections entitled: Regional Gasoline Use; Ownership of New and Used Vehicles; Fuel Efficiencies and Market Shares of New Vehicle Registrations; Regional Trends in Import Passenger Car Sales and in Light Truck and Van Sales; Regional Variations in Recreational Vehicle Shipments and in Gasoline Consumption, 1977; Regional Patterns of Motorcycle and Moped Use; and An Analysis of the Differences in Carpooling Across Metropolitan Areas. (ERA citation 05:022584)

Kulp, G Greene, DL Walton, GH Collins, MJ Shonka, DB ; Oak Ridge National Laboratory, Department of Energy Apr. 1980, 425p; Contract W-7405-ENG-26; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; ORNL-5587

48 318781 URBAN NOISE POLLUTION, 1970-JUNE, 1980 (A BIBLIOGRAPHY WITH ABSTRACTS). Aspects of noise in the urban environment are covered. The topics were chosen for their interest to urban planners and include citizen attitudes, transportation noise, and noise abatement techniques. (This updated bibliography contains 220 abstracts, 31 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service July 1980, 229p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-812779

48 318782 HIGHWAY TRAFFIC NOISE, 1964-JUNE, 1980 (A BIBLIOGRAPHY WITH ABSTRACTS). The citations relate to many aspects of highway noise and its reduction. Studies include transportation noise models, environmental aspects, noise sources, tire-pavement studies, noise barrier design, noise levels, and research in the field. The bibliography also covers highway planning and Government policies in connection with noise pollution abatement and control strategies. Central city investigations are in general excluded. (This updated bibliography contains 238 abstracts, 18 of which are new entries to the previous edition.)

Kenton, E ; National Technical Information Service July 1980, 245p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-812787

48 319320 THE GASOLINE SHORTFALL: SHARED CULPABILITY. The gasoline shortage of 1979 can be attributed to a number of factors. In 1977, in anticipation of a 1978 OPEC price increase, oil companies built up their crude stocks to higher levels. By January 1978, gasoline stocks were up 7.8 percent above levels in 1977. The oil companies then began to reduce inventories and run their refineries at rates below 1976 and 1977 levels. In spite of making hints at decontrolling gasoline prices, the Federal Go-

vernment did not. Refiners were probably waiting for higher prices and did not therefore increase their capacity. Furthermore, the government banned the use in gasoline of MMT, an octane boosting lead substitute, forcing refiners to use more crude oil per gallon of gasoline. This all backfired when a mild autumn spurred larger use of gasoline, a cold winter increased heating oil, and, by the end of December, Iranian exports ceased. To prevent future shortages, a number of steps can be taken to decrease demand. The improvements in automobile fuel efficiency mandated by the Federal Government (27.5 mpg by 1985) could conceivably cut total gasoline consumption by 15 percent. Higher prices and curtailment of pleasure driving could reduce demand another 10 percent, depending on how elastic the demand is. Increased use of mass transit could reduce gasoline use by 7 percent, and energy alternatives such as electric vehicles and gasohol could account for another 7 percent, for a total reduction of 39 percent.

Energy Staff Rpt. Vol. 4 No. 3, 1979, pp 4-6, 2 Tab.

48 319637 VIBRATION AND STRUCTURE-BORNE SOUND IN THE VICINITY OF ROAD TUNNELS. The results of measuring the vibration and structure-borne sound in the vicinity of a large motorway tunnel are presented including measurements during the construction of the tunnel.

Koch, HW (Hannover University, West Germany) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 381-388, 6 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319652 NOISE GENERATION BY RAILROAD COACHES. A systematic analysis was carried out on the acoustic behavior of railroad coaches. Radiation of air-borne sound as well as structure-borne sound transmission from the wheel/rail contact area to the car body was investigated in laboratory and stationary tests and during test runs at high speeds (160-250 km/h). The aim of the experiments was to find out how much the individual components of the trailing bogie contribute to the transmission of structure-borne sound and the radiation of air-borne sound. A rank ordering of the individual transmission paths from the axle bearing to the bogie frame was set up. An identification of the main noise sources and an indication of the frequency range in which they are important was possible.

Fischer, HM (Technical University of Berlin, West Germany) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 333-349, 14 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319653 GROUND VIBRATIONS FROM PASSING TRAINS. The residual problems of ground-borne vibration, the vehicle and track features which might be responsible for generation, its propagation, and its effects on wayside buildings are examined. Experimental work suggested various significant features of railway design which might merit attention.

Dawn, TM (British Railways Board) Stanworth, CG *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 355-362, 7 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319654 GROUND-BORNE NOISE AND VIBRATION FROM UNDERGROUND RAIL SYSTEMS. Ground-borne noise is one of the main causes of environmental impact from urban rail transit systems. The vibration resulting from track-train interaction is transmitted through the tunnel structure and the surrounding ground to adjacent buildings. The resulting vibrations of the walls and floors of these buildings cause secondary radiation of noise. This paper presents a method for estimating A-weighted sound levels as well as noise and vibration spectra due to ground-transmitted vibration in buildings near subways.

Kurzweil, LG (Department of Transportation) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 363-370, 24 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319655 COMPARATIVE VALUES OF STRUCTURE-BORNE SOUND LEVELS IN TRACK TUNNELS. Comparative figures for the structure-borne sound levels in underground train tunnels are given by the results of measurements made by the Curt-Risch-Institut as published in a series of internal reports.

Koch, HW (Hannover University, West Germany) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 377-380, 4 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319656 PROPAGATION OF NOISE FROM RAIL LINES. The author presents models for predicting the effects of geometric attenuation, air absorption, ground attenuation, and barrier insertion loss on the propagation of noise from railcars and locomotives. Predictions based on these models are compared with available field data.

Kurzweil, LG (Department of Transportation) Cobb, WN Kendig, RP *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 389-405, 30 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319657 PILOT STUDY ON RAILWAY NOISE ATTENUATION BY BELTS OF TREES. A pilot study was carried out to obtain an indication of the order of magnitude of attenuation of noise from passing trains by belts of trees and bushes 25 to 50 m wide. Pass-by noise was recorded in level grass-covered country and behind a belt of trees and bushes close by at two measurement sites.

Kragh, J *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 407-415; Proceedings of the Workshop on Railway and Tracked Transit

System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319658 RAILWAY NOISE AND VIBRATION ANNOYANCE IN RESIDENTIAL AREAS. The 1975/76 I. S. V. R. national study of railway noise in Great Britain combined a noise measurement program and a social survey of the reactions to railway noise of residents within an estimated 65 dB(A) (peak) railway noise contour. A complex probability sample of 2010 addresses grouped in sets of 5 adjacent addresses within 403 compact segments in 75 areas each approximately one mile long was utilized in the study. Each of the 403 clusters of dwelling units became a physical noise measurement site. The results indicate that through train noise, maintenance noise and vibration are the most widely noticed problems associated with railways in residential areas.

Fields, JM (Southampton University, England) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 445-458, 17 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319659 RAILWAY TRAFFIC: ENVIRONMENTAL NOISE CONTROLS FOR NEW HOUSING SITES. The absence of an established criterion for housing site design against railway noise presents problems for environmental health officers who are consulted at the planning stage of housing sites. A guidance standard is suggested and experiences of a recent housing development are described.

Clegg, JD (Environmental Health Department, England) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 463-467, 10 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319662 OVERALL RAILWAY NOISE IMPACT IN THE U. K. As part of a British Rail (BR) "Environmental and Social Impact" study in 1975, an attempt at assessing the relative noise impact of rail and road transport was made; 24 hour $L_{1/e}/q$ in dB(A) units was adopted for the noise measure, as this appeared to give good correlation with "dissatisfaction" and permitted simple estimation of levels from traffic and location data. Five train types were defined, two classes of line, three regions of population density and three standard topographies. The base $L_{1/e}/q$ value for each traffic mix, line and population region could be established from BR survey data, and the propagation from topography and population (house) densities, to give the population subjected to each $L_{1/e}/q$. The percentage "dissatisfied" at each $L_{1/e}/q$ was then applied to arrive at the total population "dissatisfied", which was found to be 106,000. A similar approach applied to motorways and principal "A" roads gave 4,480,000 "dissatisfied".

Waters, DM (Loughborough University of Technology, England) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 477-481, 8 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDG-

MENT: EI; ORDER FROM: ESL

48 319663 IMPORTANCE OF RAILWAY NOISE IN FRANCE. A national survey on environmental nuisances due to all forms of transport was made in France during 1977. From among the data gathered, it is possible to extract results concerning the impact of nuisance due to railways, partly from results of questionnaires and partly from results of acoustical measurements. Interviews and measurements were made in several towns, at randomly selected dwellings. Rail and air transport noise nuisance impacts appeared to be of comparable importance, with that of road transport very much larger than either.

Maurin, M (Institute of Transport Research) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 493-496; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319664 DUTCH STUDY ON RAILROAD TRAFFIC NOISE. A Dutch study on the community response to noise is presented. The set-up of the study is described broadly. Some details are given about the comprehensive sound level measurement program. Some preliminary results from the social survey are given. A major finding is that annoyance is caused less by the sound of trains running through than by other sounds from the track.

Jong, RG de *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 497-502, 2 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319676 EFFECT OF TRAIN NOISE ON SLEEP FOR PEOPLE LIVING IN HOUSES BORDERING THE RAILWAY LINE. Disturbance of sleep by train and road noises was studied through in situ physiological recordings. For the same value of $L_{1/e}/q$ three times as many disturbances due to the noise from road traffic were found as there were due to the train noise. The data on sleep reactions for all the noise events does not show a better train noise adaptation than that for the road noise.

Vernet, M (Institute of Transport Research) *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 483-492, 8 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319677 ON THE SOURCES OF WAYSIDE NOISE GENERATED BY HIGH-SPEED TRAINS. A linear array of 14 microphones was used to measure radiated noise generated by a four-carriage electric train traveling at speeds between 160 and 250 km/h. Most of the results given pertain to apparent source locations of wheel/rail interaction noise, although preliminary data collected in a concurrent study of railway aerodynamic noise are briefly mentioned. An analysis of the measurements suggests that apparent sources of wheel/rail interaction noise are located (i) in the rail or substructure at low

frequencies, (ii) on the wheel rim just below the axle at intermediate or peak frequencies, and (iii) on the lower part of the wheel and possibly in the rail at high frequencies.

King, WF, II Bechert, D *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 311-332, 37 Ref.; Proceedings of the Workshop on Railways and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 319678 PREDICTION OF THE PROPAGATION OF TRAIN-INDUCED GROUND VIBRATION. The author presents models for prediction of the propagation of train-induced ground vibration. Three models are presented: the line source model, the point source model and the superposed model, and each of these models is discussed in regard to available measurement data.

Verhas, HP *Journal of Sound and Vibration* Vol. 66 No. 3, Oct. 1979, pp 371-376, 3 Ref.; Proceedings of the Workshop on Railway and Tracked Transit System Noise, 2nd, Lyon, France, October 17-19, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 320004 1975 HIGHLIGHT REPORT: VOLUME XXI, DRIVING AND ENERGY CONSERVATION. A nationwide probability sample survey of 1207 respondents was conducted by ORC by telephone during the period November 26 through December 21, 1975. The data indicate that most drivers drive in ways that save gasoline. Ninety-six percent stop pressing gas pedals when they see a red light; 84% plan several errands for one trip; 84% have car engines tuned once a year (increases mileage); and 84% drive 55 mph on major highways (this speed saves gasoline). The exception is that 69% drive themselves to work; only 10% carpool or take passengers, 8% take public transit, and 5% walk to work.

Opinion Research Corporation, Federal Energy Administration One-Time No Date, n.p.; Available in Paper Copy, Microform.; ACKNOWLEDGMENT: Transportation Statistical Reference File, TSC (004); ORDER FROM: NTIS; PB-261162

48 322032 ENERGY AND THE TRANSPORT SECTOR. This article describes the current energy situation from both the global viewpoint and the viewpoint of countries with no indigenous sources of fossil fuels. In Sweden, for example, the main energy reserves of the future are hydro power and uranium. Electricity therefore becomes a natural means of distribution of energy. The lack of fossil fuels necessitates a substitution with indigenous sources of energy, where feasible. Long-distance railway transport is a self-evident element in the expanding transport sector. In view of the proven high energy efficiency of electric railway systems, there is every incentive for a more active investment policy in railway electrification. This applies to both medium-distance transportation of freight and passengers and different electric mass transit systems.

Olson, PE *ASEA Journal* Vol. 52 No. 6, 1979, pp 137-142; ACKNOWLEDGMENT: EI; ORDER FROM: ESL

48 322231 FACTORS AFFECTING WILLINGNESS TO CONSERVE GASOLINE (ABRIDGMENT). This paper explores the role of travel behavior, demographics, and attitudes toward energy conservation to explain consumer willingness to conserve gasoline. Data from a telephone survey of 500 New York households were analyzed on several-measures of willingness to conserve by using a statistical analysis procedure called automatic interaction detection. It was found that willingness to conserve gasoline is generally independent of demographics, travel behavior, and other attitudes toward energy. The factors of mild importance included residence location (New York City residents were more willing to conserve) and attitudes toward use of energy in the United States. Generally, those New Yorkers most willing to conserve were those who had (a) the least to lose if gasoline were curtailed, (b) the most flexibility in current travel behavior and (c) the most additional service options available. A brief review of other recent surveys shows that the public is consistently receptive to policy that encourages gasoline conservation by increasing travel options and offering incentives for their use. Punitive or restrictive measures are met with strong disfavor. Based on the results of this and other studies, policy suggestions include increased perception of travel options and their true costs, increased transit services, and stabilized fares. (Author)

Meyers, CE *Transportation Research Record* No. 751, 1980, pp 27-30, 1 Fig., 13 Ref.; This paper appeared in *Transportation Research Record* No. 751, *Transportation System Analysis and Planning* 1980.; ORDER FROM: TRB Publications Off

48 322250 ENERGY EMERGENCY CONTINGENCY PLANS FOR THE PORT AUTHORITY OF NY AND NJ. This report begins with a summary of contingency plan measures, presented in tabular form, to represent the major actions which would be contemplated by the Port Authority in the event of future severe gasoline shortages. The next section discusses transportation impacts at Port Authority facilities of past gasoline shortages. Its purpose is to examine the various travel pattern changes which resulted from the severe gasoline shortage that occurred during the summer of 1979. The following section contains energy emergency plans for PATH--a 13.8 mile rapid rail transit system, connecting Newark, Jersey City, Harrison and Hoboken with lower and midtown Manhattan. The objective of the next portion, an emergency contingency plan, is to establish action programs to assure that the Port Authority's Information Section at the Port Authority Bus Terminal will be adequately staffed and sufficiently informed to handle telephone requests from the public concerning revised operating plans of the regions' intercity bus and rail carriers that may be implemented as a result of a severe energy shortage. The final section reviews energy emergency contingency plans for public transportation to the region's airports. Its purpose is to identify travel markets which will be severely impacted by a significant shortage (30%) of gasoline and diesel fuel and to develop appropriate measures which will insure that adequate services are available to maintain essential public mobility.

Port Authority of New York and New Jersey, Urban Mass Transportation Administration NY-09-0054 TS-G-250, Dec. 1979, 78p

48 322253 DUTCHESS COUNTY ENERGY CONTINGENCY PLAN. The purpose of the plan is to provide for the mobilization of mass transit resources in the event of an energy emergency. This paper describes the current energy situation in Dutchess County. It also estimates potential mass transit needs during energy crises where gasoline availability is reduced by 10, 20, or 30 percent as well as data on available transit resources to meet those needs. The transit systems in Dutchess County are: the County's loop bus system, Mountain View Coach Lines, Inc., the Dutchess Assisted Rural Transit System, and the City of Poughkeepsie Bus System. The plan is divided into three contingency strategies: Executive Leadership Actions-encompassing those actions that the County Executive will perform or delegate to be performed; Emergency Service Actions-including specific plans for increasing transit resources; and Suggested Citizen Action--those actions which provide citizens with information and assistance during a crisis. Non-mass transit aspects of the plan include ideas on carpooling, vanpools, altered work hours, bikeway usage, and emergency park and ride lots. The plan is designed to be put into effect within a two to four week period from the declaration of a crisis.

Dutchess County Department of Planning Mar. 1980, 43p, Figs., Tabs., 5 App.

48 322255 ENERGY EMERGENCY CONTINGENCY PLAN: WESTPORT TRANSIT DISTRICT. This plan is the result of a short term feasibility study which focused on the development and evaluation of effective short range strategies to expand existing transit services following an interruption of automotive fuel supplies, and it will enable the Westport Transit District to respond to energy induced ridership increases in a timely and effective manner. The report begins with a description of present level of service and inventory of present equipment and resources. The next section contains an analysis of demand for transit services under three fuel reduction scenarios and system capacity analysis to identify excess capacity or capacity restraints under three demand scenarios. It is followed by a description of actions to be taken immediately by the district under energy emergency (short-term) and those actions to be taken under a sustained and slowly developed fuel reduction over a longer period of time (long-term plan). The final section contains a discussion of institutional and financial requirements to implement the Energy Emergency Contingency Plan.

Connecticut Department of Transportation Mar. 1980, v.p., Figs., Tabs.

48 322261 TRANSIT MANAGEMENT IN AN ENERGY-SCARCE ENVIRONMENT. The energy shortage, the expanding transit use and the need to make better use of the economic and human resources entrusted to transit presents a challenge to transit management. Although carrying capacity causes concern, one of the main problems facing management will be the forming of the proper frame of reference to understand this new environment. A strong, broad marketing commitment will be required. Potential customers will require information oriented to the future. Changing costs will require better information, better management and flexibility in thinking.

The development of human resources for transit is a matter of urgency. Surveys show that the demographic pattern of new riders differs from present or past riders. The transit service provided will have to be more accessible and convenient. The needs of new riders may require new kinds of services. These new services will create short-run peak capacity problems and place burdens on equipment and personnel. Better cost management will be needed to effectively control rising costs and cost-control will require better trained and better educated managers.

Smerk, GM (Indiana University, Bloomington) *Transit Journal* Vol. 6 No. 2, 1980, p 27; ORDER FROM: American Public Transit Association, 1225 Connecticut Avenue, NW, Washington, D.C., 20036

48 322269 THE 1979 ENERGY CRISIS: WHO CONSERVED HOW MUCH?. The gasoline shortage during the summer of 1979 prompted New York State residents to adopt a series of conservation actions. 1,520 New York residents were surveyed to determine what action the public took, and what actions they would take under two energy futures: gas at \$1.50/ gallon; and a 20% shortfall. To quantify the energy savings implied by these actions, trip length, trip rate, and energy use data were applied to the responses. Results showed that residents did respond significantly to the 1979 energy crisis, saving over 6% of gasoline use in the first three quarters. The actions taken were varied and extensive, cutting across all facets of travel. Most conservation (44%) was accomplished through car-related actions, particularly by a fuel-efficient car (20%) and car selling (16%). Carpooling, transit, and driving slower accounted for 8, 16, and 2% respectively, of the gasoline conserved in New York State. In cities with good transit accounted for up to 31% of the savings. Other wide differences were observed by age, income, auto ownership and location of respondents. The study concludes that since most savings was achieved by voluntary actions, government's role should be to expand and promote travel options and make them available to more people, rather than constrain or coerce behavior.

Hartgen, DT Neveu, AJ ; New York State Department of Transportation Apr. 1980, 42p, Figs., Tabs., Refs.

48 322817 HYDROGEN FUEL APPLICATIONS FOR URBAN TRANSIT. With the growing scarcity of fossil fuels and continuing concern about air quality, an increased need for viable urban transit solutions has become apparent. Hydrogen, a synthetic fuel which may be used to power internal combustion engines, provides an exceptional alternative to gasoline or diesel fuel in urban transit applications. A bus or light rail system utilizing hydrogen would be independent of oil supplies and virtually non-polluting. NASA and the aerospace industry have contributed significantly to an increased understanding of the fuel properties of hydrogen, and its increased range of applications. Technology now exists for conversion of city buses, trucks, and rail systems to hydrogen fuel. This study considers the technical aspects of hydrogen vehicle systems, summarizes past and present working examples, and describes a proposed integrated refuse disposal-hydrogen fueled transit system for the City of Denver, Colorado.

MacCarley, CA (Denver University) *AIAA Monographs* Vol. 25 1979, pp 45-62, 24 Ref.; Proceedings of the Soc and Aerospace Technology Workshop, Los Angeles, California, November 15, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Western Periodicals Company, 13000 Raymer Street, North Hollywood, California, 91605

48 322964 ENERGY STUDY OF RAIL PASSENGER TRANSPORTATION. VOLUME 2. DESCRIPTION OF OPERATING SYSTEMS. FINAL REPORT. The rail passenger systems of the US are described in terms of selected physical, operating, and economic characteristics, and services rendered are related to energy usage and costs. Rail passenger transportation exists in 4 distinct forms: intercity railroads, suburban railroads, heavy-rail transit, and light-rail transit. Each form varies in technical equipment, design of facilities, operating practices, size of systems. Specific data for the national rail passenger network and the Boston, Chicago, Cleveland, New York, Philadelphia, Pittsburgh, and San Francisco regions and the Washington Metropolitan area transit authority are presented.

Henderson, C Ellis, HT Wilhelm, JP ; SRI International Aug. 1979, 171p; Contract EY-76-C-03-1176; ACKNOWLEDGMENT: Energy Research Abstracts; ORDER FROM: NTIS; SAN-1176-T2(Vol. 2)

48 322973 PREDICTION OF COMMUNITY NOISE FROM RAIL SYSTEMS. This paper presents a simple procedure for predicting noise in the vicinity of rail lines including intercity freight and passenger services and metropolitan systems. The procedure accounts for the effects of speed; wheel and rail condition; travel on bridges and elevated transit structures; geometrical spreading of sound energy; excess attenuation due to propagation over the ground and through the air; and barrier attenuation by sound screens, cuttings, embankments, and houses. A-weighted sound pressure level is the basic quantity predicted; equations are given to determine various noise exposure measures such as the 24-hour energy equivalent sound level, the day-night average sound level and the community noise equivalent level.

Kurzweil, LG (Department of Energy) ; American Society for Testing and Materials 1979, pp 197-216, 40 Ref.; ASTM Special Technical Publication n 692, Community Noise (Symposium), Kansas City, Missouri, May 24-26, 1978.; ACKNOWLEDGMENT: EI; ORDER FROM: American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania, 19103

48 326008 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 1: SUMMARY REPORT. This report presents an analysis of Transit Energy Consumption in several urban areas. A total of ten urban areas were selected for individual case studies. In each of these ten areas, an analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of

energy consumed for each of several factors in operation- such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-1, Dec. 1979, 117p; See also Volume 2, PB80-208432. Also available in set of 13 reports PC E99, PB-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208424

48 326009 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 2: ANALYSIS OF WASHINGTON, DC. This report presents an analysis of Transit Energy Consumption in Washington, DC. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation-such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-2, Dec. 1979, 105p; See also Volume 1, PB80-208424 and Volume 3, PB80-208440. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208432

48 326010 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 3: ANALYSIS OF BALTIMORE, MARYLAND. This report presents an analysis of Transit Energy Consumption in Baltimore, MD. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation-such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-3, Dec. 1979, 77p; See also Volume 2, PB80-208432 and Volume 4, PB80-208457. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208440

48 326011 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 4: ANALYSIS OF BOSTON, MASSACHUSETTS. This report presents an analysis of Transit Energy Consumption in Boston, MA. An analysis was made of the

existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation-such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-4, Dec. 1979, 105p; See also Volume 3, PB80-208440 and Volume 5, PB80-208465. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208457

48 326012 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 5: ANALYSIS OF MIAMI, FLORIDA. This report presents an analysis of Transit Energy Consumption in Miami, FL. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation-such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-5, Dec. 1979, 81p; See also Volume 4, PB80-208457 and Volume 6, PB80-208473. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208465

48 326013 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 6: ANALYSIS OF GREAT FALLS, MONTANA [Final rept.]. This report presents an analysis of Transit Energy Consumption in Great Falls, MT. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation-such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Inc., Washington, DC. *Office of the Assistant Secretary for Policy, and International Affairs (DOT), Washington, DC. 91910-VOL-6, Dec. 1979, 60p

See also Volume 5, PB80-208465 and Volume 7, PB80-208481. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208473

48 326014 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 7: ANALYSIS OF SAN FRANCISCO, CALIFORNIA. This report presents an analysis of Transit Energy Consumption in San Francisco, CA. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation—such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-7, Dec. 1979, 110p; See also Volume 6, PB80-208473 and Volume 8, PB80-208499. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208481

48 326015 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 8: ANALYSIS OF SAN DIEGO, CALIFORNIA. This report presents an analysis of Transit Energy Consumption in San Diego, CA. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation—such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-8, Dec. 1979, 83p; See also Volume 7, PB80-208481 and Volume 9, PB80-208507. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208499

48 326016 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 9: ANALYSIS OF CHICAGO, ILLINOIS. This report presents an analysis of Transit Energy Consumption in Chicago, IL. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation—such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-9, Dec. 1979, 83p; See also Volume 8, PB80-208499 and Volume 10, PB80-208515. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208507

48 326017 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 10: ANALYSIS OF PORTLAND, OREGON. This report presents an analysis of Transit Energy Consumption in Portland, OR. An analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation—such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-10, Dec. 1979, 73p; See also Volume 9, PB80-208507 and Volume 11, PB80-208523. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208515

48 326018 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 11: ANALYSIS OF TORONTO, ONTARIO, CANADA. This report is part of the Transit Energy Consumption and Federal Policy Study that analyzes the way in which energy consumption and conservation has been considered in the planning, development, and operation of public transit systems in selected cities. Although Toronto, Canada, is not subject to U.S. Federal policy, it is pertinent to observe this system as an example and comparative element in this study. Toronto has a successful transit system, and it is useful to observe the differences in policy and planning. The report discusses each and all of the transit operators and the general characteristics of the Toronto Metropolitan Area. Each transit operator is discussed in terms of function, structure, facilities and equipment, and utilization and operations.

International Business Services, Incorporated, Asst Secretary for Policy & International Affairs 91910-VOL-11, Dec. 1979, 66p; See also Volume 10, PB80-208515 and Volume 12, PB80-208531. Also available in set of 13 reports PC E99, PB80-208416.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208523

48 326019 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 12: ANALYSIS OF THE CAPITAL GRANT APPLICATION DECISION PROCESS. This report presents an analysis of Transit Energy Consumption in several urban areas. A total of ten urban areas were selected for individual case studies. In each of these ten areas, an analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation—such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-12, Dec. 1979, 55p; See also Volume 11, PB80-208523 and Volume 13, PB80-208549. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208531

48 326020 ANALYSIS OF TRANSIT ENERGY CONSUMPTION AND FEDERAL POLICY. VOLUME 13: ANALYSIS OF SYSTEM CONSTRUCTION ENERGY. This report presents an analysis of Transit Energy Consumption in several urban areas. A total of ten urban areas were selected for individual case studies. In each of these ten areas, an analysis was made of the existing transit system, planned systems, and the transit planning process in that region. Separate studies were made of Construction Energy Consumption and of the DOT Capital Grant Application Process and the type of energy analysis used in that process. The analysis of the current and planned systems was directed at finding the source and amount of energy consumed for each of several factors in operation—such as traction power, control power, and in maintenance and construction.

Weirich, R Burgwald, B Cole, W Adams, A Wagner, C ; International Business Services, Incorporated, Asst Secretary for Policy & International Affairs Final Rpt. 91910-VOL-13, Dec. 1979, 85p; See also Volume 12, PB80-208531. Also available in set of 13 reports PC E99, PB80-208416.; Contract DOT-OS-80105; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-208549

48 326266 THE ENERGY ADVANTAGES OF PUBLIC TRANSPORTATION. EXECUTIVE SUMMARY. This report addresses the total energy advantage of public transportation, considering both auto and transit energy consumption as well as residential energy consumption and residential mix. The relative modal efficiencies, spatial structure, and residential energy consumption are considered in some detail. The focus is on petroleum-based energy. Regional variations are noted.

McShane, WR Bloch, A Ihlo, W ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0021) UMTA-NY-11-0021-80-1, Mar. 1980, 12p; See also PB80-226129.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226111

48 326267 THE ENERGY ADVANTAGES OF PUBLIC TRANSPORTATION. This report addresses the total energy advantage of public transportation, considering both auto and transit energy consumption as well as residential energy consumption and residential mix. The relative modal efficiencies, spatial structure, and residential energy consumption are considered in some detail. The focus is on petroleum-based energy. Regional variations are noted.

McShane, WR Bloch, A Ihlo, W ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0021) UMTA-NY-11-0021-80-1, Mar. 1980, 12p; See also PB80-226129.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226111

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McShane, WR Bloch, A Ihlo, W ; Polytechnic Institute of New York, Urban Mass Transportation Administration, (UMTA-NY-11-0021) UMTA-NY-11-0021-80-2, Mar. 1980, 84p; See also PB80-226111.; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-226129

48 326474 ENVIRONMENTAL IMPACTS OF BART (BAY AREA RAPID TRANSIT). This final report is one of a series and gives an overview of the San Francisco Bay Area Rapid Transit System's (BART) environmental impacts. The disruption of traffic and other activities during subway construction, traffic and parking problems at suburban stations, and train noise along aerial lines have been the most serious environmental impacts of the BART system. Beneficial impacts include its landscaping, linear park, encouragement of downtown street improvements, and generally excellent provisions for its riders. BART's future operational impacts, both beneficial and adverse, are not expected to change much from those to date. Contrary to some fears expressed during the planning process, BART has not generated significant automobile-related air pollution or noise at its suburban stations. Crime has not been a significant problem, either to patrons or station-area neighborhoods. Also, above-ground trackway functions do not apparently pose a serious barrier to cross-line movement. The natural ecosystems near BART facilities have not suffered; vibration from passing trains is not a problem; and the visual impacts of BART facilities have not been significant.

Graff, DL Knight, RL ; Metropolitan Transportation Commission, Department of Transportation, Department of Housing and Urban Development Final Rpt. DOT-P-30-79-05, Apr. 1979, 157p; Also pub. as Department of Housing and Urban Development, Washington, DC. rept. no. HUD-0001646. Prepared by Gruen Associates, Inc., San Francisco, CA., and DeLeuw, Cather and Co., San Francisco, CA.; Contract DOT-OS-30176; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-118085, DOTL NTIS

48 327058 URBAN AIR POLLUTION. AUGUST, 1979-JULY, 1980 (CITATIONS FROM THE NTIS DATA BASE) [Rept. for Aug 79-Jul 80]. Selected reports are cited on urban air pollution and its abatement. These citations were selected because of their general interest to urban planners, which will enable them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (This updated bibliography contains 57 citations, all of which are new entries to the previous edition.)

Cavagnaro, DM ; National Technical Information Service., Springfield, VA. Sept. 1980, 63p;

ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-814429

48 327059 URBAN AIR POLLUTION, 1978-JULY, 1979 (CITATIONS FROM THE NTIS DATA BASE) [Rept. for 1978-Jul 79]. This bibliography discusses urban air pollution and its abatement. These citations were selected because of their general interest to urban planners which will enable them to become aware of new abatement strategies and techniques. The majority of the studies cover various aspects of transportation emissions. Other topics include health standards, atmospheric models to aid in planning, law enforcement, abatement policies, and the effects of new modes of transportation. (This updated bibliography contains 221 citations, none of which are new entries to the previous edition.)

Cavagnaro, DM ; National Technical Information Service., Springfield, VA. Sept. 1980, 227p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-814411

48 327060 ENERGY CONSERVATION: TRANSPORTATION, 1978-JULY, 1980 (CITATIONS FROM THE NTIS DATA BASE). The potential to achieve fuel conservation through technology, management, and planning is discussed. Transportation areas covered include urban mass transit, aviation, marine transportation, automobiles, trucks, and railroads. A few abstracts discuss public attitudes concerning conservation measures. (This updated bibliography contains 136 citations, 67 of which are new entries to the previous edition.)

Hundemann, AS ; National Technical Information Service Aug. 1980, 141p; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB80-814403

48 328229 NOISE IMPACT INVENTORY OF ELEVATED STRUCTURES IN U.S. URBAN RAIL RAPID TRANSIT SYSTEMS. This report presents the results of the third task of a five-task program dealing with the reduction of noise from elevated structures in use in U.S. rail rapid transit systems. This report is an inventory and impact assessment of the noise radiated by trains passing on these structures, insofar as this noise is experienced by nearby community residents. An overview is provided of the noise contributions from the various types of structures in nine existing or planned U.S. transit systems operating on 253 km (157 miles). These systems are: Metropolitan Atlanta Rapid Transit Authority (MARTA); Bay Area Rapid Transit District (BART); Chicago Transit Authority (CTA); Metropolitan Dade County (Metrorail-under construction); Massachusetts Bay Transportation Authority (MBTA); New York City Transit Authority (NYCTA); Port Authority Transit Corporation of Pennsylvania and New Jersey (PATCO); Southeastern Pennsylvania Transportation Authority (SEPTA); and Washington Metropolitan Area Transit Authority (WMATA).

These structures are classified into 17 different categories, and noise emission characteristics are determined for each type, based on field measurements and/or published data. Day-night average sound levels are estimated for wayside locations near the elevated structures, and population data are used to evaluate noise impact in terms of the Sound Level Weighted Population (LWP).

Bolt, Beranek and Newman, Incorporated, Transportation Systems Center, Urban Mass Transportation Administration Intrm Rpt. DOT-TSC-UMTA-80-29, Sept. 1980, 199p; Contract DOT-TSC-1531; ACKNOWLEDGMENT: NTIS; ORDER FROM: NTIS; PB81-120958

48 329961 THE INFLUENCE OF UNDERGROUND RAILWAYS ON THE ENVIRONMENT: EXPERIENCES OF BERLIN'S UNDERGROUND. Public transport services are called upon to make greater efforts to reduce as far as possible the effects on the environment caused by them. With a measure of financial support from the Federal Ministry of Research and Technology (BMFT), extensive measurements and tests to this end are being carried out by the Berlin Transport Authority (BVG). The first priority is the diminution of the rolling noises caused by wheel and rail action, on the causes of which interesting new knowledge has been obtained. Progress has also been made toward the prevention of screeching noises on tight curves. Other subjects of study are solid-borne noise and vibration in tunnels and the environmental nuisance created by work-shops and pollution. [German]

Irlé, P *Eisenbahntechnische Rundschau* Vol. 29 No. 9, Sept. 1980, pp 641-643; ACKNOWLEDGMENT: British Railways; ORDER FROM: Hestra-Verlag, Holzhofallee 33, Postfach 4244, 6100 Darmstadt 1, West Germany

48 341561 PROPAGATION OF VIBRATIONS AND NOISE FROM NEW YORK SUBWAY TUNNELS INTO NEARBY BUILDINGS. Vibrations associated with subway train passages were measured simultaneously at several points in a two-level tunnel and on the floors and walls of rooms in a building over the tunnel. The corresponding sound in the rooms was also recorded. Results are presented that illustrate the observed invert vibration spectra, the vibration distributions in the tunnel, the dependence of the vibrations of the room surfaces on the tunnel vibrations, and the relation between sound in the rooms and the vibrations of their surfaces.

Ungar, EE (Bolt, Beranek and Newman, Incorporated) Wittig, LE Paolillo, AA ; Polish Academy of Sciences Proceeding 1979, pp 919-922; Proceedings of the International Conference on Noise Control Engineering, Inter-Noise 79, V2, Warsaw, Poland, September 11-13, 1979.; ACKNOWLEDGMENT: EI; ORDER FROM: Polish Academy of Sciences, Institute of Fundamental Technical Research, Warsaw, Poland

