

# TRANSPORTATION RESEARCH BOARD

## 2006 ANNUAL REPORT



TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES

**The mission of the Transportation Research Board** is to promote innovation and progress in transportation through research. In an objective and interdisciplinary setting, the Board facilitates the sharing of information on transportation practice and policy by researchers and practitioners; stimulates research and offers research management services that promote technical excellence; provides expert advice on transportation policy and programs; and disseminates research results broadly and encourages their implementation.

**The nation turns to the National Academies—**National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—for independent, objective advice

on issues that affect people's lives worldwide. Established in 1916 under the congressional charter of the private, nonprofit National Academy of Sciences, the National Research Council—through volunteer advisory committees—brings the entire scientific and technical community to bear on national problems. The principal operating agency of both the National Academy of Sciences and the National Academy of Engineering, the National Research Council is administered jointly by the two academies and the Institute of Medicine.

The National Research Council has six major program units. One of these is the Transportation Research Board, which was organized in 1920 and is charged with promoting innovation and progress in transportation through research.



## DEAR SUPPORTER OF TRB

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The research provisions of federal surface transportation programs have a significant impact on TRB, directly and indirectly—providing support for TRB’s core programs and authorizing and funding specific research programs and studies. Last year’s annual report, prepared in the immediate aftermath of the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), noted that the effects of this complex legislation would take time to unfold.

One year later, the opportunities and challenges that SAFETEA-LU has presented to TRB are more clear. Among the most promising opportunities is the new Strategic Highway Research Program (SHRP II), which has been in various stages of discussion and planning for the past eight years. This new program, under way since March, will focus substantial resources in four critical areas of highway transportation—safety, renewal, reliability, and capacity. SHRP II is scheduled to complete its first round of competitively selected research awards in time for the 2007 Annual Meeting.

SAFETEA-LU also authorized new cooperative research programs—a National Freight Cooperative Research Program and a pilot Hazardous Materials Cooperative Research Program—providing further opportunities for TRB to fulfill its mission of promoting transportation innovation. TRB worked closely with the U.S. Department of Transportation (DOT) on the necessary funding and administrative arrangements that allowed these programs to start up in September. In addition, during the span of SAFETEA-LU, funding levels for the National Cooperative Highway Research Program (NCHRP) and the Transit Cooperative Research Program (TCRP) are expected to increase modestly. Along with the new Airport Cooperative Research Program (ACRP), the new SAFETEA-LU programs significantly increase TRB’s role in



administering competitive research to address the day-to-day problems of travelers and transportation providers.

The greatest challenge facing TRB follows from one of the unexpected—and probably unintended—consequences of SAFETEA-LU. Unprecedented congressional earmarks and programmatic designations significantly reduced the discretionary research funding available to the U.S. DOT’s surface transportation programs. Particularly hard hit was the Federal Highway Administration (FHWA), which historically has used the funds to support research and technol-

After signing the memorandum of understanding to launch SHRP II on January 25, J. Richard Capka, Federal Highway Administration; John C. Horsley, American Association of State Highway and Transportation Officials (AASHTO); and Ralph J. Cicerone, National Academy of Sciences (NAS), shared congratulations.



TRB Executive Director, Robert E. Skinner, Jr.; Michael D. Meyer, 2006 Chair of the TRB Executive Committee; and Linda S. Watson, 2006 Vice Chair of the TRB Executive Committee.



At the AASHTO exhibit at the TRB Annual Meeting, January 23, Secretary of Transportation Norman Mineta (*center*) cuts the ribbon to inaugurate the national celebration of the 50th anniversary of the Interstate Highway System. Participants include (*front row, left to right*) William W. Millar, American Public Transportation Association; Gary Ridley, Oklahoma Department of Transportation (DOT); Gloria J. Jeff, Los Angeles DOT; Robert E. Skinner, Jr., TRB; Secretary Mineta; John C. Horsley, American Association of State Highway and Transportation Officials (AASHTO); and T. Peter Ruane, American Road and Transportation Builders Association; (*back row, left to right*) Alan Pisarski, consultant; Michael D. Meyer, Georgia Institute of Technology; and Harold Linnenkohl, Georgia DOT.

ogy transfer, including TRB’s core programs—the standing technical committees, many publications, information services, the Annual Meeting, and many other technical conferences.

Unless the U.S. Congress makes what are termed “technical corrections” to SAFETEA-LU to provide more flexibility to FHWA, the agency will reduce its expected level of support for TRB core programs during the next three years by approximately \$1.1 million annually. As a result, TRB will be making selected cost reductions and will be implementing actions to increase revenues from nongovernment sources. Some measures, such as higher fees, will be visible to TRB participants; others, such as staffing adjustments, will be less obvious. All together, these actions will keep the core services to sponsors and others largely intact and may be hardly noticeable for many participants. Nonetheless, some painful adjustments in staffing and services are necessary, and TRB’s ability to keep pace with the growth in transportation issues, constituencies, and technologies will be seriously challenged.

With the start-up of new programs and increased activities in ongoing programs, the past year has been busy for volunteers and staff. Highlights are summarized below, with further details provided throughout this annual report.

## ANNUAL MEETING AND CONFERENCES

Attendance at the TRB 85th Annual Meeting, January 22–26, 2006, passed 10,000 for the first time. Approximately 10,300 transportation professionals and students listened to 2,800 presen-

tations and attended the more than 500 sessions and 350 meetings of TRB committees, subcommittees, panels, and task forces. The popularity and role of the meet-the-author poster sessions continues to grow, with approximately 43 percent of the papers presented as posters.

Because of developments at the end of 2005, two spotlight themes were added to the Annual Meeting—SAFETEA-LU: What It Means for Research and the Transportation Community, and Disaster Preparedness, Response, and Recovery. These supplemented the previously adopted themes of Transportation 2025: Getting There from Here, and The Interstate System’s 50th Anniversary: What Have We Learned?

Among the many highlights was the TRB Chairman’s Luncheon address on climate change by Ralph J. Cicerone, the new President of the National Academy of Sciences and the Chair of the National Research Council (NRC). The Thomas B. Deen Distinguished Lecture was presented by bridge engineer and designer Abba Lichtenstein, who guided attendees on a slideshow tour of historic transportation facilities and the actions taken for their preservation.

The spotlight theme for the TRB 86th Annual Meeting, January 21–25, 2007, will be Transportation Institutions, Finance, and Workforce: Meeting the Needs of the 21st Century. The theme incorporates three of the issues identified in the 2006 update of TRB’s *Critical Issues in Transportation*.

During the year, TRB sponsored 21 specialty conferences, cosponsored 20 others, and conducted more than 80 workshops. The theme of the TRB Summer Conference in La Jolla, Califor-



NAS President Cicerone, speaking at the Chairman’s Luncheon, placed TRB’s list of critical issues in the context of the critical issues in science and technology.



Meet-the-author poster sessions attracted steady traffic at the Annual Meeting.

nia, was Tackling the TRB Critical Issues in Transportation. More than 40 TRB committees met during the conference, which also included the 31st Annual Summer Ports, Waterways, Freight, and International Trade Conference. Other conferences, held throughout the United States and abroad, examined topics ranging from aviation system planning to bus rapid transit, freight demand modeling, visualization in transportation, the evolving roles of metropolitan planning organizations, and the management of traffic during incidents and special events.

## TRANSPORTATION RESEARCH RECORD

An initiative is under way to improve access by researchers and other interested parties to papers published in the *Transportation Research Record: Journal of the Transportation Research Board* (TRR). During 2005, authors who submitted papers received temporary access to a searchable database on the TRB website of more than 6,000 papers that have been published in the TRR since 1996. In 2006, TRB staff took steps to make all or part of the TRR collection of papers in electronic format available on the web to all users year-round through subscriptions and pay-per-view; TRB sponsors would continue to have full access at no additional cost. The intent is to provide a useful service to transportation researchers, increase the journal's citation index rating, and generate the revenue necessary to support these services. The TRR online subscription service should be available early in 2007.

In addition, the Technical Activities Council formed a TRR Publication Board that will pro-

vide recommendations and guidance on policy and actions to maintain and enhance the quality of TRB's peer-reviewed journal.

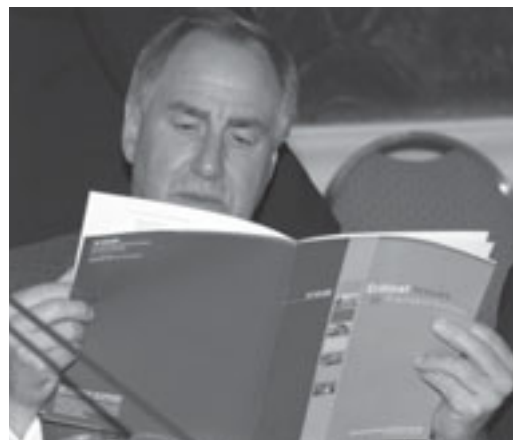
## CRITICAL ISSUES

The latest edition of *Critical Issues in Transportation* was released at the 2006 Annual Meeting. The list is intended to direct attention to the issues, facilitate debate, and encourage research to resolve the problems identified. An extensive outreach was undertaken to disseminate the document, with 26,000 copies distributed to traditional and nontraditional TRB audiences. Future conferences and Annual Meetings will highlight the critical issues.

## RESEARCH MANAGEMENT

SHRP II has started work under the direction of Neil F. Hawks, previously Director of Special Programs at TRB, and Deputy Director Ann M. Brach, formerly Senior Program Officer in the Studies and Information Services Division. The program has established Technical Coordinating Committees in each of the four research theme areas. An Oversight Committee, chaired by Allen D. Biehler, Secretary of Pennsylvania DOT, met twice and selected the elements of the first year's research program. The program consists of 12 projects with a total contract value of approximately \$20 million.

In 2006, NCHRP and TCRP operated at nearly the same funding levels as in 2005—\$33 million and \$9 million, respectively. NCHRP published 61 reports on practical topics, including work zone traffic control devices, contracting for intelligent transportation systems (ITS) projects,



TRB Executive Committee member James R. Hertwig, CSX Intermodal, reviews *Critical Issues in Transportation*, which has received wide distribution since its debut at the Annual Meeting.

The Airport Cooperative Research Program governing board held its inaugural meeting in January 2006 in Washington, D.C.



integrating environmental factors in transportation systems planning, early opening-to-traffic pavement rehabilitation, and the design of curved girder bridges. TCRP published 31 research reports on public transportation topics, such as creating high-ridership transit systems, using ITS data to improve transit system performance, evaluating suburban transit services, forecasting ridership, planning transit service for new development, managing capital costs of major transit projects, and applying smart card interoperability.

Research sponsored jointly by NCHRP and TCRP produced *Commuting in America III*, which provides a snapshot view of commuting patterns and trends derived principally from an analysis of the 2000 decennial U.S. Census. The book—which received extensive media coverage—is a valuable resource for those interested in public policy, planning, research, and education. Other jointly sponsored projects produced reports on surface transportation security and on pedestrian safety at unsignalized crossings.

The Airport Cooperative Research Program (ACRP), sponsored by the Federal Aviation Administration, is funded at about \$10 million annually. The ACRP governing board held its inaugural meeting in January 2006. ACRP has programmed 37 research projects, totaling \$14.5 million; 15 of the projects were under contract by the end of 2006.

Both the National Cooperative Freight Research Program, sponsored by the Research and Innovative Technology Administration, and the Hazardous Materials Cooperative Research Program, sponsored by the Pipeline and Hazardous Materials Safety Administration, were authorized in SAFETEA-LU and started late in 2006. Plans for the first research to be conducted

under these programs were developed at meetings held near the end of the year.

## ADVICE TO POLICY MAKERS

During the 2006 Annual Meeting, TRB released a major report, *The Fuel Tax and Alternatives for Transportation Funding*, and the findings were subsequently presented to the Commission on Surface Transportation Policy and Revenue created by SAFETEA-LU. Other policy reports issued in 2006 included the following:

- An assessment of the risks associated with transporting nuclear waste and spent nuclear fuel to the expected national repository in Yucca Mountain, Nevada—TRB assisted the Nuclear and Radiation Studies Board of the National Research Council’s (NRC) Division on Earth and Life Studies on this project;
- An examination of the feasibility of reducing rolling resistance in replacement tires for passenger vehicles and the trade-offs between performance and fuel economy;
- A workshop summary on the growing public health crisis in road safety in developing countries and the potential U.S. role in mitigating the problems—TRB led this effort, assisted by the Institute of Medicine and the NRC Policy and Global Affairs Division; and
- A letter report critiquing the U.S. Department of Transportation’s draft research and technology plan.



Allen D. Biehler, chair of the SHRP II Oversight Committee, briefs the TRB Executive Committee on the research program’s start-up.



Harvey Fineberg, President of the Institute of Medicine (IOM), and Michael McGinnis, Senior Scholar, IOM, meet with Maryonne Plessis-Fraissard, World Bank, between sessions of a workshop cosponsored by TRB on road safety in developing countries. (Photo: Mark Rosenberg)



G. A. Giannopoulos, Hellenic Institute of Transport, Greece, and TRB Executive Director Robert E. Skinner, Jr., sign a memorandum of understanding between the European Conference of Transport Research Institutes (ECTRI) and TRB. The agreement will facilitate scanning tours; participation in conferences, committees, and projects; and other joint activities. ECTRI was established as a nonprofit association headquartered in France and represents 20 transportation research institutes in 17 European countries.

## STRATEGIC PLANNING

The Executive Committee, acting through its Subcommittee on Planning and Policy Review, has begun a major update of the TRB strategic plan. Inputs to the process will include surveys of TRB participants and volunteers, such as the survey of e-newsletter recipients conducted in September. Scheduled for adoption by the Executive Committee in 2007, the plan will address the services TRB provides, the organizations and individuals that participate—and that do not participate—in TRB, and funding requirements and options.

## INTERNATIONAL ACTIVITIES

More than 1,000 attendees at the 2006 Annual Meeting came from outside the United States, and many serve on TRB technical committees. Under the leadership of Executive Committee Chair Michael D. Meyer, who continues in his role as International Secretary, the International Activities Committee has promoted initiatives that will strengthen TRB's connections with technical communities outside the United States. At the Annual Meeting, TRB signed a memorandum of understanding with the new European Council of Transport Research Institutes that provides a framework for cooperative activities between the two organizations. Meyer promoted

the new agreement in a keynote address at the Transportation Research Forum conference in June in Göteborg, Sweden.

## NATIONAL ACADEMIES UPDATE

William A. Wulf is in the final year of his presidency of the National Academy of Engineering (NAE). Charles M. Vest, President Emeritus of the Massachusetts Institute of Technology, has been nominated to succeed him. Voting by the NAE membership will take place in March, and the new president will take office on July 1, 2007.



William A. Wulf, President of the National Academy of Engineering since 1997, will complete his final term in mid-2007.

## ORGANIZATIONAL AND STAFF CHANGES

With the start-up of SHRP II, TRB has made some internal organizational changes. Activities that were managed by the Special Programs Division were reassigned to the Studies and Information Services Division, which has been renamed the Studies and Special Programs Division. Committees that provide continuing advice to FHWA on research programs—mostly pavement-related—will be managed as part of the division's Policy Studies Group. The Innovations Deserving Exploratory Analysis (IDEA) programs will be administered with the Synthesis Unit, which produces state-of-the-practice reports for the cooperative research programs.

All in all, 2006 has been an active and productive year for TRB. Despite the challenges ahead, we expect that the steps taken this year—many with the participation and help of TRB volunteers—will lay a strong foundation for future success in fostering transportation research, education, and technology transfer.

Michael D. Meyer  
Chair, Executive Committee

Robert E. Skinner, Jr.  
Executive Director

# TRANSPORTATION RESEARCH BOARD 2006 EXECUTIVE COMMITTEE\*



**Meyer**



**Watson**



**Skinner**

**Chair: Michael D. Meyer**, Professor, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta

**Vice Chair: Linda S. Watson**, Executive Director, LYNX–Central Florida Regional Transportation Authority, Orlando

**Executive Director: Robert E. Skinner, Jr.**, Transportation Research Board



**Behrens**



**Canby**



**Hanson**



**McNeil**



**Rahn**



**Biehler**



**Duncan**



**Hertwig**



**Miller**



**Rosenbloom**



**Bowe**



**Garber**



**Jeff**



**Morris**



**Schwartz**



**Brown**



**Gittens**



**Kanafani**



**Murray**



**Townes**



**Butler**



**Giuliano**



**Linnenkohl**



**Njord**



**Walton**

**Michael W. Behrens**, Executive Director, Texas Department of Transportation, Austin  
**Allen D. Biehler**, Secretary, Pennsylvania Department of Transportation, Harrisburg  
**John D. Bowe**, Regional President, APL Americas, Oakland, California  
**Larry L. Brown, Sr.**, Executive Director, Mississippi Department of Transportation, Jackson  
**Deborah H. Butler**, Vice President, Customer Service, Norfolk Southern Corporation and Subsidiaries, Atlanta, Georgia  
**Anne P. Canby**, President, Surface Transportation Policy Partnership, Washington, D.C.  
**Douglas G. Duncan**, President and CEO, FedEx Freight, Memphis, Tennessee  
**Nicholas J. Garber**, Henry L. Kinnier Professor, Department of Civil Engineering, University of Virginia, Charlottesville

\* Membership as of December 2006.



**Angela Gittens**, Vice President, Airport Business Services, HNTB Corporation, Miami, Florida

**Genevieve Giuliano**, Professor and Senior Associate Dean of Research and Technology, School of Policy, Planning, and Development, and Director, METRANS National Center for Metropolitan Transportation Research, University of Southern California, Los Angeles (Past Chair, 2003)

**Susan Hanson**, Landry University Professor of Geography, Graduate School of Geography, Clark University, Worcester, Massachusetts

**James R. Hertwig**, President, CSX Intermodal, Jacksonville, Florida

**Gloria J. Jeff**, General Manager, City of Los Angeles Department of Transportation, California

**Adib K. Kanafani**, Cahill Professor of Civil Engineering, University of California, Berkeley

**Harold E. Linnenkohl**, Commissioner, Georgia Department of Transportation, Atlanta

**Sue McNeil**, Professor, Department of Civil and Environmental Engineering, University of Delaware, Newark

**Debra L. Miller**, Secretary, Kansas Department of Transportation, Topeka

**Michael R. Morris**, Director of Transportation, North Central Texas Council of Governments, Arlington

**Carol A. Murray**, Commissioner, New Hampshire Department of Transportation, Concord

**John R. Njord**, Executive Director, Utah Department of Transportation, Salt Lake City (Past Chair, 2005)

**Pete K. Rahn**, Director, Missouri Department of Transportation, Jefferson City

**Sandra Rosenbloom**, Professor of Planning, University of Arizona, Tucson

**Henry G. (Gerry) Schwartz, Jr.**, Senior Professor, Washington University, St. Louis, Missouri

**Michael S. Townes**, President and CEO, Hampton Roads Transit, Virginia (Past Chair, 2004)

**C. Michael Walton**, Ernest H. Cockrell Centennial Chair in Engineering, University of Texas, Austin

**Thad Allen** (Adm., U.S. Coast Guard), Commandant, U.S. Coast Guard, Washington, D.C. (ex officio)

**Thomas J. Barrett** (Vice Adm., U.S. Coast Guard, ret.), Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation (ex officio)

**Marion C. Blakey**, Administrator, Federal Aviation Administration, U.S. Department of Transportation (ex officio)

**Joseph H. Boardman**, Administrator, Federal Railroad Administration, U.S. Department of Transportation (ex officio)

**John A. Bobo, Jr.**, Acting Administrator, Research and Innovative Technology Administration, U.S. Department of Transportation (ex officio)

**Rebecca M. Brewster**, President and COO, American Transportation Research Institute, Smyrna, Georgia (ex officio)

**George Bugliarello**, Chancellor, Polytechnic University of New York, Brooklyn; Foreign Secretary, National Academy of Engineering, Washington, D.C. (ex officio)

**J. Richard Capka**, Administrator, Federal Highway Administration, U.S. Department of Transportation (ex officio)

**Sean T. Connaughton**, Administrator, Maritime Administration, U.S. Department of Transportation (ex officio)

**Edward R. Hamberger**, President and CEO, Association of American Railroads, Washington, D.C. (ex officio)

**John H. Hill**, Administrator, Federal Motor Carrier Safety Administration, U.S. Department of Transportation (ex officio)

**John C. Horsley**, Executive Director, American Association of State Highway and Transportation Officials, Washington, D.C. (ex officio)

**J. Edward Johnson**, Director, Applied Science Directorate, National Aeronautics and Space Administration, John C. Stennis Space Center, Mississippi (ex officio)

**William W. Millar**, President, American Public Transportation Association, Washington, D.C. (ex officio) (Past Chair, 1992)

**Nicole R. Nason**, Administrator, National Highway Traffic Safety Administration, U.S. Department of Transportation (ex officio)

**Jeffrey N. Shane**, Under Secretary for Policy, U.S. Department of Transportation (ex officio)

**James S. Simpson**, Administrator, Federal Transit Administration, U.S. Department of Transportation (ex officio)

**Carl A. Strock** (Lt. Gen., U.S. Army), Chief of Engineers and Commanding General, U.S. Army Corps of Engineers, Washington, D.C. (ex officio)



Allen



Barrett



Blakey



Boardman



Bobo



Brewster



Bugliarello



Capka



Connaughton



Hamberger



Hill



Horsley



Johnson



Millar



Nason



Shane



Simpson



Strock



**C. Michael Walton**  
*Chair*  
Subcommittee  
for NRC Oversight



**Robert E. Skinner, Jr.**  
*Executive Director*



**Suzanne B. Schneider**  
*Associate*  
Executive Director

The TRB Executive Office provides policy and operational guidance for programs and activities; oversees committee and panel appointments and report review; provides personnel support for TRB staff; develops and directs the Board's communications and outreach efforts; provides staff support to the Executive Committee and its Subcommittee for National Research Council (NRC) Oversight; and maintains liaison with the executive offices of the National Academies, the Board's parent institution. The Executive Office also manages the editing, production, design, and publication of many TRB reports, including its journal series, magazine, and other titles.

## OVERSIGHT ACTIVITIES

The Executive Office supports the work of the TRB Executive Committee, which provides policy direction to TRB programs and activities in accordance with the policies of the National Academies. Oversight of committee and panel appointments and of report review is the responsibility of the Executive Committee's Subcommittee for NRC Oversight, which ensures that TRB meets institutional standards and that its activities are appropriate for the National Academies. As part of its oversight function, the subcommittee monitors the Board's progress in expanding the participation of minorities and women in TRB committees and activities. C. Michael Walton, TRB Division Chair for NRC Oversight, heads this subcommittee and represents TRB as an ex officio member on the NRC Governing Board.

The Executive Office processes the Board's large volume of committee and panel appointments and maintains committee membership records. A hallmark of the National Academies is its institutional process to ensure the independent, rigorous review of reports. To maintain



Executive Director Robert E. Skinner, Jr., briefs the TRB Technical Activities Council in January on the work of the National Academies and on the TRB Executive Committee agenda for 2006.

these high standards, the Executive Office coordinates and manages the review process for TRB reports under the direction of the Subcommittee for NRC Oversight.

## PUBLICATIONS

To fulfill one of its oldest missions, TRB disseminates transportation research results and technology information through an extensive array of timely publications. The Board has gained national and international prominence for its books and reports assessing the state of the art or practice in specific areas of transportation, presenting the results of transportation research, addressing major national transportation policy issues, and identifying research needs. TRB continues to expand its publishing efforts by releasing a growing number of titles electronically, some exclusively in electronic format.

TRB books and reports cover 17 broad categories and topics, spanning the range of transportation functions and modes. The TRB Publications Office produces titles in the following series:

- *Transportation Research Record: Journal of the Transportation Research Board* gathers technical papers, originally presented at TRB Annual Meetings and other conferences, that have

been accepted for publication through peer review. Papers presented at the Annual Meeting and approved for publication are issued within 7 to 12 months. In 2006, the Board published 47 volumes of the journal, containing 817 papers grouped by subject. Record papers in the 2006 series were posted simultaneously with release of each printed volume to a searchable, password-protected section of the TRB website, which also includes all journal papers published since 1996.<sup>1</sup>

- The bimonthly magazine *TR News* features timely articles on innovative and state-of-the-art research and practice in all modes of transportation. News items of interest to the transportation community, profiles of transportation professionals, book and journal summaries, meeting announcements, and highlights of TRB activities also are included. Highlights this year included articles on New York City's subway century, the transportation information superhighway on the Internet, and the start-up of state highway agencies. A special theme issue on The Interstate Achievement: Getting There and Beyond celebrated the 50th anniversary of the Interstate Highway System with a collection of articles on the past, present, and future of the Interstate system. Another theme issue focused on the golden anniversary of containerized shipping. Selected features of *TR News* are posted on the TRB website, and the full issue is made accessible on the web on a four-month delay.<sup>2</sup> Because of the anticipated interest, the

<sup>1</sup> [www.TRB.org/publications/trr/Login.asp](http://www.TRB.org/publications/trr/Login.asp).

<sup>2</sup> [www.TRB.org/news/blurb\\_browse.asp?id=14](http://www.TRB.org/news/blurb_browse.asp?id=14).



C. Michael Walton, speaking at a Technical Activities Council meeting with Suzanne B. Schneider, reports on progress in enhancing the diversity of committee membership.



May–June 2006 issue on the Interstate system was made available on the web immediately.

- *Special Reports* contain the results of TRB policy studies on issues of national importance in transportation. These studies are often conducted at the request of federal agencies or of Congress and focus on a variety of complex, often controversial, topics. Three special reports were published in 2006: *The Fuel Tax and Alternatives for Transportation Funding*; *Tires and Passenger Vehicle Fuel Economy: Informing Consumers, Improving Performance*; and *Improving Road Safety in Developing Countries: Opportunities for U.S. Cooperation and Engagement*. All current and selected out-of-print special reports are posted on the Board's website.<sup>3</sup>
- *Conference Proceedings* assemble formal papers, presentations, and summaries of discussions from TRB conferences and workshops. Three titles were published this year, reporting on conferences about future truck and bus safety research opportunities, women's issues in transportation, and integrating sustainability into the transportation planning process. All three reports are posted on the web.<sup>4</sup>
- *Transportation Research Circulars* collect research problem statements, reports, and technical information from the work of TRB technical activities committees. Topics of Circulars published this year included urban street design, asphalt emulsion technology, innovations in statewide planning, critical

The Subcommittee for National Research Council Oversight ensures that TRB committee and panel appointments and report reviews comply with National Academies review procedures to ensure quality and objectivity: (left to right) John R. Njord, Linda S. Watson, Debra L. Miller, Michael D. Meyer, Susan Hanson, Suzanne B. Schneider, and Chair C. Michael Walton.

<sup>3</sup> [www.TRB.org/news/blurb\\_browse.asp?id=12](http://www.TRB.org/news/blurb_browse.asp?id=12).

<sup>4</sup> [www.TRB.org/news/blurb\\_browse.asp?id=92](http://www.TRB.org/news/blurb_browse.asp?id=92).





CBS News reporter Bob Orr was one of four experts who offered practical insights to the TRB Executive Committee in January on the topic of Raising the Public Profile of Transportation.

issues in aviation and the environment, safety data analysis and evaluation, and driver education. The 100th title in the electronic circular series was posted to the TRB website in July.<sup>5</sup>

- *Miscellaneous Reports* include special publications like the *Highway Capacity Manual 2000* and the *Access Management Manual*. The *Highway Capacity Manual 2000* was last updated in 2005 to incorporate corrections and changes as of July 2005 into the two print versions—one for U.S. customary measures and one for metric—and the CD-ROM. Released at the beginning of the year was a new edition of *Critical Issues in Transportation*, a brief publication that is periodically updated by the TRB Executive Committee to focus attention on pressing issues and their likely impact on the nation's economy and quality of life.

In addition, the Cooperative Research Programs Division produces an array of titles in several publications series. (For a list of all TRB publications, see pages 55–57.)

## COMMUNICATIONS

TRB is committed to improving the communication and public awareness of transportation issues and to enhancing the dissemination of research findings worldwide. Under the direction

<sup>5</sup> [www.TRB.org/news/blurb\\_browse.asp?id=16](http://www.TRB.org/news/blurb_browse.asp?id=16).



of the Board's Senior Communications Officer, TRB has been developing and implementing a variety of initiatives to improve communications and outreach.

One of the Board's most successful communications initiatives is the weekly *Transportation Research E-Newsletter*,<sup>6</sup> which reports on transportation research and research-related events within TRB and beyond. Circulation of the free newsletter has reached more than 22,000 and continues to grow. Approximately one-fifth of the readership is from outside the United States.

Other communications activities include enhancements to the Board's website; outreach to local government groups, other organizations, and individuals beyond traditional TRB constituencies; and targeting new audiences for specific reports and activities. In one of these efforts, TRB teamed with the National Conference of State Legislatures to create customized web links enabling state legislators and their staffs to access transportation research information on a variety of timely topics. This year's communication initiatives also included a coordinated dissemination campaign for the new edition of *Critical Issues in Transportation*, with more than 26,000 copies distributed to traditional and nontraditional audiences.

## STAFF NEWS

- **Javy Awan**, Director of Publications, and **Jennifer J. Weeks**, Editorial Services Specialist, received Individual Distinguished Service Awards from the National Academies in October.
- **Christopher R. D'Amore** joined the Publications Office staff as Assistant Editor, and **Paul D. deBruijn** came on board as Senior Production Assistant.

<sup>6</sup> [www.TRB.org/news/blurb\\_detail.asp?id=3946](http://www.TRB.org/news/blurb_detail.asp?id=3946). To subscribe, send an e-mail to [RHouston@nas.edu](mailto:RHouston@nas.edu) with "Subscribe TRB E-Newsletter" in the subject field.

# TECHNICAL ACTIVITIES

The TRB Technical Activities Division provides a forum for transportation professionals to identify research needs and to share information on research and issues of interest. The Division's staff of specialists in each mode and discipline work with a community of volunteers to carry out activities on behalf of TRB sponsors and the transportation community. This community includes thousands of members and friends of more than 200 standing committees.

The TRB Technical Activities Council oversees the organization and activities of these committees. In 2006, Neil Pedersen, Maryland State Highway Administrator, became chair of the Council. Supplementing the community are TRB representatives in each state, in more than 150 universities, and in 35 transit agencies.

## FOSTERING A COMMUNITY OF RESEARCHERS AND PRACTITIONERS

### Bringing People Together

#### *TRB Annual Meeting*

The year began with success, as attendance at the TRB 85th Annual Meeting, January 22–26, in Washington, D.C., passed the 10,000 mark for the first time. Approximately 10,300 people had a choice of more than 500 sessions featuring a total of 2,800 presentations, plus 350 meetings of TRB committees, subcommittees, panels, and task forces. The meet-the-author poster sessions continued to gain in popularity—approximately 43 percent of the papers were presented in poster sessions.

Because of developments at the end of 2005, the program added spotlight themes on SAFETEA-LU: What It Means for Research and the Transportation Community and on Disaster Preparedness, Response, and Recovery. These supplemented the previously scheduled spotlight



Technical Activities Council Chair Neil Pedersen and Technical Activities Director Mark Norman clarify an item of discussion at a council meeting.

themes of Transportation 2025: Getting There from Here and The Interstate System's 50th Anniversary: What Have We Learned?

Among the many highlights was the Chairman's Luncheon address by Ralph J. Cicerone, the new president of the National Academy of Sciences and chair of the National Research Council. Cicerone spoke on transportation and the nation's critical issues in science and technology, including the connection between climate change and transportation. Bridge engineer and designer Abba Lichenstein presented the Thomas B. Deen Distinguished Lecture, focusing his talk on the preservation of historic transportation facilities.

Later in the year, TRB committees reviewed more than 3,000 papers and developed the pro-



At a meet-the-author poster session, Tomer Toledo, Technion–Israel Institute of Technology, explains findings on In-Vehicle Data Recorder for Evaluation of Driver Behavior and Safety.



**Neil J. Pedersen**  
Council Chair  
Technical Activities



**Robert C. Johns**  
Chair  
Policy and  
Organization Group



**Marcy S. Schwartz**  
Chair  
Planning and  
Environment Group



**L. David Suits**  
Chair  
Design and  
Construction Group



**Leland D. Smithson**  
Chair  
Operations and  
Maintenance Group



**Shelly R. Brown**  
Chair  
Legal Resources  
Group



**Barry M. Sweedler**  
Chair  
System Users Group



**Patricia V. McLaughlin**  
Chair  
Public  
Transportation Group



**Christopher P. L. Barkan**  
Chair  
Rail Group



**Christina S. Casgar**  
Chair  
Freight Systems  
Group



**James M. Crites**  
Chair  
Aviation Group



**Arlene L. Dietz**  
Chair  
Marine Group



**Mark R. Norman**  
Director  
Technical Activities

gram for the 2007 Annual Meeting. The spotlight theme will be Transportation Institutions, Finance, and Workforce: Meeting the Needs of the 21st Century. The theme focuses on three of the critical issues in transportation identified by the TRB Executive Committee in 2006.

#### *Specialty Conferences*

TRB sponsored 21 specialty conferences, cosponsored 20 others, and presented more than 80 workshops throughout the year. The TRB Summer Conference in La Jolla, California, in July focused on Tackling the TRB Critical Issues in Transportation. More than 40 TRB committees met during the conference, which also included the 31st Annual Summer Ports, Waterways, Freight, and International Trade Conference.

A Transportation 2025 spotlight session, *Crude Awakenings: Oil in the New Millennium*, was one of many that attracted capacity audiences.

Other headline conferences included the 45th Workshop on Transportation Law; the 6th National Aviation System Planning Symposium; Innovations in Travel Modeling; the North American Travel Monitoring Exposition and Conference; the 3rd Bus Rapid Transit Conference, in conjunction with the American Public Transportation Association; the Metropolitan Planning Organization: Present and Future; Transportation Planning for Small and Medium-Sized Communities; Freight Demand Modeling; Tools for Public Agency Decision Making; the 17th National Rural Public and Intercity Bus Transportation Conference; the International Visualization in Transportation Symposium; the 2nd National Conference on Transportation Programming; and the 2nd National Conference on Incidents and Special Events Management.

#### *Increasing Diversity*

TRB advanced ongoing efforts to increase participation by young people, minorities, and women in committees and activities. A survey of participants at the conclusion of the lively New and Young Attendees Welcome Session at the Annual Meeting revealed that the more than 160 who volunteered to participate in committees included a high percentage of young people, minorities, and women. As a result, the diversity of committee members has continued to rise in 2006.



## Disseminating Information

### *Transportation Research Records*

The 2006 series of the *Transportation Research Record: Journal of the Transportation Research Board* (TRR) published 817 papers in 47 volumes. The papers were among the 2,800 submitted by the August 1, 2005, deadline and peer reviewed by standing committee volunteers. Several conference proceedings and many web circulars also were released.

The electronic accessibility of TRR papers to researchers and other interested parties continues to improve. In 2005 and 2006, authors submitting papers received temporary access to a searchable database on the TRB website with links to more than 6,000 TRR full-text papers published since 1996 for background and referencing.<sup>1</sup>

TRB staff also is working to make all or part of the TRR collection that is in electronic format available on the web to all users year-round through subscriptions and pay-per-view arrangements. TRB sponsors will continue to have full access to the files at no additional cost. The goals are to provide a useful service to transportation researchers, increase the citation index rating for the TRR, and generate the revenue necessary to support these services. Subscriptions to the TRR online should be available in 2007.

In addition, the Technical Activities Council formed a TRR Publication Board to provide recommendations and guidance on policy and actions to maintain and enhance the quality of the peer-reviewed journal.

### *E-Sessions*

Also expanded on the TRB website were e-sessions, recordings of key TRB Annual Meeting and conference sessions including PowerPoint presentations.<sup>2</sup> The service makes valuable information available to members of the research community who may not be able to attend TRB meetings and conferences. E-sessions usually are posted within 24 hours of the event.

## International Activities

The 2006 Annual Meeting marked a major milestone in TRB's efforts to increase international cooperation and research collaboration. TRB

<sup>1</sup> Transportation Research Record: Journal of the Transportation Research Board, [www.TRB.org/TRROnline/Login.asp](http://www.TRB.org/TRROnline/Login.asp).

<sup>2</sup> Transportation Research Board Technical Activities e-sessions, [www.TRB.org/conferences/e-session/default.asp](http://www.TRB.org/conferences/e-session/default.asp).



Executive Director Robert E. Skinner, Jr., and European Conference of Transport Research Institutes (ECTRI) President G. A. Giannopoulos signed a memorandum of understanding (MOU), witnessed by approximately 350 attendees at an international reception. Michael D. Meyer, incoming TRB Executive Committee Chair and International Activities Committee Chair, also spoke at the ceremony.

The MOU traces a 10-point action plan that includes outreach, international conferences, professional exchanges, and support of young transportation professionals. Each action item designates an ECTRI and a TRB representative who will work to achieve the proposed action.

Also at the Annual Meeting, TRB hosted a session of the World Road Association (PIARC) Road System Economics Committee, which comprises delegates from 33 countries. A workshop sponsored by the TRB Taxation and Finance Committee featured speakers from ECTRI, the World Bank, the Organization for Economic Cooperation and Development, the Conference of European Ministers of Transport, and the Ministries of Japan and the Czech Republic.

Additional international workshops were held on road safety in developing countries and on air

Ports and Channels Committee Chair Jeannie Beckett (*right*), Port of Tacoma, answers questions about TRB from first-time meeting attendees Karin Foster (*left*), Baltimore Metropolitan Council, and Megan Smirti, University of California–Berkeley.



Jean-Pierre Médevielle, European Conference of Transport Research Institutes (ECTRI); G. A. Giannopoulos, Hellenic Institute of Transport, Greece; and Robert E. Skinner, Jr., TRB, display the memorandum of understanding between ECTRI and TRB in preparation for the signing.

Speakers at an Annual Meeting session on Emerging Innovations in European Freight Modeling included Lorant Antal Tavasszy (*left*), TNO Inro, on the Dutch national freight model, and Gerard de Jong, Rand Europe, on the logistics model for Norway and Sweden.



quality issues in Latin America. In all, the program included more than 50 international sessions. A session on women's transportation issues in developing countries, sponsored by the TRB Women's Issues in Transportation Committee, was well attended.

Outreach included Meyer's keynote speech at the Transport Research Forum conference in Göteborg, Sweden, in June, and the participation of TRB Senior Program Officer Martine Micozzi in the European Transport Conference held in Strasbourg, France, in September. In addition, TRB hosted 10 delegations and visitors from Africa, Australia, China, France, India, Israel, Korea, and the Netherlands.

The number of international delegates on TRB Standing Committees increased by more than 11 percent in 2006. Efforts to support additional international collaboration are continuing.

## Laying the Foundation for the Future

### *Providing Sound Financial Footing*

Because of funding changes under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the Federal Highway Administration (FHWA) is expected to cut back its level of support for TRB core programs by approximately \$1.1 million per year. The TRB budgets beginning in 2007, therefore, required adjustment.

Most of the work of the Technical Activities Division depends on core funding. Significant amounts of time and effort were devoted to the budget challenges as TRB staff identified cost-saving and revenue-enhancing options to mitigate the shortfall. The options were presented to members of the TRB Executive Committee, the

Technical Activities Council, and others. The following objectives guided the selection of measures to meet the funding challenges:

- Maintain the high quality of TRB products and programs.
- Sustain the scope of coverage of TRB products and programs.
- Trim services and products in a cost-effective and understandable way.
- Maintain the level of services for TRB sponsor organizations.
- Provide access to TRB products and programs to nonsponsors at costs that are reasonable and that reflect marketplace rates.

Measures undertaken include the following:

- Reorganize the Technical Activities Division staff to take maximum advantage of talents and expertise.
- Find alternative ways to complete tasks, minimizing the need to fill several vacant staff positions.
- Reduce nonessential staff travel.
- Revise registration fees and budgets for upcoming Annual Meetings and conferences.
- Initiate revisions to TRB affiliate fees and services.
- Work with the leadership of the Council of University Transportation Centers on packages of fees and services for the academic community.
- Investigate less expensive options for delivering webinars and webcasts.
- Initiate a service to provide web access to TRR papers through paid subscriptions and pay-per-view arrangements.
- Consult with the Technical Activities Council, standing committee chairs, TRB representatives from state departments of transportation (DOTs), and others on potential actions and scenarios.

These and other measures should put TRB in a stronger financial position to pursue its mission and to meet the needs of the transportation community.

### *Strategic Planning*

The standing committees provided advice and comments on the updating of the TRB strategic plan and the development of an action plan for the Technical Activities Division. More than 125



committees provided answers to strategic questions, such as What does TRB do best? What can TRB do better? What constituencies should TRB outreach focus on? How can TRB improve service to these constituencies and to the transportation community at large?

The strategic plans will be developed and adopted in 2007.

#### *New Committees*

The Technical Activities Council established five new standing committees to address issues of growing importance to the transportation community: National Parks and Public Lands; Marine Environment; Trucking Industry Research; Ecology and Transportation; and Visualization in Transportation.

## POLICY AND ORGANIZATION

### Transportation Policy

TRB committees in policy and administration undertook a variety of activities, including the Road Pricing Committee's workshops at the Annual Meeting and at the midyear meeting in California; an international workshop on public-private partnerships and a midyear workshop sponsored by the Taxation and Finance Committee; and the Strategic Management Committee's workshops to gather comments on the white papers and sessions prepared for the National Cooperative Highway Research Program (NCHRP) State Leadership and CEO Forum in September.

### Critical and Cross-Cutting Issues

The Policy and Organization Group is identifying critical and cross-cutting issues to guide development of activities among its 30 committees and within the Technical Activities Division. A research agenda will be developed for each issue.

The process started when the group organized spotlight sessions for the 2006 Annual Meeting on transportation organizations in 2025, the future transportation workforce, and collaboration in transportation. At the 2006 Summer Conference, the group expanded the list to include finance, data and information as assets, global competitiveness, and emergency preparedness. The group is organizing spotlight theme sessions in most of these topics for the 2007 Annual Meeting.



At a poster session on transportation security research, author Kriste Henson, Los Alamos National Laboratory, awaits comments from Joe Hill, Illinois DOT, on the modeling of homeland security applications.

### Security

The 2006 Annual Meeting program included several security-related workshops and sessions, including the third annual workshop on bridge and tunnel security, plus workshops on homeland security preparedness training and on spatial data needs and opportunities. Sessions on security in all modes of transportation covered vulnerability risk assessments, performance measures, and shipping challenges at the borders. The number of high-quality, peer-reviewed research papers was sufficient to publish a security volume of the TRR in 2006.<sup>3</sup>

The Critical Transportation Infrastructure Committee met with the Standing Committee on Transportation Security of the American Association of State Highway and Transportation Officials (AASHTO) in Orlando, Florida, in September. The meeting featured roundtable discussions on emergency operations, evacuation, incident management, and emergency communications. Attendees also toured the I-Florida model deployment initiative, the Florida DOT Traffic Management Center in Orlando, and the Florida Turnpike Authority's incident management program, which included a demonstration of a response operation to right an overturned tanker.

### Data and Information Systems

#### *Information Needs Assessment*

The TRB data committees developed the Transportation Information Assets and Impacts initiative to define the information needs of the Board's 200-plus standing committees. Members of 144 committees, covering all modes and all

<sup>3</sup> *Transportation Research Record: Journal of the Transportation Research Board*, No. 1942.

division groups, contributed to a list of more than 600 information needs on a dedicated website.

A team synthesized the responses, analyzed examples of information use from committees, and produced a white paper presenting a framework for describing needs and for illustrating how the information is valuable in transportation decision making. The efforts serve as the groundwork for 2007 initiatives by the data committees to explore the concept of information resources as assets in setting strategic directions.

#### *Conferences and Programs*

The North American Travel Monitoring Conference and Exposition, a biennial forum, convened in Minneapolis, Minnesota, June 4–7, for the exchange and dissemination of information on the collection, management, and use of monitored traffic data in all applications.

The Environmental Geospatial Information for Transportation meeting in May brought together environmental managers and geospatial data specialists in the mid-Atlantic region to share successful practices and to discuss improvements to environmental geospatial data to support transportation decision making.

The Challenges of Data for Performance Measures Workshop gave data managers and performance measures practitioners a forum in July for discussing improvements in the use of data resources for performance measurement within their organizations.

The conference on Research Opportunities in Transportation: Radio Frequency Identification Applications in Washington, D.C., in October showcased emerging technologies that could affect the transportation community. The con-

ference provided an opportunity for University Transportation Centers to brief U.S. DOT about the latest technological developments.

A peer exchange on Integrating Roadway, Traffic, and Crash Data highlighted current practices and responses to SAFETEA-LU requirements to improve understanding of crash causes and the management of transportation assets.

#### *Data Publications*

The data and information technology committees produced seven electronic circulars in 2006 summarizing 2005 and 2006 functions:

- 6th National Conference on Transportation Asset Management,<sup>4</sup>
- Commodity Flow Survey Conference,<sup>5</sup>
- Freight Data for State Transportation Agencies,<sup>6</sup>
- Data Requirements in Transportation Reauthorization Legislation Conference,
- Geospatial Information Technologies for Asset Management Peer Exchange,<sup>7</sup>
- Challenges of Data for Performance Measures Workshop, and
- Environmental Geospatial Information for Transportation Peer Exchange.<sup>8</sup>

#### **Research and Education**

The research and education committees helped plan the 2006 International Symposium on Transportation Technology Transfer. The symposium attracted more than 350 participants, including many international attendees. Sessions and workshops organized by committee members included transforming the transportation workforce through technology exchange; deploying research results; advancing technology transfer; and market-ready technologies and innovations.

Environmental Geospatial Information for Transportation: An Exchange for the Mid-Atlantic Region convened May 3–4 at the Keck Center of the National Academies, Washington, D.C.



<sup>4</sup> Circular E-C093, [www.TRB.org/publications/circulars/ec093.pdf](http://www.TRB.org/publications/circulars/ec093.pdf).

<sup>5</sup> Circular E-C088, [www.TRB.org/publications/circulars/ec088.pdf](http://www.TRB.org/publications/circulars/ec088.pdf).

<sup>6</sup> Circular E-C080, [www.TRB.org/publications/circulars/ec080.pdf](http://www.TRB.org/publications/circulars/ec080.pdf).

<sup>7</sup> Circular E-C108, [www.TRB.org/publications/circulars/ec108.pdf](http://www.TRB.org/publications/circulars/ec108.pdf).

<sup>8</sup> Circular E-C106, [www.TRB.org/publications/circulars/ec106.pdf](http://www.TRB.org/publications/circulars/ec106.pdf).

## PLANNING AND ENVIRONMENT

### Transportation System Planning

The Innovations in Travel Demand Forecasting Conference, held in Austin, Texas, in May explored state-of-the-art techniques in travel demand forecasting and survey data collection. Researchers and practitioners exchanged ideas about recent advances in travel modeling, opportunities and challenges related to implementation, and directions for research and development.

The Transportation Needs of National Parks and Public Lands Committee cosponsored a joint summer meeting in Tacoma, Washington, on Transportation Design: Managing Water Quality Concerns and Mobility in National Parks and Public Lands. The program included sessions on transportation planning and improvements at Mount Rainier National Park and a tour of the park's transportation projects. The Landscape and Environmental Design Committee and the Hydrology, Hydraulics, and Water Quality Committee were cosponsors.

The Access Committee convened the 7th biennial conference on Access Management in Park City, Utah, in August. The conference brought together engineers, planners, consultants, land developers, and academics from all fields of highway design, traffic engineering, and planning.

The Metropolitan Policy, Planning, and Process Committee held a conference in August in Washington, D.C., on the organizational structures and roles of metropolitan planning organizations (MPOs) in statewide planning and regional decision making. Looking at the present and future, the forum provided participants with opportunities to discuss and compare MPO structures and operations to meet wide-ranging and expanding responsibilities.

Tools of the Trade, the 10th National Conference on Transportation Planning for Small and Medium-Sized Communities, in Nashville, Tennessee, September 13–15, presented planners with ready-to-use, economical, and practical techniques.

Sessions at the Key Issues in Transportation Programming Conference, held in Seattle, Washington, in November covered technical approaches—such as efficient mechanisms to

catalogue and evaluate large numbers of candidate projects; state and MPO relationships; and policy and politics in the programming process.

### Social, Economic, and Environmental

The new Ecology and Transportation Committee, which as a task force had played a role in the biennial International Conference on Ecology and Transportation, started its activities by holding a workshop and meeting in Seattle with the Environmental Analysis Committee.

The Historic and Archeological Preservation Committee held a workshop in Williamsburg, Virginia, in July. A plenary session commemorated the 40th anniversary of the National Historic Preservation Act, and other sessions examined archaeology and science, battlefields in transportation, and the use of historic contexts.

The Transportation-Related Noise and Vibration Committee also met in Williamsburg for a summer workshop covering a range of topics, from the effects of pile driving on fish to the reasons for conducting long-term measurements for traffic noise studies.

A conference sponsored by the Waste Management and Resource Efficiency in Transportation Committee in Chicago, Illinois, highlighted the transportation industry's changeover from remediation and management to minimization and reuse of solid and hazardous waste. The agenda included presentations by staff from state DOTs, transit agencies, and private companies.

## DESIGN AND CONSTRUCTION

### Design

The Geometric Design Committee published an electronic circular, *International Perspectives on Urban Street Design*, the proceedings of a context-sensitive design workshop at the 2005 Annual Meeting.<sup>9</sup> The committee also met in Park City, Utah, in conjunction with the 7th National Access Management Conference.

The Roadside Safety Design Committee and the Work Zone Traffic Control Committee held a joint meeting in Jackson, California, and conducted a workshop on Positive Protection in Work Zones. The program provided the roadside

<sup>9</sup> Circular E-C097, [www.TRB.org/publications/circulars/ec097.pdf](http://www.TRB.org/publications/circulars/ec097.pdf).



The Fifth National Seismic Conference on Bridges and Highways included a tour of bridges and bridge construction in the San Francisco Bay Area; (above) the old Carquinez Bridge, under demolition, with the new suspension bridge in the background.

safety community with examples of recent developments in work zone traffic control and safety devices.

### Structures

The Structures Section cosponsored three conferences: the First International Conference on Fatigue and Fracture in the Infrastructure: Bridges and Structures of the 21st Century, in Philadelphia, Pennsylvania; the 7th International Conference on Short- and Medium-Span Bridges, in Montreal, Quebec, Canada; and the 5th National Seismic Conference on Bridges and Highways, in San Francisco, California. The Section also prepared an electronic circular, *50 Years of Interstate Structures: Successes and Future Developments*, with papers from a spotlight double session at the 2006 Annual Meeting.<sup>10</sup>

### Construction and Materials

The construction and materials committees sponsored four workshops at the 2006 Annual Meeting. One offered a 10-year perspective on the intent of the quality assurance procedures for

construction in the Code of Federal Regulations, Title 23, Part 637. Another looked at environment-friendly concrete in transportation infrastructure, including environmental concerns about the production and use of portland cement concrete and the use of nontraditional and substandard materials to supplement depleting resources. A third workshop reviewed sound and noise basics, emerging measurement techniques, and emerging solutions for quieter concrete pavements. The fourth offered practical approaches to improve the performance and extend the fatigue life of Superpave mixtures.

In October, TRB cosponsored FHWA's International Conference on Long-Life Concrete Pavements, in Chicago, Illinois. The committees on Portland Cement Concrete Pavement Construction, Pavement Rehabilitation, Concrete Materials and Placement, and Rigid Pavement Design assisted in developing the program.

The Flexible Pavement Construction and Rehabilitation, General Issues in Asphalt Technology, and Pavement Rehabilitation Committees sponsored an electronic circular, *Rubblization of Portland Cement Concrete Pavements*.<sup>11</sup> The volume contains papers formalized after a two-part session on the topic at the 2005 Annual Meeting.

The Task Force on Design-Build produced an electronic circular, *Design-Build: A Quality Process*, assembling noteworthy points raised at a 2005 Annual Meeting workshop on achieving quality in design-build projects from the preparation of a request for proposals through final construction.<sup>12</sup>

### Soils, Geology, and Foundations

The geotechnical engineering committees sponsored four workshops at the 2006 TRB Annual Meeting on the use of the cone penetration test for foundation analysis and design, including design methods and case histories of transportation projects; issues related to the Mechanistic-Empirical Pavement Design Guide's use of the enhanced integrated climatic model to predict the effects of climate on pavements; the latest applications and future developments in the use

<sup>10</sup> Circular E-C104, [www.TRB.org/publications/circulars/ec104.pdf](http://www.TRB.org/publications/circulars/ec104.pdf).

<sup>11</sup> Circular E-C087, [www.TRB.org/publications/circulars/ec087.pdf](http://www.TRB.org/publications/circulars/ec087.pdf).

<sup>12</sup> Circular E-C090, [www.TRB.org/publications/circulars/ec090.pdf](http://www.TRB.org/publications/circulars/ec090.pdf).

of ground-penetrating radar in pavements and utilities; and applications of geophysics for geotechnical projects, presenting case studies and resources.

In September, the Engineering Geology Committee, the Exploration and Classification of Earth Materials Committee, and the Mineral Aggregates Committee sponsored a symposium on Applications of Geophysics to Geotechnical Projects, immediately preceding the 57th Highway Geology Symposium in Breckenridge, Colorado. The symposium's objective was technology transfer.

In October, the Subsurface Soil–Structure Interaction, the Culverts and Hydraulic Structures, and the Subsurface Drainage Committees cosponsored the Plastic Pipes XIII Conference in Washington, D.C.

The Engineering Geology Committee and the Exploration and Classification of Earth Materials Committee cosponsored the 2006 Highway Geophysics Conference in St. Louis, Missouri, in December.

The Chemical and Mechanical Stabilization Committee sponsored an electronic circular, *Evaluation of Chemical Stabilizers: State-of-the-Practice Report*.<sup>13</sup> The circular provides a synthesis of successful practices by agencies that have achieved a reasonable amount of uniformity and standardization in evaluating chemical stabilizers for soil.

## OPERATIONS

The 1st International Symposium on Freeway and Tollway Operations, held in June in Athens, Greece, provided an opportunity for more than 550 participants from 25 countries to share views, knowledge, and experience on freeway and tollway operations. The symposium showed that practitioners, policy makers, and researchers around the globe face similar issues and could learn much by sharing challenges and successes with colleagues from other countries.

The Freeway Operations Committee organized the symposium. Cosponsors included FHWA; the International Bridge, Tunnel, and Turnpike Association; California's Partners for Advanced Transit and Highways; and the Hellenic Institute of Transportation Engineers. Local hosts

were Attiki Odos, S.A., and Attikes Diadromes, S.A., tollway authorities in the Athens area.

The 5th International Symposium on Highway Capacity and Quality of Service, held in July in Yokohama, Japan, attracted more than 150 participants from 17 countries—researchers, engineers, planners, and other practitioners. The Highway Capacity and Quality of Service Committee sponsored the symposium; local sponsors and hosts included the Japan Society of Traffic Engineers, Nagoya University, University of Tokyo, Tottori University, and Japan's Ministry of Land, Infrastructure, and Transport.

## MAINTENANCE

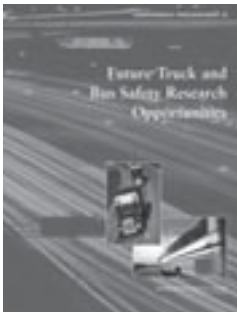
The Maintenance Section committees sponsored a variety of sessions at the Annual Meeting. Pavement maintenance topics included starting a pavement preservation program; construction and performance standards; the effects of temperature on bituminous sealants; and properties and performance of materials used in joints and cracks. Structures maintenance and management topics drew attention to the use of epoxy-coated rebar in concrete bridge components; infrastructure corrosion control systems; advanced bridge inspection techniques; and information systems for structures management.

Safety and operations topics covered traffic flow through highway work zones; portable positive protection systems; new tools for work zone traffic control; work zone safety issues and crashes; and the visibility and durability and the management and testing of pavement marking. Maintenance management topics included quality measures and assessments and the evaluation of contracts and performance. Winter maintenance topics highlighted forecasting and performance, as well as safety and environmental issues. Surface transportation weather topics focused on winter driving and safety; analysis and forecasting; and the SAFETEA-LU Road Weather Research and Development Program.

In addition, the maintenance committees sponsored the Bridge Preservation Best Practices Workshop at the Annual Meeting, as well as the 11th AASHTO-TRB Maintenance Management Conference in Charleston, South Carolina, July 16–20.<sup>14</sup>

<sup>13</sup> Circular E-C086, [www.TRB.org/publications/circulars/ec086.pdf](http://www.TRB.org/publications/circulars/ec086.pdf).

<sup>14</sup> Circular E-C098, [www.TRB.org/publications/circulars/ec098.pdf](http://www.TRB.org/publications/circulars/ec098.pdf).



Conference Proceedings 38 includes problem statements for long-range research into truck and bus safety.

## SAFETY

The Alcohol, Other Drugs, and Transportation Committee continued a tradition of technical midyear meeting workshops. This year's theme was Regulation and Policy in Alcohol and Traffic Safety.

The Joint Subcommittee on Safety Workforce Development completed work on a scan of highway safety training and education and on a set of core competencies for highway safety professionals, published in the Research Results Digest series.<sup>15</sup> The AASHTO Standing Committee on Research approved funding to develop training modules for the core competencies.

The Joint Subcommittee on Roundabouts organized and conducted the National Roundabouts Conference in Vail, Colorado, which has nine operating roundabouts in the vicinity. The proceedings are online in the electronic circular series,<sup>16</sup> and 1,000 CD-ROMs of the presentations have been distributed to participants and requesters.

The Pedestrians Committee and the Safety Data, Analysis, and Evaluation Committee published research problem statements in electronic circulars.<sup>17,18</sup>

In January TRB published Conference Proceedings 38, a summary of the proceedings and the conference committee's research recommendations from a March 2005 workshop on Future Truck and Bus Safety Research Opportunities, sponsored by the Federal Motor Carrier Safety Administration.<sup>19</sup> The workshop focused on the long-range research needed in the next 5 to 25 years.

## LEGAL RESOURCES

The 45th Annual Workshop on Transportation Law—the major activity of the Legal Resources Group—attracted approximately 175 lawyers,

<sup>15</sup> NCHRP Research Results Digest 302, [www.TRB.org/publications/nchrp/nchrp\\_rrd\\_302.pdf](http://www.TRB.org/publications/nchrp/nchrp_rrd_302.pdf).

<sup>16</sup> Circular E-C083, [www.TRB.org/publications/circulars/ec083.pdf](http://www.TRB.org/publications/circulars/ec083.pdf).

<sup>17</sup> Circular E-C084, [www.TRB.org/publications/circulars/ec084.pdf](http://www.TRB.org/publications/circulars/ec084.pdf).

<sup>18</sup> Circular E-C094, [www.TRB.org/publications/circulars/ec094.pdf](http://www.TRB.org/publications/circulars/ec094.pdf).

<sup>19</sup> Conference Proceedings 38, [www.TRB.org/publications/conf/CP38.pdf](http://www.TRB.org/publications/conf/CP38.pdf).

engineers, and transportation administrators to Chicago, Illinois, July 23–26. The workshop was accredited by most of the states that have continuing legal education requirements.

The Transit and Intermodal Transportation Law Committee and the Environmental Issues in Transportation Law Committee focused on the regulatory requirements of SAFETEA-LU for charter buses, third-party contracting, and environmental processing. Also discussed were privatization and the funding of transportation development, the processing of Disadvantaged Business Enterprise applications, and the impact of the *Kelo v. City of New London* decision on the power of governments to condemn property for private development.

Throughout the year, the group provided suggestions and assistance to NCHRP Project 20-6, Legal Problems Arising Out of Transportation Programs, and to Transit Cooperative Research Program Project J-5, Legal Aspects of Transit and Intermodal Transportation Law.

The Legal Resources Group Executive Board was instrumental in initiating Airport Cooperative Research Program (ACRP) Project 11-01, Legal Aspects of Airport Operations. The proposal to the ACRP governing board was accepted in January, and the research project was started on June 1, 2006, and has received funding for a second year. Research reports from this project will assist state DOT aviation attorneys, as well as city and county airport attorneys.

## AVIATION

From 2004 through 2006, TRB conducted a project to assist the Federal Aviation Administration (FAA) with plans to develop tools for assessing the emissions impacts of aviation operations. With the input of participants at four workshops, a specially appointed TRB committee prepared three letter reports to FAA that helped define the scope of the study and provided recommendations and options for developing an integrated set of tools. At the end of 2006, FAA presented the results for feedback on potential follow-up efforts.

The Aviation Economics and Forecasting Committee, the Aviation System Planning Committee, and the Light Commercial and General Aviation Committee conducted two workshops with FAA cooperation, to provide comments and



Participants at an aviation forecasting workshop consider the potential effects of microjets on the system.

discussion about current forecasts. The September 18–19 workshop focused on understanding airport forecasts at the national, regional, state, and individual airport levels. How the aviation system will be affected by the entry of microjets into the business, charter, and general aviation fleets was the focus of the second workshop, October 5–6.

## FREIGHT SYSTEMS

### Conferences and Initiatives

The growth in freight demand has increased pressures on freight system capacity. A day-long series of technical sessions at the 2006 Annual Meeting examined critical issues in freight system capacity, including the impact of pricing on congestion management; urban highway bottlenecks; supply chain structure and restructuring; and operations strategies as responses to congestion.

The Freight Systems Group committees held midyear meetings as part of the TRB Summer Conference. Several sessions featured freight-related topics.

In September, TRB conducted a Conference on Freight Demand Modeling: Tools for Public-Sector Decision Making, with support from several federal agencies. The program provided examples and evaluations of the state of the practice in freight demand modeling and highlighted the need for improved modeling tools, particularly with increased public involvement in freight transportation concerns.

The September–October *TR News* commemorated the 50th anniversary of containerization

with articles examining the impact of containerization on global shipping, the issue of supply chain security, and terminal, vessel, and equipment developments.<sup>20</sup>

### Freight Industry Roundtable

TRB's Freight Transportation Industry Roundtable used the Annual Meeting to reach out to a larger audience of public- and private-sector officials and to showcase the U.S. DOT's development of a national freight policy framework. Carrier and shipper views on capacity issues illustrated the need for a policy to guide solutions to capacity constraints.

The roundtable held a spring meeting in Long Beach, California, focusing on the financing of freight projects, including several key regional examples and public–private financing issues. A fall meeting in Washington highlighted the experience of shippers and carriers with freight performance measures.

## MARINE

### Committee Developments

TRB's 2006 marine activities began with several well-attended sessions and workshops at the Annual Meeting. In addition to cosponsoring the Freight Day sessions, marine committees hosted sessions on a range of topics: the impact of Hurricanes Katrina and Rita on port operations, port reserve capacity, the marine environment, short sea shipping, seabasing, and ferry transportation. In addition, the Marine Environmental Task Force cosponsored a workshop on freight-related air quality issues, a topic addressed again in a session at the 2006 Summer Conference.

The Marine Group committees also published a TRR volume on water transportation.<sup>21</sup> In June, the Technical Activities Council approved the Marine Environmental Task Force as a standing committee.

The 31st Annual TRB Summer Ports, Waterways, Freight, and International Trade Conference met in La Jolla, California, in July, as part of the TRB 2006 Summer Conference. Plenary ses-

<sup>20</sup> <http://onlinepubs.trb.org/onlinepubs/trnews/trnews246.pdf>.

<sup>21</sup> *Transportation Research Record: Journal of the Transportation Research Board*, No. 1963.

sions covered such topics as nonhighway alternatives for moving freight, solutions to reduce environmental health and community impacts from goods movement and port operations, developments in port security and port operations, and expanding gateways to the U.S. consumer market. Participants also toured the Port of San Diego and the Otay Mesa border crossing.

### Marine Board Activities

With the U.S. Coast Guard, the Marine Board hosted and cosponsored the 7th Annual Harbor Safety Committee Conference, in Washington, D.C., in April. The event opened with a keynote address by U.S. DOT Secretary Norman Mineta and included sessions on navigation, disaster planning and preparedness, disaster response and recovery, security, passenger vessel operations, and recreational boating.

The Marine Board held its spring meeting at the offices of the Port of Seattle, Washington, in May, with a focus on developing a strategic plan. The fall meeting in Washington, D.C., included recognition of four outgoing Marine Board members and a welcome to four new members.

## PUBLIC TRANSPORTATION

The Light Rail Transit Committee conducted the Joint International Light Rail Transit Conference in St. Louis, April 9–11. The conference was cosponsored with the American Public Transportation Association (APTA), the Union Internationale des Transports Publics, and the Federal Transit Administration (FTA), and was hosted by St. Louis Metro. A comprehensive proceedings will be published as an electronic circular in early 2007.

The committees on Bus Transit Systems and High-Occupancy Vehicles presented the Third National Bus Rapid Transit Conference, cosponsored with APTA and FTA, and hosted by the Toronto Transit Commission and GO Transit, August 2–4 in Toronto, Canada.

The Rural Public and Intercity Bus Transportation Committee conducted the 17th National Rural Public and Intercity Bus Transportation Conference, October 22–25, in Stevenson, Washington. Cosponsors were FTA, the American Public Works Association, and Wash-

ington State DOT, with the cooperation of Oregon DOT and the National Association of Development Organizations.

## RAIL

### Making Connections

Technical sessions at the Annual Meeting dealt with critical issues related to rail transportation, including rail corridor and system capacity, cost-sharing for joint use of rail lines by freight and passenger services, and public financing of rail improvements for local freight services.

Several rail committees joined with rail transit committees in holding midyear meetings in New York City in June. A joint session included presentations and discussions on topics of mutual interest, including train control technology, rail and transit in America after the peak in oil production, and public–private partnerships for investment in solving rail bottlenecks.

### Rail Network Performance

At the request of the Federal Railroad Administration, which also served as a sponsor, TRB conducted the Workshop on Research to Enhance Rail Network Performance, April 5–6, in Wash-



At the Workshop on Research to Enhance Rail Network Performance, participants (*left to right*) Reilly McCarren, Arkansas and Missouri Railroad; Brendan Hickman, Teradata; and Bruce Horowitz, ESH Consult, participate in a breakout discussion to develop research problem statements.



ington, D.C. High-level railroad industry and government leaders shared their perspectives on the safety, capacity, and efficiency of the rail network for freight and passengers.

Breakout discussion groups gave all participants opportunities to express their views on research and development priorities under each of the themes and in areas of overlap. The sponsoring TRB committee—the Committee for Review of the Federal Railroad Administration Research, Development, and Demonstration Programs—is using the research needs statements from the breakout groups to prioritize research directions, which will be published as part of the workshop proceedings.

## STAFF NEWS

- **Kimberly M. Fisher** was named Associate Director of the Technical Activities Division.
- **Christine Gerencher** assumed responsibilities for the standing committees on the environment, supplementing her aviation committees.
- Joining the division staff were **David Floyd**, as Senior Program Associate, and **Masha Vassilieva**, as Meeting Assistant.

## 2006 AWARDS



For outstanding contributions to bridge design and engineering research, and for his leadership in incorporating research results into everyday design practice, **John M. Kulicki** (*left*) received the Roy W. Crum Distinguished Service Award. Kulicki is President–Chief Executive Officer and Chief Engineer, Modjeski and Masters, Inc., Harrisburg, Pennsylvania. Michael D. Meyer, Chair of the TRB Executive Committee, presented the award.



Past Chair of the TRB Executive Committee **Genevieve Giuliano** received the W. N. Carey, Jr., Distinguished Service Award in recognition of her outstanding leadership and service to transportation research and to TRB. Giuliano is Professor and Senior Associate Dean of Research and Technology in the School of Policy, Planning, and Development at the University of Southern California (USC) and Director of the joint USC–California State University Long Beach METTRANS Transportation Center.



**Sandra L. Draggoo**, Executive Director of the Capital Area Transportation Authority, Lansing, Michigan, was the 2006 recipient of the Sharon D. Banks Award for Innovative Leadership in Transportation. The award cited her “outstanding accomplishments as a transit manager who puts people first.” TRB Executive Director Robert E. Skinner, Jr., presented the award, which is conferred biennially.



**Abba Lichtenstein** (*second from right*), consultant nationwide on the preservation and rehabilitation of historic bridges and canals, delivered the 2006 Thomas B. Deen Distinguished Lecture, “The Preservation of Historic Transportation Facilities,” complete with several slide tours of renewed facilities. At the left is Thomas B. Deen, past Executive Director of TRB, and presenting the award plaque is Technical Activities Council Chair Neil J. Pedersen, Maryland State Highway Administration; TRB Executive Director Robert E. Skinner, Jr., is at the right.

# STUDIES AND SPECIAL PROGRAMS



**Genevieve Giuliano**  
Chair  
Subcommittee on  
Planning and  
Policy Review

The Studies and Special Programs Division conducts policy studies at the request of the U.S. Congress, the executive branch agencies, states, and other sponsors; operates a bibliographic database of completed research and provides library reference services; produces syntheses of current practices in highway, transit, airport operations, and truck and bus safety; and manages Innovations Deserving Exploratory Analysis (IDEA) programs in highway, transit, rail and truck safety, and high-speed rail.



**Stephen R. Godwin**  
Director  
Studies and  
Special Programs

## POLICY STUDIES

With guidance from committees drawn from the nation's leading experts, the Policy Studies group produces reports examining complex and controversial transportation issues. Studies cover all modes of transportation and a variety of safety, economic, environmental, and research policy issues. The U.S. Congress and the executive branch have adopted many recommendations from TRB policy reports, attesting to the substantive value of the findings.

The Subcommittee on Planning and Policy Review provides oversight for TRB's policy work, under the leadership of former TRB Executive Committee Chair Genevieve Giuliano, Professor and Senior Associate Dean of Research and Technology in the School of Policy, Planning, and Development, and Director of the METRANS Transportation Center, University of Southern California. Since 1998, all completed policy study reports are posted on the TRB website.<sup>1</sup> *Informing Transportation Policy Choices*, a publication that provides an overview of all TRB policy studies from 1983 through 2002, also is posted on the Policy Studies page of the website.<sup>2</sup>

<sup>1</sup> [http://www4.trb.org/trb/onlinepubs.nsf/web/divb\\_publications](http://www4.trb.org/trb/onlinepubs.nsf/web/divb_publications).

<sup>2</sup> <http://gulliver.trb.org/publications/policy/itpc.pdf>.

## Completed Reports

### *The Fuel Tax and Alternatives for Transportation Funding*

Special Report 285



A study committee was charged with reviewing the long-term viability of the gas tax as the mainstay of funding for surface transportation. Transportation officials have been concerned that fuel taxes and other user fees—

which have provided stable and growing revenue—could become less reliable as sources of funding if worldwide demand exceeds petroleum reserves and if increased vehicle fuel economy results in less gas tax revenue to the federal government and the states. Threats to revenue streams may be compounded by the unwillingness of public officials to do what they have done in the past—adjust tax rates upward to offset the erosion of purchasing power by inflation.

The committee's report cites official forecasts that proven reserves are adequate to meet demand for the next 15 years, but at a higher real

Rudolph G. Penner, Urban Institute, responds to audience questions at a TRB Annual Meeting session, which presented the findings from TRB Special Report 285, *The Fuel Tax and Alternatives for Transportation Funding*.



price than in recent years.<sup>3</sup> Without sustained sharp increases in fuel prices or legislation mandating higher fuel economy, fleet fuel economy will improve only marginally in the next 15 years. With growth in travel, tax revenues should continue to grow—but not as fast as the projected increases in traffic.

Although the fuel tax is likely to remain an important source of transportation funding, several finance mechanisms to supplement the fuel tax would perform more effectively. The committee recommends (a) relying more heavily on tolls and congestion fees to supplement highway funding and (b) providing stable, broad-based state and local taxes for transit.

Road use metering and charges for mileage are identified as promising approaches that should be tested in large-scale trials to demonstrate the workability of the technologies, particularly in relation to privacy concerns. The committee observes that political support will be needed to set tolls, congestion fees, and dedicated taxes for transit at appropriate levels, as well as to adjust fuel taxes regularly to counter inflation and respond to growth in demand.

The committee was chaired by Rudolph G. Penner, an economist with the Urban Institute and former director of the Congressional Budget Office. Funding was provided by the Federal Highway Administration (FHWA), the National Cooperative Highway Research Program (NCHRP), the UPS Foundation, and TRB.

*Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States*

National Academies Press, 2006

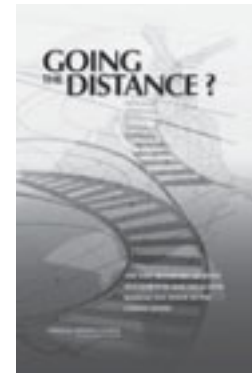
TRB assisted the National Research Council's Nuclear and Radiation Studies Board in conducting a comprehensive assessment of the risks of transporting high-level nuclear waste and spent nuclear fuel to the expected national repository at Yucca Mountain, Nevada.<sup>4</sup> The study committee could find no technical barriers to the safe transport of radioactive materials but noted that the social risks—such as lowered property values along chosen routes, reductions in tourism, and increased public anxiety about the program—could be barriers.

<sup>3</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr285.pdf>.

<sup>4</sup> <http://newton.nap.edu/books/0309100046/html/>.



Managing the risk of transporting spent nuclear fuel from nuclear utilities is the subject of a new report issued by the National Research Council with assistance from TRB.

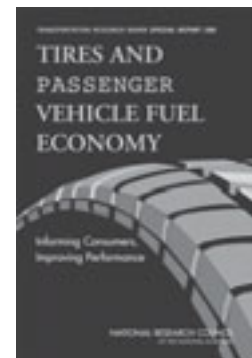


The committee strongly endorsed the Department of Energy (DOE) plan to rely mostly on transport via rail in specially designed trains. Although shipping the large volumes of spent fuel stored at nuclear utilities can be managed safely by rail with strict adherence to regulations, the committee noted several immediate challenges to address, including the program's organizational structure within DOE. The committee's report includes detailed recommendations for managing the risk of transporting spent nuclear fuels and high-level nuclear waste.

The committee chair was Neil F. Lane, University Professor at Rice University; Thomas B. Deen, former Executive Director of TRB, served as vice-chair. Funding was provided by DOE, the U.S. Department of Transportation (DOT), the Nuclear Regulatory Commission, the Electric Power Research Institute, the American Association of State Highway and Transportation Officials (AASHTO) through NCHRP, and the National Academy of Sciences.

*Tires and Passenger Vehicle Fuel Economy: Informing Consumers, Improving Performance*  
Special Report 286

With heightened interest in energy conservation nationwide, several proposals have addressed ways to improve vehicle fuel economy through new standards for tires. California, for example, has enacted legislation that may lead to a state fuel economy standard for tires. Industry has resisted the proposed standard for low rolling resistance and has expressed concerns about the possible trade-offs in safety and tire wear life. Some in California are concerned that a reduction in tire wear life could increase the state's large stockpile of scrap tires.



The U.S. Congress therefore requested the National Academies to examine the issues and trade-offs. The committee finds that tire rolling resistance can be reduced by 10 percent by reducing tread depth and making certain changes in the tread design.<sup>5</sup> Such a reduction in rolling resistance would improve vehicle fuel economy by 1 to 2 percent if tires are properly inflated.

The 10 percent reduction in the rolling resistance of replacement tires, however, could have negative consequences for safety and tire wear. The committee observes that tires already on the market achieve a rolling resistance 10 percent lower than the average, meet federal traction requirements, and have the wear characteristics preferred by consumers—but at a modest cost premium.

The committee recommends that Congress provide the National Highway Traffic Safety Administration (NHTSA) with the resources to work with industry to inform consumers about rolling resistance. The committee was chaired by Dale F. Stein, President Emeritus of the Michigan Technological Institute. NHTSA funded the study.

*Improving Road Safety in Developing Countries: Opportunities for U.S. Cooperation and Engagement—Workshop Summary*

Special Report 287

The growing public health crisis of traffic deaths and injuries in developing countries and the potential role of the United States in mitigating the problem was the subject of a workshop convened January 26–27, 2006, by the Institute of Medicine (IOM), the National Research Council's Policy and Global Affairs Division, and TRB.<sup>6</sup>

More than 1 million people died as a result of road traffic crashes in low- and middle-income nations in 2000, and the World Health Organization (WHO) has projected that the number will nearly double by 2020. Children and young people are particularly vulnerable—WHO calculates that in 2002 among 5-to-29-year-olds worldwide, road traffic injuries were the second leading cause of death; 96 percent of those killed lived in low- and middle-income countries.

The participants in this workshop, including representatives from federal agencies and experts

<sup>5</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr286.pdf>.

<sup>6</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr287.pdf>.



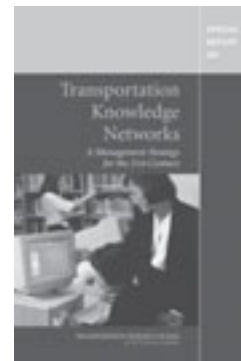
At a January workshop sponsored by the Institute of Medicine, TRB, and the NRC Policy and Global Affairs Division, John Flaherty, U.S. Department of Transportation, described the challenges of increasing the awareness of and attention to the road safety problems experienced by developing countries.

in traffic safety from several nations, discussed options for U.S. engagement in addressing this problem and reviewed suggestions for more effective collaboration among the U.S. agencies involved in traffic safety in developing nations.

The planning committee for the workshop was chaired by Mark Rosenberg, IOM, Executive Director of the Task Force for Child Survival and Development, Emory University. The Centers for Disease Control and Prevention and NHTSA provided the workshop funding.

*Transportation Knowledge Networks: A Management Strategy for the 21st Century*

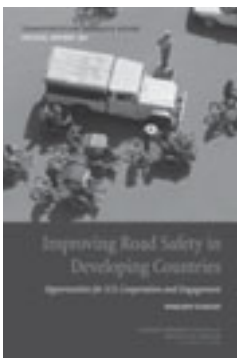
Special Report 284



Information technology has transformed the way that users access information and has expanded the volume of information available. This has created opportunities, such as desktop access to information—and problems, notably information

overload. The National Transportation Library was authorized in 1998 to help manage the expanding volume of transportation-related information but has struggled for resources and has not achieved the original vision.

Because the administration's reauthorization proposal did not continue funding for the National Transportation Library, AASHTO





Study committee member Ellen Oman, Washington State DOT, speaks at an Annual Meeting session that released Special Report 284, *Transportation Knowledge Networks*.

sponsored a study to identify a strategy for managing transportation information. The study committee recommends the creation of regional knowledge networks that would share resources and develop tools to provide information services linking information providers to users.<sup>7</sup>

The Research and Innovative Technology Administration (RITA) should take the lead in developing these networks and the National Transportation Library should take the lead in developing a federal transportation knowledge network, according to the committee. Recognizing the shortage of funds in the current authorization, the committee proposes a funding package for the next authorization. In the interim, through NCHRP, AASHTO is sponsoring a project to develop a specific funding plan.

The committee was led by Francis B. Francois, former Executive Director of AASHTO, and was funded through NCHRP.

<sup>7</sup> <http://onlinepubs.trb.org/onlinepubs/sr/sr284.pdf>.



Heavy icebreaker *Polar Sea*, viewed from *Polar Star*, sails toward McMurdo Station. TRB assisted the Polar Research Board in a study that examined agency management of the aging icebreakers.

*Polar Icebreakers in a Changing World:  
An Assessment of U.S. Needs*  
National Academies Press, 2005

TRB assisted the Polar Research Board in a study of the U.S. strategic interest in maintaining ice-breaking capability in polar regions, including the issue of replacing, repairing, or leasing vessels.<sup>8</sup> Requested by Congress, the report describes current and needed icebreaking services in the Arctic and the Antarctic.

The U.S. Coast Guard maintains three icebreakers—*Polar Star*, *Polar Sea*, and *Healy*, which is principally a research vessel that cannot break heavy ice. Both *Polar Star* and *Polar Sea* are more than 28 years old and near the end of their 30-year service lives. The heavy icebreakers are mostly used to break ice to resupply McMurdo Station for National Science Foundation (NSF)-funded research in the Antarctic region. Yet many of the Coast Guard's icebreaking missions are in the Arctic region of Alaska. This has led to disputes about which agency should fund and manage the icebreakers.

The Office of Management and Budget assigned the financial management of the icebreakers to NSF for Fiscal Year 2006. Having a science agency exercise control over Coast Guard missions that require icebreakers is an untenable arrangement, according to the study committee, which maintains that the Coast Guard should continue to operate the icebreakers for strategic reasons. The committee concludes that a minimum of two polar icebreakers will continue to be required and that extensive repairs are necessary, until new vessels are acquired, to keep the *Polar Sea* operable and the *Polar Star* available.

The study committee was chaired by Anita K. Jones, University of Virginia. The U.S. Coast Guard funded the study.

## Letter Reports

*Review of the U.S. DOT Research, Development,  
and Technology Strategic Plan*  
August 2006

In Section 5208 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Congress required

<sup>8</sup> <http://Newton.nap.edu/catalog/11525.htm>.



The Committee for Review of the U.S. DOT Research, Development, and Technology Strategic Plan gains background information from Martin Spitzer (in front of screen at left), professional staff member of the Committee on Science, U.S. House of Representatives.

U.S. DOT to (a) prepare a 5-year strategic plan that would integrate the research, development, and technology (RD&T) activities across the department and (b) have the plan reviewed by a committee of the National Research Council. A committee convened by TRB conducted the review, which began in June and was completed by August 2006.

The committee finds the draft to be a reasonable first effort, with notable strengths—such as encouraging collaboration across modal administrations.<sup>9</sup> The committee also notes important shortcomings, such as the failure to discuss legal and institutional constraints on strategic planning for research—particularly the Congressional earmarking of research funds for specific institutions.

The committee's letter also points out that a strategic research plan should articulate the value of RD&T, promote ways to overcome barriers to strategic planning, identify gaps in program coverage, and underline the processes that lead to effective research. The committee also notes activities that RITA could undertake—with commitments of resources and high-level support—to bolster research activities within U.S. DOT.

Joseph M. Sussman, Massachusetts Institute of Technology, chaired the committee. Funding was provided by RITA.

*Review of the FHWA Research Program*  
August 2006

Since 1991, the TRB Research and Technology Coordinating Committee (RTCC) has reviewed national highway research activities in general

<sup>9</sup> [http://onlinepubs.trb.org/onlinepubs/reports/letterreport\\_usdotrd&tplan.pdf](http://onlinepubs.trb.org/onlinepubs/reports/letterreport_usdotrd&tplan.pdf).

and the FHWA highway research program in particular. In an August 2006 letter report, the RTCC urges FHWA to hire a qualified program manager as soon as possible and begin soliciting proposals for advanced research projects.<sup>10</sup> Congress authorized \$14 million annually in SAFETEA-LU for advanced research, an area of longer-term, higher-risk research that the RTCC has long recommended. The committee is chaired by E. Dean Carlson, Kansas DOT (retired). FHWA funds the committee's work.

*Review of the Federal Transit Administration Research and Development Program*  
March and October 2006

The Transit Research Analysis Committee (TRAC) was established to advise the Federal Transit Administration (FTA) on the development of a strategic research plan, the federal role in transit research, and the research that the agency manages.

TRAC's second letter report, March 2006, comments on the first version of the agency's strategic research plan, which was made public in September 2005, and on FTA's research in ridership and electric drive technologies. The committee notes improvements in the plan from previous drafts and encourages FTA to share the plan with Congress and the transit community.<sup>11</sup>

The committee offers recommendations for developing research priorities that meet FTA's strategic objectives in ridership and electric drive research. The FTA research program budget is the most heavily earmarked within U.S. DOT, and the committee makes several suggestions to help the agency manage this problem.

The committee's third report provides several suggestions for FTA to develop a compelling research agenda derived from the goals and strategies in the strategic plan.<sup>12</sup>

The committee is chaired by Michael S. Townes, Hampton Roads Transit. Its work is funded by FTA.

<sup>10</sup> [http://onlinepubs.trb.org/onlinepubs/reports/RTCC%20AD\\_letterreport\\_advancedresearch.pdf#search=%22Review%20of%20the%20FHWA%20Research%20Program%22](http://onlinepubs.trb.org/onlinepubs/reports/RTCC%20AD_letterreport_advancedresearch.pdf#search=%22Review%20of%20the%20FHWA%20Research%20Program%22).

<sup>11</sup> [http://onlinepubs.trb.org/onlinepubs/reports/trac\\_march\\_2006.pdf](http://onlinepubs.trb.org/onlinepubs/reports/trac_march_2006.pdf).

<sup>12</sup> [http://onlinepubs.trb.org/onlinepubs/reports/trac\\_Sept\\_2006.pdf](http://onlinepubs.trb.org/onlinepubs/reports/trac_Sept_2006.pdf).

*Review of the Long-Term  
Pavement Performance Program*  
August 2006

The Long-Term Pavement Performance Program (LTPP) is the largest and most comprehensive pavement research experiment ever conducted. Conceived and started during the first Strategic Highway Research Program (SHRP), the LTPP has been managed by FHWA with support from the states since 1992. Funding for the program is expected to end in 2009, although data collection from some highway sections, which were added to the program in recent years, will not be completed. Along with other FHWA RD&T activities authorized in SAFETEA-LU, the program will be operating at substantially reduced funding levels.

In its most recent letter report, the committee recommends that the input of expert task groups continue at a somewhat reduced level in line with expected resources and that FHWA begin planning for post-SAFETEA-LU activities to complete the program.<sup>13</sup>

The committee is chaired by Victor M. Mendez, Arizona DOT. Funding is provided by FHWA.

### Ongoing Studies

In addition to projects providing ongoing reviews of the research programs of FHWA, the Federal Railroad Administration (FRA), and FTA, the Policy Studies group includes committees working on a variety of important—and sometimes controversial—topics. Several ongoing studies are described below.

#### *Climate Change and Transportation*

The TRB Executive Committee has initiated a study of the effects of climate change on the U.S. transportation infrastructure. The study committee commissioned papers that were presented and discussed at a major conference in October 2006. The final report is scheduled for release in late 2007. Funding is provided by U.S. DOT, the U.S. Army Corps of Engineers, AASHTO through NCHRP, the Transit Cooperative Research Program (TCRP), the Environmental Protection Agency, and TRB.



#### *The Role of Transit in Emergency Evacuations*

In SAFETEA-LU, Congress requested that TRB review the role of transit in emergency evacuations of the nation's 38 largest urbanized areas. The study was requested in response to the difficulties of evacuating Manhattan after the terrorist attacks of September 11, 2001, but the project also includes examination of the evacuation problems experienced by states along the Gulf of Mexico before and after Hurricanes Katrina and Rita in 2005. Funding is provided by FTA and TCRP.

Members of the Committee for Review of the Long-Term Pavement Performance Program share a light moment during introductions.

#### *St. Lawrence Seaway: Options to Eliminate Introduction of Nonindigenous Species in the Great Lakes, Phase II*

Options are being developed to allow continued growth in trade in the Great Lakes region while curtailing the introduction of nonindigenous species via ships entering the St. Lawrence Seaway. The project is funded by the Great Lakes Protection Fund.

#### *Funding Options for Freight Transportation Projects of National Significance*

The TRB Executive Committee has initiated a study to evaluate options for the public sector to share in funding freight projects of national significance. TRB and the UPS Foundation are the study sponsors.



An ongoing study considers the St. Lawrence Seaway: Options to Eliminate Introduction of Nonindigenous Species in the Great Lakes, Phase II.

<sup>13</sup> [www.TRB.org/news/blurb\\_detail.asp?id=6681](http://www.TRB.org/news/blurb_detail.asp?id=6681).

Leanna Depue, Missouri DOT; Nicholas Garber, University of Virginia; and Thomas Hicks, Maryland State Highway Administration, listen to discussion at a meeting of the Research Priorities and Coordination in Highway Infrastructure and Operations Safety Committee.



*Traffic Safety Lessons from Benchmark Nations*  
Another study initiated by the TRB Executive Committee is examining the experience of nations that have been most successful in reducing traffic fatalities and injuries. The study will determine how these nations built the political will to implement controversial behavioral interventions and which approaches may be transferable to the United States. Funding is provided by TRB.

*Current and Future Supply of Highway Safety Professionals*

A study funded by FHWA and the Federal Motor Carrier Safety Administration (FMCSA) is addressing issues related to the retirement of the first generation of highway safety professionals—particularly how to recruit, prepare, and train replacements.

*Determination of the State of Practice in Metropolitan Area Travel Forecasting*

FHWA, FTA, and TRB have funded a project to assemble a synthesis of travel demand forecasting and modeling practice by metropolitan planning organizations (MPOs) and states. A consultant has gathered extensive information about practices from a sample of MPOs and states. The committee's final report will be released in early 2007.

*Research Priorities and Coordination in Highway Infrastructure and Operations Safety*

A pilot project funded by NCHRP and FHWA is examining ways to set priorities and to coordinate research in highway infrastructure and operations safety across federal, state, and private-sector research programs.

*Options for Streamlining Intelligent Transportation Systems Standards*

As requested by Congress in SAFETEA-LU, a study is reviewing strategies to accelerate the

development of standards for intelligent transportation systems (ITS). The study committee will build on the efforts of previous TRB committees, which have provided reviews of the ITS standards program from 1999 to 2003. The study is funded by the U.S. DOT Joint Programs Office.

## INFORMATION SERVICES

### Transportation Research Information Services

The Transportation Research Information Services (TRIS) database is the world's largest online bibliographic database of transportation information. TRIS contains more than 640,000 records of published and ongoing research in all modes and disciplines of transportation. Approximately 24,000 new records were added in 2006.

Most of the database is available on the Internet as TRIS Online through the Bureau of Transportation Statistics' (BTS) National Transportation Library website.<sup>14</sup> TRB produces and maintains TRIS, and BTS makes the database accessible on the web without charge. TRIS

<sup>14</sup> [http://onlinepubs.trb.org/onlinepubs/sp/ltpj\\_letter\\_21.pdf](http://onlinepubs.trb.org/onlinepubs/sp/ltpj_letter_21.pdf).



TRB Manager of Information Services Barbara Post demonstrates navigation of the Research in Progress website at the TRB Annual Meeting.



Online links records to the full text of electronic documents or to information about ordering from suppliers. More than 24,000 TRIS records are linked to the full text, and an additional 100,000 records are linked for ordering from the publishers. In June 2006, TRIS Online implemented a new, enhanced, searchable interface and now offers both simple and advanced search capabilities.

TRIS is also available on the Internet for a fee through Dialog, Inc., and as part of the TRANSPORT database, a cooperative effort between TRB and the International Transport Research Documentation database of the Organization for Economic Cooperation and Development (OECD). TRANSPORT is produced and distributed by Ovid–SilverPlatter.

Last year, TRB implemented a new data entry system for TRIS that is web-based and offers more flexibility, including opportunities to expand and enhance the system. The first product from the new TRIS system was the enhanced TRB Publications Index, released in December 2005. The TRB Publications Index contains all TRB, Highway Research Board (HRB), SHRP, and Marine Board publications from 1923 to date, offers simple and advanced searching, and allows users to view or download results in a variety of formats. The index provides direct web links to available full-text documents and to ordering information.

### Research in Progress

The Research in Progress (RiP) website is a searchable database of more than 8,600 records of active or recently completed research projects.<sup>15</sup> Most of the RiP records are for projects funded by U.S. DOT and state DOTs but also include university transportation research.

State DOTs can add, modify, or delete records of research through a web-based data entry system. A current awareness service is available to notify users automatically about new project records in specified subject areas. RiP contains international project records from OECD's International Transport Research Documentation's Transportation Research in Progress Database.

RiP will serve as the clearinghouse for University Transportation Centers' research. Plans are to enhance the database to allow universities to

<sup>15</sup> rip.trb.gov.



Librarian Jessica Fomalont (right) assists a visiting researcher in the TRB library.

enter research projects directly into the system. The RiP web page receives more than 100,000 visits per month.

### TRB Library

The TRB Library is a small, specialized library that provides reference and information services to TRB sponsors, committee members, and staff. Many state DOTs regularly use the library services. The library subscribes to more than 350 serial titles and contains a complete collection of TRB, HRB, SHRP, and Marine Board publications.

The TRB Library is included in the Transportation Library Catalog through the National Transportation Library and the Online Computer Library Center's WorldCat.<sup>16</sup>

## SYNTHESIS OF INFORMATION REPORTS

Under the sponsorship of the Cooperative Research Programs administered by TRB, the Synthesis unit prepares reports on current practice and knowledge in a range of key highway and

<sup>16</sup> ntl.bts.gov/.



Members of one of the first Airport Cooperative Research Program Synthesis panels examine topics and approaches at an October meeting.



NCHRP Synthesis 361 covers the use of visualization for project development.

transit topics. In 2006, the unit added a similar Synthesis project to address the practices of airport operators. Practitioners and researchers make extensive use of these state-of-the-practice reports.

A highway committee, a transit committee, and an airport committee of the Cooperative Research Programs select the study topics each year. In 2006, 13 new highway, 6 new transit, and 5 new airport studies were selected. A consultant experienced in the topic area researches and writes each Synthesis report, with guidance from an expert panel.

A list of reports published in the past 12 months appears on pages 56–57. Approximately 3,500 copies of each report are published in hard

copy, and 3,000 of these are distributed to state DOTs, transit agencies, and TRB topic-area subscribers. The reports also are posted on the TRB website.<sup>17</sup> In the 12-month period from September 1, 2005, to August 31, 2006, visitors to the TRB website viewed NCHRP Synthesis reports 23,500 times and TCRP Synthesis reports 5,000 times.

TRB maintains an inventory of hard-copy Synthesis reports for sale.<sup>18</sup> Illustrative highway and transit titles published in 2006 are listed in the box on this page.

## INNOVATIONS DESERVING EXPLORATORY ANALYSIS PROGRAMS

Innovations Deserving Exploratory Analysis (IDEA) programs fund early-stage investiga-

<sup>17</sup> Highway syntheses: [www.TRB.org/news/blurb\\_browse.asp?id=5](http://www.TRB.org/news/blurb_browse.asp?id=5); transit syntheses: [www.TRB.org/news/blurb\\_browse.asp?id=6](http://www.TRB.org/news/blurb_browse.asp?id=6).

<sup>18</sup> To order Synthesis reports, contact the TRB Online Bookstore, [www.TRB.org/bookstore/](http://www.TRB.org/bookstore/) or call 202-334-3213.

### ILLUSTRATIVE SYNTHESIS REPORTS, 2006

#### Synthesis of Highway Practice

- 356 Pavement Markings: Design and Typical Layout Details
- 357 Use of Geophysics for Transportation Projects
- 359 Bridge Rating Practices and Policies for Overweight Vehicles
- 363 Control of Invasive Species

#### Synthesis of Transit Practice

- 64 Bus Use of Shoulders
- 65 Transit Agency Participation in Medicaid Transportation Programs



At the IDEA exhibit during the TRB Annual Meeting, Jean-Louis Briaud, Texas A&M University, shows Kieran J. Feighan, Pavement Management Systems of Dublin, Ireland, the ease of handling the Briaud Compaction Device—developed under NCHRP IDEA Project 118—to measure soil modulus at the surface of a compacted layer.

## IDEAS ARE BECOMING REALITIES

- **The product of an early IDEA project is now among the top 100 fastest-growing U.S. companies.** DriveCam placed 67th on the *Inc.* magazine list of 500 companies ranked by cumulative 3-year sales growth from 2001 to 2004. Sales in 2005 were expected to double. DriveCam operates in 10 countries, including the United States. An interview with the IDEA contractor appears in Issue 2 of *Ignition*.<sup>20</sup>
- **A museum exhibit on technical textiles included the product of an NCHRP IDEA project.** A section of the carbon fiber I-beam developed through NCHRP IDEA Project 67 was part of an exhibit at the Smithsonian's Cooper-Hewitt National Design Museum in New York, and the exhibit's catalog *Extreme Textiles* included a photograph of the innovation. The project is described in Issue 9 of *Ignition*.<sup>21</sup>
- **A Transit IDEA project is the model for a national program.** A transportation service that aims to improve safety and build social networks for seniors across communities is thriving in Maine and will be tested in four other states in 2007. The evolution from IDEA project into the Independent Transportation Network is described in Issue 11 of *Ignition*.<sup>22</sup>

<sup>20</sup> [http://onlinepubs.trb.org/onlinepubs/ignition/ignition\\_2.pdf](http://onlinepubs.trb.org/onlinepubs/ignition/ignition_2.pdf).

<sup>21</sup> [www.TRB.org/news/blurbs\\_detail.asp?id=5395](http://www.TRB.org/news/blurbs_detail.asp?id=5395).

<sup>22</sup> [http://onlinepubs.trb.org/onlinepubs/ignition/ignition\\_11.pdf](http://onlinepubs.trb.org/onlinepubs/ignition/ignition_11.pdf).



- **A Safety IDEA project is investigating a way to detect flaws in the axles of train cars while the train is moving.** Axle flaws are the fifth leading cause of train accidents, and the project would address the problem without having to remove trains from service. The project is described in Issue 9 of *Ignition*.<sup>23</sup>

<sup>23</sup> [http://onlinepubs.trb.org/onlinepubs/ignition/ignition\\_9.pdf](http://onlinepubs.trb.org/onlinepubs/ignition/ignition_9.pdf).

tions of potential breakthroughs in transportation technology. Small projects, initiated by researchers, investigate the feasibility of innovative concepts that could advance transportation practice. IDEA programs sponsor high-risk research that is independent of the immediate mission concerns of public agencies and of the short-term financial imperatives of the private sector.

The state DOTs collectively fund highway-related research through the NCHRP IDEA program. Research on innovations applicable to transit practice is carried out under the Transit IDEA program, funded by FTA through TCRP. FRA sponsors the Rail IDEA program to advance the safety and performance of the U.S. rail system and with FMCSA cosponsors the Safety IDEA program, which funds projects to improve the safety of truck, intercity bus, and rail operations. As of September 2006, the Safety IDEA program committee has selected 10 research projects for funding—one contract is being negotiated, three projects are completed, and six investigations are under way.

Each IDEA program follows a similar administrative model, adapted for sponsorship arrangements and target audiences. Each program operates through a committee or panel of volunteer transportation experts who solicit, review, and select proposals that merit research contracts.

Because IDEA projects are high-risk investigations of unproven concepts, funds awarded for any one project are usually less than \$100,000. Frequently, however, IDEA funds are augmented through cost-share arrangements,



The Transit IDEA program panel reviews a project to develop a chemical and biological decontamination system for subway stations, at a January 6 meeting in Washington, D.C.

nearly doubling the amount of research that can be supported through the IDEA programs. A 2005 survey of IDEA investigators revealed that of the 206 completed contracts, research and development work continued for nearly half of the projects, employing an additional \$20 million in follow-on funding from other sources. Twenty-nine projects yielded products that are currently available to the transportation community and another 51 proven concepts are in various stages of development.

An annual summary of completed and current projects is published for each of the IDEA programs and distributed at the TRB Annual Meeting. These summaries are also available on the IDEA page of the TRB website, along with the IDEA Program Announcement, which contains forms and guidelines for submitting proposals.<sup>19</sup> A quarterly publication, *Ignition*, features interviews with IDEA investigators and transportation leaders, plus articles that highlight promising projects. Issues of *Ignition* are archived on the IDEA website.

<sup>19</sup> www.TRB.org/idea.

## STAFF NEWS

- **Jon M. Williams** was named Associate Director, IDEA and Synthesis Studies, with duties comprising management of the IDEA and Synthesis programs.
- **Gail R. Staba** joined the Synthesis staff as a Senior Program Officer for the Airport Cooperative Research Program studies. She previously worked for HNTB, Oakland International Airport, and San Francisco International Airport.
- **Laura Toth** became the Senior Project Assistant for the Policy Studies group. She previously had worked as a Senior Project Assistant in the National Academies Division on Earth and Life Studies.

# COOPERATIVE RESEARCH PROGRAMS

TRB administers six contract research programs:

- The National Cooperative Highway Research Program (NCHRP), sponsored by the American Association of State Highway and Transportation Officials (AASHTO) in cooperation with the Federal Highway Administration (FHWA);
- The Transit Cooperative Research Program (TCRP), sponsored by the Federal Transit Administration (FTA);
- The Airport Cooperative Research Program (ACRP), sponsored by the Federal Aviation Administration (FAA);
- The National Cooperative Freight Research Program (NCFRP), sponsored by the Research and Innovative Technology Administration (RITA);
- The Hazardous Materials Cooperative Research Program (HMCPR), sponsored by the Pipeline and Hazardous Materials Safety Administration (PHMSA); and
- The Commercial Truck and Bus Safety Synthesis Program (CTBSSP), sponsored by the Federal Motor Carrier Safety Administration (FMCSA).



Victor Mendez (center), Arizona DOT, conducts a meeting of the AASHTO Standing Committee on Research in March, with Wesley Lum (left), Caltrans, and Robert Reilly, TRB.

## NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP is an applied research program that responds to the needs of state highway and transportation departments by solving pressing operational problems. Although NCHRP accounts for a small percentage of the nation's annual investment in highway research, its close association with AASHTO and its position within the National Academies have enabled the program to carry out important research resulting in practical products.

Since 1962, NCHRP has administered 1,477 research projects. More than 960 publications have appeared in the *NCHRP Report* and *NCHRP Synthesis of Highway Practice* series, in addition to 310 volumes of *Research Results Digest* and 48 of *Legal Research Digest*, as well as 137 other documents published electronically.

NCHRP projects for federal fiscal year (FY) 2006 were placed under contract as funds became available. Proposal solicitations for 37 research projects in federal FY 2007 (October 1, 2006, through September 30, 2007) were released starting in August 2006; depending on the availability of funding authorized in federal legislation, contracts should be executed in the first three months of 2007.

Under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the Federal-Aid Highway State Planning and Research Funds have been decreasing slightly, and NCHRP funding will be affected proportionally. Funding available for NCHRP in FY 2005 totaled approximately \$33 million, and approximately \$32.7 million was available for FY 2006; an estimated \$33 million is expected for FY 2007.

AASHTO considered 167 problem statements submitted by states and by AASHTO committees



**Victor M. Mendez**  
Chair  
AASHTO Standing Committee on Research



**David Lee**  
Chair  
TCRP Oversight and Project Selection Committee



**James Wilding**  
Chair  
ACRP Oversight Committee



**Robert J. Reilly**  
Director  
Cooperative Research Programs

for the FY 2007 program. The quantity and quality of the requests ensure optimal use of the authorized funds. In September, AASHTO began to formulate the FY 2008 program and will determine the program content in March 2007.

NCHRP reports published during the past 12 months are listed on pages 56–57. A total of 242 projects were under contract as of September 1, 2006, with 80 additional projects under development or awaiting contract.

Each NCHRP study follows an approved research plan under the guidance of a panel of technical specialists and experienced practitioners. The panel defines the scope of work, selects the contractor under a competitive proposal process, and monitors the research from beginning to end. The panel's participation ensures the credibility of the research findings, facilitating adoption by AASHTO, state departments of transportation (DOTs), and other organizations.

NCHRP panels convened for more than 105 project meetings in 2006; panel members contributed more than 2,000 days of volunteer time to attend meetings, plus a comparable amount of time to review materials. NCHRP benefits from more than 2,013 volunteers who expend time and energy primarily for the challenges and the satisfaction of making significant contributions to the field.

Many NCHRP research projects have had a direct impact on practice through products such as specifications, manuals, and guidelines. NCHRP emphasizes working with the practitioners who will use the research results. The program's close relationship with AASHTO committees is important in carrying out this goal—approximately 44 percent of the research funds for fiscal year 2007 is allocated for 25 projects requested by 20 AASHTO committees.

Experience has shown that AASHTO committees are more likely to use NCHRP research results when (a) the committee identifies and requests the research, (b) committee members serve on the NCHRP project panel guiding the research, and (c) findings and recommendations are presented to the committee at the conclusion of the study. NCHRP projects frequently incorporate these three steps.

Many NCHRP projects are developing recommended revisions to AASHTO publications at the request of committees. When AASHTO adopts an NCHRP project's recommendations as



Dennis Judycki (right), FHWA, speaks at a meeting of the Research Advisory Committee of the AASHTO Standing Committee on Research. Graham Hill (left), U.S. House of Representatives staff, also provided insights from the federal perspective.

a guide or specification, practitioners who may not be able to stay abreast of research results benefit from having the best information available through the AASHTO documents.

Details on the program from 1962 through 1988 can be found in *NCHRP Summary of Progress Through 1988*. Details on work since 1988 are available in *NCHRP Summary of Progress, December 31, 2006* and on the web.<sup>1</sup>

NCHRP studies of particular importance to AASHTO that were completed during the past year are summarized in the following sections. All reports are available on the web.<sup>2</sup>

### Asset Management and Performance Measures

Asset management, which evaluates options by making an economic assessment of trade-offs, remains a topic of high importance to the sponsors of NCHRP. The objective is to optimize the effects of investments on an organization's goals. NCHRP has conducted several projects in the past few years; recent activity includes the following:

- NCHRP Report 551, *Performance Measures and Targets for Transportation Asset Management*, introduces a framework for identifying performance measures and setting target values. The report presents examples and is designed to help transportation agencies apply performance measures in asset management.
- Supported in part by NCHRP Project 20-36, an AASHTO-NCHRP-FHWA international scan on transportation asset management was

<sup>1</sup> [www.TRB.org/nchrp](http://www.TRB.org/nchrp).

<sup>2</sup> [www.TRB.org/news/blur\\_browse.asp?id=2](http://www.TRB.org/news/blur_browse.asp?id=2).

completed last year. FHWA has published the results. A follow-on domestic scan—one of two pilot tests of the domestic scan concept—was completed in September under NCHRP Project 20-68. Both the international scan and the domestic scan were judged outstanding successes.

- NCHRP Project 20-74, Developing an Asset Management Plan for the Interstate Highway System, was initiated in September—a project appropriate for the 50th anniversary of the Federal-Aid Highway Act of 1956, which created the Interstate system.

### Infrastructure Security

NCHRP has allocated more than \$5 million for security research to date, as a priority endeavor. The NCHRP Report 525 series, *Surface Transportation Security*, publishes the research results. Three new volumes were added this year:

- Volume 9, *Guidelines for Transportation Emergency Training Exercises* (a joint report with TCRP);
- Volume 10, *A Guide to Transportation's Role in Public Health Disasters*; and
- Volume 11, *Disruption Impact Estimating Tool—Transportation (DIETT): A Tool for Prioritizing High-Value Transportation Choke Points*.

### Highway Safety and Operations

Safety and operations are major concerns throughout the transportation industry, and NCHRP devotes significant resources to the subject. NCHRP Report 500, *Guidance for Implementation of the AASHTO Strategic Highway Safety Plan*, will comprise 23 guides, each addressing a specific aspect of the plan. To date, 17 guides have been published, and research is under way on the remaining 6 topics.

Several other research projects were completed, with results published this year:

- NCHRP Report 553, *Crashworthy Work-Zone Traffic Control Devices*, examines nonproprietary work-zone traffic control devices that are crashworthy but constructed of readily available material.
- NCHRP Report 554, *Aesthetic Concrete Barrier and Bridge Rail Design*, provides guidance on the aesthetic treatment of concrete safety shape barriers.



An NCHRP panel considers developments in Project 20-59(17), *Guide to Risk Management of Multimodal Transportation Infrastructure*, which will provide state DOTs and other transportation entities with a risk management methodology for conducting threat, vulnerability, and critical assessments of their facilities and for determining cost-effective countermeasures.

- NCHRP Report 559, *Communicating Changes in Horizontal Alignment*, explores three recommended modifications to the *Manual on Uniform Traffic Control Devices (MUTCD)* to communicate changes in horizontal alignment for two-lane, two-way rural roads.
- NCHRP Report 560, *Guide to Contracting ITS Projects*, provides guidance on contracting for intelligent transportation systems (ITS), such as variable message signs, traffic detectors, signal controllers, and other hardware and software that involve applications of advanced electronics and information management to regulate and facilitate traffic flow.
- NCHRP Report 562, *Improving Pedestrian Safety at Unsignalized Crossings*, contains guidance and engineering treatments to improve pedestrian safety on high-volume, high-speed roads. Jointly funded with TCRP, the project received an Achievement Award from the Institute of Transportation Engineers.
- NCHRP Research Results Digest 296, *Comprehensive Human Factors Guidelines for Road Systems*, summarizes NCHRP Web-Only

Three NCHRP and TCRP volumes were added to the Surface Transportation Security series.





NCHRP Report 550—TCRP Report 110, *Commuting in America III*, gained national media coverage on its release in October.

Document 70 and includes an outline of the human factors guidelines and a detailed work plan for developing the first edition. The guidelines will facilitate safe roadway design and operational decisions.

- NCHRP Research Results Digest 297, *New Facility for Calibrating Retroreflectometers*, presents the results of NCHRP Project 05-16, National Calibration Facility for Retroreflective Traffic Control Materials, which developed the instrumentation for national calibration standards for retroreflectivity, improving the accuracy of measurements made by other instruments.
- NCHRP Research Results Digest 298, *Use of Event Data Recorder (EDR) Technology for Highway Crash Data Analysis*, reviews the benefits and costs of using EDR data in highway crash data analysis and research.
- NCHRP Research Results Digest 302, *Core Competencies for Highway Safety Professionals*, examines how safety curricula have incorporated the core competencies for highway safety professionals and suggests strategies to reach a wider audience.
- NCHRP Report 541, *Consideration of Environmental Factors in Transportation System Planning*, reviews processes, procedures, and methods for integrating environmental factors in transportation systems planning and decision making at the state, regional, and metropolitan levels.
- NCHRP Report 542, *Evaluating Cultural Resource Significance: Implementation Tools*, reviews information technology (IT) tools to improve and streamline the National Register evaluation of cultural resources.
- NCHRP Report 546, *Incorporating Safety into Long-Range Transportation Planning*, examines where and how safety can be effectively addressed and integrated into long-range transportation planning at the state and metropolitan levels.
- NCHRP Report 548, *A Guidebook for Including Access Management in Transportation Planning*, offers guidance for implementing access management through the transportation planning process.
- NCHRP Report 550, *Commuting in America III*—published jointly as TCRP Report 110—presents a snapshot of commuting patterns and trends, principally derived from an analysis of the 2000 decennial U.S. census. The report is a valuable resource for public policy, planning, research, and education.
- NCHRP Report 552, *Guidelines for Analysis of Investments in Bicycle Facilities*, includes methods and tools to estimate the cost and to evaluate the value and benefits of a variety of bicycle facilities.
- NCHRP Research Results Digest 304, *Technologies to Improve Consideration of Environmental Concerns in Transportation Decisions*, describes eight technologies that transportation agencies can use when considering environmental concerns in transportation decisions.

### Transportation and Environmental Planning

AASHTO's Standing Committee on Planning and Standing Committee on the Environment maintain direct involvement in NCHRP through Projects 8-36 and 25-25, respectively, which are specifically designed to support the committees' work. Part of the NCHRP budget is set aside for each committee and then suballocated for studies. As studies are completed, the committees post the reports on their websites.

NCHRP also conducts specific research projects on planning and the environment. Recently completed projects were published as follows:

- NCHRP Report 535, *Predicting Air Quality Effects of Traffic-Flow Improvements: Final Report and User's Guide*, recommends a method to predict the long- and short-term mobile source emission impacts of traffic-flow improvement projects.
- NCHRP Report 536, *A Practitioner's Handbook—From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making*, a joint report with TCRP, contains examples of collaboration in multimodal decision making.

### Design, Construction, and Maintenance

Along with operations, the design, construction, and maintenance—including the rehabilitation—of highway facilities remain the mainstay activities of DOTs. Research activities addressing these areas vary. Examples of recently completed projects are as follows:

- NCHRP Report 540, *Early-Opening-to-Traffic Portland Cement Concrete for Pavement Reha-*



bilitation, examines the proportioning, testing, construction, and other aspects of early-opening-to-traffic concrete.

- NCHRP Report 556, *Design and Construction Guidelines for Geosynthetic-Reinforced Soil Bridge Abutments with a Flexible Facing*, presents a rational design method and construction guidelines for using geosynthetic-reinforced soil systems in bridge abutments.

### Bridges and Structures

The close working relationship between the AASHTO Highway Subcommittee on Bridges and Structures and NCHRP continues, with many projects of interest to the subcommittee under way. Recently completed and published projects include the following:

- NCHRP Report 563, *Development of LRFD Specifications for Horizontally Curved Steel Girder Bridges*, which explores the application of recommended design specifications; and
- NCHRP Report 564, *Field Inspection of In-Service FRP Bridge Decks*, which provides guidance for the in-service inspection of fiber-reinforced polymer bridge decks.

### Pavements

NCHRP Project 1-40, Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software, released Versions 0.8 and 0.9 of the software for public evaluation. Version 0.8, released in November 2005, corrected the majority of the logic and coding errors. Version 0.9, released in July 2006, included a major technical update of the software, with extensive improvements to the integrated climatic model and the climatic database, as well as a recalibration of all the flexible and rigid pavement performance models. The final NCHRP Version 1.0 is scheduled for release in early 2007.

### Hydrology and Hydraulics

The successful design and performance of transportation facilities requires understanding and accommodating the effects of moving water, which can range from inconvenient to catastrophic. NCHRP has devoted a significant amount of research to issues of hydrology and hydraulics and has completed a project this year, published as NCHRP Report 544, *Environmentally Sensitive Channel- and Bank-Protection*

*Measures*, which examines a variety of approaches and recommends design guidelines.

### State Transit Issues

The AASHTO Standing Committee on Public Transportation is directly involved in NCHRP through Project 20-65, which supports the committee's work. Recent studies published include the following:

- NCHRP Research Results Digest 294, *Transit-Oriented Development: Developing a Strategy to Measure Success*, identifies and evaluates indicators of the impacts of transit-oriented development, presents the results of a survey about the indicators, and identifies 10 indicators that may be useful in systematically monitoring and measuring the impacts of transit-oriented development.
- NCHRP Research Results Digest 295, *Availability and Accessibility of Liability and Excess Insurance for Public Transit and Private Coach Operators*, examines alternatives to conventional liability insurance coverage for public transit agencies and private motorcoach operators in response to the insurance crisis of the early 2000s.
- NCHRP Web-Only Document 86, *Estimating the Impacts of the Aging Population on Transit Ridership*, describes a spreadsheet tool for estimating the future effects, including the cost impacts, of the aging population on public transportation use, to help the industry in planning.
- The revised final report, *Toolbox for Promoting the Transit Bus Safety and Security Program in Your State: A Training Curriculum for Implementation*, is posted on the *Transit Bus Safety Resource Guide* website of the University of South Florida's Center for Urban Transportation Research, where it can be updated regularly.

### Continuing Projects

NCHRP supports several continuing projects with studies both completed and under way:

- Project 20-5, Synthesis of Information Related to Highway Problems, produces state-of-the-practice reports (see Studies and Special Programs Division section, page 31).
- Project 20-6, Legal Problems Arising out of Highway Programs, conducts reviews of case

law and publishes the results in the NCHRP Legal Research Digest series.

- Project 20-30, NCHRP IDEA (Innovations Deserving Exploratory Analysis), funds projects to demonstrate innovative concepts or products (see Studies and Special Programs Division section, page 32).
- Project 20-36, Highway Research and Technology—International Information Sharing, provides financial support for state DOT representatives to participate in foreign meetings and to host foreign experts in the United States. The project also shares expenses with FHWA for foreign scanning tours.
- Project 20-68, U.S. Domestic Scan Program, is a pilot effort to demonstrate and fine-tune the initiation of a full and continuing program. Two pilot scans were completed, on project delivery and on asset management, and a continuing program will start up.

## TRANSIT COOPERATIVE RESEARCH PROGRAM

Authorized by the Intermodal Surface Transportation Efficiency Act (ISTEA) and initiated under TRB management in July 1992, TCRP is supported by annual grants from FTA. The TCRP Oversight and Project Selection (TOPS) Committee chooses research for the program; the committee also serves as the board of directors of the Transit Development Corporation (TDC), a nonprofit educational and research affiliate of the American Public Transportation Association (APTA). A three-way memorandum of agreement by FTA, TDC, and TRB outlines the program's operating procedures. In its first 14 years, TCRP has undertaken 468 studies; of

these, 392 have been completed and 76 are in progress.

TCRP receives submissions of research problem statements throughout the year and has considered approximately 2,100 since 1992. The first 156 research projects advertised by TCRP attracted a total of 1,103 proposals from 517 different proposers—an average of 7.7 proposals per project. In early 2006, TCRP issued a call for FY 2007 problem statements to more than 4,000 individuals and organizations in the transit community, emphasizing research consistent with FTA's Strategic Research Goals and the TCRP Strategic Plan. TCRP received and processed 87 problem statements for FY 2007.

TRB submits quarterly progress reports on TCRP to FTA, describing the work accomplished during the quarter and anticipated for the next period. Details of the program's progress since 1992 can be found in the December 2006 TCRP Annual Report.

TCRP panels have the same responsibilities as NCHRP panels for developing requests for proposals, selecting contractors, and monitoring the research. TCRP panels held 54 meetings during 2006, involving approximately 500 professionals and representing more than 700 days of volunteer time. Among these were 26 panel meetings to prepare research problem statements and to select research agencies; 21 interim project meetings to review project status at midcourse; and 7 meetings on special projects. The TOPS Committee also met twice in the year.

TCRP published 31 project reports in 2006, bringing the total to 415 publications: 148 Reports, 69 Syntheses of Transit Practice, 80 Research Results Digests, 22 Legal Research Digests, 40 IDEA reports, 34 web documents, and 22 CD-ROMS.

### Research Dissemination

Dissemination of TCRP research results is a concerted activity. APTA administers TCRP Project J-1, Dissemination and Implementation of TCRP Research Findings, to distribute TCRP research materials to targeted audiences. This outreach includes various forms of promotion, such as the Internet. APTA also disseminates TCRP information through *Passenger Transport*, the industry's weekly newspaper, as well as through announcements, press releases, and news reports.

The TCRP Oversight and Project Selection Committee evaluates candidate projects for 2007 at a meeting in October.





The TCRP Screening Panel met in August to review project proposals for the coming year.

APTA solicits research problem statements; conducts surveys; arranges for workshops, field visits, and training; and oversees other activities to ensure that public transportation industry practitioners receive and implement TCRP research results. The Conference of Minority Transportation Officials also distributes TCRP materials through the TCRP Ambassador Program, which maintains a roster of transit professionals who promote TCRP project findings to practitioners.

The J-1 Program has developed a TCRP dissemination website maintained by APTA; has distributed publications catalogs on general and rural topics; has coordinated industry mailings and surveys to ascertain the levels of use and awareness of the program's products; and has produced informational CDs. TCRP reports are available online through APTA's TCRP dissemination website<sup>3</sup> and through TRB's online documents web page.<sup>4</sup>

The following TCRP activities of particular interest were in progress or were completed during the year.

### Public Transportation Security

Public transportation security continues to be a major focus for TCRP. The TOPS Committee has allocated \$2.75 million to security-related research since September 11, 2001.

TCRP Report 86 comprises a series of volumes on transit security-related research, covering a variety of topics. Four volumes were added in 2006, bringing the number of titles to 12:

- Volume 9, *Guidelines for Transportation Emergency Training Exercises*, jointly funded with NCHRP;

- Volume 10, *Hazard and Security Plan Workshop: Instructor Guide*, which is in use in a National Transit Institute course;
- Volume 11, *Security Measures for Ferry Systems*; and
- Volume 12, *Making Transportation Tunnels Safe and Secure*, jointly funded with NCHRP.

A volume expected in 2007 will provide guidance for public transportation agencies considering the introduction of a passenger security inspection program. Another upcoming volume will assemble resources on transportation security and emergency management.

Two security-related Transit IDEA projects were completed in 2006 on the detection of radioactivity and on chemical and biological decontamination. Three other Transit IDEA projects are under way on industrial chemical detection, biometric notification networks for transit employees, and bioterrorism detection technology. Transit agencies are involved in testing the experimental technologies of these IDEA projects.

### Transit Vehicles and Maintenance

Work continued on TCRP Project C-14, Technical Support for Development of Transit Bus Standards. The project has established a transit industry-driven process for producing bus standards and has recommended practices in various technical areas. Administered by APTA, the process is guided by the APTA Bus Standards Policy and Planning Committee.

In 2006, the development of standards and recommended practices continued for bus brakes; engine cooling systems; heating, ventilation, and air conditioning; transit operator and supervisor training; transit vehicle data recorders; technical specifications for hybrid-electric transit buses; bus fire prevention, including equipment specifications; bus rapid transit vehicles; bus maintenance training; and bus interior noise. In 2007, the \$1.275 million in TCRP funding for this effort will be expended, and the standards-development process will continue as an APTA-supported program.

TCRP Project E-6, Transit Bus Mechanics: Building for Success—The ASE Transit Bus Maintenance Certification Test Series, continues to develop Institute for Automotive Service Excellence (ASE) tests to certify transit bus mechanics. The tests will be similar to those for the automotive, medium- and heavy-duty truck,

<sup>3</sup> <http://www.tcrponline.org/index.cgi>.

<sup>4</sup> [www.TRB.org/trb/publications/publications.asp](http://www.TRB.org/trb/publications/publications.asp).



*Commuting in America III* was one of several joint NCHRP and TCRP projects in 2006.

and school bus industries. The project panel has identified 11 subject areas for testing.

In 2006, ASE administered the first two transit bus tests—electrical–electronics and brakes. ASE is offering the tests nationwide in the spring and fall of each year as part of the normal ASE test schedule. A total of 667 mechanics and technicians took the transit bus brakes test and 571 took the electrical–electronics test in May, with 399 and 346, respectively, gaining certification.

Work also started on the development of the next three tests—diesel engine; advanced diesel engine diagnostics; and heating, ventilation, and air conditioning. Working groups of subject matter experts were formed, and the test-development process is well under way. The tests should become part of the ASE transit bus series in spring 2007.

The plan is to add 2 to 3 tests each year until all 11 are available. The test development involves coordination with organized labor to ensure the availability of relevant training. In combination with the ASE tests, the training will serve as a major means for developing the bus maintenance workforce.

TCRP Report 114, *Center Truck Performance on Low-Floor Light Rail Vehicles*, describes performance issues—such as excessive wheel wear and noise and occasional minor derailments—in the operation of the center trucks of low-floor light rail vehicles, notably the 70 percent low-floor models. The report provides guidance on minimizing or avoiding these problems, as well

as on the specifications, maintenance, and design of low-floor light rail vehicles and on related infrastructure design and maintenance, to maximize performance.

TCRP Research Results Digest 74, *Train Door Systems Analysis*, describes the development of an online database of results from a survey of train door system issues.<sup>5</sup> The digest also provides preliminary analyses of the survey data. Supporting data are available as TCRP Web-Only Document 28, *Train Door Systems Analysis—Appendices for RRD 74*.

### Track-Related Research

Two track-related publications were issued—TCRP Research Results Digest 76, *Acoustic Rail-Break Detection Demonstration at MTA–New York City Transit*, and TCRP Research Results Digest 79, *Design of Track Transitions*. Digest 76 presents the results from a demonstration of an acoustic-based rail-break detection system in a transit application. The prototype was installed for 11 months on a 2,200-foot section of track on the A subway line in New York City. Although no rail breaks occurred during the demonstration, lessons were learned about the deployment of the technology.

Digest 79 reviews and analyzes track transition designs between ballasted and nonballasted track forms and structures and offers guidance for improving track and operating performance. The research is based on similar work conducted for freight railroads, with modifications for the transit operating environment.

### Planning

TCRP Report 113, *Using Archived AVL-APC Data to Improve Transit Performance and Management*, provides guidance for the collection and use of archived data from automatic vehicle locators (AVL) and automatic passenger counts (APC) to improve the performance and management of transit systems. The guide covers five activities: (a) analyses using AVL-APC data to improve management and performance; (b) design of a system to capture data with the accuracy and detail needed for off-line analysis; (c) data structures and software to facilitate the analysis of AVL-APC data; (d) screening, parsing, and bal-

<sup>5</sup> APTA's Rolling Stock Equipment Technical Forum maintains the database at [www.traindoors.com](http://www.traindoors.com).

ancing automatic passenger counts; and (e) using APC systems to estimate passenger-miles for the National Transit Database. In addition, the project created tools for analyzing running times and for designing scheduled running times using archived AVL and APC data.

TCRP Report 116, *Guidebook for Evaluating, Selecting, and Implementing Suburban Transit Services*, provides guidelines—derived from detailed case studies—to aid transit systems or local governments in selecting services appropriate to suburban transit needs.

TCRP Synthesis 66, *Fixed-Route Transit Ridership Forecasting and Service Planning Methods*, summarizes the use of easy-to-apply models for forecasting short-term, fixed-route, bus system, and route-level ridership. A survey of urban and rural transit agencies yields methods used for analyzing service changes and for developing new routes. The emphasis is on methods that are repeatable, timely, and transferable.

TCRP Synthesis 67, *Bus Transit Service in Land Development Planning*, summarizes practice in transit service planning for new development and identifies practices that ensure the proper consideration of transit service needs in the planning and design process. The synthesis addresses (a) planning transit service for new developments; (b) guidelines or processes used by transit agencies and others to ensure the incorporation of transit service considerations into planning for new development; (c) related physical design issues such as transit-friendly street design; easy, safe, and pleasant pedestrian access to bus stops; the urban densities necessary to sustain minimal, 30-minute service; (d) funding strategies; and (e) the statutory and regulatory authority of a transit agency.

### Capital Project Management

TCRP Research Results Digest 78, *Managing Capital Costs of Major Federally Funded Public Transportation Projects*, contains recommendations for strategies, tools, and techniques to improve the management of major transit capital projects of more than \$100 million. Successful approaches to estimation, project management, and cost containment are described in 14 case studies, indicating the tools and techniques that contribute most effectively. The contractor's final report provides background information and is available as TCRP Web-Only Document 31, *Managing Capital Costs*

*of Major Federally Funded Public Transportation Projects: Final Report.*

### Smart Card Interoperability

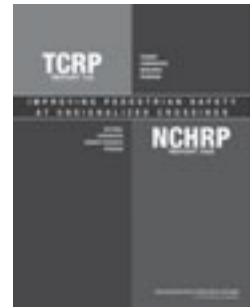
TCRP Report 115, *Smart Card Interoperability Issues for the Transit Industry*, identifies key information that public agencies need for implementing interoperable smart card payment systems; provides a set of functions for a standard public domain application programming interface (API) for a uniform application protocol data unit (APDU); and develops a prototype for a public domain API and an APDU that complies with the International Organization for Standardization criteria.

### Operations and Safety

TCRP Report 112, *Improving Pedestrian Safety at Unsignalized Crossings*, identifies engineering treatments to improve safety for pedestrians crossing high-volume, high-speed roadways at unsignalized intersections, particularly on roads served by public transportation. Modifications are recommended to the pedestrian traffic signal warrant in the MUTCD.

Cofunded by NCHRP, the report offers guidelines for selecting pedestrian crossing treatments for unsignalized intersections and midblock locations. Quantitative procedures use key input variables—such as pedestrian volume, street crossing width, and traffic volume—to recommend one of four possible categories of crossing treatments. TCRP and NCHRP received the Transportation Achievement Award for Pedestrians from the Institute of Transportation Engineers for this project.

TCRP Synthesis 64, *Bus Use of Shoulders*, documents and summarizes transit agency experi-



The joint TCRP–NCHRP Project that produced TCRP Report 112–NCHRP Report 562, *Improving Pedestrian Safety at Unsignalized Intersections*, received an achievement award from the Institute of Transportation Engineers. (Below:) Unsignalized intersection in Madison, Wisconsin, which was included in the research.



ACRP panels quickly went to work to guide the first projects.



ences with policies and regulations that permit buses to use the shoulders on arterial roads or freeways to bypass congestion, as either interim or long-term arrangements. The report explores both the highway and the transit perspectives, identifying information and experience from jurisdictions that allow buses to travel on shoulders and from jurisdictions that have considered, but have not implemented, these treatments and the reasons why. The recently initiated TCRP Project D-13, *A Guide for Implementing Bus-on-Shoulder Systems*, will explore this topic further and will provide guidance on implementation.

### Specialized Transportation

TCRP Research Results Digest 75, *Executive Summary: Cost-Benefit Analysis of Providing Non-emergency Medical Transportation*, contains information on the relative costs and benefits of providing transportation to nonemergency medical care for individuals who may miss or delay healthcare appointments because of transportation issues. The final report is available as TCRP Web-Only Document 29.

TCRP Synthesis 65, *Transit Agency Participation in Medicaid Transportation Programs*, documents and summarizes the tasks necessary for the success of a public transit–nonemergency medical transportation partnership. The real and perceived barriers are described, along with case studies of transit agency participation in the Medicaid transportation program.

### Transit Lessons from Abroad

Since 1994, TCRP Project J-3, International Transit Studies Program, has sponsored 25 leadership development missions. More than 325 transit professionals have participated in missions to Europe, Asia, Canada, South America, New Zealand, and Australia in the past 12 years. The

purpose of the program is to expand the horizons of U.S. transit managers. The findings and observations of the participants are published in the TCRP Research Results Digest Series.<sup>6</sup>

## AIRPORT COOPERATIVE RESEARCH PROGRAM

ACRP was authorized in the Vision 100: Century of Aviation Reauthorization Act, and a memorandum of agreement was signed in October 2005 to initiate the program. FAA sponsors ACRP, TRB manages the program, and representatives of airport operating agencies provide oversight and governance.

ACRP carries out applied research on problems shared by airport operating agencies but not adequately addressed by federal research programs. A 2003 study sponsored by FAA and published as TRB Special Report 272, *Airport Research Needs: Cooperative Solutions*, identified the need for ACRP. The program undertakes research and other technical activities in a variety of airport subject areas, including design, construction, maintenance, operations, safety, security, policy, planning, human resources, and administration.

The Vision 100 Act authorized \$10 million per year for ACRP through fiscal year 2007. To date, federal appropriations have included \$3 million in fiscal year 2005, and \$10 million in fiscal years 2006 and 2007.

The ACRP Oversight Committee (AOC), appointed by the U.S. Secretary of Transportation, met twice in 2006 to establish operating procedures and to select research projects for the program. The AOC selected 37 projects totaling \$14.5 million in a variety of subject areas of inter-

<sup>6</sup> TCRP Research Results Digests 20, 22, 27, 31, 33, 36, 42, 47, 49, 53, 54, 58, 62, 64, 66, 68, 70, 71, and 77.

est to the airport community. The AOC will meet again in early 2007 to select additional projects.

Panels were formed for the selected projects, and requests for proposals were developed and issued as research project statements. Research contractors have been selected for the first round of projects, and the remaining contractors will be selected in early 2007. More than 40 project panel meetings were held to develop scopes of work and to select research contractors.

## NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM

NCFRP was authorized in SAFETEA-LU. The program sponsor is RITA, and governance is provided by an oversight committee including a representative cross-section of freight stakeholders. Work on NCFRP began in September, when a funding agreement was completed between RITA and the National Academies.

NCFRP will carry out applied research on freight industry problems that are not adequately addressed by existing programs. In authorizing NCFRP, SAFETEA-LU called for the development of a national research agenda addressing freight transportation and the implementation of a multiyear strategic plan to achieve the agenda. The act also states that the agenda should include research in the following areas:

1. Techniques for estimating and quantifying the public benefits derived from freight transportation projects,
2. Alternative approaches to calculating the contribution of truck and rail traffic to congestion on specific highway segments,
3. The feasibility of consolidating origins and destinations for freight movement,
4. Methods for incorporating estimates of international trade into landside transportation planning,
5. The use of technology applications to increase the capacity of highway lanes dedicated to truck-only traffic,
6. The development of physical and policy alternatives for separating car and truck traffic,
7. Ways to synchronize infrastructure improvements with freight transportation demand,
8. The effects of changing patterns of freight movement on transportation planning decisions about rest areas, and

9. Other related areas that may identify and address emerging and future research needs related to freight transportation via all modes.

NCFRP will cover a range of issues to improve the efficiency, reliability, safety, and security of the nation's freight transportation system. The NCFRP Oversight Committee, appointed by the National Research Council, is composed of public- and private-sector freight stakeholders—including individuals employed by shippers, carriers, U.S. DOT and other federal agencies, state transportation departments, local governments, nonprofit entities, and academia. The Oversight Committee will formulate the research program by prioritizing projects and defining levels of funding and the expected products. Research problem statements, recommending research needs, will be solicited periodically but may be submitted to TRB at any time.

SAFETEA-LU authorized \$3.75 million per year for NCFRP in FY 2006 through FY 2009. The annual federal appropriations process determines NCFRP funding. The total available in FY 2006 is approximately \$2.65 million.

A memorandum of agreement was completed by the cooperating parties in April. The Oversight Committee held its first meeting late this year to establish operating procedures and to prioritize NCFRP research topics.

## HAZARDOUS MATERIALS COOPERATIVE RESEARCH PROGRAM

SAFETEA-LU authorized a pilot cooperative research program focused on hazardous materials transportation. HMCRRP is sponsored by PHMSA, and a contract to begin work on the pilot went into effect in September.

HMCRRP will complement other U.S. DOT research programs as a stakeholder-driven,



U.S. Representative Elijah E. Cummings (D.-Md.) discusses the provisions he drafted for a Hazardous Materials Cooperative Research Program under SAFETEA-LU at a session of the TRB Annual Meeting in January 2006.

Hazardous materials transportation research under HMCRRP will involve multimodal and intermodal issues. Photo shows the transfer of hazardous materials from a tanker truck to a rail car.

problem-solving program, funding research on real-world, day-to-day operational issues with near- to mid-term time frames. The first applied research projects will be designed to improve the information used in managing the risk associated with the transportation of hazardous materials. TRB will use procedures similar to those employed by NCHRP, TCRP, and ACRP to provide for competitive, merit-based selection of research institutions, research project oversight, and dissemination of research results. Using the funds provided by U.S. DOT each year, the new program will conduct studies to advance knowledge and practice in hazardous materials transportation.

The HMCRP Oversight Panel will formulate the research program by identifying the highest-priority projects and by defining funding levels and expected products. In authorizing the program, SAFETEA-LU outlined nine topics for research. The Oversight Panel will prioritize studies within the scope of the nine examples.

SAFETEA-LU authorized \$1.25 million per year for HMCRP in FY 2006 through 2009. Funding is determined by the annual federal appropriations process. The total available in FY 2006 is about \$880,000. The HMCRP Oversight Panel, appointed by TRB, held its first meeting late this year to establish operating procedures and to prioritize research needs.

## COMMERCIAL TRUCK AND BUS SAFETY SYNTHESIS PROGRAM

CTBSSP is a cooperative research program sponsored by FMCSA and administered by TRB. The program was authorized in late 2001 to support FMCSA's safety research programs.

The annual level of funding provided by FMCSA—typically \$100,000 to \$400,000—determines the number of synthesis studies the program will initiate. The reports summarize current practice in a specific technical area in commercial truck and bus safety, usually through a literature search and a survey of organizations such as state DOTs, enforcement agencies, commercial truck and bus companies, or other appropriate groups. The program is modeled after the successful synthesis programs of NCHRP and TCRP. The primary users of the syntheses are practitioners who are facing the



issues or problems with diverse approaches in a variety of settings.

A program oversight panel monitors CTBSSP and program procedures; selects synthesis topics annually, after periodic industrywide solicitations; refines synthesis scopes; selects researchers to prepare each synthesis; reviews products; and makes publication recommendations.

The program oversight panel has authorized 15 synthesis topics. Five syntheses were completed this year and are expected to be published in early 2007:

- *Commercial Motor Vehicle Driver Training Curricula and Delivery Methods and Their Effectiveness;*
- *Commercial Motor Vehicle Carrier Safety Management Certification;*
- *The Role of Safety Culture in Preventing Commercial Motor Vehicle Crashes;*
- *The Impact of Behavior-Based Safety Techniques on Commercial Motor Vehicle Drivers;* and
- *Health and Wellness Programs for Commercial Vehicle Drivers.*

## STAFF NEWS

- **Hilary Freer**, Senior Editor with the Cooperative Research Programs, received a Community Service Award from the National Academies in October.
- **Danna Powell** joined the NCHRP staff in July as a Senior Program Assistant. She previously worked with the Sheriff's Office in Alexandria, Virginia, and with the Department of Defense.
- **Michael Salamone** joined the ACRP staff in August as a Senior Program Officer. He was Deputy Director of the Des Moines International Airport for six years and has worked at airports in Iowa, Florida, and California.
- **Robert David**, who served the Federal Aviation Administration for more than 35 years in a variety of airport-related capacities, joined the ACRP staff in October as a Senior Program Officer.



# STRATEGIC HIGHWAY RESEARCH PROGRAM II

The U.S. Congress authorized the second Strategic Highway Research Program (SHRP II) in August 2005 to address complex goals that require integrated and atypical approaches to reducing crashes, renewing the transportation infrastructure, increasing highway capacity, and providing reliable travel times. The first SHRP was conducted between 1987 and 1993; SHRP II was originally proposed as a 9-year, \$450 million program. As authorized, the program is funded at approximately \$150 million over 7 years and expects to award approximately \$110 million or more in research contracts.

SHRP II is being conducted under a memorandum of understanding among the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the National Research Council, TRB's parent organization. In late March 2006, first-year funding for SHRP II

became available through an agreement with FHWA, initiating an ambitious schedule of activities to staff the program, establish committees, and refine research plans. The scope of the original research plans has been adjusted to reflect the reduction in funding and will continue to evolve in response to research findings, emerging opportunities, and potential funding fluctuations.

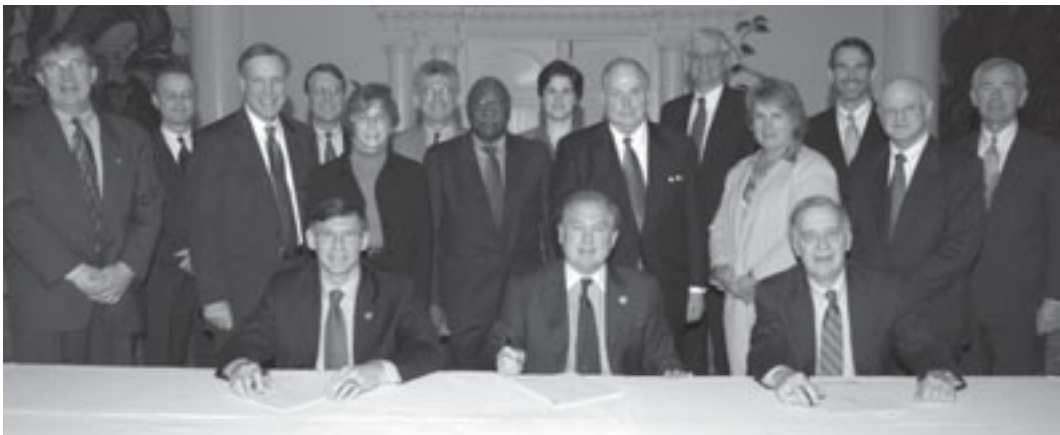
## FOCUS AREAS

### Safety

*Estimated funding: \$44 million;*

*11 planned projects*

SHRP II safety research will take advantage of unprecedented opportunities to improve highway safety through advanced technologies. Most highway safety research has focused on crashes and on how changes in vehicles and roads could



Ready to sign the memorandum of understanding to establish SHRP II, on January 25, 2006, are leaders of the sponsoring organizations, with members of the oversight committee and other witnesses: *(at table, left to right)* J. Richard Capka, FHWA; John C. Horsley, AASHTO; and Ralph J. Cicerone, National Academy of Sciences; *(standing, left to right)* Brian McLaughlin, Federal Motor Carrier Safety Administration; Stephen Godwin, TRB; Robert E. Skinner, Jr., TRB; Dennis Judycki, FHWA; Anne

Canby, Surface Transportation Policy Partnership; Allen Biehler, Pennsylvania DOT; Nicholas Garber, University of Virginia; Ann Brach, TRB; C. Michael Walton, University of Texas; Neil Pedersen, Maryland State Highway Administration; Rebecca Brewster, American Transportation Research Institute; John Njord, Utah DOT; Neil Hawks, TRB; and Henry G. (Gerry) Schwartz, Jr., Washington University in St. Louis.



**Allen D. Biehler**  
Chair  
SHRP II Oversight  
Committee



**Neil F. Hawks**  
Director  
SHRP II



**Ann M. Brach**  
Deputy Director  
SHRP II

improve safety. SHRP II safety research will focus on driver behavior and will collect data on pre-crash and noncrash circumstances.

The research will quantify the interactions of drivers, roads, vehicles, and environmental conditions and will develop objective measures of crash risk. An ambitious effort will use on-board recorders to capture data on 2,000 to 3,000 volunteer drivers, their vehicles, the environment, and the roadways. Site-based technologies and instrumented vans also will be deployed. Analysis of the data will have implications for effective countermeasures to reduce the number and severity of crashes.

### Renewal

*Estimated funding: \$29 million;  
28 planned projects*

The U.S. highway system is aging and must be rebuilt while in service. Research in the renewal focus area therefore addresses the need to complete highway projects quickly, with minimal disruption to the community, and to produce facilities that are long-lasting.

Identifying new technologies for locating underground utilities; developing procedures to speed the evaluation of designs and the inspection of construction; and applying new methods and materials for preserving, rehabilitating, and reconstructing roadways and bridges are among the goals for this focus area. Alternative strategies for contracting, financing and managing projects, and mitigating institutional barriers also are part of the emphasis on rapid renewal.

### Reliability

*Estimated funding: \$18 million;  
12 planned projects*

Improving the reliability of travel time predictions can reduce the costs and frustrations of traffic delays and can help address the problems of roadway congestion. Research in the reliability focus area will identify and analyze congestion mitigation measures and practices at agencies that have improved travel time reliability; develop analytical procedures for estimating the benefits and effectiveness of countermeasures; assess the institutional architectures necessary for successful operations programs; and develop local and national programs to monitor reliability.



The SHRP II naturalistic driving research may build on the technologies deployed in Virginia Tech's 100-Car Study, which had a complexity of in-vehicle cameras (*clockwise from upper left:*) focused on the driver's face, over the driver's shoulder, forward, backward, and on the passenger-side approaching lane, to gather data on crashes.

### Capacity

*Estimated funding: \$18 million;  
8 planned projects*

The objective of the capacity focus area is to develop a consistent framework for balanced, collaborative decisions on enhancing transportation capacity and to provide the tools for applying the framework. The research will develop a project evaluation process that will help stakeholders balance the need to reduce delays caused by conflicting demands with the need to produce transportation solutions that support community, economic, and environmental goals.

The research also will develop a structure for a project's many contributors to share data and knowledge. This will require identifying critical points for decision making in various processes, the data and knowledge essential for these decisions, and successful methods of sharing information.

## MANAGEMENT AND OVERSIGHT

TRB manages SHRP II in close cooperation with FHWA and AASHTO. The SHRP II Oversight Committee, appointed by the National Research Council, has responsibility for all aspects of the program's research activities. A technical coordinating committee in each of the four focus areas is



responsible for recommending the research plan and for monitoring the conduct of the research.

Small groups of technical experts are convened as necessary to draft research project statements to inform requests for proposals (RFPs). Members of these committees and groups are knowledgeable and experienced professionals in transportation and related fields, are recruited from around the nation, and serve without compensation.

## SCHEDULE OF ACTIVITIES

The first RFPs for each focus area were released in September. The initial projects either will produce analytic methods and study designs for follow-on research or will identify specific needs in technology, data, and knowledge for the projects that follow.

Starting in 2007, RFPs will be issued twice each year, in June and December, with notices posted in the TRB e-newsletter and website. Contract awards will go out in August and February. SHRP II will publicize its annual research program in January of each year.

## PROGRAM STAFFING

Start-up activities and the work of the program's first year have been accomplished by a core team of experienced staff members. New expertise will be added as the SHRP II staff reaches its full complement. Currently, the staff includes:

- **Neil Hawks**, a manager in the first SHRP and recently director of TRB's Special Programs Division, serves as director of SHRP II.
- **Ann Brach**, Senior Program Officer and director of the study that defined the need and proposed the goals for SHRP II, is deputy director.
- **Stephen Andrie**, recently director of the Center for Transportation Research and Education at Iowa State University, heads the SHRP II capacity focus area.
- **Kenneth Campbell**, formerly with the Oak Ridge National Laboratory and the University of Michigan Transportation Research Institute, staffs the safety focus area.

- **Walter Diewald**, Senior Program Officer and recently study director in the TRB Division of Studies and Information Services, is staff officer for the reliability focus area.
- **Robert Raab**, Senior Program Officer, is heading up the renewal focus area while the staffing process continues.
- **Monica Starnes**, Senior Program Officer, is working primarily in the renewal focus area. She previously worked for the Applied Physics Lab at Johns Hopkins University and for the National Institute of Standards and Technology.
- **Linda Mason** serves as the SHRP II Communications Officer.
- **Jo Ann Coleman** and **Makeeya Hazelton** are Senior Program Assistants. Coleman has worked as an analyst for the U.S. Department of Transportation and as transaction specialist at Remax Allegiance, Woodridge, Virginia. Hazelton was supervisor of customer service for TRB's Publications Sales and Affiliates Services department.
- **Connie Woldu** is the program's Administrative Coordinator.



Chair of the SHRP II Safety Technical Coordinating Committee Forrester Council, University of North Carolina Highway Research Center, responds to questions from the audience during the SHRP II Safety Research Symposium, August 16–17, in Washington, D.C.

## STAFF NEWS

- The SHRP II Transition Team—**Ann Brach, Walter Diewald, Neil Hawks, Linda Mason, Robert Raab, and Connie Woldu**—received a Group Distinguished Service Award from the National Academies in October.

SHRP II Director Neil Hawks and Deputy Director Ann Brach (*at head of table*) conduct one of several briefings on the new program, its plans, and scope, at the TRB Annual Meeting in January.



# ADMINISTRATION AND FINANCE



**Anthony N. Mavrogiannis**  
Director  
Finance and Business  
Operations

The TRB Administration and Finance Division provides financial, technological, and administrative support for TRB staff; financial oversight of the contracts and grants that support the work of TRB; expenditure controls; administration of publications sales and distribution; maintenance of the benefits and services for sponsor and affiliate organizations; and liaison to the administrative and financial offices of the National Academies.

## FINANCIAL MANAGEMENT

The division manages the contracts and grants that support TRB's work, prepares budgets for continuing operations and individual projects, and controls expenditures. TRB's total income and expenditures have increased consistently each year to more than \$60 million (see graph, page 51). A statement of income and expenditures appears on pages 52–53.

## AFFILIATE AND SPONSOR SERVICES

TRB's core technical activities have five levels of support: student affiliates, individual affiliates, organizational affiliates, sustaining affiliates, and sponsors. All affiliates and sponsors contribute to the support of TRB activities through annual fees determined by the level of services selected.

Individual and student affiliates' benefits include reduced registration fees for the TRB Annual Meeting, complimentary subscription to *TR News*, discounts on most TRB books and reports, use of the TRB library, and assistance with the use of TRB computer-based information services. Individual and student affiliates also may subscribe to publications at a substantially reduced rate through a selective distribution program.

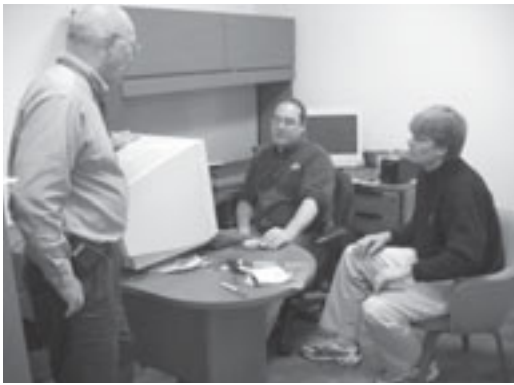
Organizational affiliates include government agencies, academic organizations, private organizations, and consultants committed to the advancement of knowledge about the nature and performance of transportation systems and system components. In addition to the range of benefits that individual affiliates receive, organizational affiliates receive most publications at no cost, as well as complimentary registrations for the TRB Annual Meeting. Organizational affiliate contributions range from \$2,850 to \$7,100, depending on the level of benefits selected.

Sustaining affiliates are agencies and organizations—including individual corporations and businesses—that support TRB at a level considerably higher than the direct cost of all the services and publications received. The minimum annual contribution is \$15,000.

Sponsors are the major source of financial support for TRB's core technical activities. Federal, state, and local government agencies and professional societies and organizations that represent industry groups are eligible to be TRB sponsors. Fees and services are negotiated to serve the sponsor's needs and to provide funda-



Publications display at the Annual Meeting attracts browsers and purchasers.



Members of TRB's Information Technology unit confer about the day's tasks: (left to right) Manager Stewart Gosney and Senior Programmer Analysts Jeff Isenhour and Lawrence Woltman.

mental support for the Board's programs and activities of interest to the entire transportation community. The minimum annual sponsor fee is \$60,000. Sponsors are also represented on the TRB Executive Committee. (See pages 58–59 for a list of TRB sponsors and sustaining affiliates.)

## PUBLICATIONS SALES AND DISTRIBUTION

TRB's timely distribution of publications disseminates transportation research and technology results worldwide. TRB also releases selected publications—some exclusively—in electronic format.

A list of TRB publications issued from January 1 through December 31, 2006, appears on pages 55–57.

## WEB AND STRATEGIC APPLICATIONS

The TRB Information Technology unit develops and supports many of the applications used by TRB's divisions and serves as the liaison for computer network infrastructure to the National Academies' Information Technology Services office. The unit's major activities in 2006 involved the planning and updating of TRB's website for transfer to a new server environment. At the same time, the National Academies relocated its operations center—including the TRB servers—to a new remote facility.

The unit implemented a new version of Web-Board, TRB's online forum for discussions, information sharing, and data storage.<sup>1</sup> The package

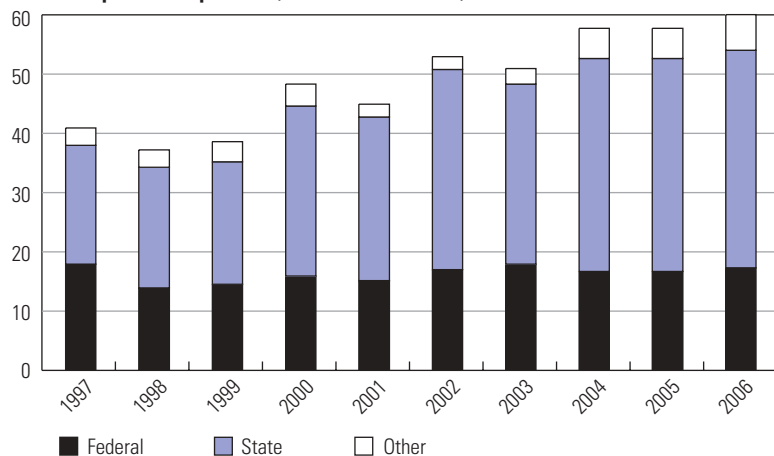
now consolidates access to web boards, conferences, and messages on a single web page for easy navigation and can be tailored for user preferences and needs.

Activities planned for 2007 include updates to the electronic bookstore, enhancements to TRB affiliate and participant data management systems, and implementation of a new content management system.

## STAFF NEWS

- **Anthony N. Mavrogiannis** assumed responsibilities as Director of Finance and Business Operations. He previously was vice president of the Airport Consultants Council and had worked several years at the National Academies as special assistant to the chief financial officer, travel services manager, and financial and administrative manager in the Office of International Affairs.
- **Chrystyne M. Talley** joined TRB as Financial Associate, primarily working with the SHRP II program. She has held several previous positions at the National Academies, in Information Technology Services, the National Research Council Office of Internal Audit, and the Office of Contracts and Grants.

TRB Expenditures per Year (in millions of dollars)



CY 2006 data use actual income and expenditures for the first three quarters and an estimate for the fourth quarter.

<sup>1</sup> [www.TRB.org/webboard/](http://www.TRB.org/webboard/).

## STATEMENT OF INCOME AND EXPENDITURES

Calendar Years 2005 and 2006

	CY 2005 (actuals)	CY 2006 (projected)*
<b>Sources of Income</b>		
<b>Core Technical Activities; Special Continuing Programs; and Studies, Conferences, and Workshops</b>		
State Transportation Departments	\$8,320,161	\$7,625,000
Federal Highway Administration	3,395,292	3,100,000
Federal Railroad Administration	1,054,159	750,000
Federal Motor Carrier Safety Administration	862,108	600,000
Federal Transit Administration	838,913	900,000
Research and Innovative Technology Administration	546,693	550,000
National Highway Traffic Safety Administration	475,957	550,000
U.S. Navy	174,843	175,000
Federal Aviation Administration	163,990	290,000
U.S. Coast Guard	100,000	100,000
Great Lakes Protection Fund	72,918	80,000
Department of Health and Human Services	70,000	70,000
Environmental Protection Agency	60,000	0
Association of American Railroads	60,000	60,000
American Public Transportation Association	60,000	60,000
American Transportation Research Institute	60,000	60,000
National Aeronautics and Space Administration	60,000	60,000
U.S. Army Corps of Engineers	50,000	50,000
Robert Wood Johnson Foundation	38,382	0
Minerals Management Service	25,000	25,000
Bureau of Indian Affairs	25,000	0
U.S. Army	25,000	0
Department of Energy	25,000	0
National Oceanographic and Atmospheric Administration	25,000	25,000
International Transportation Safety Board	23,268	0
U.S. Department of Agriculture	22,000	22,000
United Parcel Service	0	25,000
National Transportation Safety Board	15,000	0
Maritime Administration	10,000	10,000
The National Academies	48,590	50,000
Miscellaneous	12,051	15,000
Affiliates, Registration, Royalties, and Publication Sales	4,459,597	5,400,000
<b>Subtotal</b>	<b>\$21,178,922</b>	<b>\$20,652,000</b>
<b>Strategic Highway Research Program II (SHRP II)</b>	<b>\$51,966</b>	<b>\$1,225,000</b>
<b>Cooperative Research Programs</b>		
State Transportation Departments	\$28,032,082	\$29,500,000
Federal Highway Administration	632,201	730,000
Federal Transit Administration	8,088,627	7,000,000
Federal Aviation Administration	0	1,175,000
Publication Sales and Other	70,529	85,000
<b>Subtotal</b>	<b>\$36,823,439</b>	<b>\$38,490,000</b>
<b>Total TRB Income</b>		
State	\$36,352,243	\$37,125,000
Federal	16,796,749	17,407,000
Other	4,905,335	5,835,000
<b>Total</b>	<b>\$58,054,327</b>	<b>\$60,367,000</b>
<b>Sources of Expenditures</b>		
<b>Expenditures by Major Cost Category</b>		
Salaries (including fringe benefits)	\$10,930,526	\$10,450,000
Travel and Meetings	4,133,985	4,100,000
Consultants and Contracts	26,124,739	28,200,000
Abstracting, Indexing, and Publishing	2,299,584	2,300,000
Other Direct Costs	1,843,513	2,100,000
Indirect Costs	12,950,102	13,500,000
	<b>\$58,282,448</b>	<b>\$60,650,000</b>

	CY 2005 (actuals)	CY 2006 (projected) <sup>a</sup>
<b>Expenditures by Major Activity</b>		
<b>Core Technical Activities</b>		
Committee Activities and Field Visits	\$5,623,808	\$6,004,000
Annual Meeting	1,270,301	1,500,000
Library and Transportation Research Information Services	2,159,312	1,650,000
Publications	2,613,407	2,800,000
<b>Subtotal</b>	<b>\$11,666,828</b>	<b>\$11,954,000</b>
<b>Studies, Conferences, and Workshops</b>	<b>\$5,220,024</b>	<b>\$5,000,000</b>
<b>Special Continuing Programs</b>		
Pavement Program Review Committees and Activities	\$602,151	\$500,000
Innovations Deserving Exploratory Analysis (IDEA)	2,277,765	2,200,000
Synthesis Studies	1,479,588	1,500,000
Legal Studies	249,506	275,000
Research and Technology Coordinating Committee	390,527	100,000
Marine Board Core Program	223,384	221,000
<b>Subtotal</b>	<b>\$5,222,921</b>	<b>\$4,796,000</b>
<b>Strategic Highway Research Program II</b>	<b>\$51,966</b>	<b>\$1,225,000</b>
<b>Cooperative Research Programs</b>		
National Cooperative Highway Research Program		
Technical Direction, Reports, and Panels	\$8,656,364	\$7,500,000
Research	19,375,718	22,000,000
<b>Subtotal</b>	<b>\$28,032,082</b>	<b>\$29,500,000</b>
Transit Cooperative Research Program		
Technical Direction, Reports, and Panels	\$2,911,906	\$3,000,000
Research	5,176,721	4,000,000
<b>Subtotal</b>	<b>\$8,088,627</b>	<b>\$7,000,000</b>
Airport Cooperative Research Program		
Technical Direction, Reports, and Panels	\$0	\$1,175,000
Research	0	0
<b>Subtotal</b>	<b>\$0</b>	<b>\$1,175,000</b>
<b>Subtotal, Cooperative Research Programs<sup>b</sup></b>	<b>\$36,120,709</b>	<b>\$37,675,000</b>
<b>Total TRB Expenditures</b>		
State	\$36,352,243	\$37,125,000
Federal	\$16,796,749	\$17,407,000
Other	\$5,133,456	\$6,118,000
	<b>\$58,282,448</b>	<b>\$60,650,000</b>

#### SPECIAL FUND

Fund balance, end of previous fiscal year	\$5,865,899	\$5,585,812
Plus (minus) current fiscal year income over (under) expenditures	-280,087	-283,000
Balance, current fiscal year	<b>\$5,585,812</b>	<b>\$5,302,812</b>

In 1965 the TRB Executive Committee approved a reserve fund to provide for orderly adjustments in the event of a temporary shortfall in anticipated revenues for TRB Technical Activities. This fund, built up over the years from surplus income in excess of expenditures from nonfederal sources for any one fiscal year, is reserved for expenditures in excess of income for any later fiscal year under a fixed budget approved triennially by the TRB Executive Committee.

<sup>a</sup> CY 2006 data use actual income and expenditures for the first three quarters, and an estimate for the fourth quarter.

<sup>b</sup> The total expenditure shown for the Cooperative Research Programs (CRP) is lower than the total revenue shown for the CRP because some expenditures are included in CRP-supported activities under TRB's Special Continuing Programs and Studies, Conferences, and Workshops.

# TRB CONFERENCES AND WORKSHOPS

January 1, 2006–December 31, 2006

## JANUARY

22–26 TRB 85th Annual Meeting

## MARCH

27–29 AASHTO Geographic Information System for Transportation Symposium\*

28–30 Transportation and Economic Development 2006\*

## APRIL

5–6 Research to Enhance Rail Network Performance Workshop

9–11 10th National Light Rail Transit Conference\*

26–28 8th Annual National Harbor Safety Committee Conference\*

## MAY

3–4 Conference on Environmental Geospatial Information for Transportation

17–19 6th National Aviation System Planning Symposium

21–23 Conference on Innovations in Travel Modeling

## JUNE

4–7 1st International Symposium on Freeway Operations\*

4–7 North American Travel Monitoring Exposition and Conference

19–22 North American Transportation Statistics Interchange\*

## JULY

9–11 Waste Management and Resource Efficiency in Transportation Summer Workshop

9–11 31st Annual Summer Ports, Waterways, Freight, and International Trade Conference

9–12 Environmental Analysis in Transportation Committee and Ecology in Transportation Task Force Joint Summer Workshop

9–12 Transportation-Related Noise and Vibration Summer Conference

10–12 Traffic Signal Systems Workshop and Summer Meeting

16–19 3rd International Conference on Bridge Maintenance, Safety, and Management\*

16–20 11th AASHTO and TRB Maintenance Management Conference\*

23–26 Historic and Archaeological Preservation in Transportation Summer Workshop

23–26 Work Zone Traffic Control Summer Workshop

23–26 45th Annual Workshop on Transportation Law

25–29 5th International Symposium on Highway Capacity\*

30–Aug. 3 2nd International Symposium on Transportation Technology Transfer\*

## AUGUST

2–4 3rd Bus Rapid Transit Conference

6–9 1st International Conference on Fatigue and Fracture in the Infrastructure\*

13–16 9th International Conference on Applications of Advanced Technology in Transportation\*

13–16 7th National Access Management Conference

16–17 SHRP II Safety Research Symposium

23–26 7th International Conference on Short- and Medium-Span Bridges\*

27–29 Conference on the Metropolitan Planning Organization

## SEPTEMBER

10–14 9th International Level Crossing Safety and Trespass Prevention Symposium\*

13–15 10th National Conference on Transportation Planning for Small- and Medium-Sized Communities

18–19 Aviation Forecast Assumption Workshops

18–20 5th National Seismic Conference on Bridges and Highways\*

25–26 Conference on National Security, Natural Disasters, Logistics, and Transportation Risk Assessment

25–27 Conference on Freight Demand Modeling

26 Symposium on Applications of Geophysics for Geotechnical Projects

## OCTOBER

2–5 Plastic Pipes XIII Conference\*

5–6 Aviation Forecast Assumption Workshops

17–18 Research Opportunities in Radio Frequency Identification Transportation Applications Conference

22–25 17th National Rural Public and Intercity Bus Transportation Conference

23–26 International Visualization in Transportation Symposium and Workshop

25–26 International Conference on Long-Life Concrete Pavements\*

## NOVEMBER

5–7 International Joint Conference on Synergies for an Efficient Waterways System in Europe and the United States\*

12–14 2nd National Conference on Key Issues in Transportation Programming

28–Dec. 1 2nd Conference on Incident and Special Events Management\*

## DECEMBER

5–7 2006 Highway Geophysics Conference\*

6–8 TRB–FAA Aviation and Environmental Design and Aviation Environmental Portfolio Management Workshop

13 Workshop on Transportation Asset Management for Executive Officers\*

\* TRB was cosponsor of meeting.



## Transportation Research Records

- 1942 Security 2006
- 1943 Railways
- 1944 Intelligent Transportation Systems and Vehicle–Highway Automation 2006
- 1945 Traffic and Urban Data
- 1946 Construction 2006
- 1947 Rigid and Flexible Pavement Design 2006
- 1948 Management and Delivery of Maintenance and Operations Services
- 1949 Pavement Rehabilitation, Strength and Deformation Characteristics, and Surface Properties–Vehicle Interaction 2006
- 1950 Statistical Methods and Crash Prediction Modeling
- 1951 Airlines, Airports, and Airspace: Economic and Infrastructure Analysis
- 1952 Geomaterials 2006
- 1953 Safety Data, Analysis, and Evaluation
- 1954 Developing Countries
- 1955 Transit: Intermodal Transfer Facilities and Ferry Transportation; Commuter Rail; Light Rail and Major Activity Center Circulation Systems; Capacity and Quality of Service
- 1956 Management and Public Policy 2006
- 1957 National, State, and Freight Data Issues and Asset Management
- 1958 Managing and Maintaining Highway Structures and Pavements
- 1959 Freeway Operations and High-Occupancy Vehicle Systems 2006
- 1960 Finance, Economics, and Economic Development 2006
- 1961 Geometric Design and the Effects on Traffic Operations 2006
- 1962 Bituminous Materials and Nonbituminous Components of Bituminous Paving Mixtures 2006
- 1963 Inland Waterways, Ports, and Shipping
- 1964 Network Modeling 2006
- 1965 Traffic Flow Theory 2006
- 1966 Freight Analysis, Evaluation, and Modeling; Truck Transportation
- 1967 Geology and Properties of Earth Materials 2006
- 1968 Artificial Intelligence and Advanced Computing Applications
- 1969 Highway Safety: Law Enforcement; Alcohol; Driver Training; Safety Planning and Management; Commercial Vehicles; and Motorcycles
- 1970 Bituminous Paving Materials
- 1971 Transit: Bus, Paratransit, and Marketing and Fare Policy
- 1972 Travel Survey Methods, Information Technology, and Geospatial Data
- 1973 Traffic Control Devices, Visibility, and Rail–Highway Grade Crossings 2006
- 1974 Pavement Management; Monitoring, Evaluation, and Data Storage; and Accelerated Testing 2006
- 1975 Soil Mechanics 2006
- 1976 Design of Structures 2006
- 1977 Travel Demand and Land Use 2006
- 1978 Traffic Signal Systems and Regional Systems Management 2006
- 1979 Concrete Materials 2006
- 1980 Driver Behavior, Older Drivers, Simulation, User Information Systems, and Visualization

- 1981 Planning and Analysis 2006
- 1982 Pedestrians and Bicycles
- 1983 Energy and Environmental Concerns 2006—Including 2006 Thomas B. Deen Distinguished Lecture
- 1984 Highway Facility Design 2006
- 1985 Travel Behavior and Values 2006
- 1986 Transit: Management, Maintenance, Technology, and Planning
- 1987 Air Quality 2006
- 1988 Highway Capacity and Quality of Service 2006

## Transportation Research Record CD-ROM

2005 Transportation Research Record CD-ROM

## Special Reports<sup>1</sup>

- 284 Transportation Knowledge Networks: A Management Strategy for the 21st Century
- 285 The Fuel Tax and Alternatives for Transportation Funding
- 286 Tires and Passenger Vehicle Fuel Economy: Informing Consumers, Improving Performance
- 287 Improving Road Safety in Developing Countries: Opportunities for U.S. Cooperation and Engagement—Workshop Summary

## Conference Proceedings<sup>1</sup>

- 35 Research on Women’s Issues in Transportation: Report of a Conference, Volume 1: Conference Overview and Plenary Papers
- 38 Future Truck and Bus Safety Research Opportunities

## Letter Reports (online)

Research and Technology Coordinating Committee (Federal Highway Administration), August 2, 2006 (2 reports)

Committee on the Review of the U.S. Department of Transportation Strategic Plan for Research, Development, and Technology, August 2, 2006

TRB Long-Term Pavement Performance Committee, February 3, 2006, and August 22, 2006

Transit Research Analysis Committee, March 10, 2006, and September 27, 2006

## Transportation Research E-Circulars (online)

- 81 A Research Program for Improvement of the Highway Capacity Manual
- 82 Statewide Multimodal Transportation Planning Proceedings: 2004 Peer Exchange
- 83 National Roundabout Conference: 2005 Proceedings
- 84 Pedestrians: Research Program Statements
- 85 Railroad Operational Safety: Status and Research Needs
- 86 Evaluation of Chemical Stabilizers: State-of-the-Practice Report
- 87 Rubblization of Portland Cement Concrete Pavements
- 88 Commodity Flow Survey Conference

89	Critical Issues in Aviation and the Environment 2005	559	Communicating Changes in Horizontal Alignment
90	Design–Build: A Quality Process	560	Guide to Contracting ITS Projects
91	Innovations in Statewide Planning: A Peer Exchange	561	Best-Value Procurement Methods for Highway Construction Projects
92	Maintenance and Operations of Transportation Facilities: 2005 Strategic Vision	562	Improving Pedestrian Safety at Unsignalized Crossings (joint report with TCRP Report 112)
93	6th National Conference on Transportation Asset Management	563	Development of LRFD Specifications for Horizontally Curved Steel Girder Bridges
94	Safety Data Analysis and Evaluation: Research Problem Statements	564	Field Inspection of In-Service FRP Bridge Decks
95	Operations Data for Planning Applications: Identifying Needs, Opportunities, and Best Practices	565	Evaluation of Best Management Practices for Highway Runoff Control (with supporting material on CD-ROM)
96	Drugs and Traffic: A Symposium	567	Volumetric Requirements for Superpave Mix Design
97	International Perspectives on Urban Street Design: Proceedings of the Context-Sensitive Design Workshop	568	Riprap Design Criteria, Recommended Specifications, and Quality Control
98	Maintenance Management 2006: Presentations from the 11th AASHTO-TRB Maintenance Management Conference	569	Comparative Review and Analysis of State Transit Funding Programs
99	Statewide Transportation Planning: Making Connections		
100	Linking Transportation and Land Use: A Peer Exchange		
101	Driver Education: The Path Ahead		
102	Asphalt Emulsion Technology		
103	Concrete: The Sustainable Infrastructure Material for the 21st Century		
104	50 Years of Interstate Structures: Past, Present, and Future		
105	Factors Affecting Compaction of Asphalt Pavements		
106	Environmental Geospatial Information for Transportation		
107	Control of Cracking in Concrete: State of the Art		
108	Geospatial Information Technologies for Asset Management		
109	Transportation Information Assets and Impacts: An Assessment of Needs		

#### TR News

Nos. 242–247

#### Online Newsletters

TRB Transportation Research Electronic Newsletter

#### National Cooperative Highway Research Program (NCHRP) Reports<sup>2</sup>

525	Surface Transportation Security
	• Vol. 9: Guidelines for Transportation Emergency Training Exercises (joint report with TCRP Report 86, Vol. 9)
	• Vol. 10: A Guide to Transportation's Role in Public Health Disasters
	• Vol. 11: Disruption Impact Estimating Tool—Transportation (DIETT): A Tool for Prioritizing High-Value Transportation Choke Points
	• Vol. 12: Making Transportation Tunnels Safe and Secure (joint report with TCRP Report 86)
546	Incorporating Safety into Long-Range Transportation Planning (on CD-ROM)
547	Simple Performance Tests: Summary of Recommended Methods and Database
550	Commuting in America III: The Third National Report on Commuting Patterns and Trends (joint report with TCRP Report 110))
551	Performance Measures and Targets for Transportation Asset Management
552	Guidelines for Analysis of Investments in Bicycle Facilities
553	Crashworthy Work-Zone Traffic Control Devices
554	Aesthetic Concrete Barrier Design
556	Design and Construction Guidelines for Geosynthetic-Reinforced Soil Bridge Abutments with a Flexible Facing
557	Aggregate Tests for Hot-Mix Asphalt Mixtures Used in Pavements
558	Manual on Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements

#### NCHRP Syntheses of Highway Practice<sup>2</sup>

356	Pavement Markings: Design and Typical Layout Details
357	Use of Geophysics for Transportation Projects
358	Statewide Travel Forecasting Models
359	Bridge Rating Practices and Policies for Overweight Vehicles
360	Rock-Socketed Shafts for Highway Structure Foundations
361	Visualization for Project Development
362	Training Programs, Processes, Policies, and Practices
363	Control of Invasive Species
364	Eliminating Toll Road Demand and Revenues

#### NCHRP Research Results Digests<sup>2</sup>

302	Core Competencies for Highway Safety Professionals
303	Safety Impacts and Other Implications of Raised Speed Limits on High-Speed Roads
304	Technologies to Improve Consideration of Environmental Concerns in Transportation Decisions
305	Pavement Marking Materials and Markers: Real-World Relationship Between Retroreflectivity and Safety over Time
306	Identification of Liability-Related Impediments to Sharing Section 409 Safety Data Among Transportation Agencies and a Synthesis of Best Practices (with Appendix material on the web)
307	Independent Review of the Mechanistic–Empirical Design Guide and Software
308	Changes to the Mechanistic–Empirical Pavement Design Guide
309	Continuing Project to Synthesize Information on Highway Problems
310	Integrating Geospatial Technologies into the Right-of-Way Data-Management Process
311	FMCSA Regulations as They Apply to FTA Section 5310/5311 Providers: A Handbook

#### NCHRP Web-Only Documents (online)

81	Design and Construction Guidelines for Geosynthetic-Reinforced Soil Bridge Abutments with a Flexible Facing: Appendix C—Verification of the Analytical Model
82	Validation of Performance-Related Test of Aggregates for Use in Hot-Mix Asphalt Pavements: Appendixes A through F
83	Scour at Contracted Bridges
84	Innovative Load-Testing Systems
85	Considerations for a Guide to Contracting ITS Projects
86	Estimating the Impacts of the Aging Population on Transit Ridership
87	Test Methods for Evaluating Field Performance of RWIS Sensors
88	Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements
89	Appendix Material for NCHRP Research Results Digest 306
90	Safety Impacts and Other Implications of Raised Speed Limits on High-Speed Roads

- 91 Improving Pedestrian Safety at Unsignalized Crossings: Appendices B to O of NCHRP Report 562
- 92 Pavement Marking Materials and Markers: Real-World Relationship Between Retroreflectivity and Safety over Time
- 95 Integrating Geospatial Technologies into the Right-of-Way Data Management Process

### Transit Cooperative Research Program (TCRP) Reports<sup>3</sup>

- 86 Public Transportation Security
- Vol. 9: Guidelines for Transportation Emergency Training Exercises (joint report with NCHRP Report 525)
  - Vol. 10: Hazard and Security Plan Workshop: Instructor Guide (with supporting material on CD-ROM)
  - Vol. 11: Security Measures for Ferry Systems
  - Vol. 12: Making Transportation Tunnels Safe and Secure (joint report with NCHRP Report 525)
- 95 Traveler Response to Transportation System Change: Chapter 2: HOV Facilities
- 110 Commuting in America III: The Third National Report on Commuting Patterns and Trends (joint report with NCHRP Report 550)
- 112 Improving Pedestrian Safety at Unsignalized Crossings (joint report with NCHRP Report 562)
- 113 Using Archived AVL-APC Data to Improve Transit Performance and Management
- 114 Center Truck Performance on Low-Floor Light Rail Vehicles
- 115 Smart Card Interoperability Issues for the Transit Industry
- 116 Guidebook for Evaluating, Selecting, and Implementing Suburban Transit Services

### TCRP Syntheses of Transit Practice<sup>3</sup>

- 64 Bus Use of Shoulders
- 65 Transit Agency Participation in Medicaid Transportation Programs
- 66 Fixed-Route Bus Transit Ridership Forecasting and Service Planning Methods
- 67 Bus Transit Service in Land Development Planning
- 68 Methods of Ridership Communication
- 69 Web-Based Survey Techniques

### TCRP Research Results Digests<sup>3</sup>

- 74 Train Door Systems Analysis
- 75 Executive Summary: Cost–Benefit Analysis of Providing Non-Emergency Medical Transportation
- 76 Acoustic Rail-Break Detection Demonstration at MTA–New York City Transit
- 77 International Transit Study Program, Fall 2005 Mission: Innovative Techniques in the Planning and Financing of Public Transportation Projects
- 78 Managing Capital Costs of Major Federally Funded Public Transportation Projects
- 79 Design of Track Transitions
- 80 Synthesis of Information Related to Transit Practices

### TCRP Web-Only Documents (online)

- 28 Train Door Systems Analysis: Appendices for RRD74
- 29 Cost-Benefit Analysis of Providing Non-Emergency Medical Transportation
- 30 Improving Pedestrian Safety at Unsignalized Crossings: Appendices B to O of TCRP Report 112
- 31 Managing Capital Costs of Major Federally Funded Public Transportation Projects: Contractor's Final Report
- 32 Elements Needed to Create High-Ridership Transit Systems: Interim Guidebook

- 34 Developing Guidelines for Evaluating, Selecting, and Implementing Suburban Transit Services

### Cooperative Research Programs CD-ROMs

- 46 Appendixes to NCHRP Report 547: Simple Performance Tests and Advanced Materials Characterization Models (DVD affixed to NCHRP Report 547)
- 62 Incorporating Safety into Long-Range Transportation Planning (NCHRP Report 546)
- 63 Design Manual, User Guide, and Spreadsheet Model (affixed to NCHRP Report 565)
- 64 Hazard and Security Plan Workshop: Instructor Guide (appendices affixed to TCRP Report 86, Vol. 10)

### Commercial Truck and Bus Safety Synthesis Program (CTBSSP) Synthesis Reports<sup>3</sup>

- 10 Alternative Truck and Bus Inspection Strategies

### CTBSSP Research Results Digest<sup>3</sup>

- 5 Commercial Truck and Bus Safety Synthesis Program: A Status Report

### ACRP Research Results Digest<sup>3</sup>

- 1 Synthesis of Information Related to Airport Problems

### Ignition<sup>3</sup>

- Nos. 10-11

### TRB PUBLICATIONS

January 1–December 31, 2006

- 47 *Transportation Research Record: Journal of the Transportation Research Board*
- 1 Transportation Research Record CD-ROM
- 4 Special Reports
- 2 Conference Proceedings
- 5 Letter Reports (online)
- 29 Transportation Research Circulars (online)
- 6 issues of *TR News*
- 48 issues of *TRB Transportation Research Electronic Newsletter* (online)
- 24 NCHRP Reports
- 9 NCHRP Syntheses
- 10 NCHRP Research Results Digests
- 12 NCHRP Web Documents (online)
- 11 TCRP Reports
- 6 TCRP Syntheses
- 7 TCRP Research Results Digests
- 6 TCRP Web Documents (online)
- 4 CRP CD-ROMs
- 1 CTBSSP Synthesis
- 1 CTBSSP Research Results Digest
- 1 ACRP Research Results Digest
- 2 issues of *Ignition*

<sup>1</sup> Available in print and online.

<sup>2</sup> Publications released since 2001 are available in print and online.

<sup>3</sup> Entire series available in print and online.

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