ANNUAL REPORT

1977

TRANSPORTATION RESEARCH BOARD
NATIONAL ACADEMY OF SCIENCES

ANNUAL REPORT

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TRANSPORTATION RESEARCH BOARD
Commission on Sociotechnical Systems
National Research Council

National Academy of Sciences
Washington, D.C., 1977

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A. Scheffer Lang, Vice Chairman

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John McGrath Sullivan, Federal Railroad Administrator (ex officio)

Harold L. Michael, Professor, School of Civil Engineering, Purdue University (ex officio, Past Chairman, 1976)
Milton Pikarsky, Chairman of the Board, Chicago Regional Transportation Authority (ex officio, Past Chairman, 1975)

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George H. Andrews, Vice President for Transportation Marketing, Sverdrup and Parcel
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Manuel Carballo, Madison, Wisconsin
B. L. DeBerry, Engineer-Director, Texas State Department of Highways and Public Transportation
Louis J. Gambaccini, Vice President and General Manager, Port Authority Trans-Hudson Corporation
Howard L. Gauthier, Department of Geography, Ohio State University (liaison member, Maritime Transportation Research Board)
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Arthur J. Holland, Mayor, city of Trenton, New Jersey
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Robert N. Hunter, Chief Engineer, Missouri State Highway Department
Peter G. Koltnow, President, Highway Users Federation for Safety and Mobility
Thomas J. Lamphier, President, Transportation Division, Burlington Northern Inc.
A. Scheffer Lang, Assistant to the President, Staff Studies Group, Association of American Railroads
Daniel McFadden, Professor, Department of Economics and Institute of Transportation Studies, University of California, Berkeley
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George E. Pake, Vice President, Xerox Corporation, and Manager, Palo Alto Research Center
Douglas N. Schneider, Jr., Director, District of Columbia Department of Transportation
William K. Smith, Vice President—Transportation, General Mills, Inc.
Herb Teske, Secretary, South Dakota Department of Transportation

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E. C. Squires, Assistant Director for Administration
R. C. Edgerton, Assistant Director for Regular Technical Activities
P. E. Irick, Assistant Director for Special Activities
K. W. Henderson, Jr., Program Director for National Cooperative Highway Research Program

To the Supporting Members
of the Transportation Research Board

In my letter to the members in the TRB Annual Report a year ago, I noted that fiscal year 1976 had been a critical year for the Transportation Research Board and expressed optimistic views as to the likely resolution of the crucial issues that the board was facing. It is possible now to be less cautious, more positive, in responding to the questions that were troubling us a year ago.

The old Highway Research Board is really becoming a mature Transportation Research Board. Some 34 sessions during this year's Annual Meeting were devoted to subjects of specific interest to the air and rail transport communities. Several new committees have been formed to deal with the subject matter of concern to those communities, and specialists in rail and air transport have been added to many of the long-standing committees. The technical activities staff is now visiting railroads and mass transport properties on a regular basis. To broaden our base of information exchange and to improve liaison, official TRB representatives have been named in many metropolitan planning organizations and transit organizations. Conferences and workshops of direct interest to, and sponsored by, air and rail agencies have been held during the year and many more are anticipated in the future.

Our activities in support of highway research and concern for the problems of highway programs continue unabated. There are, of course, shifts in emphasis as there have been in the past.

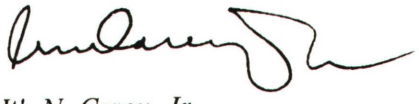
Substantial funding from the Federal Railroad Administration and the Association of American Railroads is in hand, and the outlook for support from the Federal Aviation Administration and the National Highway Traffic Safety Administration of the Department of Transportation is very good. The committee dealing with inland waterway transportation is increasing its activities. A good possibility exists that support will be obtained for TRB inland waterway activity.

The second major question a year ago dealt with whether the traditional TRB sponsors would be able to increase their financial support to keep up with inflation. At least for the 3-year period ending June 30, 1979, it now seems clear that they will.

The third such question dealt with our working relationships in the reorganized National Research Council. These continue to be good. The Commission on

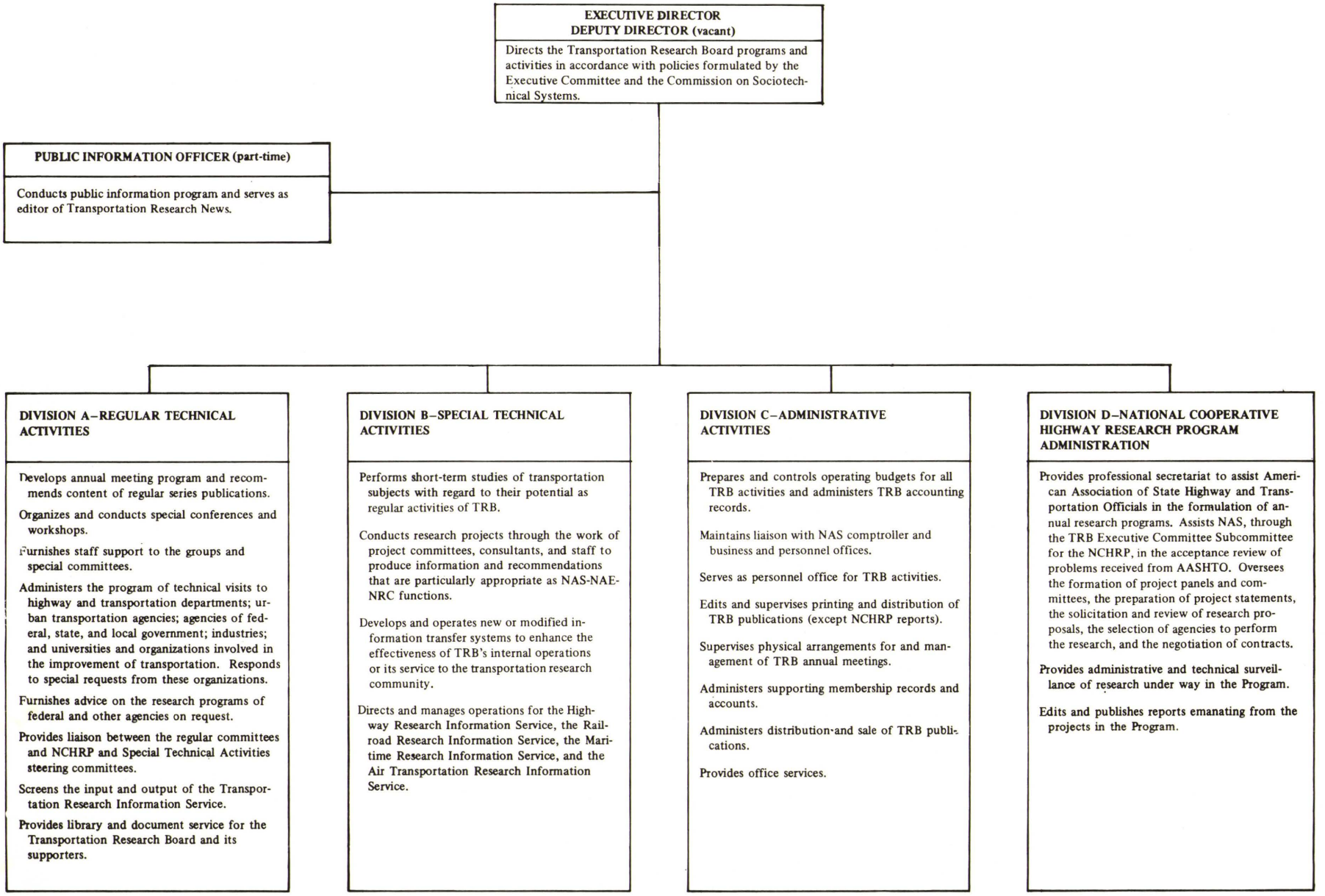
Sociotechnical Systems to which we report within the NRC structure is supportive and helpful. At the suggestion of the commission, the TRB Executive Committee, after extensive deliberation, listed "The Ten Most Critical Issues in Transportation." They were published in the November-December issue of Transportation Research News and have proved helpful as a base against which TRB activities can be evaluated and as a basis for the encouragement of well-designed research programs.

TRB is continually studying ways to improve its service to its sponsors and to the transport community. The search for new ideas is under way in the Executive Committee, the Group councils, the committees, and the staff. We are confident that your continued support of TRB is well justified.

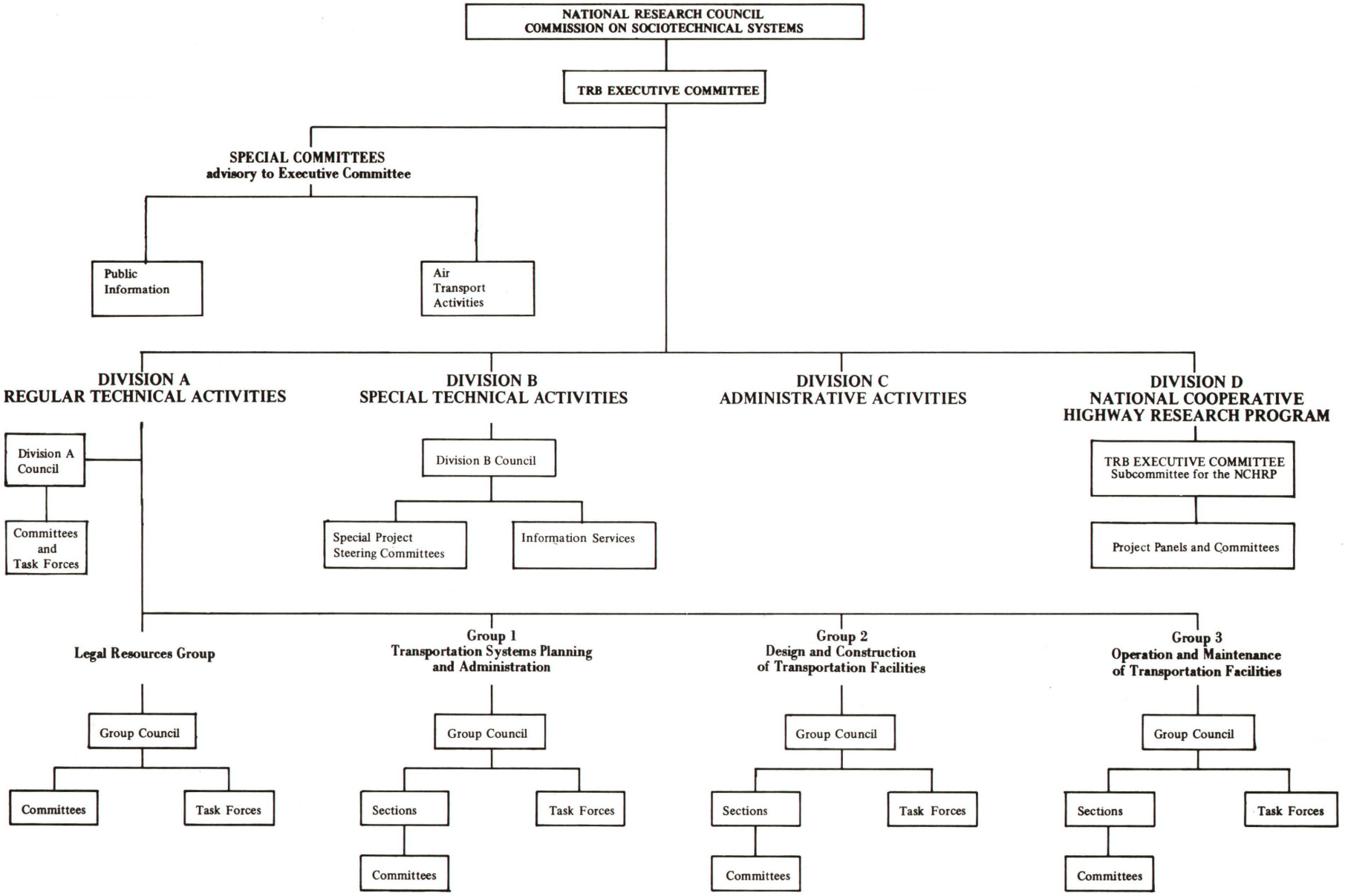


W. N. Carey, Jr.

Staff organization and responsibilities.



Transportation Research Board Organization.



REGULAR TECHNICAL ACTIVITIES

The Division A Council, the coordinating element of the division, is chaired by Kurt W. Bauer, a member of the Executive Committee.

The council provides a forum for exchange of information and coordination of activities among the groups. In addition, several committees and task forces report directly to the council. These include the Committee on the Conduct of Research, the Committee on Inland Water Transportation, and the Task Force on Transportation System Management. Committees on low-volume roads and transportation education are under consideration. Conference steering committees and project study committees of broad scope are often assigned directly to the council. During the past year these have included the Steering Committee for the Conference on the Future of the National Highway Safety Program and the Study Committee to Develop Post-1990 Planning Issues for the Northeast Corridor.

GROUP 1—TRANSPORTATION SYSTEMS PLANNING AND ADMINISTRATION

E. Wilson Campbell, chairman

Group 1 consists of 38 committees in six sections. A major emphasis this past year was to evaluate the structure of Group 1 to determine its effectiveness and responsiveness to current and emerging transport problems. The conclusion of the evaluation was that, except for some minor changes, the current committee structure is quite sound.

Among those changes were changing the name of Section A from Organization and Administration to Management and Finance; discharging the Committee on Organization and Administration and the Committee on Management Review; and establishing six new committees on State Role in Air Transport, State Role in Rail Transport, State Role in Waterborne Transportation, Surface Freight Transport Regulation, Intermodal Freight Transport, and Aviation Demand Forecasting.

A Group 1 task force recommended that a national conference on transportation planning be planned and developed to examine transportation planning in response to the shifting emphasis from regionwide to subregional areas, from long-range to short-range plans, and from capital-intensive to low-capital projects. Some of the issues to be addressed include the following: Is present methodology adequate to undertake short-range, subregional, low-capital transport strategies? Can long-range planning and short-range planning be integrated? How can transportation system management be made part of the transportation planning process? Are evaluation strategies available for evolving transportation concerns? Is the organizational structure adequate to deal with subregional problems?

At the request of the modal units of the U.S. Department of Transportation, Group 1 committees organized numerous workshops and conferences, including the following:

Conference on the State Role in Transit Management;
Regional Conference on Joint Development and Value Capture Program Activities;
Conference on Transportation System Management;
Workshop on Air Quality Analysis; and
Conference on Financing Efficient Urban Transportation, including five workshops on pricing alternatives, economic regulation, labor practices and productivity, marketing management, and intergovernmental responsibility.

The National Conference on Light Rail Transit is scheduled for August 1977. The first conference was held in 1975 and provided those in attendance an opportunity to become fully informed about the light rail transit mode. The second conference will explore the implementation of new rail systems in urban areas.

Scheduled for December 1977, the Conference on Urban Transport Service Innovations will focus on transit services and markets and alternatives in servicing needs of special groups of people, work trips, and low-density areas. Other areas to be discussed include financial, regulatory, and labor problems in implementing new and innovative services.

Group 1 is also planning conferences and workshops to examine various aspects of transportation for the elderly and the handicapped, to assist the Urban Mass Transportation Administration in identifying and evaluating problems associated with development and operation of downtown people movers, to examine the socioeconomic and planning issues of community impact associated with automated guideway transit, to explore various methods for implementing transportation planning in small and medium-sized communities, and to examine techniques for evaluating transportation alternatives.

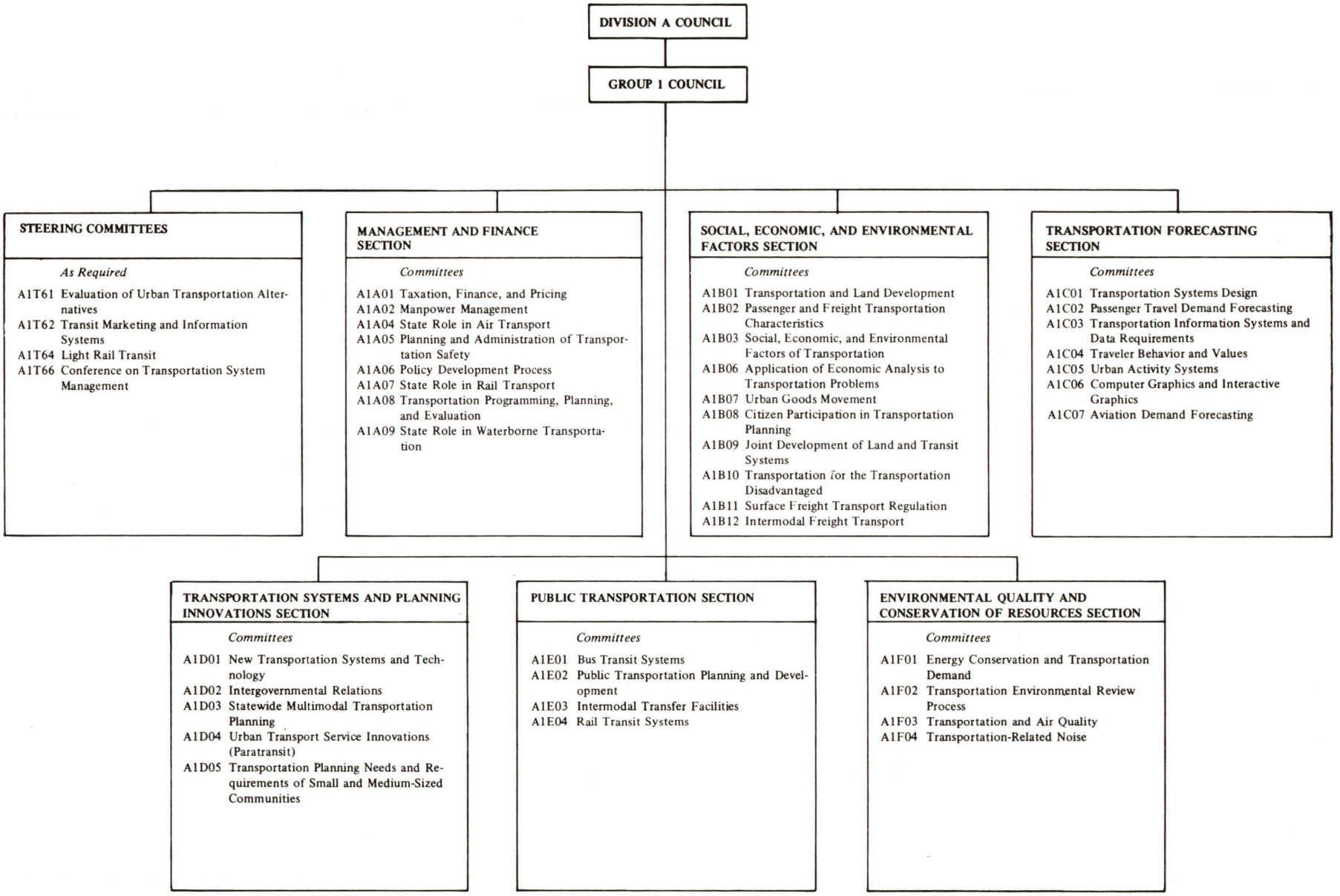
Group 1 committees continue to place a high priority on the development of research project statements. Many of the sections and committees have scheduled meetings in 1977 to discuss the critical issues and problems that are in need of attention by the research community.

GROUP 2—DESIGN AND CONSTRUCTION OF TRANSPORTATION FACILITIES

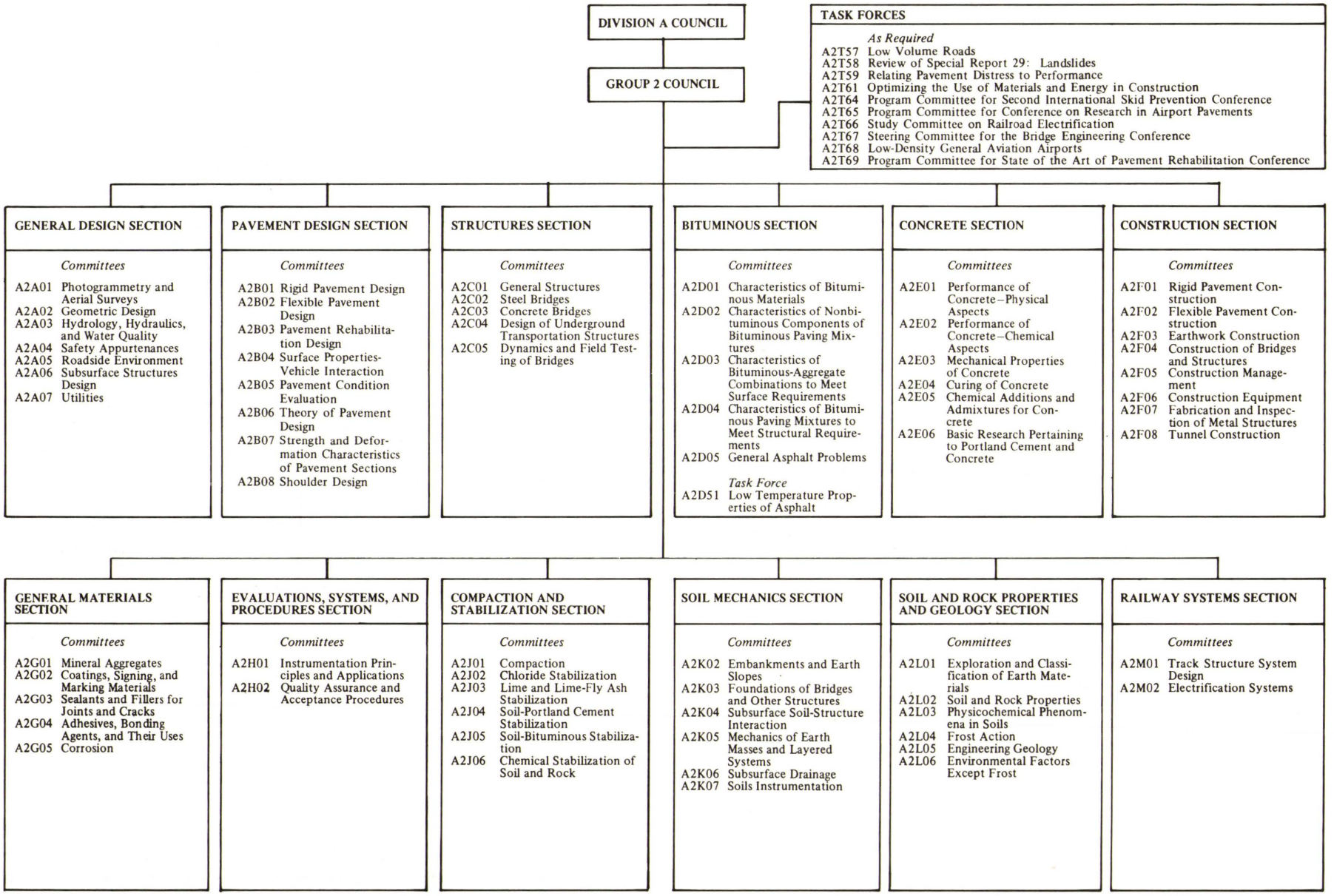
Eldon J. Yoder, chairman

Members of the Group 2 Council have been concerned with making transportation-related expenditures more productive. Thus, increased attention is being given to those items that improve the quality of life and at the same time produce a measurable benefit. For instance, smoother highways not

Organization of Group 1—Transportation Systems Planning and Administration.



Organization of Group 2—Design and Construction of Transportation Facilities.



only are more enjoyable but are less costly to travelers. Committees have been working to perfect designs and recommend practices that narrow design limits despite the inherent risk of underdesign. If the margin for error is increased, undoubtedly failures will occur. On an overall economic scale, however, the cost will have been reduced. In cases, such as bridges and barriers, that involve safety, the effort is to increase the reliability and durability within the economic constraints. To conserve and obtain maximum benefits from money spent, the effort is to incorporate beneficiated marginal materials and waste products into construction.

The objectives of many Group 2 committees are to protect the national investment in the U.S. highway system, the largest civil engineering project ever constructed, through optimum design for rehabilitating the current system and returning it to an acceptable level of performance. Along with these efforts to preserve are the efforts to provide a more skid-resistant surface and to improve safety.

Daniel J. Watkins completed his term as member-at-large, and the group is indebted to him for his contributions and hard work. James A. Caywood and William P. Hofmann are welcomed as new members-at-large.

Continuing in the efforts to ensure an effective and productive organization, the group shifted some committees, approved new names and scopes for others, discharged with thanks the Task Force on Development of Information on Nondestructive Pavement Evaluation and Overlay Design, and organized the Task Force on Program for State of the Art of Pavement Rehabilitation Conference. These changes are incorporated in the organization chart.

The Conference on Research in Airport Pavements, held in Atlanta and sponsored by the Federal Aviation Administration, was attended by 227 persons representing 40 states and 14 countries. This dissemination of research results should promote the aims of conservation in providing airport designers and constructors with more economic methodology.

The Second International Skid Prevention Conference, held in Columbus, Ohio, was attended by 254 people representing 48 states and 13 countries. New and improved designs and materials should help alleviate skidding accidents on an international basis.

Group 2 is planning the Second International Conference on Low-Volume Roads, to be held in Ames, Iowa, August 20-26, 1979, and the Bridge Engineering Conference to be held in St. Louis, Missouri, September 25-27, 1978.

Rail activities continue to expand within Group 2 and were the subject of five Annual Meeting sessions and many papers in other sessions and committee activities. The Task Force on Low-Density General Aviation Airports has been established to address specifically the problem of economical design and construction. An ad hoc committee has been appointed to study the possibilities of group involvement in design and construction of piers and terminals for inland waterways.

Other Annual Meeting sessions arranged by Group 2 committees included symposia, conferences, and formal paper sessions on quality assurance, concrete durability, slag, super water, mineral aggregates, and asphalt mixes—all addressing improvements in practice, construction, and utility. Research on concrete bridge structures and on field testing, structural adequacy, and construction of two-course concrete bridge decks was emphasized because of the formidable task of maintaining, repairing, or replacing the thousands of deficient structures throughout the nation. The need to conserve open ground and land surfaces was discussed in sessions on better contracting for underground construction and transportation tunneling needs. Sessions on pavement design, pavement surface properties, roadside management, and hydraulics addressed the problem of merging safety, efficiency, and economy. The five rail sessions covered track structural systems, research, test facilities, design and construction, and issues in railroad electrification. Basic information in structure performance through better understanding of foundations and economies through stabilization rounded out the Annual Meeting program.

Group 2 is cooperating with Group 3 in developing strategies for rehabilitation and maintenance of the total transportation system.

GROUP 3—OPERATION AND MAINTENANCE OF TRANSPORTATION FACILITIES

Adolf D. May, chairman

Group 3 selected transportation system management and impact of energy conservation on transportation maintenance and operations for focus topics this year. Topics receiving continuing emphasis include the environment, human behavior, and nonhighway transportation modes. Safety and maintenance matters have also received due attention.

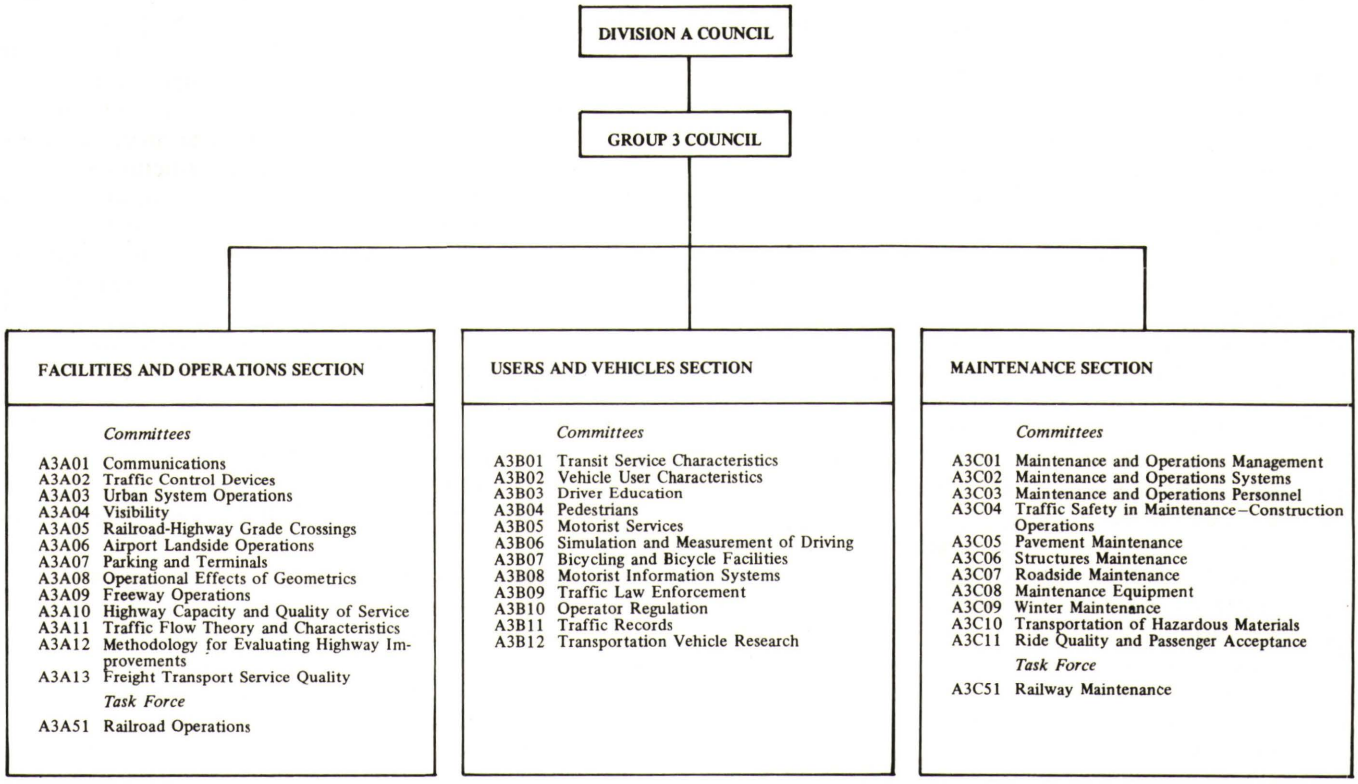
Transportation system management, given impetus by the spreading belief that only a small part of the increasing highway use will be accommodated in the future by new highway construction, focused attention on developing improved means to move greater volumes of traffic over existing facilities. This continuing activity of the traffic engineering profession has now been enhanced by the addition of large sums of money to provide electronic traffic aids, busways, and other capacity-improvement measures. The Committee on Transit Service Characteristics cooperated with Group 1 in conducting the Conference on Transportation System Management, which attracted more than 350 people. The proceedings of that conference, Special Report 172, is a major contribution to the body of knowledge on this subject.

The Committee on Highway Capacity and Quality of Service is coordinating efforts leading to the next edition of the *Highway Capacity Manual*.

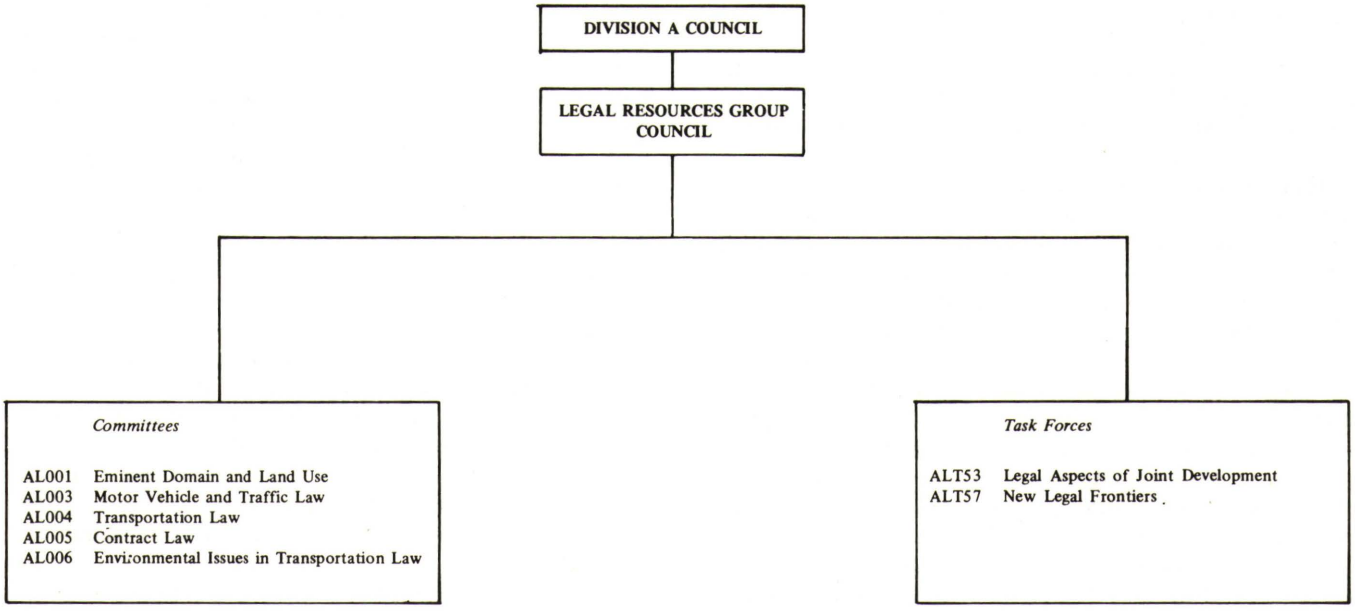
Many committees have addressed energy issues. A specific activity was the decision to form a task force concerned with the 10-year outlook on maintenance and operation strategies for energy conservation.

Attendance at the Tenth Annual Workshop on Human Factors in Transportation, sponsored jointly by the Committee on Motorist Information Systems and the Committee on Vehicle User Characteristics, exceeded that of the meeting in 1976. A Task Force on Ride Quality, now established as the Committee on Ride Quality and Passenger Acceptance, conducted the Workshop on Ride Quality. Participants reviewed the state of knowledge in human response to the transportation environment for all modes. The degree of

Organization of Group 3—Operation and Maintenance of Transportation Facilities.



Organization of Legal Resources Group.



acceptance of humans to this environment determines the cost, for example, of maintaining a roadway surface to a specific roughness level, the cost of a guideway for an advanced people-moving system, the feasibility of a helicopter commuter system, and the cost of an interisland hydrofoil craft.

The Committee on Communications held the Conference on Use of Citizens Band Radio for Motorist Aid. The enormous expansion of two-way communication through CB has provided a promising tool for identifying the need for motorist aid. This conference was an important step toward providing a system to report and respond in this area of concern. A limited distribution of the proceedings was made.

The Committee on Freight Transport Service Quality, the Task Force on Railroad Operations, and the Task Force on Railway Maintenance were established. The Committee on Airport Landside Operations was also formed and is proceeding with a program to provide guidance on this important interchange point.

Members of the Group 3 staff and committees were involved in the Paratransit Vehicle Conference, held at the request of the Urban Mass Transportation Administration. The concern over congestion, pollution, fuel consumption, use of private automobiles in urban areas, and needs of those without access to scheduled public transit services resulted in an UMTA-supported search for a more suitable shared-ride transportation vehicle. The conference provided guidance for further advancement in the program.

The new intermodal Committee on Operator Regulation held its organizational meeting.

The Conference on the Future of the National Highway Safety Program was convened in March 1977 at the request of the National Highway Traffic Safety Administration and the Federal Highway Administration to make a critical appraisal of existing safety standards and to provide guidance to NHTSA for its future direction.

Establishment of a committee on transportation system safety to address the entire area of risk management was approved.

The Workshop on Forgiving Roadside Design, which was attended by 80 people, focused on the economic and institutional constraints that hamper efforts to improve roadside safety. A solution to the problem of providing roadside safety requires overcoming both technical and institutional barriers.

The Coordination Committee of the Group 3 Council, chaired by L. David Minsk, prepared a final draft of the revised Group 3 Informational and Operational Guide.

LEGAL RESOURCES GROUP

Nolan H. Rogers, chairman

The Legal Resources Group has completed staffing its standing committees and subcommittees. The newly formed Committee on Transportation Law will be chaired by Daniel R. McLeod, and other outstanding legal talent has been recruited from the various modal organizations for the membership. We are particularly pleased that several attorneys representing public transit authorities and major private railroad companies have become involved in the Legal Resources Group and show considerable enthusiasm for the Transportation Research Board activities. This broad legal representation from the various modes expands the capability of the Legal Resources Group to further its own group activities and to render assistance to other elements of the Transportation Research Board.

The Legal Resources Group and Group 1 presented a joint conference session during the Fifty-Sixth Annual Meeting on environmental and land use problems in transportation planning. The panel consisted of G. William Frick, General Counsel, Environmental Protection Agency; Hugh J. Yarrington, General Counsel, Bureau of National Affairs; Clyde E. Pyers, Director of Planning, Maryland Department of Transportation; and Harold J. Lewis, Chief, Right of Way Division, Alabama State Highway Department and Chairman of Right of Way Committee of the American Association of State Highway and Transportation Officials. In addition, several standing committees held meetings during the Annual Meeting.

The Fifteenth Annual Workshop on Transportation Law was held in New Orleans, July 25-29, 1976, in cooperation with the Louisiana Department of Highways. In attendance were 80 attorneys, who represented the federal and state transportation sectors. The Sixteenth Annual Workshop on Transportation Law will be held at the Antlers in Colorado Springs, July 31-August 4, 1977. One of the highlights of this workshop will be an inspection of the High Speed Rail Test Center in Pueblo at the invitation of the Federal Railroad Administration.

SPECIAL COMMITTEE ON PUBLIC INFORMATION

H. Lincoln Harner, chairman

The Special Committee on Public Information serves in an advisory capacity to ensure that information about the activities of the Transportation Research Board is brought to the attention of the public and also to those directly interested in transportation research. The committee consists of 18 experienced public information and public relations specialists in the field of transportation and related subjects. They are charged with solving specific problems that arise in implementing the public information program.

In preparation for the Fifty-Sixth Annual Meeting, committee members prepared 70 press releases on papers and sessions scheduled. Members also helped to staff the press room and serve the press representatives during the meeting. Press attendance totaled 40.

SPECIAL COMMITTEE ON RAIL TRANSPORT ACTIVITIES

William J. Harris, chairman

The Special Committee on Rail Transport Activities of the Transportation Research Board was established at the direction of the Executive Committee in mid-1974 to recommend to the Executive Committee what activities TRB should undertake in the area of rail transport.

The Special Committee's final report, approved in December 1975, recommended new TRB activities in 12 railroad-related areas and recommended appointment of railroad

personnel to certain TRB standing committees.

The Special Committee was reappointed to monitor the implementation of its recommendations, to give counsel as needed, and to advise the TRB in its search for increased financial support for this broader range of activities.

As a result of the report and advice of the Special Committee, TRB has made significant progress in the rail transport area. Group 1 has three new committees: State Role in Rail Transport, Surface Freight Transport Regulation, and Intermodal Freight Transport. Group 2 has two new committees: Track Structure System Design and Electrification Systems. Group 3 has one new committee: Freight Transport Service Quality. Group 3 also has two new task forces: Railroad Operations and Railway Maintenance. Persons from the rail community have been appointed to standing committees in Groups 1, 2, and 3. The TRB Field Visit Program has been extended to include railroads and rail transport agencies.

At the suggestion of the Special Committee, TRB conducted a 4-week conference at Woods Hole, Massachusetts, during July 1975. The *Railroad Research Study Background Papers*, a volume containing the 75 papers from the conference, was published in January 1976. The final report on the conference, *Rail Transport Research Needs*, was published in June 1977 as Special Report 174.

In April 1977, having completed its assigned tasks, the Special Committee was dismissed with the thanks of the Executive Committee and of the staff.

SPECIAL COMMITTEE ON AIR TRANSPORT ACTIVITIES

Ronald W. Pulling, chairman

The Special Committee on the Air Transport Activities of the Transportation Research Board was established at the direction of the Executive Committee to assess TRB activities of potential interest to the air transport community and to make recommendations concerning the appropriate role of TRB in air transport. In October 1976 the committee completed its report and submitted it to the Executive Committee, which unanimously accepted the report at its meeting January 26, 1977. A limited number of copies are available upon request.

The committee found that one mechanism for integrating air transport into ongoing TRB programs was through adding knowledgeable aviation people to existing TRB committees. The committee also recommended that new TRB committees be established for certain unique aviation research areas. As a result, the Committee on Airport Landside Operations was established in Group 3, and the Committee on Aviation Demand Forecasting and the Committee on the State Role in Air Transport were established in Group 1.

The Special Committee has been requested to continue to serve through January 1978 to monitor the aviation activities noted above and others that may be undertaken.

FIFTY-SIXTH ANNUAL MEETING

A record 3990 of the world's leading highway and transportation researchers, engineers, educators, and administrators attended the Fifty-Sixth Annual Meeting of the Transportation Research Board held January 24-28, 1977, at the Sheraton-Park and Shoreham Americana hotels in Washington.

Classification of Organization Represented	Number of Registrants
U.S. Department of Transportation	694
Other federal agencies	110
State highway and transportation departments	750
Other state agencies	131
Local governments	250
Foreign governments	81
Universities and colleges	758
Transportation agencies	65
Research institutes	62
Consultants	445
Foreign nongovernment organizations	119
Service organizations	55
Trade associations	113
Industry	281
Press	40
Other	36
Total	3990

MEETINGS, CONFERENCES, AND WORKSHOPS

In addition to the Annual Meeting, the board conducts conferences and workshops throughout the year. This activity has increased substantially in recent years. During fiscal year 1977, the following conferences and workshops were held.

Fifteenth Annual Workshop on Transportation Law

Warwick Hotel, New Orleans, Louisiana, July 25-29, 1976

This 3½-day workshop included papers, panel discussions, and courtroom demonstrations involving highway and transportation law problems. The workshop, which was conducted by the Legal Resources Group in cooperation with the Louisiana Department of Highways, was supported by a registration fee of $70. A report was distributed to the 80 registrants and to members of committees in the Legal Resources Group.

National Conference on Urban Transportation Efficiency

Waldorf-Astoria, New York, New York, July 26-27, 1976

The purpose of the conference was to identify and define the various factors related to urban transportation efficiency and to analyze the approaches that can be taken to achieve higher efficiency and productivity in the various modes within an urban transportation system at the least possible cost. The Committee on Transportation Programming, Planning, and Evaluation cooperated with the American Society of Civil Engineers in conducting the conference. The attendance was approximately 150, and no report will be published by TRB.

Workshop on Forgiving Roadside Design

Stouffer Denver Inn, Denver, Colorado, August 3-4, 1976

This workshop focused attention on problems associated with making roadsides safer, determining the funds to solve such problems, and evaluating current roadside-obstacle safety

programs. The conference was arranged by the Committee on Operational Effects of Geometrics and supported by a registration fee of $35. A synthesis report will be sent to the 80 registrants.

Conference on State Role in Transit Management

Four Seasons Motor Inn, Colorado Springs, Colorado, August 15-17, 1976

The Transportation Research Board conducted this conference at the request of the Urban Mass Transportation Administration to explore the assistance that effective state organizations can provide to smaller communities lacking the necessary funds for adequate transit management. Support for the conference was provided by UMTA and a registration fee of $30. A report has been sent to the 90 registrants and to UMTA.

Conference on Coordinated Transit Services and Facilities

Four Seasons Motor Inn, Colorado Springs, Colorado, August 17-20, 1976

The theme of this conference, the fifth joint midyear conference of the committees in the Public Transportation Section of Group 1, was Coordinated Transit Services and Facilities. A field trip to the U.S. Department of Transportation Test Facilities at Pueblo, Colorado, was included. The conference was supported by a registration fee of $20, and a report has been distributed to the 62 registrants and to the Urban Mass Transportation Administration.

Highway Research Information Service Users Workshop

Norris Center, Northwestern University, Evanston, Illinois, September 15-16, 1976

This workshop, which focused on the Highway Research Information Service operations and services, included an opening plenary session, three concurrent panel sessions dealing with input, products, and marketing, and a concluding plenary session. A report has been sent to the 22 participants, who represented 11 states, and to the TRB representatives in the state highway and transportation departments.

Conference on Regulatory Constraints to Efficient Public Transportation

Annapolis Hilton, Annapolis, Maryland, September 19-22, 1976

The purposes of this conference were to determine how current regulations might be amended to facilitate more efficient public transportation and to consider what potential federal, state, and local impacts would occur if economic regulation of public transportation were removed or curtailed. The conference was supported by the Urban Mass Transportation Administration. The attendance was 31.

Workshop on Ride Quality

Lake Morey Inn, Fairlee, Vermont, October 13-15, 1976

In recent years, an informal group (not connected with the Transportation Research Board) met occasionally to exchange information on ride quality; the last meeting was held in Williamsburg, Virginia, in 1975. At the suggestion of this informal group, the Task Force on Ride Quality arranged a workshop to consider the Williamsburg report and to examine the ride quality technology needs of the entire transportation community. The workshop received financial support from the U.S. Department of Transportation as an addition to an existing National Aeronautics and Space Administration contract with the University of Virginia. A report has been sent to the sponsors and the 40 registrants. Based on a recommendation from the workshop, a Committee on Ride Quality and Passenger Acceptance has been formed.

Conference on Use of Citizens Band Radio for Motorist Aid

Ramada Inn, Lanham, Maryland, October 18-19, 1976

This workshop provided a forum for exchange of information, experience, and ideas relating to improved use of CB radio for motorist aid and emergency communications. It was conducted by the Committee on Communications and the Committee on Motorist Services and was supported by a registration fee of $25. A summary report was sent to the 80 who attended.

Seminar on State Sources of Revenue

National Academy of Sciences, Washington, D.C., October 21-22, 1976

Colorado Department of Highways, Denver, Colorado, October 26-27, 1976

These seminars were held in cooperation with the Finance Committee of the American Association of State Highway and Transportation Officials to give chief administrative officers of the state organizations an opportunity to discuss potential sources of additional state revenue for transportation. There were 30 in attendance at the Washington, D.C., seminar and 35 in Denver, Colorado. A report will be made in the NCHRP 20-5 Synthesis series.

Regional Conference on Joint Development and Value Capture Program Activities in Dade County, Florida

Royal Biscayne, Miami, Florida, November 4-5, 1976

This conference was sponsored by the Committee on Joint Development of Land and Transit Systems, the Florida Department of Transportation, and the Dade County Transportation Department, to discuss the status of joint development planning of local transit stations in Dade County, Florida, in connection with the new rail transit system. Sixty people attended; no publication is anticipated.

Conference on Transportation System Management

Leamington Hotel, Minneapolis, Minnesota, November 7-10, 1976

The three major objectives of this conference were to share experiences regarding selection of TSM elements, to develop an understanding of the technical aspects of TSM, and to disseminate to the widest audience possible information about TSM and its relation to the transportation planning and decision-making process. The conference was supported by funds from the Urban Mass Transportation Administration and a registration fee of $30. There were 386 in attendance. The proceedings have been published in Special Report 172.

Conference on Research in Airport Pavements

Sheraton-Biltmore Hotel, Atlanta, Georgia, November 15-16, 1976

The specific objectives of this conference were to present an overview of the results of recently completed research on airport pavements; solicit comments on potential applications of these results from Federal Aviation Administration field offices, industry, and airport personnel; explain how research findings are incorporated into federal guidance; and identify specific problem areas in need of further research. The conference, which was conducted by the Transportation Research Board in cooperation with the Georgia Institute of Technology, was supported by FAA and a registration fee. There were 224 in attendance, and the proceedings will be published in Special Report 175.

Conference on Labor Practices and Productivity in Public Transportation

National Academy of Sciences, Washington, D.C., December 6-7, 1976

This conference focused on identifying problems and alternatives to current labor practices and increased labor involvement in improving productivity and introducing technological innovation; on examining trends in bargaining and contract arbitration; and on evaluating the impacts of subsidies and transition to public ownership and operation of transit facilities. There were 42 in attendance.

Workshop on Air Quality Analysis

National Academy of Sciences, Washington, D.C., December 9-10, 1976

This workshop was organized by the Committee on Transportation and Air Quality and supported by the Federal Highway Administration and the Environmental Protection Agency. The purpose of the workshop was to review guidelines in a preliminary draft report compiled by FHWA and EPA for analyzing air quality in relation to highway projects. A final report has been sent to the 13 registrants, EPA, and FHWA.

Tenth Annual Workshop on Human Factors in Transportation

Sheraton-Park Hotel, Washington, D.C., January 23, 1977

The tenth in this workshop series provided an opportunity for exchange of information between researchers and practitioners in the transportation field with particular emphasis on human factors. The workshop was conducted jointly by the Committee on Motorist Information Systems and the Committee on Road User Characteristics and was supported by a registration fee of $35. The attendance was 137.

Conference on Paratransit Vehicle Design

Sheraton-Park Hotel, Washington, D.C., February 7-9, 1977

At the request of the Urban Mass Transportation Administration, the Transportation Research Board brought together some 41 experts in this field to exchange experiences and views on paratransit vehicle capabilities, accessibility, and flexibility; wheelchair usage; problems encountered in operating and maintaining paratransit; barriers and potential problems in getting vehicle prototype into marketable products; and possible approaches to risk sharing of the delivery system. An edited transcript of the final plenary session was provided to UMTA.

International Conference on Concrete Pavement Design

Purdue University, West Lafayette, Indiana, February 15-17, 1977

This conference was jointly sponsored by Purdue University, Federal Highway Administration, Federal Aviation Administration, Portland Cement Association, Indiana State Highway Commission, and the Transportation Research Board with the cooperation of other national and international organizations. The objective of the conference was to present the latest information on economical and practical aspects of portland cement concrete pavement design, reinforcement, jointing, support, overlays, drainage, and surface characteristics. Research findings and other innovations were discussed. Approximately 250 people attended, and a proceedings will be published by Purdue University.

Conference on the Future of the National Highway Safety Program

Airlie House, Warrenton, Virginia, March 6-9, 1977

This conference was convened at the request of the National Highway Traffic Safety Administration and the Federal Highway Administration. The primary objective was to review issue statements and policy and program alternatives related to the federal-state highway safety program. The conference was attended by 127 persons, and the proceedings will be published in Special Report 178. It is expected that the proceedings will ultimately be incorporated in a report to Congress from the Secretary of Transportation.

Conference on Transportation and the Disabled

National Academy of Sciences, Washington, D.C., May 2-3, 1977

The purpose of the conference was to bring together professionals of different disciplines to discuss ways of developing a comprehensive planning process for achieving barrier-free transportation. The process would consider social (attitudinal), economic, technological, environmental (physical), and legal-administrative aspects. The conference was sponsored by Auburn University and the U.S. Department of Health, Education and Welfare in cooperation with the Transportation Research Board. There were approximately 70 in attendance.

Second International Skid Prevention Conference

Sheraton-Columbus Hotel, Columbus, Ohio, May 2-6, 1977

The objectives of the conference were to present an overview of current knowledge and to demonstrate how this knowledge can be applied to improve safety. The subject matter covered vehicle components, pavement and roadway characteristics, accident experience, human factors, and legal problems. The conference was conducted by the Transportation Research Board with the cooperation of several national and international organizations. It was supported by a registration fee in addition to funds from the Federal Highway Administration and the National Highway Traffic Safety Administration. The attendance was 254, and the conference papers have been published in Transportation Research Records 621, 622, 623, and 624.

Workshop on Operational Issues in Designing Rail Transit and Commuter Railroad Services

Detroit Plaza Hotel, Detroit, Michigan, May 18-20, 1977

This conference addressed operational strategies currently employed for rail transit and commuter rail services, extent of track sharing, cost and benefits of off-line stations, capabilities of traffic control systems, safety, and labor and legal issues. The principal sponsor of this conference was the Operations Research Society of America; the Transportation Research Board participated through its Committee on Rail Transit Systems and its Task Force on Railroad Operations. Ninety people attended, and the proceedings will be published by the Operations Research Society of America.

Highway Research Information Service Users Workshop

Hotel Durant, Berkeley, California, May 19-20, 1977

HRIS representatives from 14 western state transportation and highway departments and staff from the regional TRISNET Document Delivery Center met to discuss ways to improve the use and usefulness of HRIS and to observe the operations of the document delivery center, including on-line retrieval. A report will be sent to the 32 participants and the TRB representatives in the state highway and transportation departments.

Conference on Rural Transportation

Pennsylvania State University, University Park, Pennsylvania, June 1-3, 1977

This conference addressed federal and state rural transportation programs, interagency cooperation, social service agency programs, demand forecasting, vehicle specifications, costs, and regulations. The principal sponsors were the Pennsylvania Department of Transportation, Pennsylvania State University, and North Carolina A&T State University; TRB participated through its Committee on Rural Public Transportation. Approximately 150 attended, and a proceedings will be published by Pennsylvania State University.

Conference on Transit Marketing Management

National Academy of Sciences, Washington, D.C., June 6-8, 1977

This conference considered how public transportation can be planned, managed, and operated to provide desired services, yet remain financially stable. Included were determining current and unexploited markets, tailoring services to meet demand, facilitating transportation to users, improving services, setting fare policies, providing transportation for the disadvantaged, and integrating public transportation management. The conference was sponsored by the Office of the Secretary of Transportation, Urban Mass Transportation Administration, Federal Highway Administration, Federal Energy Administration, and Environmental Protection Agency. Attendance was limited to 30.

Conference on Railroad Electrification: The Issues

Mayflower Hotel, Washington, D.C., June 13-15, 1977

The conference examined the institutional, economic, and technological issues of railroad electrification in North America. The conference was conducted by the Committee on Electrification Systems in cooperation with the Association of American Railroads and the Railway Progress Institute and was supported by funds from the Federal Railroad Administration and a registration fee. The attendance was 177, and the proceedings will be published in Special Report 180.

Workshop on Inland Waterway Transportation

Holiday Inn Rivermont, Memphis, Tennessee, June 15-16, 1977

This workshop was a joint meeting of members of the Committee on State Role in Waterborne Transportation, Committee on Inland Water Transportation, and Section A of Group 1, who discussed research needs during the next decade. The workshop was supported by a registration fee of $20, and a report will be published as a TRB Circular. There were approximately 60 in attendance.

Study to Develop Post-1990 Planning Issues for the Northeast Corridor

National Academy of Sciences, Washington, D.C., June 20-24, 1977

This study was convened at the request of the Federal Railroad Administration to identify issues that will be important in the 1990-2000 period, to suggest ways to determine the impact of those issues on the 1990-2000 demand for passenger travel in the Northeast Corridor, to suggest approaches for determining capacities of various modes of passenger travel in the Northeast Corridor, and to propose a program outline for work to be done between 1978 and 1982 to determine the need for and, if necessary, the nature of further improvements to the Northeast Corridor surface passenger system. The study was by invitation only, and 22 people attended. A report will be sent to FRA and those in attendance.

SPECIAL TECHNICAL ACTIVITIES

The Special Technical Activities Division (Division B) administers and sometimes conducts projects that are funded outside the regular operating budget of the board. It also manages the development and operation of transportation research information services. In the TRB organization, this division receives guidance from the 10-member Division B Council, chaired by Harmer E. Davis. A given TRB activity may be designated as a special project essentially by three routes:

1. By agreement between TRB and another National Academy of Sciences unit that has been asked to carry out the special study (a 1969 project on ambulance design criteria conducted in cooperation with the Division of Medical Sciences is an example);
2. Through TRB cooperation with sponsors, including NCHRP, of projects that require unique TRB capabilities but that are not appropriate to the Regular Technical Activities Division (a 1967 highway litter study and an NCHRP project on economic consequences of highway improvements are examples); and
3. Through TRB solicitation of sponsorship, including NCHRP, for a project whose output will be directly applicable to the board's overall objectives (the TRIS project and NCHRP Project 20-5 are current examples).

In accordance with the policy of the National Academy of Sciences, an advisory committee of appropriate experts may be formed to give advice and counsel on the conduct of a special project. Staff as needed are employed for each project, and other designated members of the TRB staff may serve as technical advisors.

In fiscal year 1977, the work of Division B included seven activities that are discussed and summarized below.

SYNTHESIS OF EXISTING INFORMATION RELATED TO HIGHWAY PROBLEMS

The objectives of this NCHRP project are to bring together research results, published material, and current practices on relatively narrow highway topics. Technical panels and consultants assist the project staff in acquiring, evaluating, and organizing the material on each topic into a *Synthesis of Highway Practice*.

Reports on the following 8 topics were completed in fiscal year 1977: statistically oriented end-result specifications; transportation requirements for the handicapped, elderly, and economically disadvantaged; staffing and management for social, economic, and environmental impact assessment; bridge bearings; design of pile foundations; recording and reporting methods for highway maintenance expenditures; consolidation of concrete for pavements, bridge decks, and overlays; and rapid-setting materials for patching of concrete. Work was completed on an additional 2 topics: effect on the environment of bridge painting practices and safe conduct of

SUMMARY OF SPECIAL TECHNICAL ACTIVITIES DURING FISCAL YEAR 1977

Projects and Operations	Started	End of Current Contract	Technical Committee	Principals	Sponsors	Current Year Funds ($)
Synthesis of existing information related to highway problems	12-67	Open	R. Biege, Jr.	T. Copas H. Pennock	NCHRP	300 000
Right-of-way and legal problems	11-68	Open	S. Corwin	J. Vance	NCHRP	50 000
Operation of Highway Research Information Service	6-67	6-76		A. Mobley	States FHWA	500 000
Operation of Maritime Research Information Service	6-69	9-77	R. Taggart	D. Mellor	MARAD	180 000
Operation of Railroad Research Information Service	3-72	2-78		F. Houser	FRA	200 000
National Network of Transportation Research Information Services	10-72	3-77	E. Mueller	P. Irick E. Pascal	US DOT	110 000
Development of Air Transport Research Information Service	9-76	9-77	J. Drake	P. Irick S. Schofer	FAA	99 000

traffic through highway construction and maintenance zones. These will be published in the NCHRP Digest series.

Reports on the following 7 topics are in the final stages of review: effect of weather on highway construction; durability of drainage pipe; energy effects, efficiencies, and prospects for various modes of transportation; priority programming and project selection; recycling materials for highways; precast concrete elements for transportation facilities; and open-graded friction courses.

Work is ongoing on an additional 16 topics that deal with rehabilitation of portland cement concrete pavement joints, bus service planning guides, construction contract staffing, design and use of highway shoulders, data storage and retrieval systems, maintenance equipment management and selection, photologging, asphalt cement properties, bituminous patching mixtures, bridge deck durability, variable message signs, quality assurance, impact of alternative work schedules on transportation, motorist information systems for trip planning and direction finding, failure and repair of continuously reinforced concrete pavement, and alternate methods of taxing motor fuels.

RIGHT-OF-WAY AND LEGAL PROBLEMS

The first two volumes of *Selected Studies of Highway Law* were published. During fiscal year 1977 considerable progress was made on the research and writing of the following papers that will be included in the last volume of the three volumes on highway law: Prequalification and Licensing of Bidders; Conflict of Interest; Competitive Bidding; Indemnification and Suretyship; Labor Relations; Effect of Mistakes in Bids, Plans, and Specifications; Changes, Changed Conditions, and Dispute Clauses; Legal Effect of Representations as to Subsurface Conditions; Contract Completion Time: Damages for Delay, Liquidated Damages, and Work Stoppage Under Work Order; Administrative Settlement and Disposition of Claims; Trial Strategy and Techniques in Contract Litigation; Environmental Litigation: Rights and Remedies; Trial Strategy and Techniques in Environmental Litigation; Liability of State Highway and Transportation Departments for Design and Maintenance Defects; Personal Liability of State Highway and Transportation Department Officers and Employees; and Legal Interrelationships of the Federal and State Governments.

HIGHWAY RESEARCH INFORMATION SERVICE

Use of the Highway Research Information Service (HRIS) by the state highway and transportation departments and the Federal Highway Administration increased during fiscal year 1977. The number of requests from sponsors for specific batch-mode file searches of the HRIS storehouse was 680. In addition, an average of 47 sponsors requested more than 7 of the 9 TRB-selected HRIS responses offered each month to all 53 sponsors.

HRIS continued magnetic tape exchange of highway transportation research information with the U.K. Transport and Road Research Laboratory, the English-language center for the International Road Research Documentation (IRRD) scheme. Each month nearly 200 IRRD selections of abstracts of non-U.S. published works and summaries of non-U.S. ongoing research projects are made available to HRIS on communication format tapes, the medium used for international exchange of transportation research information. Magnetic tape is also used to exchange ongoing highway transportation research project information with the Smithsonian Science Information Exchange (SSIE). The SSIE tape adds about 150 summaries of U.S. ongoing research projects to the HRIS file each quarter.

The HRIS file now contains more than 75 000 references, including 11 000 to ongoing research and 64 000 to published documents. About 40 percent of the HRIS document records are from sources in 72 foreign countries.

Four quarterly issues of *HRIS Abstracts* were published. They contained approximately 4275 abstracts of published technical papers, research reports, journal articles, and bibliographies stored on the HRIS magnetic tape files during the year.

This fiscal year HRIS continued to offer on-line retrieval service to the U.S. transportation community through participation in the National Network of Transportation Research Information Services (TRISNET). The HRIS on-line file consists of 7660 summaries of ongoing research projects that include 3760 U.S. research project summaries; 3900 summaries of non-U.S. highway research projects selected by the International Road Federation from its 1974, 1975, and 1976 world surveys and considered to be of special interest to the highway transportation research community in the United States; and 25 060 abstracts, which are published in *HRIS Abstracts*. The 32 720 HRIS selections in the on-line file of the TRIS on-line data base represent about 40 percent of the total HRIS storehouse.

HRIS retrieved 333 abstracts of FHWA research and development studies that are conducted under administrative contract and by staff. These abstracts are printed by FHWA in its experimental publication *Bibliography of Contract and Staff R&D Studies Reports: 1971-1976*.

HRIS staff analyzed and classified 2970 document records on construction of transportation facilities that were retrieved from the HRIS data base. The document records, which consisted of summaries of ongoing research projects and abstracts of published works, were published in October 1976 by the Office of the Secretary of Transportation in a 650-page publication *Research on Construction of Transportation Facilities: Bibliography with Abstracts*. The volume included a section on the rationale for the analysis, the results of the analysis, indexes to the summaries, indexes to the abstracts, and explanatory notes to each of the document record sections. The intent of the analysis was to demonstrate one method whereby the expertise of the professional staff of a traditional information storage and retrieval service could be used to identify possible areas of overlap and oversight in a specific area of technological research and to provide an additional tool to research managers to establish priorities for research and development.

MARITIME RESEARCH INFORMATION SERVICE

The Maritime Research Information Service (MRIS) is sponsored by the Maritime Administration and is operated by

TRB with advice from the Maritime Information Committee of the Maritime Transportation Research Board, National Research Council. The semiannual *MRIS Abstracts* and monthly *Current Awareness Service* for the maritime industry were published in fiscal year 1977. The MRIS file now contains 15 000 records, and selected records are stored in the TRISNET on-line data base.

RAILROAD RESEARCH INFORMATION SERVICE

The Railroad Research Information Service (RRIS) was developed to serve the Federal Railroad Administration and the railroad community. RRIS has been fully operational for 4 years; its file contains more than 14 000 summaries of research projects and abstracts of reports and articles. The Autumn 1976 and Spring 1977 issues of the semiannual *Railroad Research Bulletin* were published and distributed; three special bibliographies dealing with railroad safety research, railroad technical documents received through U.S. bilateral agreements, and railroad electrification were also prepared by RRIS. The volume of computer retrievals was up substantially from the previous year. RRIS references are included in the TRIS on-line data base.

AIR TRANSPORTATION RESEARCH INFORMATION SERVICE

The development of an Air Transportation Research Information Service (ATRIS) was begun in September 1976 under contract to the Federal Aviation Administration. During the first year the ATRIS Committee developed a report that gives the scope and objectives for the service and includes an action plan for implementation. A special bibliography on airport topics was also prepared.

NATIONAL NETWORK OF TRANSPORTATION RESEARCH INFORMATION SERVICES

The Transportation Research Information Services Network (TRISNET) is an evolving network of abstracting and indexing services, libraries and document centers, and an on-line center for fast access to transportation research information.

In fiscal year 1977 the TRISNET Committee developed reports on five issues: international flows of transportation information, user charge policies, institutional alternatives for TRISNET, evaluation of network services and products, and milestones for TRISNET development. The Managers Council worked in two specific areas: classification of transportation information and development of a document delivery service. The secretariat provides staff services to the committee and council and is a focal point for communications with network elements and other information centers. During fiscal year 1977 the secretariat published *TRISNET News* on a quarterly basis.

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

With the close of fiscal year 1977, the National Cooperative Highway Research Program completed its fifteenth year as the principal mechanism for providing the state highway and transportation departments with a long-range program of systematic, well-designed, applied research on the many nationwide problems facing administrators and engineers.

The NCHRP concept of operation has proved to be effective in solving the increasingly complex problems arising from the need for efficient, economical, and safer highway transportation and for meshing highway transportation with other modes and with other societal concerns. Not only has NCHRP research provided practical solutions for pressing highway and urban transportation problems but it also has provided an extensive reservoir of technical information that is being used in the development of practical solutions for all ranges of problems being worked on by other agencies.

Through activities of the Organization for Economic Cooperation and Development, the NCHRP research results have made effective contributions to road research and better transportation systems throughout the world. Because of the program's demonstrated successes, several foreign organizations have investigated the NCHRP operation to determine the suitability of similar programs in their own environments.

The NCHRP was established in 1962 to provide a continuing program of highway research. It is sponsored by participating member departments of the American Association of State Highway and Transportation Officials (AASHTO) in cooperation with the Federal Highway Administration of the U.S. Department of Transportation and is carried out under a three-way agreement among these two agencies and the National Academy of Sciences.

Each state annually contracts with the academy to commit 4½ percent of its 1½ percent federal-aid highway planning and research funds. From these contributions, a cooperative pool of about $3.5 million is made available for NCHRP's contract research and for its administrative and technical operation.

AASHTO annually proposes research problems for inclusion in the NCHRP fiscal year activities. At least two-thirds of the participating member departments must approve the research problems and agree to their financial support before they can be brought into the program. After the balloting by member departments, the approved problems are reviewed by the TRB Executive Committee Subcommittee for NCHRP as to acceptability for administration by the National Academy of Sciences (NAS) through the Transportation Research Board.

Once accepted, the problems making up each program are assigned to panels that provide guidance on the technical aspects. There are at present some 569 members on these panels representing the District of Columbia, Canada, and 80 percent of the states. They analyze the problems, outline particular projects and their objectives, and prepare research project statements by which proposals are solicited from qualified private and public research agencies. They review the proposals, recommend contract awards, and provide counsel to the NCHRP staff responsible for surveillance of work under the research contracts. Finally, they review reports for acceptability and for accomplishment of the approved research plan.

Through fiscal year 1977, these activities have resulted in the development of 270 research projects for which 299 contracts have been executed at a total funding level of some $37.6 million. The subject matter of the projects ranges across the full spectrum of concern within the transportation field and evidences the sponsors' immediate interest in acquiring early answers to their many problems. The contracts have been let to agencies headquartered in the District of Columbia and more than half of the states. Universities have received about 38 percent of the contracts; research institutes 22 percent; industry, consultants, and trade associations 37 percent; professional societies and service organizations 2 percent; and state highway and transportation departments and other transportation or governmental agencies 1 percent.

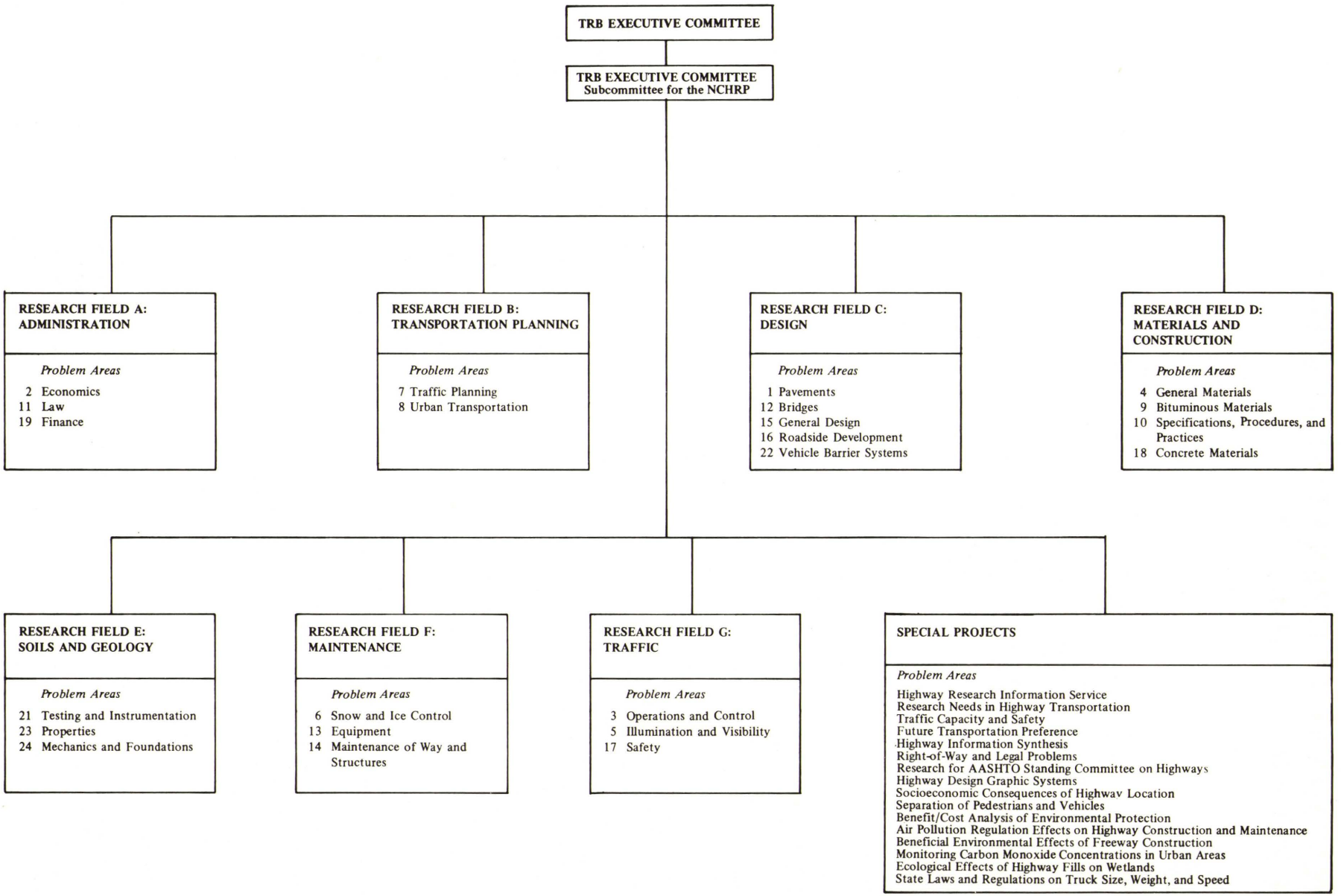
Official referral to NAS of the fiscal year 1978 program—the sixteenth program of research problems for the NCHRP—was made in February 1977. This program, tentatively funded at $3.1 million for research, consists of 8 continuation projects and 9 new contracts. A list of the projects is given below. It is estimated that research on this program will begin in early 1978.

A professional staff assigned to NCHRP by TRB includes project engineers who have experience and training appropriate to administrative and technical surveillance of the research. The engineers review quarterly progress reports and monthly progress schedules, maintain telephone contacts, visit the assigned projects throughout their contact periods, and discuss the projects with the principal investigators to learn whether the research is being pursued in line with the approved research plans.

Meetings involving the staff, project panels, and agency personnel are held frequently to review progress and provide guidance for continuing work. Thirty-nine such meetings were held in fiscal year 1977. The project engineers and the project panels evaluate the completed research to determine the degree of technical compliance with the contracts and the acceptability of the final reports to TRB and NAS.

The work of the NCHRP is manifested principally through its publications. Research findings are published in a regular NCHRP report series according to publication priorities based on the usefulness of the results to the sponsors. All possible means of reporting are used to get results in the hands of the potential users as quickly as possible. Each highway administrator receives a copy immediately on publication, and some 4000 copies are formally distributed

Organization of National Cooperative Highway Research Program.



through the Transportation Research Board's selective distribution system.

Thus far, 349 report drafts (interim or final) have been received from research contractors and have resulted in 214 regular NCHRP reports. Twenty-four project reports have not been published but, according to usual practice, were summarized in the program's annual *Summary of Progress*. The remaining report drafts are in the acceptance review of publication processes. A list of the reports issued this year is given below.

Another means for bringing research findings before practicing engineers is the *NCHRP Research Results Digest*, a series of flyers published at frequent intervals to provide an early awareness of research results emanating from the various projects. Making these results known as they are developed and before they are published in final reports encourages early application.

Semiannual progress reports were submitted by NCHRP to the sponsors to keep them informed of the status of each project in the program. An important feature of these progress reports is the documentation of known uses of NCHRP results, plus any known cost savings, so that all states may be aware of the practical applications. Considerable feedback from the states documents the value and use of many of the research products.

During fiscal year 1977, an AASHTO-appointed monitoring committee met with board staff to review all aspects of NCHRP operation and concluded that progress was satisfactory.

The NCHRP is a unique contract research effort designed to respond quickly and efficiently to the needs of the state highway and transportation departments through solution of pressing transportation problems. Although the Transportation Research Board administers the program, the research content is solely the prerogative of the American Association of State Highway and Transportation Officials and the participating member state highway and transportation departments. The program is one of applied rather than basic research, and every effort is made to help administrators use the research findings. Although NCHRP research is sponsored by AASHTO, design and operation of the program are amenable to the administration of research sponsored by any agency.

PUBLICATIONS RELEASED DURING FISCAL YEAR 1977

Rapid Measurement of Concrete Pavement Thickness and Reinforcement Location: Field Evaluation of Nondestructive Systems, Report 168
Peak-Period Traffic Congestion: Options for Current Programs, Report 169
Effects of Deicing Salts on Plant Biota and Soils: Experimental Phase, Report 170
Highway Fog: Visibility Measures and Guidance Systems, Report 171
Density Standards for Field Compaction of Granular Bases and Subbases, Report 172
Highway Noise: Generation and Control, Report 173
Highway Noise: A Design Guide for Prediction and Control, Report 174
Freeway Lane Drops, Report 175
Effects of Studded Tires, Report 176
Freight Data Requirements: Statewide Systems–Research Report, Report 177
Freight Data Requirements: Statewide Systems–Users Manual, Report 178

Lime-Fly Ash-Stabilized Bases and Subbases, Synthesis of Highway Practice 37
Statistically Oriented End-Result Specifications, Synthesis of Highway Practice 38
Transportation Requirements for the Handicapped, Elderly, and Economically Disadvantaged, Synthesis of Highway Practice 39
Staffing and Management for Impact Assessment, Synthesis of Highway Practice 40
Bridge Bearings, Synthesis of Highway Practice 41
Pile Foundations, Synthesis of Highway Practice 42

TENTATIVE AND CONTINUING RESEARCH PROJECTS FOR FISCAL YEAR 1978

Project	Allotted Amount ($)
Tentative Projects	
AREA 1: DESIGN–PAVEMENTS	
Project 1-18: Calibration and Correlation of Response-Type Road Roughness Measuring Systems	250 000
Project 1-19: Development of a System for Nationwide Evaluation of Portland Cement Concrete Pavements	125 000
AREA 3: TRAFFIC–OPERATIONS AND CONTROL	
Project 3-28: Development of an Improved Highway Capacity Manual	300 000
AREA 4: MATERIALS AND CONSTRUCTION–GENERAL MATERIALS	
Project 4-14: Coating Systems for Painting Old and New Structural Steel	150 000
AREA 8: TRANSPORTATION PLANNING–URBAN TRANSPORTATION	
Project 8-20: Improved Methods for Vehicle Counting and Determining Vehicle-Miles of Travel	200 000
AREA 10: MATERIALS AND CONSTRUCTION–SPECIFICATIONS, PROCEDURES, AND PRACTICES	
Project 10-12: Acceptance of Aggregates Used in Bituminous Paving Mixtures	175 000
AREA 12: DESIGN–BRIDGES	
Project 12-18: Development of an Integrated Bridge Design System	225 000
Project 12-19: Cathodic Protection of Concrete Bridge Structures	250 000
Project 12-20: Bridges on Secondary Highways and Local Roads: Rehabilitation and Replacement	120 000

AREA 14: MAINTENANCE–MAINTENANCE OF WAY AND STRUCTURES	
Project 14-5: Maintenance Levels-of-Service Guidelines	200 000
AREA 17: TRAFFIC–SAFETY	
Project 17-3: Application of Traffic Conflicts Analysis at Intersections	190 000
Project 17-4: Evaluation of Traffic Controls for Street and Highway Work Zones	200 000
Subtotal	2 385 000

Continuing Projects

AREA 3: TRAFFIC–OPERATIONS AND CONTROL	
Project 3-18(4): Methodology for Performance Evaluation of Signalized Network Control Strategies	60 000
Project 3-26: Investigation of Selected Noise Barrier Acoustical Parameters	150 000
AREA 8: TRANSPORTATION PLANNING–URBAN TRANSPORTATION	
Project 8-14 continued: New Approaches to Understanding Travel Behavior: Phase II	221 250
Project 8-15A: Economic Impacts of State Transportation Policies and Programs	118 000
AREA 12: DESIGN–BRIDGES	
Project 12-15: Detection and Repair of Fatigue Cracking in Highway Bridges	125 000
Project 12-15(2): Retrofitting Procedures for Fatigue-Damaged Full-Scale Welded Bridge Beams	
AREA 18: MATERIALS AND CONSTRUCTION–CONCRETE MATERIALS	
Project 18-2: Use of Polymers in Highway Concrete	300 000
AREA 20: SPECIAL PROJECTS	
Project 20-5: Synthesis of Information Related to Highway Problems	330 000
Project 20-6: Right-of-Way and Legal Problems Arising Out of Highway Programs	100 000
Project 20-7: Research for AASHTO Standing Committee on Engineering and Operations	100 000
Project 20-10: Benefits of Separating Pedestrians and Vehicles	100 000
AREA 22: DESIGN–VEHICLE BARRIER SYSTEMS	
Project 22-2(2): Multiple Service Level Highway Bridge Railings: Performance and Design Criteria	200 000
Subtotal	1 804 250
Total	4 189 250

ADMINISTRATION

The administrative activities of the Transportation Research Board are located in Division C and are the responsibility of the assistant director for administration. Division C is responsible for the preparation and control of budgets for all Transportation Research Board accounts. It maintains liaison with the comptroller of the National Academy of Sciences, the Office of the Business Manager, and the Personnel Office.

Further responsibilities of the division include personnel administration, editing and printing of TRB publications and their sale and distribution, physical arrangements and management of meetings, membership records and accounts, procurement, and general office services.

PUBLICATION PROGRAM

The Transportation Research Board has gained an enviable reputation as an agency that consistently reports useful results based on transportation research conducted in the United States and in other countries. The board's ambitious publications program is the primary mechanism for getting this information to those who can best use it. A summary of the publications is given below. In addition to the publications given in this tabulation, programs for the Annual Meeting and the conferences and workshops, newsletters, membership and author information booklets, and other miscellaneous material were published.

Papers originally presented at TRB annual meetings and accepted for publication after stringent review generally appear in the Transportation Research Record series. Reports of research in which the TRB staff or committees actively participate are published in the Special Report series.

Research conducted through the National Cooperative Highway Research Program is reported in three series: the NCHRP Reports, the Research Results Digest, and the Synthesis of Highway Practice.

TRB also publishes bimonthly the widely read *Transportation Research News*. A special section in each issue contains abstracts of about 50 important items. The works of special committees are often disseminated through the Transportation Research Circular series. In addition, the

SUMMARY OF PUBLICATION PROGRAM FOR FISCAL YEAR 1977

Series or Type	Volumes and Numbers	Individual Publications	Incorporated Papers or Reports	Pages	List Price ($)
Special Report	Nos. 168 to 174	7	134	636	27.00
Transportation Research Circular	Nos. 176 to 184	9	9	250	13.50
Transportation Research News	Nos. 65 to 70	6	244[a]	276	12.00
Transportation Research Record	Nos. 574 to 612	39	383	2600	117.60
NCHRP Report	Nos. 168 to 175	8	8	944	49.60
NCHRP Synthesis of Highway Practice	Nos. 39 to 40	4	4	268	17.60
NCHRP Research Results Digest	Nos. 89 to 92	4	4	34	4.00
HRIS Abstracts	Sept./Dec. 1976				
	March/June 1977	4	4 274[a]	1052	48.00
MRIS Abstracts	Dec. 1976				
	June 1977	2	2 468[a]	564	50.00
MRIS Current Awareness					
July to December 1976	Vol. 13, Nos. 7 to 12				
January to June 1977	Vol. 14, Nos. 1 to 6	12	1 786	404	50.00
Directory	1976	1	1	428	10.00
Bibliography	57	1	1	48	2.20
RRIS Bulletin	Vol. 3, No. 2				
	Vol. 4, No. 1	2	4 044[a]	876	27.00
		99	13 360	8380	428.50

[a]Brief abstracts of full reports contained.

board publishes a Bibliography series, a quarterly Highway Research Information Service Abstracts, a biannual Railroad Research Information Service Bulletin, and a semiannual Abstracts and a monthly Current Awareness of the Maritime Research Information Service.

Through a system of selective distribution, subscribers may elect to receive TRB publications in 36 subject areas. During fiscal year 1977, more than 305 000 copies of these publications were distributed to supporting members of the board in the United States and in some 80 foreign countries.

Most publications are furnished to regular TRB sponsors as one of the services rendered in consideration of their support, but over-the-counter sales to interested individuals and to booksellers also contribute to wide circulation.

SUPPORTING MEMBERS

The Transportation Research Board is supported principally by the state highway and transportation departments, the Federal Highway Administration, and the Urban Mass Transportation Administration. In addition, organizations and individuals may become supporting members.

Organizations may apply for membership in the Transportation Research Board if they are engaged in research related to transportation, if their activities are educational in character, or if they are interested in technical development relating to transportation within an industry or groups of industries.

There are two classes of Organizational Supporting Membership: (a) governmental agencies and academic organizations and (b) private organizations. Within the former are government units, educational institutions, and professional societies. The latter class consists of service organizations, trade associations, industrial concerns, and consulting engineers. There are 308 organizations affiliated with the board; of these about 42 percent are foreign governmental or foreign business organizations.

In addition to organizational members, TRB invites applications for Individual Supporting Membership from persons interested in its activities and who desire to further its work. There are three classes of Individual Supporting Membership: general, student, and academic. Special plans are offered to individual members who gear their membership fee to publications desired. There are more than 2800 Individual Supporting Members, made up of about 2100 general members, 300 student members, and 400 academic members.

SUSTAINING MEMBERS

In those cases in which the support furnished to TRB is much greater than that necessary to pay for publications and information services, the organization or individual is considered a Sustaining Member. In addition to the 50 state highway and transportation departments, the District of Columbia, Puerto Rico, the Federal Highway Administration, the Urban Mass Transportation Administration, the Federal Railroad Administration, and the Association of American Railroads, 15 other organizations are classified as Sustaining Members. A list of representatives and alternate representatives of these organizations is given below.

State highway and transportation departments
Representatives listed under state and university representatives

Federal Highway Administration
William M. Cox, representative

Urban Mass Transportation Administration
Charles F. Bingman, representative

Federal Railroad Administration
Bruce M. Flohr, representative

Association of American Railroads
William J. Harris, Jr., representative

American Iron and Steel Institute
Walter G. Wells, representative

Armco Steel Corporation
D. S. Wolford, representative
R. S. Standley, alternate

The Asphalt Institute
Vaughn Marker, representative
James F. Shook, alternate

Associated General Contractors of America, Inc.
Roger D. Allan, representative

Avery International
Robert A. Isaksen, representative
William A. Herring, alternate

Chevron Asphalt Company
W. J. Kari, representative
M. V. Hunter, alternate

Dow Chemical Company
D. H. Moeller, representative
James J. Kubiak, alternate

Ford Motor Company
William A. McConnell, representative
Irving J. Rubin, alternate

General Motors Corporation
David S. Potter, representative
L. G. Lundstrom, alternate

Martin Marietta Corporation
D. B. Wendling, representative
M. H. Wills, Jr., alternate
J. R. Wilson, alternate

Mobil Research and Development Corporation
C. A. Pagen, representative
D. R. Cushman, alternate

3M Company
J. C. Landen, representative
John O. Elstad, alternate
Philip V. Palmquist, alternate
R. J. Peterson, alternate

Port Authority of New York and New Jersey
Edward S. Olcott, representative
Warren S. Quimby, alternate

Portland Cement Association
Gordon Ray, representative
E. C. Lokken, alternate

United States Steel Corporation
Richard S. Fountain, representative
L. N. Bigelow, alternate

STATE AND UNIVERSITY REPRESENTATIVES

Transportation Research Board representatives in state highway and transportation departments and educational institutions provide continuing liaison between their organizations and the Transportation Research Board. The TRB representatives actually function as an arm of the board. They help arrange the field visits made by the board's professional staff, work closely with the TRB staff in developing papers for the Annual Meeting and in finding qualified people to serve on TRB committees, keep their organizations informed about the latest activities of the board, and answer questions pertaining to any TRB service. The following persons were serving as State and University Representatives as of June 1, 1977.

State Highway and Transportation Departments

Alabama
Frank L. Holman, Jr.
Alaska
Doyle W. Ross
Arizona
Gene R. Morris
Arkansas
Billy K. Cooper
California
D. G. Pengilly
Colorado
Glenn W. Fritts
Connecticut
Charles E. Dougan
Delaware
A. Barratt Cullen, Jr.
District of Columbia
Bernard J. O'Donnell
Florida
William Gartner, Jr.
Georgia
Hugh L. Tyner
Hawaii
Terry Aratani
Idaho
James W. Hill
Illinois
Donald R. Schwartz
Indiana
M. L. Hayes
Iowa
Bernard C. Brown
Kansas
John D. McNeal
Kentucky
W. B. Drake
Louisiana
E. J. Breckwoldt
Maine
Richard A. Luettich
Maryland
Nathan L. Smith, Jr.
Clyde E. Pyers
Massachusetts
Thomas F. Humphrey
Michigan
Kent A. Allemeier
Minnesota
Frederick W. Thorstenson
Mississippi
T. C. Paul Teng
Missouri
William L. Trimm
Montana
Thomas E. Martin
Nebraska
Derald S. Kohles
Nevada
George B. Westenhoefer
New Hampshire
Philip E. McIntyre
New Jersey
Eugene F. Reilly
New Mexico
Arthur G. DeLong
New York
William P. Hofmann
North Carolina
W. F. Caddell, Jr.
North Dakota
Robert T. Peterson
Ohio
Leon O. Talbert
Oklahoma
C. Dwight Hixon
Oregon
Fred B. Klaboe
Pennsylvania
Leo D. Sandvig
Rhode Island
Francis H. Dutra
South Carolina
Richard L. Stewart
South Dakota
William T. Voss
Tennessee
Paul D. Edens
Texas
Robert L. Lewis
Utah
Dale E. Peterson
Vermont
Richard J. Nicholls
Virginia
Jack H. Dillard
Washington
Russell Albert
West Virginia
George E. White, Jr.
Wisconsin
Karl H. Dunn
Wyoming
F. O. Witters
Puerto Rico
Roberto Lugo Torres

Academic Institutions

Alabama
Raymond K. Moore, Auburn University
John D. Antrim, University of Alabama
J. H. Appleton, University of Alabama in Birmingham
Alaska
George R. Knight, University of Alaska
Arizona
Judson S. Matthias, Arizona State University
Rudolf A. Jiminez, University of Arizona
Arkansas
E. Walter LeFevre, University of Arkansas
California
Ronald F. Scott, California Institute of Technology
Blaine Vogen, California State Polytechnic College
Robert L. Alexander, California State University
Thomas H. Taylor, Joint Center for Transportation Studies
James H. Banks, San Diego State University
Thomas G. Schultz, San Jose State College
Vincent Roggeveen, Stanford University
P. K. Mehta, University of California, Berkeley
Tenny N. Lam, University of California, Davis
Frederick L. McGuire, University of California, Irvine
Harry W. Case, University of California, Los Angeles
Colorado
James G. Johnstone, Colorado School of Mines
Daryl B. Simons, Colorado State University
Vasant H. Surti, University of Colorado
Ralph E. Williams, University of Denver
Connecticut
Jack E. Stephens, University of Connecticut
Delaware
T. W. Brockenbrough, University of Delaware
District of Columbia
Henry Malcolm Steiner, George Washington University
Delon Hampton, Howard University
Philip L. Brach, University of the District of Columbia, Van Ness Campus
Florida
Walter H. Zimpfer, University of Florida
W. J. Fogarty, University of Miami
Georgia
Sid Davis, Atlanta University
Paul H. Wright, Georgia Institute of Technology

Hawaii
Peter H. P. Ho, University of Hawaii
Idaho
Robert P. Lottman, University of Idaho
Illinois
J. E. Bowles, Bradley University
Donald S. Berry, Northwestern University
James E. Aaron, Southern Illinois University
Moreland Herrin, University of Illinois
Indiana
George M. Smerk, Indiana University
Harold L. Michael, Purdue University
Cecil T. Lobo, Rose-Hulman Institute of Technology
James I. Tayler, University of Notre Dame
Iowa
R. L. Carstens, Iowa State University of Science and Technology
John J. O'Mara, University of Iowa
Kenneth J. Dueker, Institute of Urban and Regional Research, University of Iowa
Kansas
Bob L. Smith, Kansas State University
Joe Lee, University of Kansas
Kentucky
Leslie H. Leach, Eastern Kentucky University
John W. Hutchinson, University of Kentucky
Louisiana
Olin K. Dart, Jr., Louisiana State University and Agricultural and Mechanical College
William O. Hadley, Louisiana Tech University
John L. Niklaus, Tulane University
Maine
George W. Greenwood, University of Maine
Maryland
Everett C. Carter, University of Maryland
Massachusetts
Gary R. Fauth, Harvard University
Daniel Roos, Massachusetts Institute of Technology
Paul W. Shuldiner, University of Massachusetts
Richard D. Desrosiers, Worcester Polytechnic Institute
Michigan
Charles E. Cutts, Michigan State University
Eugene Y. Huang, Michigan Technological University
Warren J. Baker, University of Detroit
Donald E. Cleveland, University of Michigan
John H. Lamb, Wayne State University
Minnesota
Miles S. Kersten, University of Minnesota
Mississippi
James W. Epps, Mississippi State University
Samuel L. DeLeeuw, University of Mississippi
Missouri
Robert Ulrich, Central Missouri State University
David L. Guell, University of Missouri at Columbia
Joseph H. Senne, University of Missouri at Rolla
Lonnie E. Haefner, Washington University
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Fred Moses, Case Western Reserve University
Clarence H. C. James, Cleveland State University
Robert H. Keyser, Ohio Northern University
Eldridge A. Whitehurst, Ohio State University
Edward G. Russ, Ohio University
David H. Timmerman, University of Akron
Robert T. Howe, University of Cincinnati
David C. Colony, University of Toledo
Oklahoma
Robert L. Janes, Oklahoma State University
Joakim G. Laguros, University of Oklahoma
Oregon
Robert Davis Layton, Oregon State University
Pennsylvania
Richard G. McGinnis, Bucknell University
James P. Romualdi, Carnegie-Mellon University
Daniel R. Fredland, Drexel University
David A. Van Horn, Lehigh University
William H. Gotolski, Pennsylvania State University
Vukan R. Vuchic, University of Pennsylvania
Joel I. Abrams, University of Pittsburgh
Edward M. Wallo, Villanova University
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Rhode Island
Kendall Moultrop, University of Rhode Island
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J. Edwin Clark, Clemson University
Robert R. Roberts, University of South Carolina
South Dakota
R. Norman Orava, South Dakota School of Mines and Technology

Emory E. Johnson, South Dakota State University
Norman Heimstra, University of South Dakota

Tennessee

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Frank M. Holloway, Tennessee Technological University
Kenneth W. Heathington, University of Tennessee
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Santiago Corro Caballero, University of Mexico

Philippines

P. C. Reyes, University of Philippines

STATEMENT OF INCOME AND EXPENDITURES FOR FISCAL YEAR ENDING JUNE 30, 1977
(modified cash basis)

Income by Sources During Fiscal Year 1977

	Federal	State	Other	Total
Technical Activities Programs				
Research Correlation Service (state highway and transportation departments)		$1 528 400		$1 528 400
Federal Highway Administration	$ 536 257			536 257
Urban Mass Transportation Administration	272 646			272 646
Federal Railroad Administration	309 891			309 891
National Highway Traffic Safety Administration	57 352			57 352
Office of the Secretary of Transportation	51 815			51 815
Transportation Systems Center	2 170			2 170
Federal Aviation Administration	81 848			81 848
Maritime Administration	211 681			211 681
Energy Research and Development Administration	9 023			9 023
Association of American Railroads			$103 102	103 102
Dues from Supporting Members			247 599	247 599
Library subscriptions			52 645	52 645
Publication sales			121 329	121 329
Registration fees			101 676	101 676
Highway Research Information Service			27 190	27 190
National Academy of Sciences			75 000	75 000
Miscellaneous			5 906	5 906
Subtotal	$1 532 683	$1 528 400	$734 447	$3 795 530
National Cooperative Highway Research Program				
State highway and transportation departments[a]		3 411 699		3 411 699
Income total	$1 532 683	$4 940 099	$734 447	$7 207 229
Income applicable to fiscal year 1977	1 532 683	4 940 099	436 049	6 908 831
Balance carried forward[b]	0	0	$298 398	$ 298 398

[a]The National Cooperative Highway Research Program is supported through independent contracts between the National Academy of Sciences and each of the 50 state highway and transportation departments by agreement with the Federal Highway Administration, U.S. Department of Transportation, permitting use of allocated federal-aid highway planning and research (HPR) funds.

Expenditures by Activity During Fiscal Year 1977

	Federal	State	Other	Total
Technical Activities Program				
Field Service	$ 180 743	$ 395 875	$ 97 247	$ 673 865
Committee activities	66 184	140 323	26 753	233 260
Annual Meeting, conferences, and workshops	409 213	290 648	128 957	828 818
Publications	195 421	440 971	117 628	754 020
Computer-based information services	681 122	260 583	65 464	1 007 169
Subtotal	$1 532 683	$1 528 400	$436 049	$3 497 132
National Cooperative Highway Research Program				
Administration, surveillance, and publications		$ 854 564		$ 854 564
Contract research (flow through)		2 068 498		2 068 498
In-house TRB research		488 637		488 637
Subtotal		$3 411 699		$3 411 699
Expenditure total	$1 532 683	$4 940 099	$436 049	$6 908 831

Special Fund

In 1965 TRB established a fund to provide for orderly adjustments in the event of temporary shortfall in anticipated revenue. The fund was built up during the years from unanticipated surpluses from over-the-counter publication sales, by instituting economies in printing and other operations, and from interest from investments. No federal funds have been involved. The TRB Executive Committee has stipulated that the total amount of the fund shall not exceed one-half the annual budget for regular technical activities. The fund is maintained to meet TRB short-term commitments in the event of loss of primary support and to provide for program initiatives authorized by the Executive Committee.

Fund balance June 30, 1976	$1 195 890
Expenditures in fiscal year 1977	4 037
Subtotal	$1 191 853
Fiscal year 1977 income encumbered for expenditures in fiscal years 1978 and 1979[b]	286 263
Balance June 30, 1977	$1 478 116

[b] $286 263 from fiscal year 1977 income from other than federal or state sources was transferred to the special fund. It is to be used for expenditures in fiscal years 1978 and 1979 under a 3-year fixed-income budget plan approved by the major sponsors November 28, 1966. The balance of the funds carried forward, $12 135, is held to help defray cost of proceedings of conferences held in fiscal year 1977.

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