ANNUAL REPORT

1978

TRANSPORTATION RESEARCH BOARD
NATIONAL ACADEMY OF SCIENCES

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TRANSPORTATION RESEARCH BOARD
Commission on Sociotechnical Systems
National Research Council

National Academy of Sciences
Washington, D.C., 1978

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Peter G. Koltnow, Vice Chairman

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Harvey Brooks, Chairman, Commission on Sociotechnical Systems, National Research Council (ex officio)
Howard L. Gauthier, Department of Geography, Ohio State University (ex officio, MTRB)
Richard S. Page, Urban Mass Transportation Administrator, U.S. Department of Transportation (ex officio)
Henrik E. Stafseth, Executive Director, American Association of State Highway and Transportation Officials (ex officio)
John McGrath Sullivan, Federal Railroad Administrator, U.S. Department of Transportation (ex officio)

Robert N. Hunter, Chief Engineer, Missouri State Highway Department (ex officio, Past Chairman, 1977)
Harold L. Michael, Professor, School of Civil Engineering, Purdue University (ex officio, Past Chairman, 1976)

Kurt W. Bauer, Executive Director, Southeastern Wisconsin Regional Planning Commission
Lawrence D. Dahms, Executive Director, Metropolitan Transportation Commission for the San Francisco Bay Area
B. L. DeBerry, Engineer-Director, Texas State Department of Highways and Public Transportation
Arthur C. Ford, Assistant Vice President—Long Range Planning, Delta Air Lines, Inc.
Frank C. Herringer, General Manager, San Francisco Bay Area Rapid Transit District
Arthur J. Holland, Mayor, city of Trenton, New Jersey
Ann R. Hull, Speaker Pro Tem, Maryland House of Delegates
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Douglas N. Schneider, Jr., Director, District of Columbia Department of Transportation
William K. Smith, Vice President—Transportation, General Mills, Inc.
John R. Tabb, Director, Mississippi State Highway Department
John P. Woodford, Director, Michigan Department of State Highways and Transportation

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W. N. Carey, Jr., Executive Director
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 Supporters of the Transportation Research Board
From: W. N. Carey, Jr., Executive Director



The TRB Executive Committee has adopted substantial changes in our programs for organizational and individual support to begin in calendar year 1979. These changes are expected to have a significant effect in the years to come.

The principal sponsors of TRB—the states, the several administrations of the U.S. Department of Transportation, and the Association of American Railroads—recognize that financial support for TRB meetings, publications, information services, committee activities, and the necessary staff is primarily their responsibility. Without their primary support, TRB activities could not be carried on in a meaningful way.

These sponsors have also recognized that there are several classes of organizations and individuals who make substantial use of TRB services, publications, and other opportunities for education and interactions with experts but who do not make a corresponding contribution to the financial support of TRB. Within these classes, there have been some who have paid their share in the past, and we are grateful for their support. In addition, some of these organizations and individuals make an intellectual contribution to TRB by presenting papers and participating in committee meetings, sessions, and workshops, but this is balanced by the benefits they obtain.

The purpose of the impending changes is to broaden TRB's base of financial support and to relate the fees more closely to the value of the opportunities available through affiliation with TRB. The new plans will be described in detail in an early issue of Transportation Research News, but I felt that those who receive this Annual Report should have an outline of the changes in advance.

The first step was to reduce the number of categories of affiliation. This eliminated such difficult distinctions as those between government or public bodies and private organizations and those between professional, service, and trade organizations. The new plan includes Sponsors and Associates. Sponsors are the principal supporters of TRB; they may be governmental or collective private-sector institutions. All others are classified as Sustaining Associates, Contributing Associates, or Individual Associates.

Sustaining Associates are organizations that support TRB at a level considerably higher than the direct cost to TRB of the publications and other services they

receive. They, like the Sponsors, are interested in helping to maintain TRB activities and are not overly concerned with the dollar-for-dollar basis of the relationship. The Executive Committee has established $5000/year as the minimum fee for Sustaining Associates. TRB activities of interest to them and on their behalf are negotiated to best serve each Sustaining Associate within wide limits.

Contributing Associates are organizations that are also supportive of TRB programs and activities but that do not meet the fee requirement for Sustaining Associates. They may be domestic or foreign, public or private. Fees for Contributing Associates are more nearly related to the cost of TRB services provided and are based on the nature and magnitude of the associate organization. They range from $250 to $1200/year depending on the number of professional employees in the organization whose work is related to transportation.

Individual Associates are individuals interested in transportation who pay $25/year plus fees related to the TRB technical publications they receive. Special rates are available for college students.

A special effort is under way to increase the number of associates. This effort has been planned and its execution supervised by a subcommittee of the TRB Executive Committee. It has two major purposes: first, to broaden the base of participation in TRB committee and program activity by involving people from organizations, modes, and disciplines that have not been adequately represented in TRB activities and, second, to bring in additional financial support to relieve Sponsors of at least part of the burden of continuing inflation. The subcommittee has set $250 000/year from new associates as its goal; it is recognized that this goal is optimistic, but we believe that it can be met in the next few years.

Some of the classes of organizations that the subcommittee believes should carry a larger share of TRB's financial burden include consultants; industry suppliers to transportation; suppliers of transportation; users of transportation (e.g., shippers); metropolitan planning organizations; councils of government and municipal governmental agencies; colleges and universities that have transportation programs; research organizations (for profit and nonprofit); associations and other organizations in the fields of air, pipeline, and inland waterways; and large and small transit properties.

For each class of organization, a unique approach is being designed in an attempt to describe the mutual advantages of increased support and participation. I hope to be able to report significant success at this time next year. TRB continues to study ways to improve its work on behalf of its sponsors and associates and on behalf of the transport community. We are confident that your continued support is well justified.

Staff organization and responsibilities.

EXECUTIVE DIRECTOR
DEPUTY DIRECTOR (vacant)

Directs the Transportation Research Board programs and activities in accordance with policies formulated by the Executive Committee and the Commission on Sociotechnical Systems.

PUBLIC INFORMATION OFFICER (part-time)

Conducts public information program and serves as editor of Transportation Research News.

DIVISION A–REGULAR TECHNICAL ACTIVITIES

Develops annual meeting program and recommends content of regular series publications.

Organizes and conducts special conferences and workshops.

Furnishes staff support to the groups and special committees.

Administers the program of technical visits to highway and transportation departments; urban transportation agencies; agencies of federal, state, and local government; industries; and universities and organizations involved in the improvement of transportation. Responds to special requests from these organizations.

Furnishes advice on the research programs of federal and other agencies on request.

Provides liaison between the regular committees and NCHRP and Special Technical Activities steering committees.

Screens the input and output of the Transportation Research Information Service.

Provides library and document service for the Transportation Research Board and its supporters.

DIVISION B–SPECIAL TECHNICAL ACTIVITIES

Performs short-term studies of transportation subjects with regard to their potential as regular activities of TRB.

Conducts research projects through the work of project committees, consultants, and staff to produce information and recommendations that are particularly appropriate as NAS-NAE-NRC functions.

Develops and operates new or modified information transfer systems to enhance the effectiveness of TRB's internal operations or its service to the transportation research community.

Directs and manages operations for the Highway Research Information Service, the Railroad Research Information Service, the Maritime Research Information Service, and the Air Transportation Research Information Service.

DIVISION C–ADMINISTRATIVE ACTIVITIES

Prepares and controls operating budgets for all TRB activities and administers TRB accounting records.

Maintains liaison with NAS comptroller and business and personnel offices.

Serves as personnel office for TRB activities.

Edits and supervises printing and distribution of TRB publications (except NCHRP reports).

Supervises physical arrangements for and management of TRB annual meetings.

Administers supporting membership records and accounts.

Administers distribution and sale of TRB publications.

Provides office services.

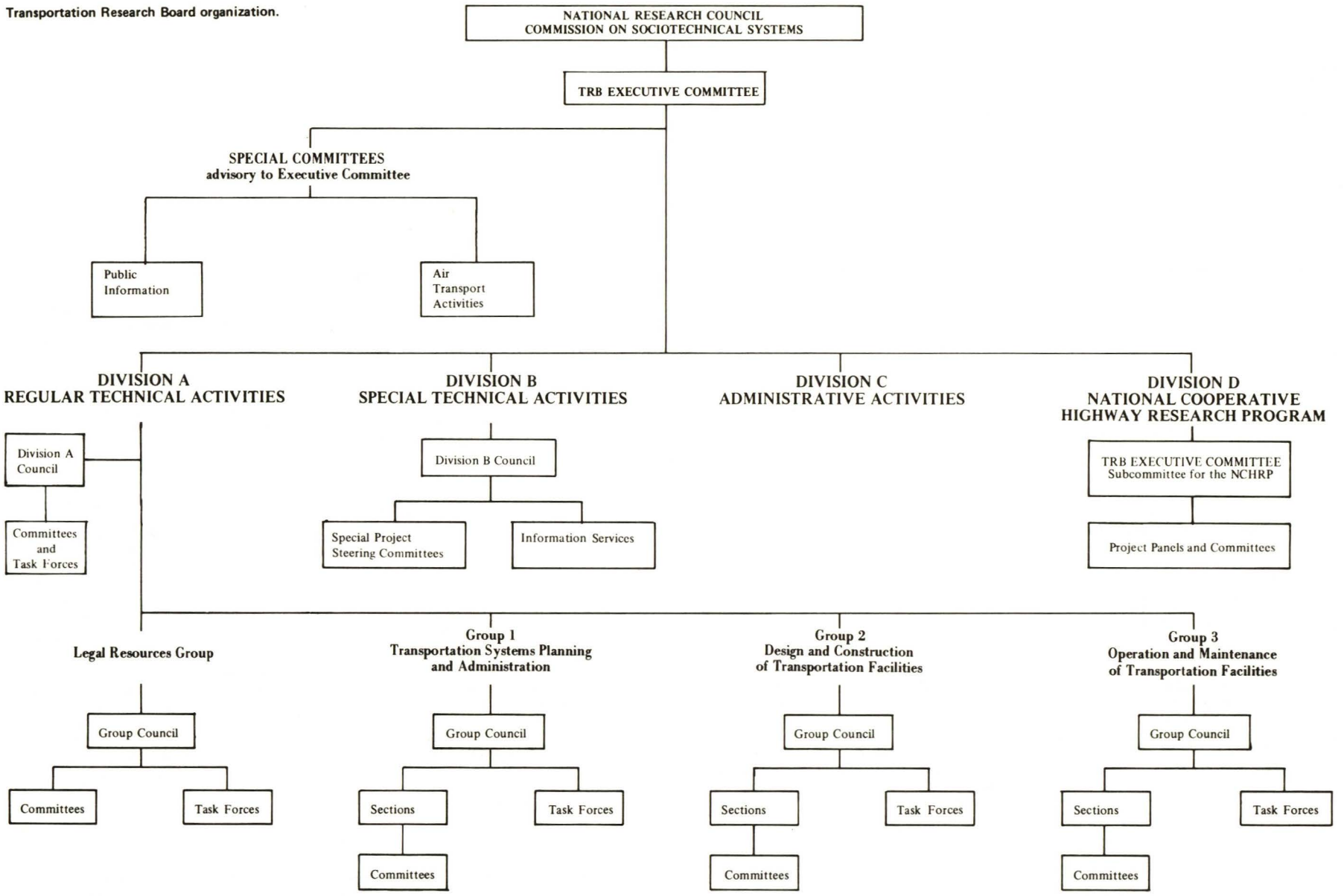
DIVISION D–NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM ADMINISTRATION

Provides professional secretariat to assist American Association of State Highway and Transportation Officials in the formulation of annual research programs. Assists NAS, through the TRB Executive Committee Subcommittee for the NCHRP, in the acceptance review of problems received from AASHTO. Oversees the formation of project panels and committees, the preparation of project statements, the solicitation and review of research proposals, the selection of agencies to perform the research, and the negotiation of contracts.

Provides administrative and technical surveillance of research under way in the Program.

Edits and publishes reports emanating from the projects in the Program.

∞ **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 Low-Volume Roads, the Committee on Inland Water Transportation, and the Task Force on Transportation System Management. A Committee on Transportation Education and Training has been approved by the council. Lester A. Hoel, Chairman of the Department of Civil Engineering at the University of Virginia, has agreed to serve as chairman of the committee. It is anticipated that the committee will be organized prior to the Fifty-Eighth Annual Meeting. 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 Workshop on Small Buses.

GROUP 1–TRANSPORTATION SYSTEMS PLANNING AND ADMINISTRATION

Leon M. Cole, chairman

Group 1 consists of 41 committees organized into six sections, as well as several subcommittees and task forces. Organizational changes during the year and other activities, such as conferences and workshops, reflect the changing needs in transportation.

Organizational changes in Group 1 involved abolishing some committees, shifting some committees to different sections, and creating new committees and task forces. For example, committees or task forces have been established or reoriented to deal with financing transportation, staff management, light-rail transit, aircraft design and airports, rural public transportation, increases in vehicle size and weight, the preservation of historic transportation facilities, and economic analyses that might be applied to solving transportation problems.

Activities at the Annual Meeting also reflected current concerns in transportation planning. Of the 75 technical sessions sponsored by Group 1 at the Fifty-Seventh Annual Meeting, 45 were conference sessions, and 30 were paper sessions.

Conferences or workshops held throughout the year also explored matters that affect policy. Conference participants are often among the people who can affect policy fairly directly, since they include administrators and elected officials at all levels of government as well as spokesmen for the general public. During the past year, self-supporting meetings and funded conferences and workshops have dealt with such matters as planning and administering transportation safety, improving transit services with limited resources, light-rail transit, financing urban transportation, transportation for the elderly and handicapped, methodologies for performing alternatives analysis for transportation investments, strategic investments in transportation to guide development, service innovations in urban transport, state aviation planning, goods movement in urban areas, identifying and responding to consumer concerns, social and economic effects of automated guideway transit, and intermodal systems of the Federal Railroad Administration.

Research needs continued to be emphasized by the committees and sections of Group 1. This effort to respond to emerging needs in transportation was reflected in conferences or workshops devoted primarily to developing statements of current research needs as well as meetings or conferences that dealt with more general activities but included research needs. Critical issues in transportation, which often provide a framework for statements of research needs, have also been reviewed and revised.

At the Annual Meeting in January, Group 1 sponsored several informal discussions between key individuals in transportation and graduate students or other novices in transportation. These discussions, held in late afternoon sessions, were exceptionally well attended. In addition, the first issues of several new or reconstituted periodicals–*New Concepts in Urban Transportation, Paratransit,* and *Land Use and Transportation*–were published.

Several conferences that reflect emerging needs in transportation are planned. They will emphasize such topics as public transportation, energy, and ways to optimize the use of existing facilities. A national conference on transportation planning will deal with such trends as the shifting emphasis from regional to subregional concerns, from long-range to short-range problems, and from high- to low-capital-intensive investments in transportation.

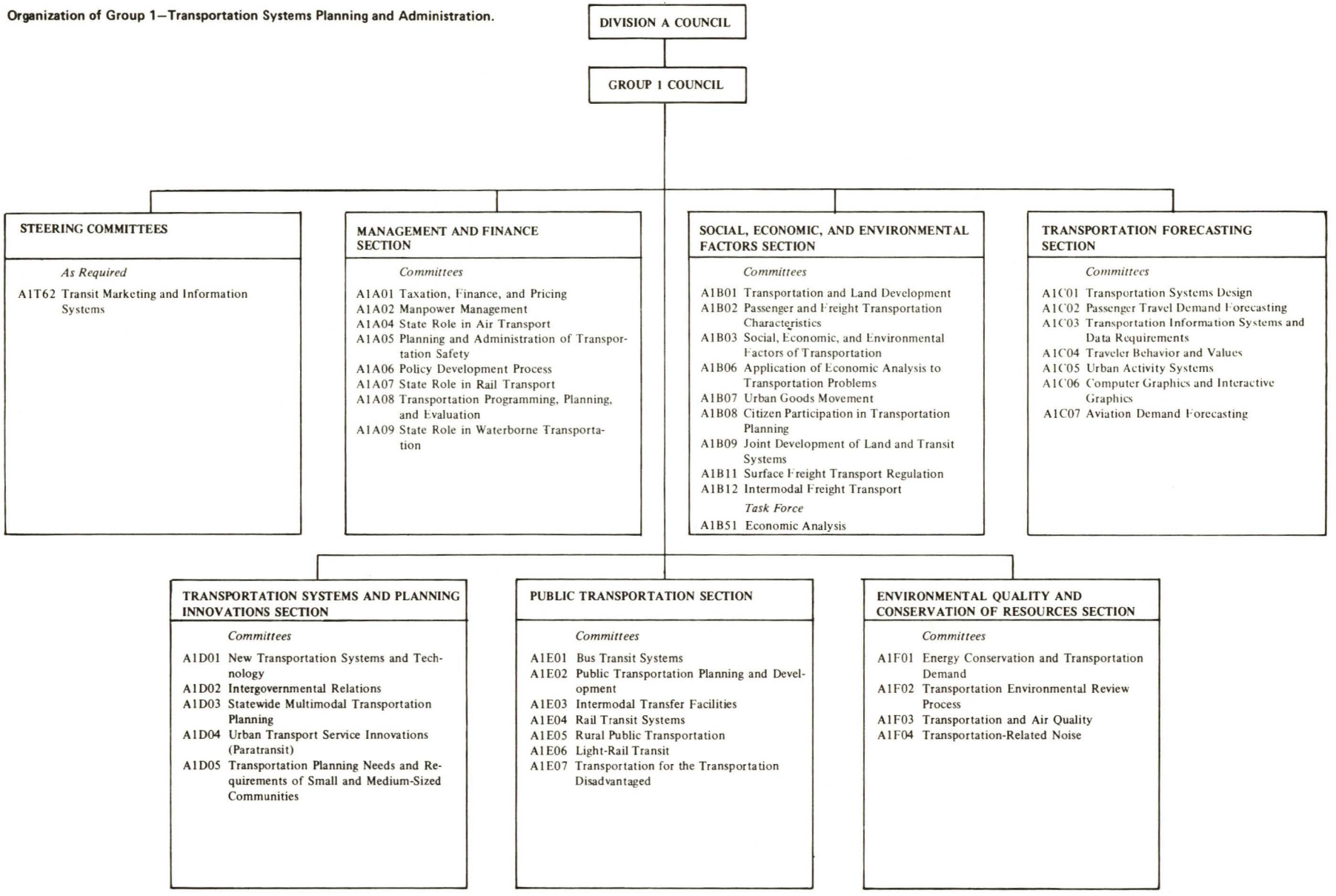
GROUP 2–DESIGN AND CONSTRUCTION OF TRANSPORTATION FACILITIES

Eldon J. Yoder, chairman

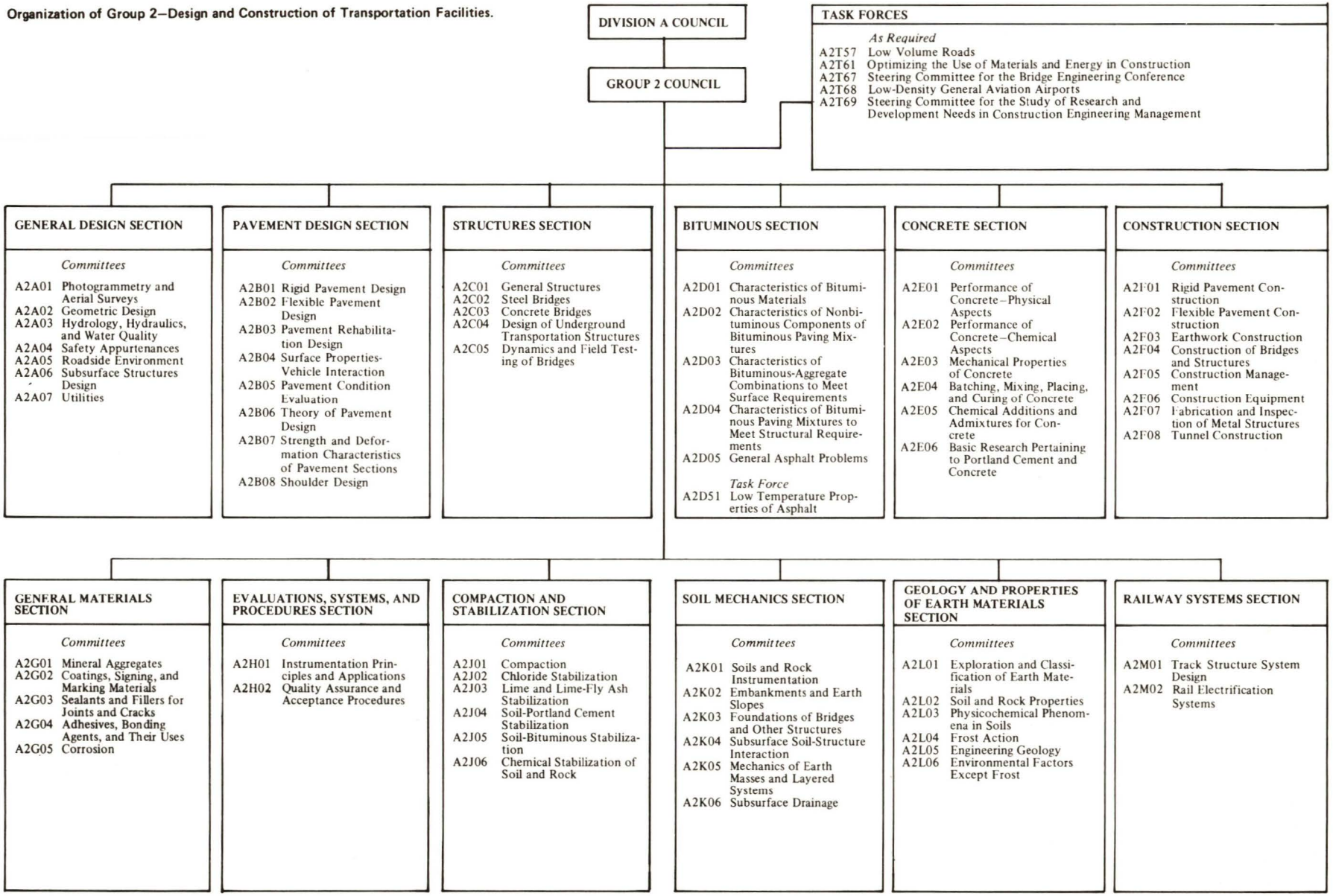
Methods and materials to be used in both short-term and long-term efforts to halt the rapidly increasing deterioration of this nation's tremendous investment in its highway system are one of the primary concerns of Group 2. Whether the action taken is called system maintenance or rehabilitation does not matter. The rising costs, coupled with the increasing unavailability of good materials, have brought about an expanding experimentation with marginal or untried materials. Several committees are concerned with the need for adequate evaluation of new materials and the proper controls and specifications for the use of marginal materials.

Group 2 is giving continuing attention to its organization

Organization of Group 1—Transportation Systems Planning and Administration.



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



in regard to current transportation needs through its standing Committee on Organization, Scope, and Functions. Appropriate adjustments, in task forces and committees and in their scopes, have been made to address these needs. Committee and task force changes are shown in the organization chart.

Among the myriad subjects to be addressed during the Fifty-Eighth Annual Meeting will be the unique planning, design, and construction problems and their solutions for the construction of Interstate 70 through Vail Pass, Colorado. The environmental considerations and the efforts to preserve the natural setting of the area complicated the design and construction problems and brought out some novel solutions. The rail committees are preparing a symposium on track-bed mechanics. User costs as they are related to pavement roughness, nondistinctive pavement analysis, probabilistic approaches to bridge designs, tender mixes, stabilization, remote sensing, and energy and dollar savings in construction are among the subjects being pursued for the Annual Meeting in January 1979.

The Steering Committee for the Bridge Engineering Conference has completed planning activities and released the preliminary program for the 13-session conference, which will be held in St. Louis, Missouri, September 25-27, 1978. The program was prepared with the cooperation of Group 3. More than 400 engineers and administrators are expected to attend.

A Group 2 steering committee is administering a 21-state pooled fund project for the Federal Highway Administration to study research and development needs in construction engineering management. One workshop was held May 15-18 at Asilomar, California; 55 representatives of the various construction engineering management interests attended. A similar number of participants from the eastern half of the nation will meet July 17-20 at Williamsburg, Virginia, to discuss the same problems. The steering committee will meet in November to merge the findings of both workshops and prepare the final report.

The group council handles short-term organizational problems through the development of task forces that are given specific tasks to complete in a limited time. This concept has been working effectively and the council discharged, with thanks, the following task forces that have completed their assignments: Task Force on Low-Volume Roads (on its recommendation, the Division A Council formed a standing Committee on Low-Volume Roads); Task Force on Review of Special Report 29, *Landslides* (the committee completed its work in rewriting the Special Report to be published as Special Report 176, *Landslides: Analysis and Control*, in Fall 1978); Task Force on Relating Pavement Distress to Performance (the task force completed the assignment with the publication of a Research Circular); Program Committee for the Conference on Research in Airport Pavement (the committee completed the summary report); Program Committee for the Second International Skid Prevention Conference (the committee completed its work with the release of four Transportation Research Records and one Research Circular containing conference proceedings and summaries); Study Committee on Railroad Electrification (the committee completed its work with the publication of the conference proceedings in a Special Report); and Task Force on Low-Density General Aviation Airports (the committee's membership and activities have been lodged with new committees in Group 1).

GROUP 3—OPERATION AND MAINTENANCE OF TRANSPORTATION FACILITIES

Adolf D. May, Jr., chairman

Group 3 continued its emphasis on transportation system management this year. Other topics that received continuing emphasis include the environment, human behavior, safety, and maintenance.

The Eleventh Annual Workshop on Human Factors in Transportation, sponsored jointly by the Committee on User Information Systems and the Committee on Vehicle User Characteristics was as successful as its predecessors were. Planning is already under way for the Twelfth Annual Workshop. A second International Symposium on Snow Removal and Ice Control Research, sponsored by the Committee on Winter Maintenance, attracted participants from Sweden, the United Kingdom, the Netherlands, Belgium, Poland, Japan, Italy, and Canada, as well as from the United States.

The Committee on Visibility held a symposium on Driver Visibility Under Varying Adverse Weather Conditions and published the proceedings in Research Circular 193. Members of the group conducted a Workshop on Small Buses for the Urban Mass Transportation Administration. The workshop, which was attended by transit operators, users, manufacturers, government officials, and representatives of universities and research organizations, examined issues ranging from marketing to safety.

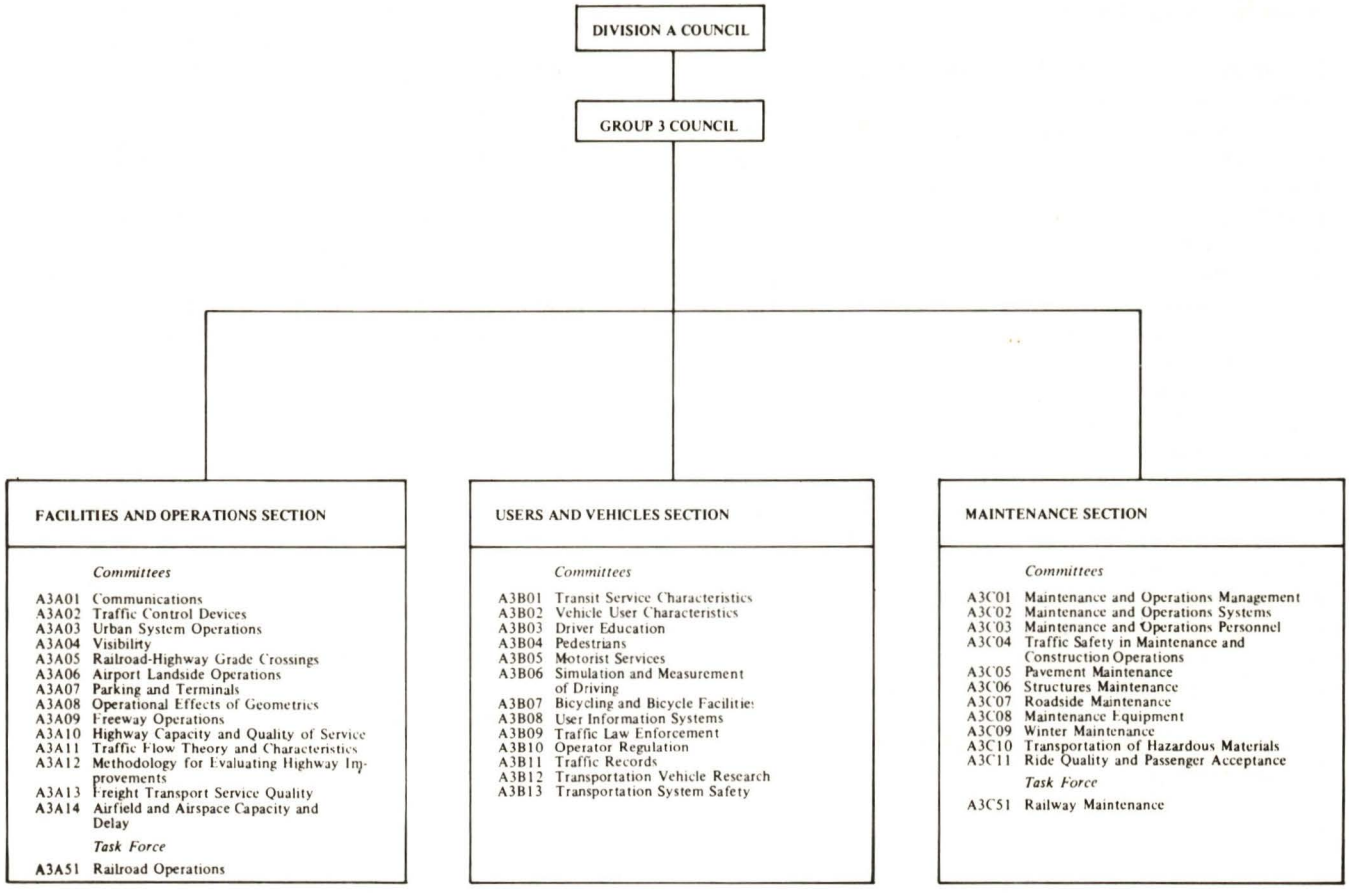
Air transportation is receiving increased attention in Group 3, as witness the establishment of a new Committee on Airfield and Airspace Capacity and Delay and the formation of a Task Force on Operations Research Applications in Air Transportation Maintenance and Operations.

Formation of a task force on two- and three-wheeled motorized vehicles and their facilities was authorized by the council.

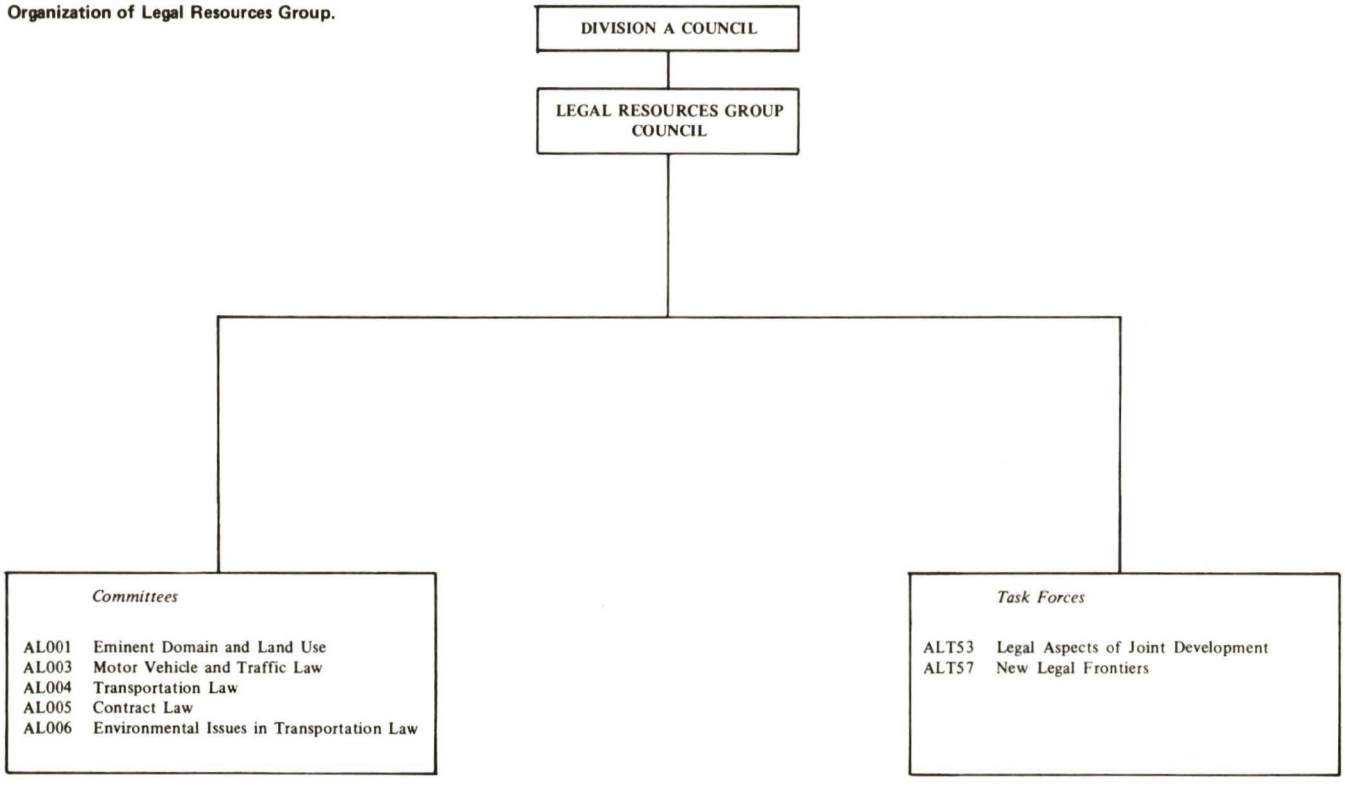
Concern that the group was not devoting enough attention to planning to meet future transportation research needs resulted in directing the largest part of the May 1978 council meeting to a far-ranging discussion of the future direction of transportation policy and operations and maintenance research needs. This discussion will provide guidance to committees in the group and promote better coordination among committees.

Plans are well advanced for a September workshop, sponsored by the Committee on Ride Quality and Passenger Acceptance, on Implications of Fuel-Efficient Vehicles for Ride Quality and Passenger Acceptance. The purpose of the workshop will be to examine the interactions between technological and operational developments in transportation systems that lead toward improved energy and to define the issues and problems that result from this examination. The Committee on Structures Maintenance has participated with Group 2 in planning for the Bridge Engineering Conference to be held September 25-27, 1978, in St. Louis, Missouri.

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



Organization of Legal Resources Group.



LEGAL RESOURCES GROUP

Nolan H. Rogers, chairman

During the Fifty-Seventh Annual Meeting the Legal Resources Group and Group 3 presented two joint conference sessions on safety in construction and maintenance work zones. The sessions were well received, and the Legal Resources Group was again pleased to have the opportunity to participate in such program sessions and hopes for further opportunities for joint sessions. In addition, several standing committees met during the Annual Meeting.

The Sixteenth Annual Workshop on Transportation Law was held in Colorado Springs, July 31-August 4, 1977. It was attended by 85 attorneys, who represented the federal and state transportation sectors, including mass transit and railroads. The Seventeenth Annual Workshop on Transportation Law will be held at the Snowbird Lodge near Salt Lake City, Utah, July 30-August 3, 1978, in cooperation with the Utah Department of Transportation. Linda Kamm, General Counsel of the U.S. Department of Transportation; Lorenzo Casanova, Chief Counsel of the Federal Highway Administration; and Clark Onstand, Chief Counsel of the Federal Aviation Administration, are among the distinguished representatives of the air, rail, and highway modes who will be participating in the workshop.

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 17 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-Seventh Annual Meeting, committee members prepared 60 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 38.

SPECIAL COMMITTEE ON AIR TRANSPORT ACTIVITIES

Ronald W. Pulling, chairman

The Special Committee on the Air Transport Activities of the Transportation Research Board was originally established in 1974 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.

The committee submitted its report to the Executive Committee, which unanimously accepted it at its meeting on January 26, 1977, and requested that the committee continue to monitor the developing air transport activities of TRB, identify new areas in aviation in which TRB needs to be involved, and endeavor to identify sources of financial support for the air transport activities of TRB. At its meeting in January 1978 the committee recommended that TRB establish a new committee on the problem of the interface between airports and aircraft; this subject is currently being pursued.

FIFTY-SEVENTH ANNUAL MEETING

A record 4014 of the world's leading highway and transportation researchers, engineers, educators, and administrators attended the Fifty-Seventh Annual Meeting of the Transportation Research Board held January 16-20, 1978, at the Sheraton-Park and Shoreham Americana hotels in Washington.

Classification of Organization Represented	Number of Registrants
U.S. Department of Transportation	679
Other federal agencies	133
State highway and transportation departments	682
Other state agencies	51
Local governments	158
Foreign governments	102
Universities and colleges	736
Transit organizations	146
Research institutes	73
Consultants	462
Foreign nongovernment organizations	139
Service organizations	86
Trade associations	106
Industry	389
Press	38
Other	34
Total	4014

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 1978, the following conferences and workshops were held.

Workshop on Research Needs

Lakeview Inn and Country Club, Morgantown, West Virginia, July 25-27, 1977

This workshop was scheduled at the time of the summer meeting of the section on Social, Economic, and Environmental Factors of Group 1 and the committees of that section. The specific objective of the workshop was to identify research needs related to the social, economic, and environmental effects of transportation during the next 5 to 10 years and to prepare problem statements. The workshop was supported by a registration fee of $20. The attendance was 51, and the proceedings have been published in TRB Circular 187.

Workshop on Planning and Administration of Transportation Safety

Central Missouri State University, Warrensburg, Missouri, July 27-29, 1977

The workshop was designed to clarify and define the role of the state highway safety agency, to ascertain some of the reasons for both successes and failures in state programs, and to suggest tasks for the agency and qualifications for its staff. The workshop was supported by a registration fee of $25, and the attendance was 49. The proceedings will be published in a TRB Circular.

Sixteenth Annual Workshop on Transportation Law

Antlers Hotel, Colorado Springs, Colorado, July 31-August 4, 1977

The 3½ day workshop included papers, panel discussions, and courtroom demonstrations involving highway and transportation law problems. It was supported by a registration fee of $85 and was conducted by the Legal Resources Group. Attendance was 86; no publication is anticipated.

Conference on Improving Transit Services With Limited Resources

Guild Inn, Toronto, Canada, August 14-18, 1977

This was the sixth in a series of joint midyear conferences sponsored by TRB Committees on Public Transportation Planning and Development, Intermodal Transfer Facilities, Rail Transit Systems, Transit Service Characteristics, and Transportation Planning Needs and Requirements of Small and Medium-Sized Communities. The purpose of the conference was to exchange technical information, develop and refine statements of research problems, and conduct committee business. There were 80 persons in attendance, and a conference summary will be distributed to the participants.

Symposium on Visibility Under Varying Environmental Conditions

Federal Office Building, Portland, Oregon, August 16-18, 1977

The symposium included presentations on general visibility during adverse weather, critical cues of vehicle guidance, and driver behavior during adverse weather. There was also a visit to an experimental fog installation, workshops, and a committee meeting to fully explore the subject matter. The symposium was sponsored by the TRB Committee on Visibility and was supported by a registration fee of $35. There were 40 in attendance, and the proceedings have been published in TRB Circular 193.

Fourth International Conference on the Structural Design of Asphalt Pavements

University of Michigan, Ann Arbor, Michigan, August 21-26, 1977

Presentations were made on methods of structural design of asphalt pavements and overlays that are based on the measured fundamental properties of materials and that are applicable to loading conditions, environmental conditions, and other physical requirements. The conference was sponsored by the University of Michigan in cooperation with the Asphalt Institute and the Federal Highway Administration. TRB participated through membership on the Technical Advisory Committee. Publication of the proceedings will be supported by registration fees and other non-TRB funds. The attendance was 460.

National Conference on Rail-Highway Grade-Crossing Safety

University of Utah, Salt Lake City, Utah, August 23-25, 1977

This conference fostered the exchange, among the representatives of several affected groups, of information about current rail-highway grade-crossing programs and the examination of future needs in promoting grade-crossing programs. The conference was sponsored by the U.S. Department of Transportation, American Association of State Highway and Transportation Officials (AASHTO), Amtrak, National Safety Council, and National Association of Regulatory Utility Commissioners. The TRB cooperated through its Committee on Railroad-Highway Grade Crossings. The conference was supported by a registration fee, and a report will be distributed by the U.S. Department of Transportation to the approximately 300 participants.

National Conference on Light-Rail Transit

Sheraton-Boston Hotel, Boston, Massachusetts, August 28-31, 1977

In response to a request by the Urban Mass Transportation Administration (UMTA), TRB conducted the second conference on light-rail transit. The first major conference was held in Philadelphia, Pennsylvania, in June 1975 and permitted those in attendance to become fully informed about the light-rail transit mode. This second conference explored the implementation of new rail systems in urban areas. The focus of the meeting was on light-rail transit potentials in North American cities. The site was Boston, where the new U.S. Standard Light-Rail Transit Vehicle is in operation. The conference was supported by funds from UMTA and a registration fee of $50 for those who preregistered and $60 for those who registered during the conference. The attendance was 460, and the proceedings will be published in Special Report 182.

Conference on Intergovernmental Fiscal Responsibilities for Public Transportation

Sheraton-Fontainbleau, Ocean City, Maryland, September 11-14, 1977

This conference was held to examine transit fiscal issues and sources of revenues for capital and operating costs. Specific issues discussed were intergovernmental fiscal relations, including the roles, financial responsibilities, and limitations of each level of government; sources and potential of revenues at each level of government; estimates of deficits and means of financing them; capital grants impacts; finding channels; need for flexibility of use of urban transportation monies; and degree of governmental controls. The conference was sponsored by the Office of the Secretary, U.S. Department of Transportation; UMTA; the Federal Energy Administration; and the Environmental Protection Agency. The attendance was 52; the report has been included in Special Report 181.

Workshop on Pedestrians

Biltmore Hotel, New York, New York, September 12-15, 1977

The TRB Committee on Pedestrians held a combined midyear meeting and workshop. In addition to conducting

committee business, the workshop included discussion on pedestrian control and safety. A series of field trips took place to inspect pedestrian facilities at the Port Authority of New York and New Jersey, World Trade Center, and Roosevelt Island. The workshop was supported by a registration fee of $45 and funds from the Federal Highway Administration (FHWA) and the U.S. Department of Housing and Urban Development. The attendance was 45; a report will be made to the sponsors and attendees.

Conference on Transportation for the Elderly and Handicapped

Belmont Conference Center, Elkridge, Maryland, September 27-30, 1977

This conference was convened at the request of UMTA to discuss a number of social and economic concerns as well as technological issues that affect transportation for the elderly and handicapped. In the area of social and economic concerns, case studies were presented that examined the problems operators have with regulations and funding for special systems. Technical papers discussed the design and operation of vehicles constructed to serve the handicapped. Attendance was limited to 36; a report will be made to UMTA and the participants.

Workshop on Techniques of Alternative Analysis for Major Transportation Investments

Airlie House, Warrenton, Virginia, November 8-10, 1977

This workshop was held to look at the technical issues that are of current interest to those developing alternative analyses for major transportation investments, to permit exchange of information on current analysis techniques and to identify needs for improvement. The workshop focused on identification of alternatives, prediction of impacts, integration of the environmental impact statement, and evaluation and decision making. Participants represented state and municipal planning organizations, transit properties, consultants, the federal government, and the academic community. The workshop was supported by UMTA; a report will be made to UMTA and the 90 attendees.

Conference on Transportation and Land Development

Holiday Inn of Chicago-O'Hare, Schiller Park, Illinois, November 10-12, 1977

The conference explored the issues, what is being done about them, and how priorities are changing for strategic transportation investments to achieve urban and regional development objectives. The workshop was supported by funds from UMTA and a registration fee of $30. There were 117 in attendance; a Special Report will be published.

Workshop on Small Buses

Sheraton National Motor Hotel, Arlington, Virginia, November 21-22, 1977

At the request of UMTA, this workshop was convened to explore the critical issues related to the operation of small buses in urban mass transportation. Issues included the role of UMTA in the development of small buses to accommodate the elderly and the handicapped, regulations and specifications, marketing factors, design concepts, and legal aspects. The workshop was supported by funds from UMTA and a registration fee of $25. A report will be made to the sponsor and the 75 attendees.

Conference on Urban Transport Service Innovations

El Cortez Hotel, San Diego, California, December 5-7, 1977

This conference focused on transit services and markets and discussed various alternatives in serving social service needs, the work trip, the community, and low-density areas. Other areas discussed included financial, regulatory, and labor problems in implementing new and innovative services. It was supported by funds from UMTA and cosponsored by the American Public Transit Association, San Diego Transit, and the TRB Committee on Urban Transport Service Innovations. There was also a registration fee of $45 for those who preregistered and $55 for those who registered during the conference. The attendance was 306; a Special Report will be published.

Coordination of Northeast Corridor Improvement

National Academy of Sciences, January 4, 1978

At the request of the Federal Railroad Administration (FRA), this meeting was convened to explore means of creating an additional channel for coordination of the Northeast Corridor Improvement Project. Representatives from organizations that have planning or operating responsibilities in the corridor examined possible means of coordination the TRB can administer for FRA. A report will be forwarded to the sponsor and the approximately 75 attendees.

Eleventh Annual Human Factors Workshop

Sheraton-Park Hotel, Washington, D.C., January 15, 1978

This workshop provided an opportunity for exchange of information between researchers and practitioners in the transportation field with particular emphasis on human factors aspects. It was sponsored jointly by the TRB Committee on User Information Systems and Vehicle User Characteristics and supported by a registration fee of $40. There were approximately 130 in attendance.

Highway Research Information Service Users Workshop

Ramada Inn and Virginia Highway Transportation Research Center, Charlottesville, Virginia, February 2-3, 1978

Representatives from the highway and transportation departments of 11 eastern states, 2 central states, the District of Columbia, and FHWA met to discuss ways and means to improve the use and usefulness of the Highway Research Information Service and to observe the operations of the Foreign Science and Technology Center, a U.S. Army foreign language document-processing and translation unit in Charlottesville, Virginia. A report will be made to the participants and the TRB representatives.

Workshop on Consumer Concerns

The Cascades, Williamsburg, Virginia, February 22-24, 1978

At the request of UMTA, a workshop was held to identify areas of consumer concerns, areas of research needs, and means of communication between the various parties. The workshop was supported by funds from UMTA and a registration fee of $55. The attendance was 55; a report will be sent to the sponsor and participants.

International Conference on Transport for Elderly and Handicapped Persons

Corpus Christi College, Cambridge University, Cambridge, England, April 4-6, 1978

The goal of this conference was to gather, review, and disseminate reliable information on recent transportation developments and actions related to the elderly and handicapped. The conference was cosponsored by the U.K. Transport and Road Research Laboratory, the French Ministry of Transport, and TRB. It was supported by a registration fee, and the approximate attendance was 150. A report will be published by the sponsors in the United Kingdom.

Workshop on Aviation Planning and Program Development

Lincoln Hilton, Lincoln, Nebraska, April 24-26, 1978

The purpose of this workshop was to identify and document the state of the art of the aviation planning process. Its focus was on system implementation and development of a source document on the state aviation planning process. The workshop was cosponsored by the National Association of State Aviation Officials (NASAO), AASHTO, and the TRB Committee on State Role in Air Transport and supported by a registration fee of $50. A report will be published by NASAO.

Workshop on Research and Development Needs in Construction Engineering Management

Asilomar Conference Center, Pacific Grove, California, May 15-18, 1978

This was one of two workshops scheduled in the east and west. The objective of these workshops is to formulate a national priority program of short- and long-range research and development needs in construction engineering management. The workshops are being supported by funds from FHWA. The attendance was 60; a report will be made to the sponsor and attendees.

Second International Symposium on Snow Removal and Ice Control Research

Dartmouth College, Hanover, New Hampshire, May 15-19, 1978

The effect of ice and snow on transportation and communications facilities and methods of their control was the theme of this symposium. Some of the topics covered were aircraft, power-line, and railroad icing; ice adhesion and detection; and snowdrifting. The symposium was cosponsored by TRB, the U.S. Army Cold Regions Research and Engineering Laboratories, and the U.S. Department of Transportation. Approximately 100 were in attendance; a publication is anticipated.

Third National Conference on Rural Public Transportation

Michigan Technological University, Houghton, Michigan, June 28-30, 1978

Topics to be included at this conference are current practices in rural public transportation, particularly regarding cost and finance; insurance; regulation; intergovernmental relations; record keeping; service for the elderly and handicapped; marketing; and vehicle performance. The conference will be supported by funds from UMTA and a registration fee of $60. A report will be made to the sponsor and to the approximately 200 attendees.

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 U.S. AID 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 1978, the work of Division B included seven activities that are discussed and summarized below.

TRANSPORTATION TECHNOLOGY SUPPORT FOR DEVELOPING COUNTRIES

In October 1977, Division B began a 3-year special project under the sponsorship of the U.S. Agency for International Development (AID) to enhance rural transportation in developing countries by providing improved access to existing information on the planning, design, construction, and maintenance of low-volume roads. With advice and guidance from a project steering committee, information products are produced and transmitted through a network of correspondents in developing countries. The products include compendiums of previously published information on relatively narrow topics, syntheses of existing information on somewhat broader topics, and proceedings of international workshops on low-volume roads. Compendiums are produced on a monthly basis, syntheses on a semiannual basis, and proceedings on a biennial basis. The project work also includes field visits to developing countries and colloquiums for students from developing countries who are attending U.S. colleges and universities.

SUMMARY OF SPECIAL TECHNICAL ACTIVITIES DURING FISCAL YEAR 1978

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	330 000
Right-of-way and legal problems	11-68	Open	S. Corwin	J. Vance	NCHRP	90 000
Operation of Highway Research Information Service	6-67	6-78 9-78		A. Mobley	States FHWA	536 200
Operation of Maritime Research Information Service	6-69	9-78	R. Taggart	D. Mellor	MARAD	200 000
Operation of Railroad Research Information Service	3-72	9-78		F. Houser	FRA	175 000
Development and Operation of Air Transport Research Information Service	9-76	9-77	J. Drake	P. Irick S. Schofer	FAA	90 000
Transportation Technology Support for Developing Countries	10-77	9-80	K. Bergstralh	L. Crowther	U.S. AID	200 000

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*.

Work on the following 10 topics was completed in fiscal year 1978: effect of weather on highway construction; priority programming and project selection; durability of drainage pipe; recycling materials for highways; construction contract staffing; precast concrete elements for transportation facilities; state highway and transportation data storage and retrieval systems; maintenance equipment: management and selection systems; open-graded friction courses; and energy effects, efficiencies, and prospects for various modes of transportation.

First drafts have been completed for the following eight reports: rehabilitation of PCC pavement joints, design and use of highway shoulders, relationship of asphalt cement properties to pavement durability, bridge deck durability, failure and repair of continuously reinforced concrete pavement, design of sedimentation basins, and consequences of deferred maintenance.

Other topics on which work has been started include bus transit service-planning guides; photologging; bituminous patching mixtures; variable message signs; alternative work schedules: experience and transportation impacts; direction-finding from arterials to destination; glare-screen guidelines; welding and inspection practices in bridge fabrication; rapid testing; environmental monitoring (air, water, noise); formulating and justifying highway maintenance budgets; vehicle size and weight regulation, enforcement, and permit operations; measurement of pavement condition; and bridge deck drainage.

RIGHT-OF-WAY AND LEGAL PROBLEMS

Volume 3 of *Selected Studies in Highway Law* was published during fiscal year 1978. It covers the fields of contract law, environmental law, tort liability, and intergovernmental relations. The following papers appear in Volume 3: Licensing and Qualification of Bidders; Competitive Bidding and Award of Highway Construction Contracts; Bid Mistakes: A Practical Approach to the Problem; Indeminification and Suretyship in Highway Construction Contract Awards; Labor Standards in Federal-Aid Highway Construction Contracts; Control of Conflicts of Interest in Highway Contract Administration; Legal Problems Arising From Changes, Changed Conditions, and Disputes Clauses in Highway Construction Contracts; Legal Effect of Representations as to Subsurface Conditions; Liability for Delay in Completion of Highway Construction Contracts; Trial Strategy and Techniques in Highway Contract Litigation; Environmental Litigation: Rights and Remedies; Trial Strategy and Techniques in Environmental Litigation; Liability of State Highway Departments for Design, Construction, and Maintenance Defects; Personal Liability of State Highway Department Officers and Employees; Liability of State and Local Governments for Snow and Ice Control; Liability for Wet-Weather Skidding Accidents and Legal Implications of Regulations Directed to Reducing Such Accidents on Highways; Liability of State and Local Governments for Negligence Arising out of Installation and Maintenance of Warning Signs, Traffic Lights, and Pavement Markings; Federal-State Relationship in the Federal-Aid Highway Program.

Volumes 1 and 2 (published in 1976) and Volume 3 of *Selected Studies in Highway Law* together contain 2000 pages of text material and 40 000 case citations and provide a comprehensive coverage of the field of highway law.

The supplementation of papers published in Volumes 1 and 2 began during fiscal year 1978.

HIGHWAY RESEARCH INFORMATION SERVICE

Use of the Highway Research Information Service (HRIS) by the state highway and transportation departments and the Federal Highway Administration reached an all-time high in fiscal year 1978. The number of requests from sponsors for specific batch-mode file searches of the HRIS storehouse was 785. In addition, an average of 47 sponsors requested more than 9 of the 13 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 contribution adds about 150 summaries of U.S. ongoing research projects to the HRIS file each quarter. Abstracts of published research reports were acquired from the National Technical Information Service (NTIS) in machine-readable-record (MRR) form. Abstracts of journal articles and technical papers in conference proceedings were purchased in MRR form on computer magnetic tape from Engineering Index. Overall, nearly 50 percent of HRIS selections are now acquired in MRR form since they are less costly to store and less likely to introduce coding or keyboarding errors into the data base. Duplication of the documentation efforts of other information services outside of TRB is thus avoided.

The HRIS file now contains more than 78 000 references, including 8200 ongoing research project summaries and 69 800 abstracts of 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 3915 abstracts of published technical papers in conference proceedings, research reports, journal articles, and bibliographies stored on the HRIS magnetic tape files during the year. A cumulative index to the four issues was published in the *HRIS Abstracts*, Vol. 10, No. 4, Winter 1977. The annual subscription price was increased to $40 to help defray the cost of producing the index.

A *TRB Publication Index* was prepared by HRIS during

the latter half of 1977 for publication by TRB. The 4-year index contains bibliographic citations to 2480 technical papers, monographs, and research reports published by TRB during 1973, 1974, 1975, and 1976.

Again this year, HRIS staffed the Transportation Research Information Center booth at the TRB Annual Meeting. Products of HRIS and the other information services operated by TRB were displayed and on-line retrieval was demonstrated to interested individuals among the 4014 registrants.

Work on the International Road Research Documentation (IRRD)–HRIS Thesaurus Concordance was advanced to permit conversion of HRIS subject index terms to IRRD keywords by use of computer. The current version of the machine-readable concordance contains 8768 HRIS subject terms. It is expected that further refinement of relationships between HRIS subject terms and IRRD keywords will be developed during fiscal year 1979.

On February 2-3, 1978, the final workshop of a series of three HRIS user workshops was held at the Virginia Highway and Transportation Research Council in Charlottesville to discuss ways and means to improve the use and usefulness of the service. The workshop was attended by representatives from 11 eastern states and 2 central states, as well as the District of Columbia, the Federal Highway Administration, the Office of the Secretary of the U.S. Department of Transportation, and TRB. The workshop produced 39 recommendations; some of these were affirmations or modifications of recommendations of the HRIS Users Workshop for the Central Region, held at Northwestern University in September 1976, and that for the Western Region, held at the University of California, Berkeley, in May 1977. Copies of the final reports of each of the three workshops are available from HRIS. As a result of the February HRIS Users Workshop, the Delaware Department of Transportation requested that HRIS conduct a half-day seminar for 30 of their professional staff and provide an executive briefing on HRIS operations, data base content, products, and services for 11 of their senior staff members.

The Kansas Department of Transportation requested that HRIS demonstrate the Transportation Research Information Service (TRIS) on-line retrieval to the participants in their annual Transportation Engineering Conference at Kansas State University.

At the request of the International Bridge, Tunnel, and Turnpike Association, a paper on the use and usefulness of HRIS was presented at the association's Spring 1978 workshop, and a demonstration of TRIS on-line retrieval was made to the 186 participants.

During 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 all summaries of ongoing research projects in the HRIS data base and 29 600 abstracts of published works. The 37 800 HRIS selections in the on-line file of the TRIS on-line data base represent nearly 50 percent of the total HRIS storehouse.

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 1978. The MRIS file now contains more than 15 000 records. In March 1978, the MRIS file became available to on-line users through the Lockheed DIALOG retrieval system.

RAILROAD RESEARCH INFORMATION SERVICE

The Railroad Research Information Service (RRIS), developed to serve the Federal Railroad Administration and the railroad community, has been operational for 5 years. Its file contains more than 16 500 references; more than 500 of these are summaries of railroad-related ongoing research projects in North America and Europe, and the remainder are abstracts of published documents and descriptions of computer programs and magnetic data tapes. The Autumn 1977 and Spring 1978 issues of the *Railroad Research Bulletin* were published and distributed. Paid subscriptions for this semiannual publication increased by 16 percent during the year as the result of continuing promotion. The number of computer retrievals also increased during the year.

AIR TRANSPORTATION RESEARCH INFORMATION SERVICE

At the conclusion of the first year's contract, the Air Transportation Research Information Service (ATRIS) committee published *Implementation Plan for an Air Transportation Research Information Service*, which defines the scope and objectives of ATRIS and discusses specific proposals for input and output operations during the first three years, the potential user community, cost estimates, and funding strategies.

A bibliography on *Airports* (Report FAA-EM-77-15) was also published for distribution to potential ATRIS users as a prototype ATRIS product. The bibliography contains nearly 800 references to reports, conference papers, journal articles, and other documents about airports. References are grouped in 10 chapters.

ATRIS continues its second year of development under the sponsorship of the Federal Aviation Administration. Five tasks for the current fiscal year are to develop acquisition agreements with U.S. and foreign organizations that can provide air transportation information; distribute the prototype *Airports* bibliography to potential users and revise, update, and extend the mailing list; conduct in-depth interviews with selected target clients to determine user needs and wants and to analyze user feedback; acquire, process, and store abstracts for the ATRIS data base; and prepare an initial issue of an ATRIS abstracts bulletin.

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

With the close of fiscal year 1978, the National Cooperative Highway Research Program (NCHRP) completed its sixteenth 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 that face administrators and engineers.

The NCHRP concept of operation has proved to be effective in solving the increasingly complex problems that arise 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 national highway and urban transportation problems, but it has also 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. In addition, NCHRP research results have made effective contributions to road research and better transportation systems throughout the world. Because of its demonstrated successes, both foreign and domestic organizations have investigated the NCHRP operation to determine the suitability of similar programs in their own environments.

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 (NAS).

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 $3.9 million is made available for NCHRP's contract research and for its administrative and technical operation.

AASHTO annually proposes research problems for inclusion in NCHRP's 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 their acceptability for administration by NAS through TRB.

Once they have been accepted, the problems that make up each program are assigned to panels that provide guidance on the technical aspects. These panels have at present some 659 members who represent the District of Columbia, Canada, and 86 percent of the states. The panel members analyze the problems, outline particular projects and their objectives, and prepare research project statements that are used to solicit proposals 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 1978, these activities have resulted in the development of 285 research projects, for which 342 contracts have been executed at a total funding level of some $39.7 million. The subject matter of the projects ranges across the full spectrum of concern within the transportation field and indicates 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 37 percent of the contracts; research institutes, 21 percent; industry, consultants, and trade associations, 38 percent; professional societies and service organizations, 2 percent; and state highway and transportation departments and other transportation or government agencies, 1 percent.

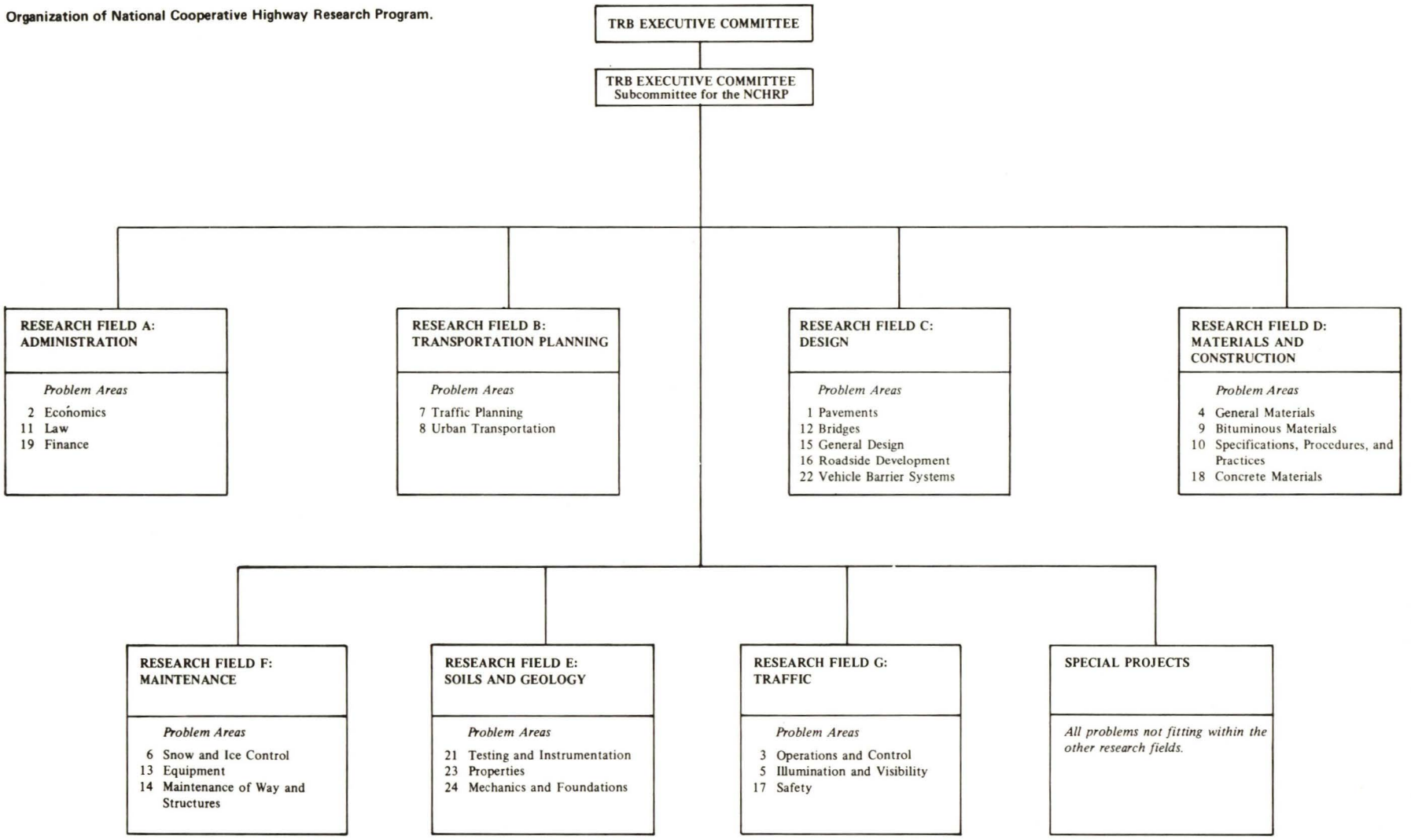
Official referral to NAS of the fiscal year 1979 program—the seventeenth program of research problems for the NCHRP—was made in December 1977. This program, tentatively funded at $2.7 million for research, consists of 9 continuation projects and 10 new contracts. A list of the projects is given below. It is estimated that research on this program will begin in late 1978.

A professional staff assigned to NCHRP by TRB includes projects engineers who have broad 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 that involve the staff, project panels, and agency personnel are held frequently to review progress and provide guidance for continuing work. Thirty-two such meetings were held in fiscal year 1978. The projects 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 NCHRP is manifested principally through its publications. Research findings are published in either of two regular NCHRP report series. Publication priorities are 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 3000 to 5500 copies are formally distributed through TRB's selective distribution system.

Organization of National Cooperative Highway Research Program.



Thus far, 401 report drafts (interim or final) have been received from research contractors and have resulted in 236 regular NCHRP reports. Twenty-seven project reports have not been published but, according to usual practice, have been summarized in NCHRP's annual *Summary of Progress*. The remaining report drafts are in the acceptance review or publication processes. A list of the reports issued this year is given below.

Another means of 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 of the various projects. Making these results known as they are developed and before they are published in final reports encourages their early application.

Semiannual progress reports were submitted by NCHRP to the sponsors to keep them informed of the status of all active projects. An important feature of these progress reports is the documentation of known uses of NCHRP results, as well as 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 1978, an AASHTO-appointed monitoring committee met with TRB staff to review all aspects of NCHRP operation and concluded that progress was satisfactory.

NCHRP is a unique contract research effort designed to respond quickly and efficiently to the needs of the state highway and transportation departments by solving pressing transportation problems. Although TRB administers the program, the research content is solely the prerogative of AASHTO 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, the design and operation of the program are amenable to the administration of research sponsored by any agency.

TENTATIVE AND CONTINUING RESEARCH PROJECTS FOR FISCAL YEAR 1979

Projects	Allotted Amount ($)
Tentative Projects	
AREA 1: DESIGN–PAVEMENTS	
Project 1-20: Influence of Asphalt Temperature Susceptibility on Pavement Construction and Performance	200 000
AREA 8: TRANSPORTATION PLANNING–URBAN TRANSPORTATION	
Project 8-21: Guidelines for Use of Van Pools and Car Pools as a Transportation System Management Technique	250 000
Project 8-22: Transportation Financing Within the Context of Energy Constraints	100 000
Project 8-23: Fuel Supply Limitation and Passenger Travel	110 000
AREA 10: MATERIALS AND CONSTRUCTION–SPECIFICATIONS, PROCEDURES, AND PRACTICES	
Project 10-13: Ultrasonic Measurement of Weld Flaw Size	125 000
Project 10-14: Locating Voids Beneath Pavement by Using Pulsed Electromagnetic Wave Techniques	100 000
AREA 12: DESIGN–BRIDGES	
Project 12-21: Evaluation of Damage and Methods of Repair for Prestressed Concrete Bridge Members	60 000
AREA 20: SPECIAL PROJECTS	
Project 20-17: Statewide Freight Demand-Forecasting Procedures	100 000
Project 20-18: Evaluation of Highway Air Pollution Dispersion Models	200 000
AREA 24: SOILS AND GEOLOGY–MECHANICS AND FOUNDATIONS	
Project 24-1: Manual on Subsurface Investigations	75 000
Subtotal	1 320 000
Continuing Projects	
AREA 3: TRAFFIC–OPERATIONS AND CONTROL	
Project 3-26: Development of an Improved Highway Capacity Manual	150 000
AREA 12: DESIGN–BRIDGES	
Project 12-15: Detection and Repair of Fatigue Cracking in Highway Bridges	150 000
Project 12-15(2): Retrofitting Procedures for Fatigue-Damaged Full-Scale Welded Bridge Beams	
Project 12-15(3): Fatigue Behavior of Welded Bridge Attachments	
Project 12-17: Evaluation of Repair Techniques for Damanged Steel Bridge Members	200 000
Project 12-19: Cathodic Protection of Concrete Bridge Structures	100 000
AREA 20: SPECIAL PROJECTS	
Project 20-5: Synthesis of Information Related to Highway Problems	360 000
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 Highways	100 000
Project 20-14: Monitoring Carbon Monoxide Concentrations in Urban Areas	190 000
AREA 22: DESIGN–VEHICLE BARRIER SYSTEMS	
Project 22-2(2): Multiple-Level Service-Highway Bridge Railings: Performance and Design Criteria	30 000
Subtotal	1 380 000
Total	2 700 000

PUBLICATIONS RELEASED DURING FISCAL YEAR 1978

Evaluating Options in Statewide Transportation Planning/Programming–Issues, Techniques, and Their Relationships, Report 179

Cathodic Protection for Reinforced Concrete Bridge Decks–Laboratory Phase, Report 180

Subcritical Crack Growth and Fracture of Bridge Steels, Report 181

Economic Evaluation of Ice and Frost on Bridge Decks, Report 182

Studded Tires and Highway Safety, Report 183

Influence of Combined Highway Grade and Horizontal Alignment on Skidding, Report 184

Grade Effects on Traffic Flow Stability and Capacity, Report 185

Energy Effects, Efficiencies, and Prospects for Various Modes of Transportation, Synthesis of Highway Practice 43

Consolidation of Concrete for Pavements, Bridge Decks, and Overlays, Synthesis of Highway Practice 44

Rapid-Setting Materials for Patching of Concrete, Synthesis of Highway Practice 45

Recording and Reporting Methods for Highway Maintenance Expenditures, Synthesis of Highway Practice 46

Effect of Weather on Highway Construction, Synthesis of Highway Practice 47

Priority Programming and Project Selection, Synthesis of Highway Practice 48

Open-Graded Friction Courses, Synthesis of Highway Practice 49

Durability of Drainage Pipe, Synthesis of Highway Practice 50

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 TRB 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

TRB 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. TRB's ambitious publication 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, TRB publishes a Bibliography series, a quarterly Highway Research Information Service Abstracts, a semiannual Railroad

SUMMARY OF PUBLICATION PROGRAM FOR FISCAL YEAR 1978

Series or Type	Volumes and Numbers	Individual Publications	Incorporated Papers or Reports	Pages	List Price ($)
Special Report	Nos. 177, 178, 180, 181	4	4	460	18.80
Transportation Research Circular	Nos. 185 to 195	11	11	238	12.00
Transportation Research News	Nos. 71 to 76	6	250[a]	268	12.00
Transportation Research Record	Nos. 613 to 646, 648, 649, 661 to 663	39	434	2 814	132.60
NCHRP Report	Nos. 176 to 189	14	14	1 620	84.40
NCHRP Synthesis of Highway Practice	Nos. 41 to 50	10	10	540	39.20
NCHRP Research Results Digest	Nos. 93 to 104	12	12	154	12.00
HRIS Abstracts	Sept./Dec. 1977, March/June 1978	4	3 913[a]	1 076	48.00
MRIS Abstracts	Dec. 1977, June 1978	2	2 916[a]	604	50.00
MRIS Current Awareness					
July to December 1977	Vol. 14, Nos. 7 to 12				
January to June 1978	Vol. 15, Nos. 1 to 7	13	2 806[a]	431	50.00
Directory	1977	1	1	428	10.00
Publication Index	1973-1976	1	1	260	10.00
Selected Studies in Highway Law	Vol. 3	1	1	1 048	30.00
RRIS Bulletin	Vol. 4, No. 2				
	Vol. 5, No. 1	2	2 314[a]	710	30.00
		120	12 687	10 651	539.00

[a] Brief abstracts of full reports contained.

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 1978, more than 376 000 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.

GENERAL SUPPORT

In 1979 there will be significant changes in the TRB programs for supporting affiliation. These changes are described in the memorandum to the supporters of TRB on pages 4 and 5 of this Annual Report. During 1978, the previous arrangements have been in effect. There is little point in spelling out the various classes of affiliation as they exist in 1978 since most will be changed next year. Suffice to say that there are 300 organizations affiliated with TRB. Of these about 35 percent are foreign. Further, there are more than 3000 individual affiliates.

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, 12 other organizations have been classified as Sustaining Members. These 12 and their representatives and alternate representatives are given below.

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
Chevron Asphalt Company
W. J. Kari, representative
M. V. Hunter, alternate
Dow Chemical Company
D. H. Moeller, representative
D. R. Larrimore, 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. Willis, Jr., alternate
J. R. Wilson, 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
William F. Hollingsworth, alternate

STATE, UNIVERSITY, AND TRANSIT REPRESENTATIVES

Transportation Research Board representatives in state highway and transportation departments, educational institutions, and transit agencies provide continuing liaison between their organizations and TRB. The TRB representatives actually function as an arm of the board. The following persons were serving as state, university, and transit representatives as of June 1, 1978.

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
Harvey R. Atchison
Connecticut
Charles E. Dougan
Delaware
Oscar L. Sebastian
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
Robert L. Eskew
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
Joseph G. Arruda
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
Fred VanKirk
Wisconsin
Karl H. Dunn
Wyoming
F. O. Witters
Puerto Rico
Replacement pending

Academic Institutions

Alabama
Raymond K. Moore, Auburn University
John D. Antrim, University of Alabama
J. H. Appleton, University of Alabama in Birmingham
Alaska
John L. Burdick, 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 M. 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
Gordon J. Fielding, University of California, Irvine
Frederick L. McGuire, University of California–Irvine Medical Center
Colorado
James G. Johnstone, Colorado School of Mines
Daryl B. Simons, Colorado State University
Vasant H. Surti, University of Colorado at Denver
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
Brett Klecka, Florida International University
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
C. S. Papacostas, 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 at Urbana-Champaign
Indiana
George M. Smerk, Indiana University
Harold L. Michael, Purdue University
Cecil T. Lobo, Rose-Hulman Institute of Technology
James I. Taylor, University of Notre Dame
Iowa
R. L. Carstens, Iowa State University
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
William A. Browne, 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
Richard J. Scranton, Northeastern University
Richard L. Savage, Tufts University
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
Eugene L. Skok, Jr., 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

Montana
Alfred C. Scheer, Montana State University
John M. Stewart, University of Montana
Nebraska
Edward Robert Post, University of Nebraska
Nevada
Charles R. Breese, University of Nevada
New Hampshire
Thomas J. Adler, Dartmouth College
Replacement pending, University of New Hampshire
New Jersey
Paul Michael Lion, Princeton University
Edward G. Nawy, Rutgers, State University of New Jersey
I. Robert Ehrlich, Stevens Institute of Technology
New Mexico
Kenneth R. White, New Mexico State University
Cornie L. Hulsbos, University of New Mexico
New York
Ming L. Pei, City University of New York
Feng-Bor Lin, Clarkson College of Technology
Gordon P. Fisher, Cornell University
Joseph J. Breen, Manhattan College
Louis J. Pignataro, Polytechnic Institute of New York
Larry J. Feeser, Rensselaer Polytechnic Institute
Robert E. Paaswell, State University of New York at Buffalo
Thomas J. Thomas, St. John's University
Paul J. Brennan, Syracuse University
North Carolina
Aleksandar Sedmak Vesic, Duke University
Arthur Saltzman, North Carolina A&T State University
W. G. Mullen, North Carolina State University at Raleigh
Gorman Gilbert, University of North Carolina
North Dakota
James L. Jorgenson, North Dakota State University
Oscar E. Manz, University of North Dakota
Ohio
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
George N. Bathish, Widener College
Rhode Island
Kendall Moultrop, University of Rhode Island
South Carolina
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
Martin E. Lipinski, Memphis State University
Frank M. Holloway, Tennessee Technological University
Kenneth W. Heathington, University of Tennessee
Peter G. Hoadley, Vanderbilt University
Texas
Carl P. Sharpe, Rice Center for Community Design and Research
Cecil H. Smith, Southern Methodist University
Charles J. Keese, Texas A&M University
Joseph E. Minor, Texas Technological University
Ardis White, University of Houston
John J. Haynes, University of Texas at Arlington
Clyde E. Lee, University of Texas at Austin
Utah
W. Don Budge, Brigham Young University
Clifford G. Bryner, University of Utah
Reynold K. Watkins, Utah State University
Vermont
Kenneth M. Kidd, Norwich University
Joseph C. Oppenlander, University of Vermont
Virginia
Lester A. Hoel, University of Virginia
J. A. McDonough, Virginia Military Institute
Richard D. Walker, Virginia Polytechnic Institute and State University
Washington
Ronald L. Terrel, University of Washington
John C. Cook, Washington State University
West Virginia
Replacement pending, West Virginia Institute of Technology
Lyle K. Moulton, West Virginia University
Wisconsin
William G. Murphy, Marquette University
Herman A. Kuhn, University of Wisconsin–Madison
Edward Beimborn, University of Wisconsin–Milwaukee
James R. Levey, University of Wisconsin–Platteville
Wyoming
Donald R. Lamb, University of Wyoming
Puerto Rico
Jose Vega-Ortiz, University of Puerto Rico
Canada
J. J. Bakker, University of Alberta
V. Setty Pendakur, University of British Columbia
Merritt M. Davis, University of Toronto
India
O. P. Jain, University of Roorke
Japan
Masaki Koshi, University of Tokyo
Mexico
Santiago Corro Caballero, University of Mexico
Philippines
Manuel C. Jabson III, University of the Philippines

Transit

California
- Bay Area Rapid Transit District, Oakland
  Ward D. Belding, Jr.
- Golden Gate Bridge, Highway and Transportation District, San Francisco
  Jerome M. Kuykendall
- Southern California Rapid Transit District, Los Angeles
  Richard Gallagher

Colorado
- Regional Transportation District, Denver
  John D. Simpson

District of Columbia
- Washington Metropolitan Area Transit Authority
  William I. Herman

Florida
- Jacksonville Transportation Authority
  Frederick W. Bowman
- Metropolitan Dade County, Miami
  Woodrow L. Moore, Jr.

Georgia
- Metropolitan Atlanta Rapid Transit Authority
  John W. Bates

Illinois
- Chicago Transit Authority
  Harold R. Hirsch

Indiana
- Indianapolis Public Transportation Corporation
  William E. Bell

Kentucky
- Transit Authority of River City, Louisville
  Robert S. Carhart

Maryland
- Mass Transit Administration, Baltimore
  Louis R. Rainone

Massachusetts
- Massachusetts Bay Transportation Authority
  Ronald J. Tober

Minnesota
- Twin Cities Metro Transit Commission, St. Paul
  John R. Jamieson

Missouri
- Bi-State Development Agency–Transit, St. Louis
  Jerry L. Eddy

Nebraska
- Transit Authority of the City of Omaha
  Jerome T. Erdman

New York
- Capital District Transportation Authority, Albany
  Jack Reilly
- Niagara Frontier Transportation Authority, Buffalo
  Vito J. Sportelli
- Port Authority Trans-Hudson Corporation, New York
  James E. Dreyer

Ohio
- Central Ohio Transit Authority, Columbus
  James E. Reading
- Greater Cleveland Regional Transit Authority
  J. Dan Jones
- Miami Valley Regional Transit Authority, Dayton
  R. B. Shaffer
- Queen City Metro, Cincinnati
  Linda S. Hunkins

Oregon
- Tri-Met, Portland
  G. A. Wood

Pennsylvania
- Port Authority of Allegheny County, Pittsburgh
  J. Harold Norris

Puerto Rico
- Metropolitan Bus Authority, Hato Rey
  Rafael Martinez

Texas
- National City Management Company, Houston
  D. N. Lambert

Washington
- Municipality of Metropolitan Seattle
  David L. Kalberer

Wisconsin
- Madison Department of Transportation
  Warren O. Somerfeld
- Milwaukee Transport Services, Inc.
  Galen C. Larson

STATEMENT OF INCOME AND EXPENDITURES FOR FISCAL YEAR ENDING JUNE 30, 1978
(modified cash basis)

Income by Sources During Fiscal Year 1978

	Federal	State	Other	Total
Technical Activities Programs				
Research Correlation Service (state highway and transportation departments)		$1 552 600		$1 552 600
Federal Highway Administration	$ 581 471			581 471
Urban Mass Transportation Administration	362 573			362 573
Federal Railroad Administration	296 855			296 855
Office of the Secretary of Transportation	21 482			21 482
Federal Aviation Administration	81 068			81 068
Maritime Administration	175 908			175 908
Agency for International Development	89 117			89 117
Association of American Railroads			$101 540	101 540
Dues from Supporting Members			241 638	241 638
Library subscriptions			51 190	51 190
Publication sales			166 590	166 590
Registration fees			95 631	95 631
Highway Research Information Service			13 535	13 535
National Academy of Sciences			75 000	75 000
Miscellaneous			6 005	6 005
Special fund[a]			87 626	87 626
Subtotal	1 608 474	1 552 600	838 755	3 999 829
National Cooperative Highway Research Program				
State highway and transportation departments[b]		3 937 622		3 937 622
Publication sales			30 689	30 689
Subtotal		3 937 622	30 689	3 968 311
All Programs				
Total income	$1 608 474	$5 490 222	$869 444	$7 968 140

[a] The sum of $87 626 was transferred from the special fund to cover deficit balance incurred for fiscal year 1978. This amount came from fiscal year 1977 income from other than federal or state sources to be used for expenditures in fiscal 1978 and 1979 as provided under a 3-year fixed-income budget plan approved by the major sponsors, November 28, 1966.

[b] 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 agreements 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 1978

	Federal	State	Other	Total
Technical Activities Program				
Field visit program	$ 199 991	$ 402 123	$202 177	$ 804 291
Committee activities	79 234	142 839	130 055	352 128
Annual Meeting, conferences, and workshops	439 895	294 994	177 442	912 331
Publications	214 482	448 701	221 137	884 320
Computer-based information services	674 872	263 943	107 944	1 046 759
Subtotal	1 608 474	1 552 600	838 755	3 999 829
National Cooperative Highway Research Program				
Administration, surveillance, and publications		1 036 904	28 819	1 065 723
Contract research (flow through)		2 486 817		2 486 817
In-house TRB research		413 901	1 870	415 771
Subtotal		3 937 622	30 689	3 968 311
All Programs				
Total expenditures	$1 608 474	$5 490 222	$869 444	$7 968 140

Expenditures by Object Class During Fiscal Year 1978

Technical Activities Program				
Salary and related benefits	$ 796 247	$ 787 168	$357 333	$1 940 748
Travel	144 929	94 707	52 776	292 412
Communications and shipping	26 464	38 815	18 583	83 862
Materials and services	63 913	43 473	63 639	171 025
Data processing	37 030	35 710	34 079	106 819
Printing and duplicating	79 424	130 418	90 888	300 730
Subcontracts	13 721			13 721
Indirect costs	446 746	422 309	221 457	1 090 512
Subtotal	1 608 474	1 552 600	838 755	3 999 829
National Cooperative Highway Research Program				
Salary and related benefits		726 013		726 013
Travel		95 969		95 969
Communications and shipping		25 390		25 390
Materials and services		26 268		26 268
Data processing		5 140		5 140
Printing and duplicating		163 726	22 078	185 804
Subcontracts		2 362 210		2 362 210
Indirect costs		532 906	8 611	541 517
Subtotal		3 937 622	30 689	3 968 311
All Programs				
Total expenditures	$1 608 474	$5 490 222	$869 444	$7 968 140

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, 1977		$1 478 116
Expenditures in fiscal year 1978:		
Consultant	$10 532	
Fund close out fiscal year 1977	6 108	
Close out fiscal year 1978	87 626	104 266
Balance June 30, 1978		$1 373 850

TRANSPORTATION RESEARCH BOARD
National Academy of Sciences
2101 Constitution Avenue, N.W., Washington, D.C. 20418

Address Correction Requested

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