



TRB
TRANSPORTATION RESEARCH BOARD



2011



ANNUAL REPORT



TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

The Transportation Research Board was organized in 1920 and is one of six major divisions of the National Research Council, which serves as an independent adviser to the federal government and others on scientific and technical questions of national importance. The National Research Council is jointly administered by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

National Academy of Sciences
National Academy of Engineering
Institute of Medicine
National Research Council

DEAR SUPPORTER OF TRB

The Transportation Research Board is a division of the National Research Council (NRC), the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine—honorific societies chartered by Congress to advise government on scientific and technical matters. Within this institution, commonly referred to as the National Academies, TRB's portfolio of services and activities is distinctive. All of the NRC units share the congressionally chartered mission of advising government on matters related to science and technology; for most, providing advice through expert committees and ad hoc studies is a primary activity. Not so for TRB—conducting policy studies is an important but relatively small part of our work. Research management and the activities involved in information exchange and dissemination through our core program account for approximately 90 percent of our staffing and budget.

Other NRC units increasingly see these TRB activities as models that could benefit their own areas of specialty. Units in other fields of



Neil J. Pedersen, Executive Committee Chair (*left*); Sandra Rosenbloom, Executive Committee Vice Chair; and Robert E. Skinner, Jr., TRB Executive Director.



public service, such as education and medicine, which—like transportation—are decentralized and multidisciplinary, are particularly interested in replicating the TRB model.

Each of these fields has many professional organizations, generally organized along disciplinary lines, which hold annual meetings, maintain standing committees, and publish technical material. What distinguishes TRB's core program and attracts interest is the multidisciplinary environment in which our activities take place. With no prerequisite credentials, the disciplinary background of TRB participants has evolved, reflecting the emergence of new issues and new expertise.

TRB's cooperative research programs also have attracted interest. For some, the independence and transparency of housing a research program at the National Academies is appealing. For others, the appeal is in an applied research program tailored to the interests of specific constituencies and governed by representatives from organizations that will apply research results. In research, one size does not fit all, and there is a niche for applied research programs that are stakeholder-driven and adopt a prac-

Students and young transportation professionals engage in a dialogue with Research and Innovative Technology Administration leadership at the Annual Meeting. A major TRB initiative is expanding outreach to and increasing involvement of younger members of the transportation research community.

itioner perspective in the selection of projects and the programming of funds.

From time to time, other NRC units have attempted to initiate activities modeled on TRB's core program or cooperative research programs. Established institutional cultures and the required funding complicate the task, making one group's recent success particularly notable. The Institute of Medicine's Clinical Research Roundtable recommended and supported the establishment of a Patient-Centered Outcomes Research Center; a recent article in the *Journal of the American Medical Association* noted that the center is modeled on TRB's cooperative research programs.

Imitation is the sincerest form of flattery. Initiatives modeled after TRB in other fields are a testament to the wisdom of the transportation leaders who established the Board in 1920 and to the leaders who created the first cooperative research program nearly 50 years ago—the National Cooperative Highway Research Program.

TRB's core program, cooperative research programs, and other activities remain as vibrant today as when they were first established. The highlights of our activities offer clear evidence.

Annual Meeting and Conferences

The TRB Annual Meeting in January set the tone for 2011. The attendance total of 10,900 broke the previous record of 10,500, set in 2007. Program highlights included the keynote address by National Transportation Safety Board Chair Deborah A. P. Hersman at the Chairman's Luncheon and the Thomas B. Deen Distinguished Lecture, "Railroads and the New Normal: Impacts of Lean and Green," presented by James W. McClellan. The spotlight theme for the meeting was Transportation, Livability, and Economic Development in a Changing World.

Planning for the TRB 2012 Annual Meeting kicked into high gear this fall. Transportation: Putting Innovation and People to Work is the theme for the 91st Annual Meeting. By the August 1, 2011, deadline, TRB had received a record number of 4,200 papers for peer review and selection for presentation at the meeting and for publication in the *Transportation Research Record: Journal of the Transportation Research Board*.



National Academy of Engineering President Charles M. Vest introduced Hersman at the Chairman's Luncheon.



In the keynote address at the TRB 2011 Chairman's Luncheon, National Transportation Safety Board Chairman Deborah A. P. Hersman recounted safety lessons learned from high-profile events and emphasized the need for investments in safety.

Turnout at TRB-sponsored conferences remained strong throughout the year. One concern, however, is that attendance by state department of transportation (DOT) employees continued below the levels reached before the economic downturn, because of travel restrictions. Among the major conferences in 2011 were the 4th International Transportation Systems Performance Measurement Conference; the 10th International Conference on Low-Volume Roads; and the International Conference on Roundabouts. The TRB Joint Midyear Meeting was the venue for more than 40 standing committees, and the Annual Workshop on Transportation Law convened for its milestone 50th session. TRB also conducted its first virtual workshop in September, attracting online participants to learn about Keeping Up with Communication Technology: Practical Uses of Social Media.

Technical Activities

TRB's grass roots are our 200-plus standing committees and their nearly 5,000 members. The committees may be standing, but they are not static. Guided by the Technical Activities Council (TAC) and the group executive boards and sections, the committees are continually evolving to remain vibrant and maintain rel-

evance to the challenges facing transportation systems. Technical focus areas expand and are redefined; membership changes; and committees take on new assignments.

Several initiatives in the past year proactively promote the evolution and effectiveness of TRB standing committees:

- **Developing better research needs statements.** Standing committees routinely produce research needs statements, a task for which they are well suited. The TAC initiative aims to improve the quality of the statements by providing guidance and training through a community of committee research coordinators, as well as through enhancements to the TRB Research Needs Statements database. Producing better, more clearly written statements should increase the likelihood that the projects will be taken up and funded.
- **Raising the profile of transportation research.** The TAC and its standing committees are identifying opportunities to raise the profile of transportation research and its value in difficult economic times.

- **Conducting a strategic review of the membership structure for standing committees.** The review is taking a fresh look at the size of TRB standing committees, as well as at the rotation policies and schedules for members and chairs.
- **Giving young transportation professionals a voice.** The TAC has worked with the group executive boards to develop additional approaches for involving young transportation professionals in the work and deliberations of committees.

Research Management

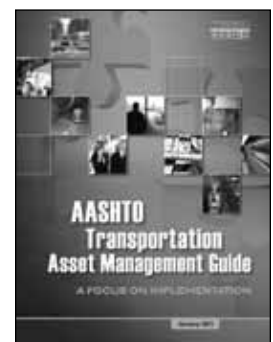
Cooperative Research Programs

TRB's cooperative research programs collectively published more than 150 reports in 2011. All are available on the TRB website, and most are available in hard copy.

The National Cooperative Highway Research Program (NCHRP), the largest of the programs, generated 80 reports—or more than half of the total. The NCHRP titles cover every aspect of highway technology and operations. Illustrative topics include outsourcing and privatization of vehicle and equipment fleet maintenance; information management systems for transportation agency real estate offices; measuring transportation network performance; performance-based transportation resource allocation; mix-design practices for warm-mix asphalt; intelligent soil compaction systems; and guidelines for ramp and interchange spacing. Also in 2011, the American Association of State Highway and Transportation Officials (AASHTO) published the *Transportation Asset Management Guide: A Focus on Implementation*, based on the final report from an NCHRP research project. Next year, NCHRP celebrates its 50th anniversary.

The Transit Cooperative Research Program (TCRP) published 29 reports in 2011. Topics included safety-related rule compliance; fuel choices for post-2010 transit buses; communicating with vulnerable populations in emergencies; demand for rural intercity bus services; and mobility for veterans.

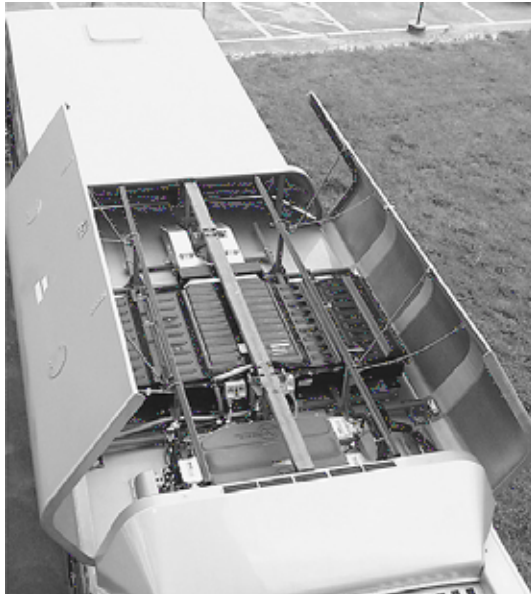
In addition to published research reports, TCRP has funded a certification test program for transit bus maintenance technicians through the National Institute of Automotive Service Excellence (ASE). The program includes nine



The American Association of State Highway and Transportation Officials developed and published the *Transportation Asset Management Guide: A Focus on Implementation* based on research findings and a final report from an NCHRP project.



The TRB 2011 Annual Meeting in January had a high rate of international participation.



Alternative fuels in transit buses are among the subjects explored in 2011 TCRP reports. (Photo: National Renewable Energy Laboratory)

transit bus-specific tests in a range of technical areas. Approximately 3,000 technicians have passed 8,500 tests, and 400 have attained ASE Transit Bus Master Technician status by passing seven of the individual tests. Next year, TCRP celebrates its 20th anniversary.

The Airport Cooperative Research Program published 35 reports in 2011, covering such topics as airport performance indicators; airport interterminal concession programs; risk assessment of runway safety areas; airport capital planning; optimizing the use of aircraft deicing and anti-icing fluids; and sustainable airport construction practices. The National Cooperative

The Cooperative Research Programs publications team, here at a weekly meeting in the atrium of the National Academies' Keck Center in Washington, D.C., managed and produced more than 150 reports across all five programs in 2011, in a variety of print and electronic formats.



Freight Research Program published reports on performance measures for freight transportation; truck drayage productivity; estimating the benefits of specific freight investments; and selecting locations for freight facilities.

The Hazardous Materials Cooperative Research Program, although the smallest, had its greatest year of output, issuing five reports, detailing a consolidated security credential for persons who transport hazardous materials; community emergency response needs and capabilities to counter hazardous materials releases; emerging technologies applicable to hazardous materials transportation safety and security; guidelines for local hazardous materials commodity flow studies; and impacts on soil and groundwater from chemical mixture releases.

The start of the newest program, the National Cooperative Rail Research Program, was delayed pending the appointment of an oversight committee by U.S. DOT.

Second Strategic Highway Research Program

The second Strategic Highway Research Program (SHRP 2) is a variation on the model for multidisciplinary stakeholder-driven research; the program focuses energy and resources on a small number of large problems—highway safety, renewal, reliability, and capacity. With three years left in the short-term program, SHRP 2 is expanding its focus beyond the conduct of research to develop partnerships with organizations that can test the emerging products, ensure their robustness, and plan for their implementation.

By the end of 2011, 51 pilot studies and field tests of SHRP 2 research products were underway in 24 states. State transportation agencies are active in each test and many other organizations are participating at different locations—including natural resource agencies, metropolitan and transit planning organizations, local governments, regional councils, toll authorities, universities, emergency responders, and construction contractors.

Because SHRP 2 research targets a variety of issues within the four focus areas, the resulting products are diverse, ranging from organizational strategies to guidance that individuals can apply in their professional practice; and from statistical models, improved freight data, and



Kenneth L. Campbell (left) of TRB's second Strategic Highway Research Program (SHRP 2) and National Public Radio correspondent Joe Palca examine the data collection mechanism on a car equipped for the SHRP 2 naturalistic driving study.

standard bridge designs to advances in identifying underground utilities.

More than 100 contracts are active or completed, 35 documents have been published—including TRB's first Google e-book—and seven invitational work sessions have helped prepare for the implementation of SHRP 2 products. Our partners at the Federal Highway Administration (FHWA), AASHTO, and the National Highway Traffic Safety Administration (NHTSA) are preparing for implementation, planning to integrate SHRP 2 products into the array of resources needed to strengthen our transportation system.

While three of the SHRP 2 research themes are transitioning from research to pilots and other work preceding implementation, the SHRP 2 safety area's naturalistic driving field study began ramping up data collection in 2011. The field study uses instrumented vehicles to collect continuous information about driver behavior; the project's size, duration, scope, and geographic extent are unprecedented. At the close of 2011, nearly 1,000 vehicles at six sites were collecting data. The study overcame several unusual challenges: the design and manufacture of millions of dollars of customized electronics, approvals

from eight independent ethics boards, and the recruitment of drivers of all types.

Policy Studies

The policy studies unit had a productive and eventful year with the completion of nine major reports and five letter-style reports covering topics as varied as oil well blowouts, unintended sudden acceleration in motor vehicles, offshore wind turbines, naval engineering research, the traffic impacts of military base expansions, surface transportation research, and transportation energy consumption and greenhouse gas emissions.

Of particular note are two high-profile reports:

- At the request of the NHTSA Administrator, TRB led an advisory study on the approaches and resources needed to carry out the agency's safety role as motor vehicles increasingly rely on electronic control systems.
- TRB also led a study by the National Academy of Engineering and NRC, requested by the Secretary of the Interior, that defines the probable causes of the blowout and explosion on the *Deepwater Horizon* and that advises industry and government on strategies to prevent similar incidents.

TRB's role in the blowout study was the result of past work by the Marine Board in offshore and naval engineering. Other TRB Marine Board studies in 2011 advise the Bureau of Ocean Energy Management, Regulation, and Enforcement on the structural integrity of offshore wind turbines and on how to ensure the effectiveness of the safety and environmental management systems that were mandated for offshore oil and gas platforms after the *Deepwater Horizon* accident. Yet another TRB Marine Board study advises the U.S. Navy's Office of Naval Research on the structure and direction of its basic and applied naval engineering research.

Three major policy studies, initiated by the Executive Committee to advise Congress, were released this year. The studies examine the equity implications of evolving transportation finance and funding mechanisms, priorities for the collection and dissemination of passenger and freight data, and transportation policies to



Visits to the National Naval Medical Center in Bethesda, Maryland, are expected to double with the closing of Walter Reed Army Medical Center (*lower right*). The medical center is served by a highway, several major thoroughfares, and a transit station—all used by commuters to metropolitan Washington, D.C. TRB Special Report 302 examines the effects of military base realignments on transportation.

reduce energy consumption and greenhouse gas emissions. Among other reports requested by Congress, one recommends reforms in the way that the Department of Defense funds transportation facilities in metropolitan areas affected by

major military base realignments, and another evaluates a U.S. DOT study on environmental streamlining mandated in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users.

In addition, ongoing peer reviews advise FHWA, the Federal Transit Administration, and the Federal Railroad Administration on research projects and on the direction and conduct of their research programs.

Strategic Planning

Instead of undertaking a complete update of the TRB Strategic Plan, the Executive Committee and its Subcommittee on Planning and Policy Review decided to select key issues to address in greater depth each year. This year, the issues selected are international activities and the *Transportation Research Record* (TRR) series of peer-reviewed technical papers.

STAFF NEWS

After 25 years as study director for many influential TRB policy reports, **Nancy P. (Nan) Humphrey** retired in March as Senior Program Officer. Working with NRC-appointed committees, Humphrey produced reports that led to the creation of U.S. DOT's Bureau of Transportation Statistics in 1991 and the Transit Cooperative Research Program in 1992; another study, *Managing Speed*, has guided FHWA and NHTSA policy. Known for her productivity and insistence on high standards of quality, Humphrey also directed TRB studies on such topics as adapting to climate change, driving and the built environment, highway safety, pipeline safety, the role of transit in emergency evacuations, and consumer automotive safety information.

Jewelene Richardson, Director, Committee Appointments and Human Resources, retired in September after a distinguished career of more than 42 years with TRB. Her skills and dedication to serving volunteers and staff—the people who make TRB what it is—contributed significantly to the Board's functioning during more than four decades. Starting as Senior Secretary, Richardson ably moved to positions with progressively more responsibility and retired as a member of TRB's senior leadership team.

Charles W. Niessner retired in November after 12 years as Senior Program Officer with the Cooperative Research Programs. He was involved in the development of many key safety-related products, including the 23-volume NCHRP Report 500 series implementing the AASHTO Strategic Highway Safety Plan, and the first *Highway Safety Manual*, published by AASHTO in 2010.

Neil F. Hawks retired as Director of SHRP 2 at the end of 2011, after 29 years at the National Research Council (NRC). Hawks joined TRB as Engineer of Soils, Geology, and Foundations in 1982, and when the first SHRP began under NRC, he signed on and assumed a management role in the historic program, working with the long-term pavement performance test and in the development and implementation of Superpave®. At the program's conclusion, Hawks returned to lead TRB's new Special Programs Division, responsible for SHRP follow-on activities, including the Innovations Deserving Exploratory Analysis programs. TRB and the transportation community are indebted to Hawks for his achievement in starting up a program of the scope and magnitude of SHRP 2 on a tight, congressionally imposed schedule, as well as for his contributions to accelerate the pace of innovation in highway transportation.

International Activities

Previous annual reports have noted the growing international presence at TRB—more Annual Meeting attendees from other countries and more sessions focused on transportation activities outside of the United States; new memorandums of agreement between TRB and transportation organizations outside the United States and the increased collaboration that these agreements signify; loan staff from other countries working on SHRP 2; and the creation of the new TRID bibliographic data base, which combines TRB's Transportation Research Information Services database with the International Transport Research Documentation database produced through the Organisation for Economic Co-Operation and Development and the International Transport Forum.

All of these are positive developments for TRB, and we can do more to encourage effective international collaboration on transportation research and innovation. But resources are always constrained, and we must be deliberate in choosing how best to enhance current activities and initiate new ones. To consider our next steps over the next few years, a group of TRB volunteers and staff involved in international activities met in November, brainstormed ideas, and developed proposed actions for consideration by the Executive Committee.

Transportation Research Record

TRB is the world's largest publisher of peer-reviewed technical papers focused on transportation. Records were set in 2011 for the number of



Ralph J. Cicerone began a second term as President, National Academy of Sciences, and Chair, National Research Council. (Photo: Patricia Pooladi)

papers published—nearly 1,000—and the number of papers submitted—more than 4,000. The citation impact factor for the TRRs increased by 60 percent compared with last year's score. But success raises a variety of challenges. In concert with the TRR Publication Board, TRB staff is reviewing the peer review process; the editing, printing, and distribution; the electronic dissemination; and the financing of TRRs. This review will help set the course for the TRR over the next five years.

National Academies Update

Ralph J. Cicerone was elected to a second term as president of the National Academy of Sciences and chair of the National Research Council.

The restoration and rehabilitation of the historic National Academy of Sciences building on Constitution Avenue is on schedule for completion by mid-2012.

Neil J. Pedersen
Chair, Executive Committee

Robert E. Skinner, Jr.
Executive Director



Staff and volunteer members met November 10 to chart the course of future international activities and research at TRB.

TRANSPORTATION RESEARCH BOARD 2011 EXECUTIVE COMMITTEE*

Chair: Neil J. Pedersen, Consultant, Silver Spring, Maryland
Vice Chair: Sandra Rosenbloom, Professor of Planning, University of Arizona, Tucson
Executive Director: Robert E. Skinner, Jr., Transportation Research Board

J. Barry Barker, Executive Director, Transit Authority of River City, Louisville, Kentucky
Deborah H. Butler, Executive Vice President, Planning, and CIO, Norfolk Southern Corporation, Norfolk, Virginia
William A. V. Clark, Professor, Department of Geography, University of California, Los Angeles
Eugene A. Conti, Jr., Secretary of Transportation, North Carolina Department of Transportation, Raleigh
James M. Crites, Executive Vice President of Operations, Dallas-Fort Worth International Airport, Texas
Paula J. Hammond, Secretary, Washington State Department of Transportation, Olympia
Michael W. Hancock, Secretary, Kentucky Transportation Cabinet, Frankfort
Adib K. Kanafani, Professor of the Graduate School, University of California, Berkeley (Past Chair, 2009)
Michael P. Lewis, Director, Rhode Island Department of Transportation, Providence
Susan Martinovich, Director, Nevada Department of Transportation, Carson City
Joan McDonald, Commissioner, New York State Department of Transportation, Albany
Michael R. Morris, Director of Transportation, North Central Texas Council of Governments, Arlington (Past Chair, 2010)
Tracy L. Rosser, Vice President, Regional General Manager, Wal-Mart Stores, Inc., Mandeville, Louisiana
Steven T. Scalzo, Chief Operating Officer, Marine Resources Group, Seattle, Washington
Henry G. (Gerry) Schwartz, Jr., Chairman (retired), Jacobs/Sverdrup Civil, Inc., St. Louis, Missouri
Beverly A. Scott, General Manager and Chief Executive Officer, Metropolitan Atlanta Rapid Transit Authority, Atlanta, Georgia
David Seltzer, Principal, Mercator Advisors LLC, Philadelphia, Pennsylvania
Lawrence A. Selzer, President and CEO, The Conservation Fund, Arlington, Virginia
Kumares C. Sinha, Olson Distinguished Professor of Civil Engineering, Purdue University, West Lafayette, Indiana
Thomas K. Sorel, Commissioner, Minnesota Department of Transportation, St. Paul



Pedersen



Rosenbloom



Skinner



Barker



Butler



Clark



Conti



Crites



Hammond



Hancock



Kanafani



Lewis



Martinovich



McDonald



Morris



Rosser



Scalzo



Schwartz



Scott



Seltzer



Selzer



Sinha



Sorel

* Membership as of December 2011.



Sperling



Steudle



Stotlar



Walton

Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy; Director, Institute of Transportation Studies; and Interim Director, Energy Efficiency Center, University of California, Davis
Kirk T. Steudle, Director, Michigan Department of Transportation, Lansing
Douglas W. Stotlar, President and Chief Executive Officer, Con-Way, Inc., Ann Arbor, Michigan
C. Michael Walton, Ernest H. Cockrell Centennial Chair in Engineering, University of Texas, Austin (Past Chair, 1991)



Brewster



Ferro



Gishi



Gray

Rebecca M. Brewster, President and COO, American Transportation Research Institute, Smyrna, Georgia (ex officio)
Anne S. Ferro, Administrator, Federal Motor Carrier Safety Administration, U.S. Department of Transportation (ex officio)
LeRoy Gishi, Chief, Division of Transportation, Bureau of Indian Affairs, U.S. Department of the Interior, Washington, D.C. (ex officio)
John T. Gray, Senior Vice President, Policy and Economics, Association of American Railroads, Washington, D.C. (ex officio)



Horsley



Huerta



Matsuda



Melaniphy

John C. Horsley, Executive Director, American Association of State Highway and Transportation Officials, Washington, D.C. (ex officio)
Michael P. Huerta, Acting Administrator, Federal Aviation Administration, U.S. Department of Transportation (ex officio)
David T. Matsuda, Deputy Administrator, Maritime Administration, U.S. Department of Transportation (ex officio)



Mendez



O'Toole



Papp



Quarterman

Michael P. Melaniphy, President, American Public Transportation Association, Washington, D.C. (ex officio)
Victor M. Mendez, Administrator, Federal Highway Administration, U.S. Department of Transportation (ex officio)
Tara O'Toole, Under Secretary for Science and Technology, U.S. Department of Homeland Security (ex officio)
Robert J. Papp (Adm., U.S. Coast Guard), Commandant, U.S. Coast Guard, U.S. Department of Homeland Security (ex officio)



Rogoff



Strickland



Szabo



Trottenberg

Cynthia L. Quarterman, Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation (ex officio)
Peter M. Rogoff, Administrator, Federal Transit Administration, U.S. Department of Transportation (ex officio)
David L. Strickland, Administrator, National Highway Traffic Safety Administration, U.S. Department of Transportation (ex officio)
Joseph C. Szabo, Administrator, Federal Railroad Administration, U.S. Department of Transportation (ex officio)
Polly Trottenberg, Assistant Secretary for Transportation Policy, U.S. Department of Transportation (ex officio)
Robert L. Van Antwerp (Lt. General, U.S. Army), Chief of Engineers and Commanding General, U.S. Army Corps of Engineers, Washington, D.C. (ex officio)
Barry R. Wallerstein, Executive Officer, South Coast Air Quality Management District, Diamond Bar, California (ex officio)
Gregory D. Winfree, Acting Administrator, Research and Innovative Technology Administration, U.S. Department of Transportation (ex officio)



Van Antwerp



Wallerstein



Winfree

EXECUTIVE OFFICE



Subcommittee for NRC Oversight (SNO) members (*left to right:*) Neil J. Pedersen, Executive Committee Chair; William A. V. Clark; Henry G. (Gerry) Schwartz, SNO Vice Chair; Suzanne B. Schneider, TRB Associate Executive Director; C. Michael Walton, SNO Chair; Sandra Rosenbloom, Executive Committee Vice Chair; and Michael R. Morris, past chair of the Executive Committee.

The TRB Executive Office provides policy and operational guidance for programs and activities; oversees committee and panel appointments and report review; provides support and direction for human resources issues, staffing needs, and information technology services; 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 (SNO); 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 within the overall policies of the National Academies. Oversight of committee and panel appointments and of report review is the responsibility of the SNO, 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 representation of minorities and women on TRB committees and panels. C. Michael Walton, TRB Division Chair for NRC Oversight, heads this subcommittee and represents TRB as an ex officio member



C. Michael Walton
Chair
Subcommittee for
NRC Oversight



H. Gerard (Gerry) Schwartz, Jr.
Vice Chair
Subcommittee for
NRC Oversight



Robert E. Skinner, Jr.
Executive Director



Suzanne B. Schneider
Associate Executive Director

on the NRC Governing Board. Henry G. (Gerry) Schwartz, Jr., serves as the SNO Vice Chair, with oversight responsibilities for the second Strategic Highway Research Program (SHRP 2).

The Executive Office processes the Board's large volume of committee and panel appointments and maintains committee membership records. It also manages the institutional review process—a hallmark of the National Academies—designed to ensure the independent, rigorous review of reports. In maintaining these high standards, TRB follows NRC-approved guidelines that carefully match the review criteria and procedures to the type of report.

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 practice in specific areas of transportation, presenting the results of transportation research, addressing major national transportation policy issues, and identifying research needs.

TRB books and reports span the range of transportation functions, disciplines, and modes. The TRB Publications Office produces titles in the following series:



Sara Land, Texas Southern University, discusses her research on vulnerable populations and public transportation needs at the Annual Meeting. Land was one of four TRB Minority Student Fellows at the meeting. The program, in its second year, is coordinated by the Executive Office.

- *Transportation Research Record: Journal of the Transportation Research Board* gathers technical papers that have been accepted for publication through a rigorous peer review process refereed by TRB technical committees. In 2011, the Board published 63 volumes of the journal, containing 988 papers grouped by subject. TRR Online, inaugurated



Board leaders and Executive Committee chairs, past and present, gathered at the Annual Meeting to celebrate TRB's 90th anniversary. (Front row, left to right:) William Millar, 1992; Genevieve Giuliano, 2003; former Executive Director Thomas Deen; Executive Director Robert E. Skinner, Jr.; Debra Miller, 2008; Martin Wachs, 2000; Joseph Sussman, 1994; (back row, left to right:) Neil J. Pedersen, 2011; Herbert H. Richardson, 1988; Michael Morris, 2010; C. Michael Walton, 1991; E. Dean Carlson, 2002; and David N. Wormley, 1997.



in 2007, is an online subscription and pay-per-view service for the *Transportation Research Record* series. Record papers are posted simultaneously with the release of each printed volume to the TRR Online website, which includes approximately 12,000 journal papers published in the TRR series since 1996.¹ The service allows all visitors to identify papers of interest and review abstracts; access to the full papers is available to service subscribers and employees of TRB sponsors or by individual purchase.

- The bimonthly magazine *TR News* features timely articles on innovative and state-of-the-art research and practice in all modes of transportation. News of interest to the transportation research community, profiles of transportation professionals, book and journal summaries, meeting announcements, and highlights of TRB activities also are included; the case-study Research Pays Off series published its 150th article this year. Special features in 2011 included articles on collaborative, problem-solving research through the University Transportation Centers program of the Research and Innovative Technology Administration; lessons learned in rebuilding urban Interstates in Oklahoma City, Oklahoma, and St. Louis, Missouri; and emerging nanotechnology applications in transportation. The May–June issue focused on Public–Private Partnerships: Filling Funding Gaps for Infrastructure; the July–August magazine highlighted transportation security and criti-

cal infrastructure protection in the decade since September 11, 2001; and the September–October edition examined topics in aviation. 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.² Since 2010, the web postings have incorporated full-color photographs and graphics on the inside pages.

- *Special Reports* contain the results of TRB policy studies on issues of national importance in transportation. These studies—many conducted at the request of federal agencies or of Congress—focus on a variety of complex, often controversial, topics. Special reports published in 2011 included *Federal Funding of Transportation Improvements in BRAC Cases*; *Equity of Evolving Transportation Finance Mechanisms*; *How We Travel: A Sustainable National Program for Travel Data*; *Naval Engineering in the 21st Century: The Science and Technology Foundation for Future Naval Fleets*; and *Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation*. All current and selected out-of-print special reports are posted on the Board’s website.³
- *Conference Proceedings* assemble formal papers, presentations, and summaries of discussions from TRB conferences and workshops. *Women’s Issues in Transportation: Summary of the Fourth International Conference, Volume 2—Technical Papers* was published this year and posted on the web.⁴
- A related series, published exclusively online, *Conference Proceedings on the Web*, released *Offshore Wind Energy Projects: Summary of a Workshop*.⁵
- *Transportation Research E-Circulars* collect research problem statements, reports, and technical information from the work of TRB



Completely revised and expanded, the *Highway Capacity Manual 2010* was released this year in a boxed three-volume set with a fourth volume online.

¹ www.trb.org/Finance/Public/TRRJournalOnline1.aspx.

² www.trb.org/Publications/Public/PubsTRNewsMagazine.aspx.

³ www.trb.org/Publications/Public/PubsPolicyStudiesSpecialReports.aspx.

⁴ www.trb.org/Publications/Public/PubsConferencesandWorkshopsConferenceProceedings.aspx.

⁵ www.trb.org/Publications/PubsConferencesandWorkshopsWeb.aspx.

technical committees. Topics of circulars published this year included critical issues in aviation and the environment, development of a warranty program for hot-mix asphalt, automated imaging technologies for pavement distress surveys, modeling operating speed, regional transportation operations, dynamic traffic assignment, adapting transportation to the impacts of climate change, and applications of the Commodity Flow Survey. Circulars are available exclusively in electronic format on the TRB website.⁶

- *Miscellaneous Reports* include special publications like the *Highway Capacity Manual 2010* and the *Access Management Manual*. This year saw the release of the completely revised and expanded *Highway Capacity Manual 2010* in three slipcased volumes, plus an online fourth volume of ongoing supplemental research.⁷

In addition, the Cooperative Research Programs and SHRP 2 produced an array of titles in several publications series. (For a list of all TRB publications, see pages 66–69.)

Communications

TRB is committed to improving the communication and public awareness of transportation issues and to enhancing the dissemination of research findings worldwide and has undertaken a variety of initiatives intended to achieve these goals.

One of the Board’s most successful communications initiatives is the weekly *TRB Transportation Research E-Newsletter*,⁸ which reports on transportation research and research-related events within TRB and beyond. Circulation of the free newsletter is currently more than 39,000 and growing. Approximately one-fifth of the readership is from countries outside the United States. In 2011 TRB upgraded the design and delivery software of the e-newsletter, resulting in enhanced navigation, readability, and customization options for its subscribers.

⁶ www.trb.org/Publications/Public/PubsTransportationResearchCirculars.aspx.

⁷ <http://www.trb.org/main/blurbs/164718.aspx>.

⁸ www.trb.org/Publications/Public/PubsTRBENewsletter.aspx. To subscribe, send an e-mail to RHouston@nas.edu with “Subscribe TRB E-Newsletter” in the subject field.

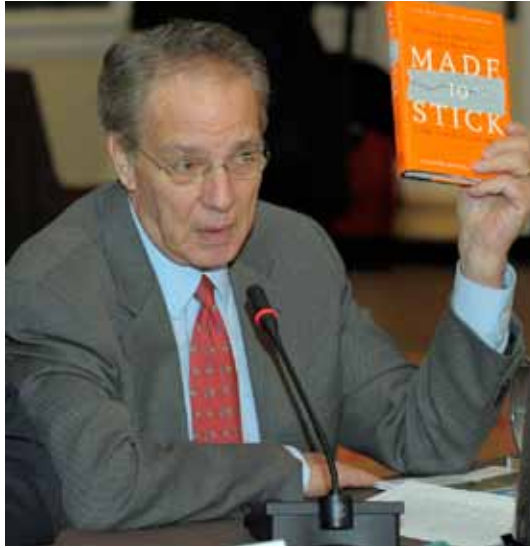


In addition to its regular webinar series, managed by TRB Program Officer for Electronic Dissemination Lisa Berardi Marflak, in 2011 TRB presented a virtual workshop for the first time. The September conference included a variety of sessions and breakout discussions exploring practical uses for social media.

TRB’s website is designed to help users readily find research news, announcements, and publications in more than 35 subject areas. The site also highlights selected transportation research–related products developed at the federal and state levels and within the academic and international transportation communities. Website functions—such as RSS (really simple syndication), Facebook, e-mail to a friend, and Twitter—allow users to keep up with and to share the latest developments in transportation research. In addition, postings for TRB’s programs offer an array of links to content. The recently upgraded search capabilities on the TRB website allow users to refine searches easily, based on subject area and type of content,



TRB continues to increase and develop its online presence via social media platforms such as Facebook and Twitter.



Jeffrey Shane of Hogan Lovells briefs members of the Executive Committee on the need for effective data to ensure informed transportation policy and investments, in one of several programs coordinated by the Executive Office.

and to find the information more readily.

Through TRB's web briefing—or webinar—series, transportation professionals share and receive information online in a conference-

like atmosphere, but in their own offices. The webinars disseminate information on new TRB reports, TRB Annual Meeting sessions, and topics requested by TRB committees. Three to four webinars are conducted each month, averaging more than 285 participants per session.

Professional engineers are now able to receive Professional Development Hours (PDH) certificates after attending select TRB webinars. In addition, TRB program divisions increasingly rely on web briefings to train volunteers and to provide updates on research in progress. This year, TRB also used the webinar platform to brief congressional staff on TRB policy studies pertinent to issues in the reauthorization of federal surface transportation programs.

TRB entered the social networking arena with the launch of its Twitter feed, TRBofNA, in December 2009 and the unveiling of its Facebook page in December 2010. Twitter messages—or tweets—and Facebook postings highlight TRB and National Academies products and meetings, as well as other transportation-related news. TRB's social media sites have attracted more than 2,700 Twitter followers and 700 Facebook fans.

— — STAFF NEWS — —

Jewelene Richardson retired as Director, TRB Committee Appointments and Human Resources, in September (see page 6).

Claudette Louard-Clarke joined the staff of the TRB Executive Office as Director, TRB Human Resources. She has more than 20 years of experience at the National Academies, with the past 10 years as Financial and Administrative Officer for the Office of Development.

Robert J. Summersgill was promoted to Manager, Committee Appointments and Databases, in September.

Russell W. Houston assumed oversight of the Information Technology unit, which transferred from Administration and Finance to the Executive Office in September.

Eric A. Grim was promoted to Software Products Manager.

The *Transportation Research Record* Publishing Managers Group—**Phyllis D. Barber**, Publishing Services Manager; **Juanita Green**, Production Manager; **Ann E. Petty**, Managing Editor; and **Jennifer J. Weeks**, Manuscript Preparation Manager—received a Group Distinguished Service Award from the National Academies in October.

Jennifer Correro rejoined the publications staff as Senior Editorial Assistant-Proofreader in October.

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 works with thousands of volunteers to carry out activities on behalf of TRB sponsors and the transportation community. The community includes thousands of members and friends of more than 200 standing committees.

By almost any measure, the TRB Technical Activities Division delivered more services and products to its stakeholders in the past year than ever before. New highs were set with an Annual Meeting attendance of 10,900 and with more than 4,000 papers received and peer-reviewed, more than 2,200 papers presented at the Annual Meeting, and nearly 1,000 papers published in the *Transportation Research Record: Journal of the Transportation Research Board* (TRR). More-

over, the citation impact factor for TRB's journal increased by 60 percent over the previous year.

Strategic Initiatives

Organization can never be a substitute for initiative and for judgment.

—LOUIS D. BRANDEIS, U.S. SUPREME COURT
ASSOCIATE JUSTICE FROM 1916 TO 1939

The Technical Activities Division launched several new strategic initiatives during 2011—for example,

- Offering access to more than 2,200 papers, visual aids, and posters from the more than 3,500 Annual Meeting presentations, along with videos of more than 40 high-profile sessions, via the new TRB Annual Meeting Online portal;



Katherine F. Turnbull
Council Chair
Technical Activities



Johanna P. Zmud
Chair
Policy and
Organization Group



Mark S. Kross
Chair
Planning and
Environment Group



Thomas J. Kazmierowski
Chair
Design and
Construction Group



Paul J. Carlson
Chair
Operations and
Preservation Group



Edward V. A. Kussy
Chair
Legal Resources
Group



Ronald R. Knipling
Chair
System Users Group



Steven Silkunas
Chair
Public
Transportation
Group



Anthony D. Perl
Chair
Rail Group



Peter F. Swan
Chair
Freight Systems
Group



Peter B. Mandle
Chair
Aviation Group



Jeannie G. Beckett
Chair
Marine Group
(Marine Board)



Harold (Skip) Paul
Chair
State DOT
Representative



Mark R. Norman
Director
TRB Technical
Activities Division



Katherine F. Turnbull, Texas Transportation Institute, shares Technical Activities Division updates with the Rail Group Executive Board in January. Turnbull chairs the Technical Activities Council.

- Fostering and nurturing research agendas for TRB standing committees, providing guidance and training through Committee Research Coordinators and enhancing the TRB Research Needs Statements database;
- Raising the profile of transportation research, identifying opportunities and options in challenging economic times;
- Conducting a strategic review of the membership structure of the standing committees, examining committee size and the rotation policies and schedules;
- Giving young transportation professionals a voice, taking formal approaches to involve young professionals and to offer opportunities to contribute to TRB deliberations that affect them; and
- Starting a strategic review of TRB's journal through the TRR Publication Board, examining the structure, content, and business plan.

The outputs and implications of these initiatives will become more evident during 2012.

The TRB Annual Meeting in January set the tone for 2011. The attendance total exceeded the previous record of 10,500, set in 2007. Turnout at TRB-sponsored conferences remained strong throughout the year. Attendance by state department of transportation (DOT) employees, however, continued below the levels reached before the economic downturn, because of travel restrictions. TRB conducted its first totally virtual program in September, *Keeping Up with Communication Technology: An Online Workshop on the Practical Uses of Social Media*, with almost 400 participants.

Highlights of the 90th Annual Meeting included the keynote address at the Chairman's Luncheon by Deborah A. P. Hersman, Chair of the National Transportation Safety Board, and



Tom Wall, Georgia Institute of Technology, participates in a session at the 2011 TRB Annual Meeting. The Technical Activities Division is seeking the input of students and young transportation professionals as part of its strategic plan.



Standing committees such as the Transportation in the Developing Countries Committee foster international outreach and transfer of knowledge.

the Thomas B. Deen Distinguished Lecture presented by James McClellan, "Railroads and the New Normal: The Impact of Lean and Green."¹ The meeting's spotlight theme was Transportation, Livability, and Economic Development in a Changing World.

Planning for TRB's 91st Annual Meeting kicked into high gear in fall 2011, with the theme of Transportation: Putting Innovation and People to Work. At the August 1 deadline for submittal, TRB had received 4,200 papers—a record number—into peer review for presentation at the meeting and publication in the TRR.

TRB sponsored and cosponsored 18 international conferences, including the 6th International Symposium on Highway Capacity and Quality of Service, in Sweden; the 8th International Conference on Managing Pavement Assets, in Chile; the first conference of the Transportation Research Group of India, in Bangalore; and the GeoHunan International Conference, in China, which focused on emerging technologies in the design, construction, rehabilitation, and inspection of transportation infrastructure.

The TRB Technical Activities Council oversees the organization and activities of the standing committees. Katherine F. Turnbull, Executive Associate Director of the Texas Transportation Institute at Texas A&M University, chairs the council. TRB representatives in each state, in more than 150 universities, and in 25 transit agencies serve as liaisons to the transportation community.

¹ For photographic highlights of the 2011 Annual Meeting, see <http://onlinepubs.trb.org/onlinepubs/trnews/trnews273.pdf>, pp. 29–40.

Highlights for 2011 from the Technical Activities Division's portfolio span the range of transportation disciplines and modes and are detailed in the following sections.

Policy and Organization

Transportation Policy

Working with a cross section of TRB standing committees, the Policy and Organization Group led an initiative to improve understanding of the role of research and analysis in designing solutions for restructuring the federal surface transportation program. The initiative identified opportunities for improving the relevance and availability of TRB research to policy makers and to decision makers.

In May, the Performance Measurement Committee sponsored the 4th International Transportation Systems Performance Measurement Conference, with the theme of Driving Change and Being Driven by Change. Steve Heminger, Executive Director of the Metropolitan Transportation Commission, Oakland, California; and Carlos Braceras, Deputy Director of Utah DOT, addressed the conference's opening session. Panelists Jeffrey Paniati, Executive Director of the Federal Highway Administration (FHWA); Paula Hammond, Secretary of Washington State DOT; and Debra Miller, Secretary of Kansas DOT, discussed the application of performance measures. The conference tracks addressed issues ranging from new technologies to the collection and analysis of data to the development of metrics. A poster session offered information about tools, methods, and approaches for incorporating sustainability and livability considerations into performance measurement at state DOTs.

In July, 42 TRB committees and subcommittees met at the Joint Midyear Meeting in Boston, Massachusetts. The Revenue and Finance Committee conducted two workshops, *Paying for the Next Surface Transportation Bill: What Proposals Are on the Table?* and *With or Without the Federal Surface Transportation Legislation—Still Forging Ahead!*

The Strategic Management and the Management and Productivity Committees cosponsored workshops on *Strategic Decision Making: Tools and Techniques for Effective Partnerships*, and *A Conversation with Leaders on Building*

Effective Partnerships. The sessions provided tools and tips to help transportation agencies thrive with reduced resources in a changing environment.

Security

Noting the 10th anniversary of the tragic events of September 11, 2001 (9/11), several TRB activities examined how far the nation has come and what still needs to be done to strengthen and protect the transportation infrastructure and to meet the challenges of disasters, man-made or natural. The July–August *TR News* featured articles on infrastructure resiliency, airport security, bridge and tunnel security, maritime piracy and the global supply chain, North American perimeter security, and rail and transit security, and highlighted an array of security-related projects under TRB's Cooperative Research Programs.²

The 2011 Annual Meeting program included sessions on evacuation planning, a 10-year retrospective on transportation security, the *Deepwater Horizon* disaster, and the fourth annual workshop on bridge and tunnel safety and security. A meet-the-author poster session featured research on emergency evacuation and a range of other topics in critical transportation infrastructure protection. At the Joint Summer Meeting in Boston, a session focused on advancing the state of the practice in critical infrastruc-

² <http://onlinepubs.trb.org/onlinepubs/trnews/trnews275.pdf>.



Data analysis and performance metrics were highlighted at the 4th International Transportation Systems Performance Measurement Conference in May.



A state and local distribution hub in Point Isabel, Texas, assisted victims of Hurricane Dolly in 2008. The efficiency and resiliency of transportation infrastructure in the face of natural and manmade disasters is an area of focus at TRB. (Photo: Barry Bahler, Federal Emergency Management Agency)



Articles in the July-August issue of *TR News* assessed developments in transportation security and infrastructure protection as of the 10th anniversary of the September 11, 2001, terrorist attacks.

ture protection with new tools and technologies, and another presented postdisaster logistics and supply-chain challenges.

With support from the Transportation Security Administration, TRB and the American Association of State Highway and Transportation Officials (AASHTO) hosted the Transportation Hazards and Security Summit and Workshop 2011: Looking Beyond the 10th Anniversary of 9/11, at the National Academies' Beckman Center in Irvine, California, in August. Summit participants explored the results and implementation of security research in the past decade; shared best practices in preparedness, response, recovery, and resiliency; identified barriers to the implementation of security measures; and outlined research, evaluation, and training needs.

Data and Information Systems

A workshop on Geographic Information Systems for Livable and Sustainable Communities convened leading scientists working with geospatial technologies to exchange views with transportation professionals and community leaders and to consider an agenda for integrated research. The workshop served as a forum for almost 200 survey users and illustrated the added value of geospatial data. In October, a conference on Using Census Data for Transportation Applications examined the transition to the new American Community Survey and explored the demographic data needs of the transportation community.

TRB has established a special task force, Data for Decisions and Performance Measures, to explore how data are used in decision mak-

Committee members plan the December conference on Strategies for Meeting Critical Data Needs for Decision Making in State and Metropolitan Transportation Agencies. Other data-related events included a conference on census data in transportation applications.



Bicyclists are counted with technologies installed by the City of Chicago Department of Transportation's (DOT) Chicago Bicycle Program. A TRB subcommittee is exploring data collection methods and technology for bikes and pedestrians. (Photo: David B. Gleason)

ing and to coordinate activities in this area by TRB standing committees. The TRB Executive Committee initiated a December conference on Data Needs for State and Metropolitan Planning Organization Decision Making. The planning committee of policy makers and transportation data experts crafted the program to focus on the data and information valued by decision makers and to consider actions to bridge gaps.

A new Knowledge Management Task Force will coordinate and facilitate crosscutting issues in knowledge management among the TRB standing committees. Several committees have collaborated to establish a joint Bicycle and Pedestrian Data Subcommittee to explore data-counting technologies for nonmotorized modes, as well as associated data collection and management challenges.

Research and Education

The Conduct of Research and the Technology Transfer Committees worked with the Technical Activities Council on an initiative, Back to Basics: Fostering and Nurturing Research Agendas for TRB Standing Committees. The objective is to provide standing committees with the knowledge and tools to identify research needs within their scopes; increase the probability that research addressing these needs will be conducted; and disseminate information on ongoing and completed research.

Implementation involves two main efforts: first, enhancing the TRB Research Needs State-

ments (RNS) database and other tools, and second, providing guidance and training through a community of Committee Research Coordinators, similar to the successful model of Committee Communications Coordinators. Initial enhancements to the RNS database are under way, and in late 2011, more than 100 standing committee chairs appointed a research coordinator for their committees. The coordinators were briefed through a webinar, and a workshop will be held at the 2012 TRB Annual Meeting.

Planning and Environment

Transportation System Planning

The planning committees collaborated this year to explore the process, obstacles, and opportunities associated with moving research results into practice. A series of webinars and teleconferences in the spring and during two sessions at the Joint Summer Meeting presented the topic and looked at the next steps. Work continued online in the fall, with an action plan expected by the end of the year.

The National Parks and Public Lands Committee met in the White Mountain National Forest in New Hampshire. The Multimodal Statewide Planning Committee continued its tradition of a summer peer exchange in Woods Hole, Massachusetts. The 2011 peer exchange focused on addressing financial uncertainty in the planning process.



The Chicago Metropolitan Agency for Planning's Go to 2040 outreach program, which included interactive kiosks throughout the city, received top honors in the annual Communicating Concepts with John and Jane Q. Public competition. (Photo: Chicago Metropolitan Agency for Planning)

The Public Involvement Committee held the fourth annual communications competition on communicating sustainability and livability concepts; the winners will be announced at the 2012 Annual Meeting. The winner of the third annual TRB Communicating Concepts with John and Jane Q. Public Competition was the Chicago Metropolitan Agency for Planning, for its outreach program, Go to 2040: Invent the Future.

The 13th TRB National Transportation Planning Applications Conference, held in Reno, Nevada, in May drew a large number of participants who learned from practitioners from around the country.

Social, Economic, and Environment

The Social, Economic, and Cultural Factors Section sponsored a session at TRB's Joint Summer Meeting to address the topic, How Can We Better Measure Return on Transportation Investments? Many performance metrics do not integrate social and environmental factors; panelists discussed analytical tools to measure the value of spending on transportation and to focus investments on the highest return on investment in terms of the triple bottom-line of financial, social, and environmental performance.

In May, the Transportation and Air Quality Committee participated in the 2011 Transportation Planning, Land Use, and Air Quality Conference hosted by FHWA, Iowa State University, and the American Society of Civil Engineers.

The Special Task Force (STF) on Climate Change and Energy sponsored an Annual Meeting session on transportation system adaptation to climate change, and cosponsored a workshop on low-carbon transportation. In addition, the STF produced an e-circular, *Adapting Transportation to the Impacts of Climate Change: State of the Practice 2011*,³ and helped develop several webinars on climate change adaptation and mitigation.

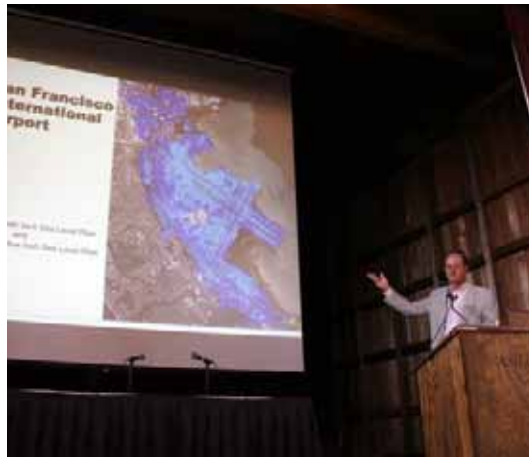
The STF and the Transportation Energy and the Alternative Transportation Fuels and Technologies Committees held midyear meetings in August at the 13th Biennial Asilomar Conference on Transportation and Energy, cosponsored by TRB, with the theme, Rethinking Energy and Climate Strategies for Transportation. The STF



Stormy weather at Gatwick Airport in London. Transportation systems must adapt to increased severe weather patterns induced by climate change; in 2011, climate change adaptation was the focus of several webinars, an Annual Meeting session, an e-circular, and other activities.

³ Circular E-C 152, <http://onlinepubs.trb.org/onlinepubs/circulars/ec152.pdf>.

The Asilomar Conference on Transportation and Energy, cosponsored by TRB, explored new approaches to energy and climate change issues in transportation. (Photo: Institute of Transportation Studies, University of California, Davis)



worked to finalize plans for the 2012 Annual Meeting and to continue developing a *TR News* theme issue, scheduled for July–August 2012, on the implementation of climate change adaptation policies by state DOTs and metropolitan planning organizations (MPOs).

Representatives of four states and five MPOs convened a peer exchange on Incorporating Targets for Reducing Greenhouse Gas Emissions into Transportation Asset Management. Participants shared experiences and drafted research needs statements to address key challenges.

Design and Construction

Design

Committees in the design sections conducted an array of meetings, sessions, and workshops at the 2011 TRB Annual Meeting:

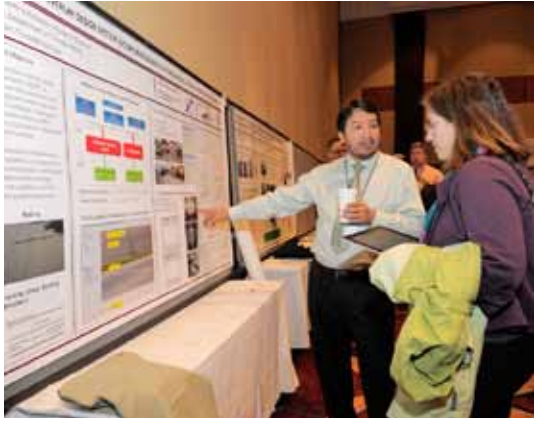
- Design Section committees sponsored a workshop on Reinventing Project Management Practices to Integrate Context-Sensitive Solutions;
- Pavement Management Section committees sponsored a two-part session on Sustainable Highway Infrastructure; and
- Structures Section committees sponsored a megasession on Special Construction Techniques for Steel and Concrete Highway Bridges.

The Roadside Safety Design Committee held a summer meeting in Cleveland, Ohio, in May with Task Force 13—a joint committee of AASHTO, the American General Contractors, and the American Road and Transportation Builders Association. The meeting’s theme was Roadway Departure Crashes: Bridging the Gap Between Testing and Real-World Performance. The TRB Geometric Design and the Operational Effects of Geometrics Committees met with AASHTO’s Task Force on Geometric Design in Irvine, California, in July, to formulate strategic research needs in geometric design.

The Structures Section cosponsored the 28th International Bridge Conference in June, the 6th New York City Bridge Conference in July, and the 7th World Congress on Joints, Bearings, and Seismic Systems for Concrete Structures in October. The Pavement Management Systems Committee cosponsored the 8th International Conference on Pavement Management Assets in Santiago, Chile, in November.

State-of-the-art practice in bridge design and rehabilitation was the subject of the 6th New York City Bridge Conference, cosponsored by TRB in July. (Photo: Mike LaMonaca)





German Claros, Texas DOT, discusses asphalt overlay design systems at the Annual Meeting.

Construction and Materials

Committees in the Construction, Asphalt Materials, and Concrete Materials Sections reviewed their largest-ever sheaf of papers for the 2011 TRB Annual Meeting and conducted sessions and workshops on emerging topics and current issues, such as warm-mix asphalt; moisture susceptibility in asphalt pavements; the use of higher percentages of recycled asphalt pavement; open-graded friction courses; continuously reinforced concrete pavement; environmental sustainability rating systems; managing construction through supply-chain management; longitudinal joints in asphalt pavements; sensor technology in concrete materials; durable materials for concrete sustainability; concrete cracking; optimizing design and construction of concrete pavements to reduce construction time, cost, and delays for users; and tracking the economic progress of Disadvantaged Business Enterprises on transportation projects.

The Construction Management and the Project Delivery Methods Committees cosponsored the 2nd International Conference on Construction Management in Orlando, Florida, in February. The Characteristics of Asphalt-Aggregate Combinations to Meet Surface Requirements Committee cosponsored the 5th International Conference on Bituminous Mixtures and Pavements in Thessaloniki, Greece, in June.

The Characteristics of Asphalt Paving Mixtures to Meet Structural Requirements produced a TRB webinar in October on Advanced Models to Characterize and Design Asphalt Pavements: Implementation and Application Examples. The Project Delivery Methods Com-

mittee sponsored the May-June 2011 *TR News* on public-private partnerships.⁴

The Characteristics of Asphalt Materials Committee produced an e-circular on *Development in Asphalt Binder Specifications*,⁵ and the Flexible Pavement Construction and Rehabilitation and the General Issues in Asphalt Technology Committees published *Development of Warranty Programs for Hot-Mix Asphalt*.⁶

Soils, Geology, and Foundations

Geotechnical Engineering Section committees were involved in the following activities at the 2011 Annual Meeting:

- The Mineral Aggregates Committee cosponsored a workshop on Aggregate Source Depletion and Future Supply;
- The Application of Emerging Technologies to Design and Construction Committee sponsored a workshop on the State of the Art of Automated Machine Guidance and cosponsored Emerging Sensor Technology for Utility Construction: Status of SHRP 2 Research, as well as Visualization Research: The State of Affairs and Virtual Design and Construction for Transportation: Terminologies, Opportunities, and Barriers;

⁴ <http://onlinepubs.trb.org/onlinepubs/trnews/trnews274.pdf>.

⁵ Circular E-C 147, <http://onlinepubs.trb.org/onlinepubs/circulars/ec147.pdf>.

⁶ Circular E-C 154, <http://onlinepubs.trb.org/onlinepubs/circulars/ec154.pdf>.



Completion of the North Tarrant Express Lanes in Texas is scheduled for 2015. This and other transportation projects fostered under public-private partnerships were examined in a special issue of *TR News* developed through the Project Delivery Methods Committee. (Photo: North Tarrant Express)

Cecil Jones, Diversified Engineering Services (right), explains the activities of the Soil Mechanics Section to Daniel Rosenblum (left), Tina Pourhsams-Manzouri, and Carmen Astilleja of Arizona State University at a session for new and young Annual Meeting attendees.



- The Exploration and Classification of Earth Materials Committee cosponsored Reinventing Geotechnical Investigations;
- The Transportation Earthworks Committee cosponsored SHRP 2: Geotechnical Solutions for Transportation Infrastructure;
- The Chemical and Mechanical Stabilization Committee cosponsored Advances in Soil Stabilization: Practical and Sustainable Solutions; and
- The Engineering Geology Committee cosponsored Design and Construction of Rockfall Mitigation Systems.

TRB convened the 10th International Conference on Low-Volume Roads in Orlando, Florida, in July; more than 90 papers were published in three TRR volumes.⁷ Conference sponsors were the Bureau of Indian Affairs and the Fish and Wildlife Service, U.S. Department of the Interior; FHWA; the Forest Service of the U.S. Department of Agriculture; the Engineer Research and Development Center of the U.S. Army Corps of Engineers; and the U.S. Environmental Protection Agency.

The Engineering Geology and the Exploration and Classification of Earth Materials Committees conducted a Symposium on Geophysical Exploration, Nondestructive Evaluation, and Monitoring Techniques for Landslides, Rockfalls, and Other Geohazards in Lexington, Kentucky, in July.

Among the conferences cosponsored by section committees were Geo-Frontiers 2011, in Dallas, Texas in March; GeoHunan International Conference II: Emerging Technologies

⁷ TRR Nos. 2202, 2203, and 2204.

for Design, Construction, Rehabilitation, and Inspection of Transportation Infrastructure, in Hunan, China, in June; and the 2nd Road Dust Best Management Practices Conference, in Las Vegas, Nevada, in November. In addition, the Subsurface Drainage Committee sponsored a webinar on Moisture Impacts on Pavement Performance in June.

Operations

The 1st International Conference on Access Management was held in Athens, Greece, in June, attracting more than 100 participants from 14 countries to share knowledge, expertise, and experience in integrating access management into established planning, policy, and design processes. The TRB Access Management Committee sponsored the conference, which was hosted by the National Technical University of Athens.

Also in June, the 6th International Symposium on Highway Capacity and Quality of Service met in Stockholm, Sweden, attracting more than 100 participants from 18 countries. The program covered the latest developments in highway and transportation capacity and quality of service, including the newest edition of the *Highway Capacity Manual*, HCM 2010, released in March.⁸

Operations Section committees published three e-circulars:

- *75 Years of the Fundamental Diagram for Traffic Flow Theory: Greenshields Symposium*, papers exploring the history and technologi-

⁸ www.trb.org/main/blurbs/164718.aspx.



Senior Program Officer Richard Cunard (standing) briefs a meeting of the Operational Effects of Geometrics Committee.



TRB Minority Fellow Kyle Green, North Carolina Agricultural and Technical State University (*right*), shares research on reflective crack mitigation strategies on flexible pavements with Suzanne Schneider, TRB Associate Executive Director (*left*); Roger Olson, Minnesota DOT and Chair, Pavement Maintenance Committee; and James Bryant, Senior Program Officer, Second Strategic Highway Research Program, TRB.

cal impacts of traffic flow theory, as well as its current status, recent developments, and research needs;⁹

- *Advancing Regional Transportation Operations: A National Workshop*, summarizing the state of the practice in regional approaches to managing and operating the transportation system in a multiagency, multimodal, and cross-functional manner to improve system performance and reliability;¹⁰ and
- *Modeling Operating Speed*, a synthesis of operating speed models developed in different regions of the world, identifying the limitations and deficiencies in the models, outlining research needs, and providing practitioner perspectives on the potential use of speed prediction models in road design practice.¹¹

Maintenance and Preservation

Maintenance and Preservation Section committees sponsored a variety of workshops and sessions at the 2011 TRB Annual Meeting on topics in management, personnel, pavements, structures, signing and pavement markings, equipment management, winter maintenance,

⁹ Circular E-C 149, <http://onlinepubs.trb.org/onlinepubs/circulars/ec149.pdf>.

¹⁰ Circular E-C 150, <http://onlinepubs.trb.org/onlinepubs/circulars/ec150.pdf>.

¹¹ Circular E-C 151, <http://onlinepubs.trb.org/onlinepubs/circulars/ec151.pdf>.

and work zones. Specific session topics included assessing highway infrastructure health and performance; recruiting and retaining women in maintenance and operations, traffic incident management, and emergency response; innovative approaches to pavement maintenance and preservation; underwater bridge repair; the long-term bridge performance program; non-destructive evaluation for bridge maintenance; infrastructure corrosion control; an asset management approach to traffic sign maintenance, retroreflectivity, and visibility of signing and pavement markings; equipment fleet management; managing and contracting for winter maintenance services; predicting road surface conditions during weather events; best practices in work zone assessment, data collection, and performance measurement; and work zone safety, mobility, and traffic control.

The Winter Maintenance and the Surface Transportation Weather Committees are sponsoring the International Conference on Winter Maintenance and Surface Transportation Weather, in Coralville, Iowa, April 30–May 3, 2012. All of the section committees are cosponsoring the 2012 AASHTO-TRB Maintenance Management Conference in Seattle, Washington, July 15–19, 2012.

Safety

Safety committees are creating subcommittees to focus research on decreasing the number of roadway crashes. Recently formed subcommittees include Global Road Safety; Emerging Vehicles and Technology in Personal Transportation; Toward Zero Deaths; Safety Culture; Traffic Speed and Safety: Crosscutting Issues; and Pedestrian and Bicycle University Education.

TRB, AASHTO, and FHWA continue to implement the *Highway Safety Manual* (HSM).¹² Thirteen states are participating in the lead state program funded by FHWA and TRB's National Cooperative Highway Research Program (NCHRP); the first peer exchange was held in August. The Highway Safety Performance Committee has started work on the second edition of the HSM, and NCHRP has awarded two contracts for additional crash prediction models.

An international conference on roundabouts

¹² www.trb.org/main/blurbs/163701.aspx.



The recruitment and retention of female maintenance and operations personnel was among the topics addressed by the Maintenance and Preservation Section at the Annual Meeting. (Photo: Missouri DOT)



David Shinar, Ben Gurion University of the Negev (right), discusses traffic safety problems, research approaches, and implementation of crash countermeasures in other countries at a Human Factors Workshop session in January.

attracted approximately 400 participants. Interest in this alternative to traditional intersections is expanding rapidly, and the evaluation data continue to illuminate several benefits in safety, reduced delays, and reduced vehicle emissions.

The 6th University Transportation Centers Spotlight Conference, Improving Safety Programs Through University–Agency Partnerships, highlighted successful collaborations and offered approaches to make the arrangements more effective in improving roadway safety. Other safety conferences in 2011 included the 6th International Visualization in Transportation Symposium, in Chicago in August; Emerging Issues in Safe and Sustainable Mobility for Older People, in Washington, D.C., in August; and the 3rd International Conference on Road Safety and Simulation, in Indianapolis, Indiana, in September.

Legal Resources

The Legal Resources Group celebrated half a century of conducting informative law workshops, with the 50th Annual Workshop on Transportation Law, in Seattle, Washington, July 17–20. Alan Boyd, first Secretary of U.S. DOT, and John Vardaman of Williams and Connolly were the featured speakers, addressing the early development of a policy on environmental justice and the effects of the U.S. Supreme Court’s decision in *Citizens to Preserve Overton Park v. Volpe*. The annual workshop provides legal educational opportunities, with accredited continuing legal education for highway and transit attorneys; approximately 155 attorneys participated.



A growing interest in roundabouts was reflected in the large turnout to the 3rd International Conference on Roundabouts in Carmel, Indiana. (Photo: Washington State DOT)

Through its quarterly online newsletter, *The Natural Lawyer*, the Environmental Committee dealt with issues related to climate change, stormwater management, environmental compliance by transportation agencies, and the recently released guidance for preparing documents under the National Environmental Policy Act.

The Tort Liability and Risk Management Committee continues to track state and local governments’ implementation of the *Manual on Uniform Traffic Control Devices*, including revisions in the historic approach to standards. The Eminent Domain and Land Use Committee continues to monitor the effects of the Supreme Court decision in *Kelo v. City of New London* on state condemnation efforts and use of rights-of-way. The Transportation Law Committee considered the implications of state transportation departments’ handling of furloughs, compliance with Americans with Disabilities Act requirements, and transportation issues in tribal communities.

Aviation

The Airfield and Airspace Capacity and Delay, the Intergovernmental Relations in Aviation, and the Aviation System Planning Committees held midyear meetings in May and June in Washington, D.C., to discuss plans for the 2012 Annual Meeting. Subcommittees of the Light Commercial and General Aviation Committee on civil helicopters, on regional and commuter airlines, and on business aviation also met at the same time to discuss industry economic and activity forecasts.

The Environmental Impacts of Aviation Committee held a midyear meeting in May at the National Academies’ Jonsson Center in Woods Hole. Invited presentations addressed climate change adaptation issues for aviation. The committee updated the e-circular, *Critical Issues in Aviation and the Environment*, published in March.¹³

Committees in the Aviation Group produced the September–October issue of *TR News*, covering the dynamic role of research in responding to such challenges as new air traffic control

¹³ Circular E-C 148, <http://onlinepubs.trb.org/onlinepubs/circulars/ec148.pdf>.



The Federal Aviation Administration and TRB hosted a Commercial Aviation Forecast Assumptions Workshop at the Keck Center in October.

technologies, achieving sustainability, adopting alternative fuels, improving security, and stabilizing industry economics.¹⁴

Freight Systems

The Freight Systems Group continues to focus on promoting awareness and understanding of the importance of goods movement and the integration of freight systems and facilities into transportation planning, operations, and development.

In keeping with the theme of the 2011 Annual Meeting, the Freight Systems Group sponsored Freight Day, a series of four sessions centered

¹⁴ <http://onlinepubs.trb.org/onlinepubs/trnews/trnews276.pdf>.



The Green Trucking workshop at the Annual Meeting opened a dialogue about energy use and emissions of higher-productivity vehicles; technologies, metrics, and models for productive and environmentally friendly trucking; and balancing energy use with size and weight regulations.

on Freight's Contribution to Livability and Economic Development, along with a workshop on Green Trucking. Other sessions covered such topics as balancing freight movement needs in livable urban areas, international border issues, intermodal transportation and facilities, risks in hazardous materials transportation, military logistics, freight planning, and freight data and modeling. The committees received a record number of papers to review; many were presented in lectern and poster sessions and a selection was published in two volumes of the TRR.¹⁵

Several of the Freight Systems Group committees convened at the Joint Summer Meeting in Boston and presented sessions on livability, increasing freight throughput with existing infrastructure, the challenges and logistics of disaster relief aid, and enhancing port facilities. The Truck Size and Weight Committee met with its counterpart AASHTO committee in Austin, Texas.

To promote a better understanding of the trucking industry, the Freight Systems Group issued an e-circular, *Trucking 101*, through the efforts of volunteers, notably from the Trucking Industry Research Committee.¹⁶

Marine

Marine topics at the 2011 Annual Meeting included port management, global port planning, environmental impacts of maritime operations, marine operational safety, America's marine highway, the inland waterways capital development plan, and ferry system planning. Peer-reviewed papers were published in a TRR titled *Water Transportation and Marine Terminal Operations*.¹⁷

In June, the TRB Marine Board cosponsored with the U.S. Coast Guard the second joint conference of harbor safety and area maritime security committees in Houston, Texas, with the theme, Safeguarding the Nation's Maritime Gateways. Presentations from the event are available as online videos.¹⁸ In September, the Marine Board hosted a forum on offshore wind

¹⁵ TRR Nos. 2224 and 2238.

¹⁶ Circular E-C 146, <http://onlinepubs.trb.org/onlinepubs/circulars/ec146.pdf>.

¹⁷ TRR No. 2222.

¹⁸ www.bethereglobal.com/content/501_trb_hsc_2011/2011_agenda.pdf.



U.S. Coast Guard Captain John Plunkett, Commander, Marine Safety Unit, Port Arthur (left); U.S. Navy Rear Admiral Sinclair Harris, Director, Irregular Warfare Office of the Chief of Naval Operations; and U.S. Coast Guard Captain Marcus Woodring, Commander, Sector Houston-Galveston, at the 2011 Joint Harbor Safety Committee and Area Maritime Security Committee Conference in Houston, Texas, in June. Harris delivered a luncheon address at the conference. (Photo: M. H. K. Aschemeyer)

energy. Policy studies on offshore wind energy structures and naval engineering in the 21st century were released in 2011.¹⁹

The Joint Summer Meeting in Boston included sessions on addressing community and environmental impacts in multimodal freight settings; inland waterway public policy issues; cost comparisons of road, rail, and waterway freight movements; military uses of the marine highway; and a review of ferry system initiatives. In September, TRB cosponsored the 2011 SmartRivers Conference in New Orleans, Louisiana, covering such topics as smart service design and innovation, public policy, finance, environmental management, flood protection and mitigation, and economic development.

The Marine Board held its Spring Meeting in Washington, D.C., with a focus on the inland waterway capital development plan and on recent marine-related reports from the Government Accountability Office and the Maritime Administration. The fall meeting in Anchorage, Alaska, examined Maritime Commerce in a Changing Arctic. Public sessions covered topics relating to international Arctic initiatives and the U.S. role; offshore oil and gas development in the U.S. Arctic; Arctic shipping and vessel activities and landside infrastructure challenges; and initiatives in Arctic charting, navigation aids, and icebreaking.

¹⁹ <http://onlinepubs.trb.org/onlinepubs/sr/sr305.pdf>; <http://onlinepubs.trb.org/onlinepubs/sr/srSEMSInterimReport.pdf>; <http://onlinepubs.trb.org/onlinepubs/sr/sr306.pdf>.

Public Transportation

In addition to committee meetings and sessions, the Public Transportation Group conducted topical workshops at TRB's 90th Annual Meeting, including

- How We Double Ridesharing in 10 Years to Enhance Livability and Productivity;
- The Big Picture: Total Transportation Connectivity—Integrating Transportation Technologies to Create Seamless Mobility Solutions for Livable Communities;
- Critical Roles of Multimodal Transportation in Major Activity Center Circulation and Urban Development; and
- Complete Bus Stops: Benefits of Accessibility Improvements.

Committees published several research documents, including four volumes of the TRR,²⁰ and conducted five midyear meetings. The Light Rail Transit Committee, the Commuter Rail Committee, and the joint subcommittee on Self-Powered Units held midyear meetings at the American Public Transportation Association (APTA) Rail Conference in Boston. A rail passenger caucus convened in Chicago and Wisconsin to host a joint meeting of the passenger rail-oriented committees and to provide training in rail transit systems, programs, and policies.

A new joint subcommittee on Transit State of Good Repair was formed under the Transit Management and Performance Committee with several cosponsoring committees: Commuter Rail, Rail Transit Systems, Bus Transit Systems, Light Rail Transit, Intermodal Transfer Facilities, and Rail Transit Infrastructure. The joint subcommittee will work to define the state of good repair; will examine current standards and performance measures, as well as funding sources; will explore the coordination of activities and the incorporation of the concept into planning and design; and will outline research needs.

Rail

In the past year, members and friends of TRB's Rail Group committees have directed their attention to emerging issues in the passenger

²⁰ TRR Nos. 2216, 2217, 2218, and 2219.



Signs in Washington Metropolitan Area Transit Authority Metrorail stations communicate weekend track work activities to riders. The Transit Management and Performance Committee and other committees in the Public Transportation Group have formed a new subcommittee on Transit State of Good Repair.

and freight rail industries. For example, while the Federal Railroad Administration (FRA) continues efforts to implement a high-speed passenger rail program, federal and state funding has become more questionable and controversial, with growing budget deficits. The implementation of federally mandated positive train control, the Surface Transportation Board review of freight rail competition, and a proposed increase in truck size and weight limits have been central issues for the freight rail industry.

TRB's Annual Meeting included workshops and sessions on high-speed and intercity passenger rail service and operations, covering environmental aspects, international and domestic development, and infrastructure design, as well as rail transit developments. U.S. Congressman Bill Shuster, Chair of the House Subcommittee on Railroads, Pipelines, and Hazardous Materials, attended the Intercity Passenger Rail Committee meeting to discuss his view of high-speed and intercity passenger rail. FRA Deputy Administrator Karen Rae addressed a session on high-speed rail. Other sessions focused on freight and passenger rail design, operation, and maintenance, with emphasis on related innovative research results.



Rail group committees held midyear meetings, some in conjunction with the Association of American Railroads' Annual Research Review and the 2011 Joint Rail Conference, in Pueblo, Colorado, cosponsored by TRB. Other committees met at the APTA Rail Conference in Boston.



The National Academies presented a Communication Award to **Kimberly M. Fisher**, Associate Division Director—Planning and Energy, for her efforts in reaching out to TRB volunteers and TRB meeting attendees.

Associate Division Director **Frederick D. Hejl**, Materials and Construction Engineer, received a Distinguished Service Award from the National Academies in

MAJOR AWARDS PRESENTED IN 2011

Jane Garvey (*below*), Chairman, Meridian North America, was honored with the Frank Turner Medal for Lifetime Achievement in Transportation, for her widely recognized contributions in highways, aviation, and transportation finance over a long career of public service. Garvey served as Commissioner of the Massachusetts Department of Public Works, as director of Boston's Logan International Airport, and as Deputy Administrator and then Acting Administrator of the Federal Highway Administration (FHWA), where she initiated several innovative financing approaches. In 1997, she was appointed Administrator of the



Federal Aviation Administration (FAA); in her 5-year term, she helped restore confidence in air travel after the 2001 terrorist attacks, established a risk management approach for aviation safety, and worked to expand the capacity and capability of the air traffic control system.

The George S. Bartlett Award for outstanding contributions to highway progress was presented to former U.S. Representative **James L. Oberstar** (D-Minnesota, with incoming TRB Executive Committee Chair and past Bartlett Award recipient Neil S.



Pedersen at right). Elected to 18 terms in Congress, Oberstar championed investment in the nation's highway and transportation infrastructure and played a vital role in developing major public infrastructure legislation. As a member and Chairman of the U.S. House of Representatives Transportation and Infrastructure Committee, he worked to improve safety and efficiency for the traveling public throughout his career.

Debra L. Miller (*below*), Secretary, Kansas Department of Transportation, received the W. N. Carey, Jr., Distinguished Service Award for exceptional service to transportation



research and TRB. A leader in policy and strategic planning for TRB, Miller was 2008 chair of the Executive Committee and past chair of its Subcommittee on Planning and Policy Review. She has served with distinction on study committees and technical project panels and has championed research and policy analyses that address long-term challenges faced by transportation agencies. A past chair of TRB's standing committee on Transportation and Economic Development, she currently chairs the planning committee for the Conference on Meeting Critical Data Needs for Decision Making in State and Metropolitan Transportation Agencies and is a member of the SHRP 2 Oversight Committee.



The career achievements of **James W. McClellan** (*above*), Vice President, Woodside Consulting Group, were recognized with the 2011 Thomas B. Deen Distinguished Lectureship. McClellan, who retired in 2003 from Norfolk Southern (NS), presented a lecture on "Railroads and the New Normal: Impacts of Lean and Green." He detailed the progress of the railroad industry since the 1960s—from dwindling traffic

and overregulation to efficiency, financial success, and environmental sustainability. McClellan's career in railroads has spanned the private and public sectors—he was involved in the creation of Amtrak and of Conrail, as well as in the division of Conrail into CSX and NS.

The Roy W. Crum Distinguished Service Award for distinguished achievement in transportation research was presented to **A. Keith Turner**, emeritus professor, Colorado School of Mines, by outgoing Executive Committee Chair Michael R. Morris (*below, right*). Turner's research on applying computer and spatial information technologies to geological and environmental issues is internationally recognized. He was recently appointed a Visiting Research Associate to the British Geological Survey and has collaborated with European Geological Surveys for more than 20 years on spatial data management, visualization, and analysis and has been active in TRB for nearly 40 years. He was instrumental in developing the 1996 TRB special report, *Landslides: Investigation and Mitigation*.



STUDIES AND SPECIAL PROGRAMS

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; develops and operates bibliographic databases of ongoing and completed research and provides library reference services for sponsors; produces syntheses of current practices in highway, transit, airport operations, and commercial truck and bus safety; and manages Innovations Deserving Exploratory Analysis (IDEA) programs in highway, transit, and rail and truck safety.

Policy Studies

With the guidance of committees drawn from the nation's leading experts, the Policy Studies unit 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. In addition, studies conducted through TRB's Marine Board may address offshore engineering and regulatory issues not directly related to transportation.

TRB's parent organization, the National Research Council (NRC), appoints the study committees to achieve a balance of expertise and perspectives. The U.S. Congress and the



TRB Executive Director Robert E. Skinner, Jr. (right), contributes to discussions at the fall meeting of the Subcommittee on Planning and Policy Review, November 11, at the Keck Center.



Automobile safety advocate Joan Claybrook (left) gives a statement to a National Research Council (NRC) study committee on Electronic Vehicle Controls and Unintended Acceleration in October 2010. The study committee developed Special Report 308, *Making Driving Safer: The Promise and Challenge of Automotive Electronics*. (Photo: Patricia Pooladi)

executive branch have adopted many recommendations from TRB policy reports, attesting to the substantive value of the findings.

The TRB Executive Committee's Subcommittee on Planning and Policy Review provides oversight for TRB's policy work, under the leadership of former Executive Committee Chair Adib K. Kanafani, University of California, Berkeley. Since 1998, all completed policy study reports are posted on the TRB website.¹ *Informing Transportation Policy Choices*, a web document that provides an overview of TRB policy studies, also is posted on the Policy Studies page of the website.²

High-Profile Studies

Allegations that Toyota automobiles had accelerated uncontrollably raised concerns nationwide. Through the National Highway Traffic Safety Administration (NHTSA), Secretary of Transportation Ray LaHood initiated two major efforts to examine the unintended accel-



Adib K. Kanafani
Chair
Subcommittee on
Planning and Policy
Review



Stephen R. Godwin
Director
Studies and Special
Programs

¹ www.trb.org/Publications/Public/PubsPolicyStudiesSpecialReports.aspx.

² www.trb.org/Publications/Public/PolicyStudiesInformingTransportationPolicyChoi.aspx.

Oil drilling rig *Deepsea Delta* in the North Sea. The U.S. Department of the Interior requested a study by an NRC–National Academy of Engineering committee on causes of a blowout on the offshore rig *Deepwater Horizon* in the Gulf of Mexico in May 2010. (Photo: Erik Christensen)



eration of motor vehicles. NHTSA convened NASA experts in electronic control systems to study Toyota’s electronic throttles to identify possible electronic causes of the unintended acceleration. NHTSA also asked NRC to convene an independent committee of experts to review efforts by the agency and by the automobile industry to address the safety implications of the growing reliance on electronic control systems in automobiles. In Special Report 308, *Making Driving Safer: The Promise and Challenge of Automotive Electronics*, the committee examines these issues and advises NHTSA on the approaches and resources needed to carry out the agency’s safety role. The report is scheduled for release in mid-January 2012.³ TRB’s Policy Studies group led the project in collaboration with two NRC units—the Computer Science and Telecommunications Board and the Board on Energy and Environmental Systems. Louis J. Lanzerotti (NAE), New Jersey Institute of Technology, chaired the committee.

After the blowout and explosion on the *Deepwater Horizon* offshore oil platform in the Gulf of Mexico, the Department of the Interior contacted the National Academy of Engineering (NAE) and NRC to conduct an independent examination of the causes. The committee assessed the causes of the blowout and explosion and has made recommendations to government and industry on minimizing the risk of similar disasters. The report, *Macondo Well–Deepwater Horizon Blowout: Lessons for Improving Offshore Drilling Safety*, was published in December by the National Academies Press.⁴ TRB managed the NAE-NRC study because of the Marine

³ <http://onlinepubs.trb.org/onlinepubs/sr/sr308.pdf>.

⁴ www.nap.edu/catalog.php?record_id=13273.

Board’s history of conducting projects related to offshore oil and gas platforms. The NRC Board on Environmental Studies and Toxicology assisted with the project. Donald C. Winter (NAE), University of Michigan and former Secretary of the Navy, chaired the study committee.

Other Completed Policy Studies

Federal Funding of Transportation Improvements in BRAC Cases

(SPECIAL REPORT 302, FEBRUARY)

In the appropriations act for fiscal year (FY) 2010, Congress requested a study of federal funding for transportation improvements in Defense Base Closure and Realignment Commission (BRAC) cases. The study committee concluded that traffic delays resulting from the BRAC decisions and the short timeline for implementing the decisions will impose substantial costs on surrounding communities and may even be harmful to the military.

The committee’s report offers recommendations to mitigate the effects of BRAC for the near, short, and long terms.⁵ The committee advises Congress to consider a special appropriation or the allocation of uncommitted stimulus funds to address the most immediate, adverse transportation problems caused by base realignments; to create new funding streams for transportation infrastructure, noting that the Department of Defense should accept more financial responsibility for transportation problems related to

⁵ <http://onlinepubs.trb.org/onlinepubs/sr/sr302.pdf>.



Among the infrastructure changes necessitated by the Base Realignment and Closure Act—which shifted a large number of military and U.S. Department of Defense personnel to Mark Center in metropolitan Washington, D.C.—was an extension to the Fairfax County Parkway, shown under construction in an aerial view. (Photo: Trevor Wrayton, Virginia DOT)

growth on military bases, just as private developers pay impact fees for improvements to the accessibility of their sites; and to improve the coordination and planning between military bases and the surrounding communities. Joseph M. Sussman, Massachusetts Institute of Technology, chaired the committee; the study was funded by the Department of Defense.

Equity of Evolving Transportation Finance Mechanisms

(SPECIAL REPORT 303, AUGUST)

As traditional sources of funding for surface transportation fail to keep pace with demand, proposals proliferate for new and evolving sources. In particular, road pricing strategies—such as high-occupancy toll (HOT) lanes—have generated concern about equity. The TRB Executive Committee therefore initiated a project to examine the equity consequences of newer forms of transportation financing. The study committee concludes that the available evidence is weak and indicates the difficulty of generalizing about the equity consequences of HOT lanes, cordon tolls, and other evolving pricing mechanisms.⁶

Equity has many dimensions—such as income, geography, and generational characteristics; moreover, local circumstances often influence the equity impacts of projects. The increasing reliance on general sales taxes to support surface transportation projects, however, usually translates to poorer households paying a larger share of their income than wealthier households do.

The committee encourages policy makers to support local, in-depth evaluations of proposed financing arrangements before making investment decisions and to engage the public to explore perceptions of the new financing approaches. Joseph L. Schofer, Northwestern University, chaired the study committee; TRB funded the project.

How We Travel: A Sustainable National Program for Travel Data

(TRB SPECIAL REPORT 304, MARCH)

The authoring committee for this report assesses travel data at the federal, state, and local levels and defines an achievable and sustainable

system to gather travel data to support public and private transportation decision making and to justify authorizations of federal and state funding by indicating levels of performance.⁷ The committee recommends a National Travel Data Program to assemble a core of essential passenger and freight travel data, sponsored at the federal level and well integrated with travel data collected by states, metropolitan planning organizations, transit and other local agencies, and the private sector. Joseph L. Schofer, Northwestern University, chaired the committee, whose work was sponsored by the Research and Innovative Technology Administration (RITA), the Federal Highway Administration (FHWA), the National Cooperative Highway Research Program (NCHRP), and TRB.

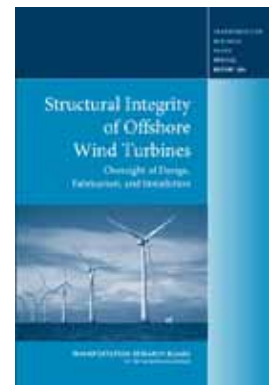
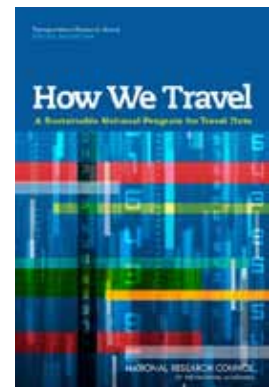
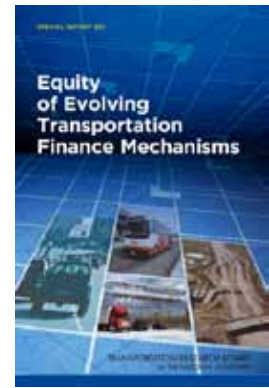
Structural Integrity of Offshore Wind Turbines: Oversight of Design, Fabrication, and Installation

(SPECIAL REPORT 305, APRIL)

This report explores the approach taken by the U.S. Department of the Interior’s Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) in overseeing the development and safe operation of wind turbines on the outer continental shelf, with a focus on structural safety.⁸ The committee finds that the United States needs clear requirements that can accommodate design development and can support the nascent offshore wind industry.

The committee recommends that BOEMRE develop requirements that establish goals and objectives for structural integrity, environmental performance, and energy generation. The risks to human life and the environment associated with offshore wind farms are substantially lower than for other industries, such as offshore oil and gas, because offshore wind farms are unmanned and contain minimal quantities of hazardous substances.

This finding implies that an approach with significantly less regulatory oversight may be appropriate for offshore wind farms. Industry would be responsible for proposing standards, guidelines, and recommended practices to meet performance requirements established by



⁶ <http://onlinepubs.trb.org/onlinepubs/sr/sr303.pdf>.

⁷ <http://onlinepubs.trb.org/onlinepubs/sr/sr304.pdf>.

⁸ <http://onlinepubs.trb.org/onlinepubs/sr/sr305.pdf>. After completion of the report, part of BOEMRE became the Bureau of Ocean Energy Management.



Turbines in the Thanet wind project off the southeast coast of England. The Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) of the U.S. Department of the Interior requested an NRC study to examine its oversight approach for the development and operation of offshore wind turbines, still in planning stages for the United States. (Photo: Jamie Cook)

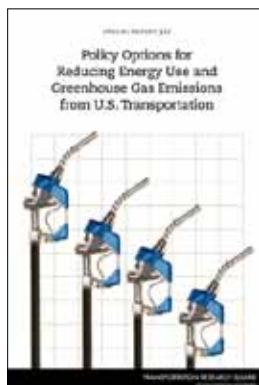
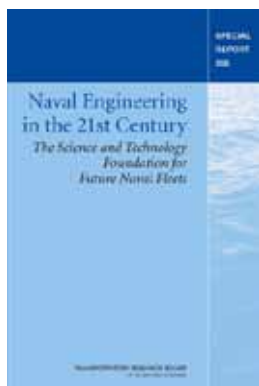
BOEMRE. The U.S. domestic industry can build on standards, guidelines, and practices from Europe, where offshore wind energy initiatives are farther along in development, but will have to fill gaps to address such problems as wave and wind loadings in hurricanes.

The report includes findings and recommendations about the role of certified verification agents, or third-party evaluators, in reviewing standards and project-specific proposals. R. Keith Michel of Herbert Engineering served as committee chair. The project was funded by BOEMRE.

Naval Engineering in the 21st Century: The Science and Technology Foundation for Future Naval Fleets

(SPECIAL REPORT 306, JUNE)

This report examines the state of basic and applied research in the scientific fields that support naval engineering and explores the effectiveness of activities by the Office of Naval Research (ONR) in sustaining these fields through the National Naval Responsibility for Naval Engineering (NNR-NE) initiative.⁹ The committee developed conclusions and recommendations in five areas—the value of the NNR-NE, the state of science and technology supporting naval engineering, the wholeness



of the NNR-NE research portfolio, opportunities for enhancing research and education, and the effectiveness of the NNR-NE initiative. The recommendations are addressed to the administrators of the NNR-NE initiative and of ONR. Martha Grabowski of Le Moyne College and Rensselaer Polytechnic Institute served as committee chair; ONR funded the project.

Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation

(SPECIAL REPORT 307, JULY)

A study committee examined whether policy measures that target cars and light trucks, medium and heavy trucks, and commercial airliners could effect major changes in transportation energy use and emissions trends. The three modes are the largest users of energy in the U.S. transportation sector, accounting for the majority of passenger trips and freight shipments.

In its report, the committee concludes that tougher fuel economy standards for U.S. transportation are not sufficient to cut national petroleum use significantly in the next half century.¹⁰ That goal requires a combination of measures that foster consumer and supplier interest in vehicle fuel economy, alternative fuels, and a more efficient transportation system.

Major policy options examined in the report—fuel taxes, vehicle efficiency standards, fuel standards, infrastructure investments, and coordinated transportation and land use planning—can bring about large energy and emissions savings from these modes over time; nevertheless, each option presents particular challenges in the scope and timing of its impacts. The report suggests that combining transportation policy options to increase the timeliness and expand the scale and scope of the response may be warranted. Emil Frankel, Bipartisan Policy Center, chaired the committee; TRB funded the study.

Effectiveness of Safety and Environmental Management Systems for Outer Continental Shelf Oil and Gas Operations

(LETTER REPORT, JUNE)

In an interim report released in June, the study committee examined methods for assessing the effectiveness of the Safety and Environ-

⁹ <http://onlinepubs.trb.org/onlinepubs/sr/sr306.pdf>.

¹⁰ <http://onlinepubs.trb.org/onlinepubs/sr/sr307.pdf>.



Inefficient and congested roads lead to greater fuel consumption and more GHG emissions. Special Report 307 concludes that a combination of measures—including infrastructure investments and land use planning—can significantly reduce transportation’s use of fossil fuel. (Photo: AAA Foundation for Traffic Safety)

mental Management Systems (SEMS) used by offshore oil and gas platform operators.¹¹ The report presented nine methods for evaluating the effectiveness of a SEMS program; outlined the benefits and disadvantages of each; identified the entities that could perform the audits; specified the range of potential roles and qualifications of the auditors and of the inspectors for the Bureau of Safety and Environmental Enforcement; and presented various methods for conducting the audits. The final report is expected in early 2012. Kenneth E. Arnold (NAE), WorleyParsons, chaired the committee; the study is funded by BOEMRE.

Evaluation of Streamlining the 4(f) Regulatory Review Process

(LETTER REPORT, SEPTEMBER)

Section 6009 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) directed the U.S. Department of Transportation (DOT) to implement regulations to streamline evaluation of the impacts of transportation projects on 4(f) resources, which include parks and recreation areas, refuges, and cultural or historic sites. The legislation also required U.S. DOT to study the consequences of those changes and for TRB to comment on the evaluation design and the draft reports.

The Phase II draft reviewed by the committee in June 2011 showed positive results from the new, *de minimis*, determinations mandated

¹¹ <http://onlinepubs.trb.org/onlinepubs/sr/srSEMSInterimReport.pdf>.

by SAFETEA-LU and from regulatory clarification of what constitutes a feasible and prudent alternative to an impact on a 4(f) resource. In its third and final letter report, however, the committee finds that the draft U.S. DOT study has not adequately met the objectives outlined in SAFETEA-LU Section 6009.¹² The committee concludes that the study relies on an incomplete conceptual framework for evaluating the outcomes and inadequately represents the perspectives of nonfederal stakeholders in 4(f) resources because of low response rates from these groups. The letter report offers recommendations for improving the Phase II report. Michael D. Meyer, Georgia Institute of Technology, chaired the committee, whose work was supported by FHWA.

Ongoing Major Studies

Other important studies are under way in the Policy Studies unit:

- A new initiative of the Executive Committee is examining options for travel in short-haul, intercity markets. Air, highway, rail, and bus options are being considered, with an emphasis on intercity rail and bus.
- The economic benefits of funding transportation projects to stimulate recovery from economic recessions have become a topic in national debates; NCHRP and TRB are funding an analysis of the issue. Therese J.

¹² http://onlinepubs.trb.org/onlinepubs/reports/4f_Sept2011.pdf.



William Dupor, Ohio State University, participates in the first meeting of the Committee on Economic and Employment Benefits of Highway Investments in Response to Economic Downturns, in October at the Keck Center.

McGuire, Northwestern University, chairs the study committee.

- Building on an international scan of research programs in 2008, NCHRP is funding a follow-up study to determine whether processes used abroad for strategic multimodal research planning and technology transfer could be applied in the United States. Sue McNeil, University of Delaware, chairs the study committee.
- In a follow-up to the study completed this year on offshore wind turbines, the Bureau of Ocean Energy Management has requested a study to examine regulations that ensure the safety of workers who install and maintain offshore wind turbines.

Ongoing Reviews

The Policy Studies unit also convenes committees of experts to review research programs funded and managed by FHWA, the Federal Transit Administration (FTA), and the Federal Railroad Administration (FRA), as well as to review major research projects of FHWA. These independent peer reviews are a mainstay of the policy work of TRB. The committees for these projects typically report to the sponsor through letter reports or other brief documents.¹³

- The Research and Technology Coordinating Committee (RTCC) advises FHWA on its research and development (R&D) program. Meetings in 2011 focused on strategies for the formal evaluation of research programs and steps to facilitate the adoption of innovations, including proprietary products. Michael D. Meyer, Georgia Institute of Technology, chairs the committee.
- FRA supports independent peer reviews by TRB of major research initiatives and of its R&D program. The committee's 2011 letter report commends FRA's management team and provides guidance on steps to enhance stakeholder involvement in the agency's R&D program.¹⁴ Robert E. Gallamore, Gallamore Group LLC, chairs the committee.
- The Transportation Research Analysis Com-

mittee (TRAC) advises FTA on its R&D program. The committee's 2011 letter report identifies and prioritizes research topics that could lead to increased ridership.¹⁵ J. Barry Barker, Transit Authority of River City, Louisville, Kentucky, chairs TRAC, and FTA supports the committee's work.

- FTA also is funding a project to provide a peer review of the Transit Economic Requirements Model, used to estimate capital needs for the public transportation industry.
- The Long-Term Pavement Performance (LTPP) program, the largest and most sophisticated experiment on pavement performance, has reached its 21st year. In its January and August letter reports, the committee's recommendations aim at securing the future of the LTPP database and fulfilling the promise of better roads through the development and application of LTPP program products.¹⁶ William H. Temple, a consultant and former chief engineer of the Louisiana Department of Transportation and Development, chairs the committee; FHWA sponsors the committee's work.
- As 2011 drew to an end, a new committee was appointed to provide guidance on FHWA's Long-Term Bridge Performance program, an initiative loosely modeled on LTPP and similarly designed to improve the long-term performance of bridges and enhance bridge maintenance and design. Ananth K. Prasad, Florida DOT, chairs the committee.

Information Services

Transportation Research Information Services

In January 2011, at TRB's 90th Annual Meeting, TRB and the Joint Transport Research Centre of the Organisation for Economic Co-operation and Development (OECD) launched TRID, a database integrating the records of TRB's Transportation Research Information Services (TRIS) and the International Transport Research Documentation (ITRD) databases.¹⁷ TRID is the

¹³ www.trb.org/Publications/Public/PubsPolicyStudiesLetterReports.aspx.

¹⁴ http://onlinepubs.trb.org/onlinepubs/reports/frar&d_March_2011.pdf.

¹⁵ http://onlinepubs.trb.org/onlinepubs/reports/trac_November_2011.pdf.

¹⁶ http://onlinepubs.trb.org/onlinepubs/sp/ltppletter_27.pdf and http://onlinepubs.trb.org/onlinepubs/sp/ltppletter_28.pdf.

¹⁷ <http://trid.trb.org/>.

world's largest and most comprehensive bibliographic resource of transportation research information.

TRB produces and maintains TRIS through the sponsorship of the state DOTs, the U.S. DOT administrations, and other sponsors of TRB's core technical activities. ITRD is produced by member organizations under the sponsorship of OECD's Joint Transport Research Centre and ITRD.

The TRID database covers all modes and disciplines of transportation and contains more than 935,000 records of published or ongoing research. The database is multilingual, with records in English, German, French, or Spanish, and is available free of charge to the public at TRB's website.

Several enhancements have improved the accessing and sharing of indexed documents through TRID. The integrated database provides simple and advanced searching and allows users to export and e-mail results in a variety of formats. Users may search the entire database, or select a specific collection for searching—such as the TRIS database, the ITRD database, or other collections. Users may view and modify their search history, subscribe to RSS feeds, or share results via Twitter, Facebook, and other social media. More than 64,000 records have direct links to full-text documents, and users may limit searches to records with links to full text. Other links allow users to locate libraries that own an item of interest.

In early November, after less than one year of operation, TRID received its one millionth visit—a major milestone, indicative of the value of the database to the transportation community; users came from 223 countries and territories. The TRIS databases—TRID, the Publications Index, Research Needs Statements (RNS), and Research in Progress (RiP)—accounted for 55 percent of visits to the TRB website and 9 percent of total traffic to National Academies websites.

TRIS, along with the ITRD records in English, also is available for a fee through Dialog, Inc., and as part of the TRANSPORT database. A cooperative effort of TRB and ITRD, TRANSPORT is produced and distributed by Ovid.

Publications Index

The TRB Publications Index, a searchable database on TRB's website, includes all TRB, High-



TRID, the integrated database of TRB's Transportation Research Information Services and the Organisation for Economic Co-operation and Development's International Transport Research Documentation, was created in January and received its one millionth visitor in November. Stephen Perkins, International Transport Forum (ITF) (*seated, left*); and Stephen Godwin, TRB (*seated, right*), sign a memorandum of understanding at the Annual Meeting. (*Standing, left to right:*) TRB Executive Director Robert E. Skinner, Jr.; Véronique Feypell, ITF; Barbara Post, TRB; Jorge Prozzi, University of Texas at Austin; Birgitta Sanstedt, Swedish National Road and Transport Research Institute; and C. D. van den Braak, Institute for Road Safety Research, the Netherlands.

way Research Board (HRB), Strategic Highway Research Program (SHRP), and Marine Board publications since 1923.¹⁸ The TRB Publications Index offers simple and advanced searching and allows users to view, download, and e-mail the results in a variety of formats. The index provides links to full-text documents and to ordering information.

Research Needs Statements Database

The RNS Database is a dynamic collection of highest-priority topics, developed by TRB technical standing committees.¹⁹ The RNS Database serves as a tool for reviewing transportation research needs, setting research priorities, and identifying gaps in current research. More than 1,200 statements of research needs are posted.

Research in Progress Database

RiP is a searchable database of more than 12,500 records of active or recently completed research projects.²⁰ The RiP database serves as a clear-

¹⁸ [www.trb.org/InformationServices/Public/TRBPublications Index.aspx](http://www.trb.org/InformationServices/Public/TRBPublications/Index.aspx).

¹⁹ <http://rns.trb.org/>.

²⁰ <http://rip.trb.org/>.



The TRB library shows the effects of a 5.8-magnitude earthquake that struck the Mid-Atlantic region in August. TRB and NRC library staff spent the better part of a day reshelving the books. (Photo: Frances E. Holland)

inghouse of research for University Transportation Centers (UTCs), fulfilling a requirement in SAFETEA-LU. RITA funded the software enhancements to facilitate this application.

Users at state DOTs and UTCs can add, modify, or delete records of research through a web-based data entry system. A current awareness service notifies users automatically about new and updated project records in specified subject areas. The RiP database contains international project records from ITRD's Transport Research in Progress, or TRIP, database. The RiP website received more than 110,000 visits from users worldwide in 2011 and is searchable through an interface on TRID.

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 request the library's services. The library subscribes to more than 400 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. The TRB Library participates in the Eastern Transportation Knowledge Network and the National Transportation Knowledge Network.

Synthesis Programs

Cooperative Research Programs Syntheses

Under the sponsorship of the Cooperative Research Programs administered by TRB—specifically the Airport Cooperative Research program (ACRP), NCHRP, and the Transit Cooperative Research Program (TCRP)—the Synthesis Programs unit prepares reports on current practice and knowledge for a range of key highway, transit, and airport topics. Practitioners and researchers make extensive use of the reports.

An airport panel, a highway panel, and a transit panel select the study topics each year. In 2011, the panels selected 15 new highway, 7 new transit, and 7 new airport studies. 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 66–69. Approximately 2,500 copies of each report are published in hard copy, and 2,300 of these are distributed to state DOTs, transit agencies, airport operators, and TRB topic-area subscribers. The reports also are posted on the TRB website.²¹

TRB maintains an inventory of hard-copy Synthesis reports for sale.²² Following are summaries of illustrative airport, highway, and transit reports published in 2011.

ACRP Synthesis Reports

ACRP Synthesis 21, *Airport Energy Efficiency and Cost Reduction*, reports on energy efficiency improvements implemented at airports at low cost and with short payback. The findings reveal that operations and maintenance practices, such as performance monitoring and commissioning, were most common among successful approaches.

ACRP Synthesis 28, *Investigating Safety Impacts of Energy Technologies on Airports and Aviation*, compiles literature, data, and ongoing research on the effects of energy technolo-

²¹ Airport syntheses: www.trb.org/Publications/Public/PubsACRPSynthesisReports.aspx; highway syntheses: www.trb.org/Publications/Public/PubsNCHRPSynthesisReports.aspx; transit syntheses: www.trb.org/Publications/Public/PubsTCRPSynthesisReports.aspx.

²² Synthesis reports may be ordered from the TRB Online Bookstore, www.trb.org/Finance/Public/Bookstore.aspx, or by calling 202-334-3213.



The solar photovoltaic panels at Meadows Field Airport in Bakersfield, California, are located approximately 250 ft from the runway. ACRP Synthesis 28 examines the safety impacts of energy technologies on aviation. (Photo: Harris Miller Miller & Hanson Inc.)

gies on airports and aviation safety through physical, visual, and communications systems interference. The report focuses on solar photovoltaic panels and farms, concentrating solar power plants, wind turbine generators and farms, traditional power plants, and electrical transmission.

ACRP Synthesis 25, *Strategies for Reuse of Underutilized or Vacant Airport Facilities*, presents an overview of the issues involved in the reuse of aeronautical facilities, including an examination of interim and long-term solutions, the decision process to maintain or demolish a structure, environmental and regulatory issues, success stories, and obstacles to effective reuse.

NCHRP Synthesis Reports

NCHRP Synthesis 414, *Effective Delivery of Small-Scale Federal-Aid Projects*, compiles and



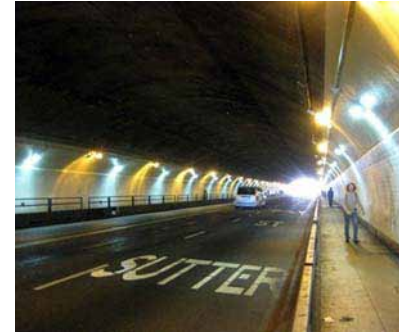
Gaining federal aid for small-scale local projects, such as this road widening in Radnor Township, Pennsylvania, is the subject of NCHRP Synthesis 414. (Photo: Leslie McCarthy)

documents streamlined methods for meeting federal funding requirements for small-scale highway projects budgeted at \$300,000 or less. The study explores ways that state DOTs work with local agencies to implement small projects eligible for federal aid. The report has generated interest from state and local transportation agencies. In summer 2011, four AASHTO regional conferences included peer exchanges on project delivery, with a presentation on the report by Leslie McCarthy, one of the authors, or by members of the project's oversight panel.

NCHRP Synthesis 415, *Design Fires in Road Tunnels*, provides information in support of AASHTO's efforts to draft standards for tunnel design and the mitigation of tunnel fires. Igor Maeveski of Jacobs Engineering prepared the synthesis of the state of the practice in tunnel fire design, including statistical data for fire incidents in road tunnels since 1949, as well as information on tunnel fire safety projects in the United States and Europe.

NCHRP Synthesis 421, *Recycling and Reclamation of Asphalt Pavements Using In-Place Methods*, assists agencies in optimizing the value of in-place materials, minimizing construction time and traffic flow disruptions, and reducing the number of construction vehicles moving in and out of a construction area. Prepared by Mary Stroup-Gardiner, the report addresses hot in-place recycling, cold in-place recycling, and full-depth reclamation. Several states, FHWA, and the Asphalt Recycling and Reclamation Association have put the report to immediate use.

NCHRP Synthesis 424, *Engineering Economic Analysis Practices for Highway Investment*, prepared by Michael Markow, examines ways that U.S. transportation agencies have applied engineering economics—such as benefit-cost analyses—to decisions involving highway investments. Case examples provide perspectives on the successful use of economic analysis in project and program development, from planning to construction.



Design guidance for fire management in tunnels—including combined-use tunnels such as this one in San Francisco, California—is explored in NCHRP Synthesis 415.

NCHRP Synthesis 421 gathers information on hot and cold in-place recycling and full-depth asphalt reclamation—processes that allow transportation agencies to reduce unnecessary traffic congestion during construction and optimize in-place materials.





The safety of transit operators is the focus of TCRP Synthesis 93. (Photo: Dallas Area Rapid Transit)

TCRP Synthesis Reports

Transit unions have been disseminating information from TCRP Synthesis 93, *Practices to Protect Bus Operators from Passenger Assault*, prepared by Yuko J. Nakanishi, to their membership, as transit agencies respond to increases in assaults on vehicle operators. The report includes special security methods and practices from 22 transit agencies, along with appendices of information about state laws.

TRB is planning a webinar on TCRP Synthesis 90, *Video Surveillance Uses by Rail Transit Agencies*, prepared by Dorothy M. Schulz. The comprehensive presentation of video surveillance technology at select passenger rail agencies includes on-board rail cars, stations, and rights-of-way. Information is provided about administrative policies; policies on archiving, storing, and accessing images; and sources of funding for installation.

Commercial Truck and Bus Safety Synthesis Program

The Commercial Truck and Bus Safety Synthesis Program (CTBSSP) is a cooperative research

The Commercial Truck and Bus Safety Synthesis Program released a report on the health effects on commercial drivers of stimulants, hypnotics, and nutritional and other supplements, like these displayed and sold at a highway truck stop.



program sponsored by the Federal Motor Carrier Safety Administration (FMCSA) and administered by TRB. The program was authorized in 2001 to support FMCSA's safety research programs. In 2007, FMCSA reauthorized CTBSSP through a cooperative agreement, providing \$200,000 annually through 2011. The funding supports two new studies each year.

The studies 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 on the synthesis programs of NCHRP and TCRP. The primary users of the synthesis final reports are practitioners facing the issues or problems addressed, in a variety of settings.

A program oversight committee monitors CTBSSP and the program procedures; selects topics annually, after periodic, industrywide solicitations; refines scopes; selects researchers to prepare each synthesis; reviews products; and makes publication recommendations. An expert panel is appointed to review the scope and the consultant reports for each new topic. The CTBSSP oversight panel has authorized 25 topics. Five reports, listed on page 69, were published in 2011 and are available on the TRB website.²³ Two new topics started up in 2011.

IDEA Programs

IDEA programs fund early-stage investigations of potential breakthroughs in transportation technology. Through small projects, 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.

Four IDEA programs were operating in 2011. 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

²³ www.trb.org/Publications/Public/PubsCTBSSPSynthesisReports.aspx.

and FMCSA cosponsor the Safety IDEA program, which supports projects to improve the safety of truck, intercity bus, and rail operations. The Reliability IDEA program, funded by SHRP 2, supports projects to increase the consistency and dependability of travel times, improve the prediction of travel time, and provide information to travelers and other highway system users about dealing with unexpected delays.

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. IDEA projects are high-risk investigations of unproven concepts. Funds awarded for any one project range between \$50,000 and \$150,000. Frequently, however, IDEA funds are augmented through cost-share arrangements, nearly doubling the amount of research that can be supported through the IDEA programs.

At the 2011 TRB Annual Meeting, the transit, highway, and safety programs conducted poster sessions, highlighting 19 of the most promising current projects. Each session attracted a constant stream of interested visitors, who interacted directly with the inventors.

An annual report that includes summaries of completed and current projects is published for each of the IDEA programs and is distributed at the TRB Annual Meeting. These summaries also are available on the IDEA page of the TRB website, along with the IDEA program announce-



Among the IDEA projects highlighted at an Annual Meeting poster session was the Google Transit Data Tool for Small Transit Agencies, presented by Bruce Williams (left), of PEMMCO, Inc.

ment, which contains forms and guidelines for submitting proposals.²⁴ Contractor final reports for completed IDEA projects also are posted on the TRB website.²⁵ A less formal publication, *Ignition*, features interviews with IDEA investigators and transportation leaders, plus articles that highlight promising projects.²⁶ Issues of *Ignition* are archived on the IDEA website.

²⁴ www.trb.org/IDEAProgram/Public/IDEAProgram.aspx.

²⁵ www.trb.org/IDEAProgram/Public/IDEAProgram.aspx.

²⁶ www.trb.org/Publications/Public/PubsIDEAIgnitionMagazines.aspx.



At a meeting of the Transit IDEA J-4 panel, Colette LaMontagne, Navigant Consulting, Inc., presents a project to develop advanced wayside energy storage systems for rail transit.

— — STAFF NEWS — —

Nancy P. Humphrey, a Senior Program Officer who managed many important and high-profile studies in her 25-year career with TRB, retired in April (see page 6).

Senior Program Officer **Joseph R. Morris** received a Distinguished Service Award from the National Academies in October.

Mark Hutchins was promoted to Program Officer.

Tanya M. Zwahlen joined the Synthesis staff as Program Consultant.

COOPERATIVE RESEARCH PROGRAMS

TRB administers six cooperative 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 (HMCRP), sponsored by the Pipeline and Hazardous Materials Safety Administration (PHMSA); and
- The National Cooperative Rail Research Program (NCRRP), to be initiated in early 2012 and sponsored by the Federal Railroad Administration (FRA).

National Cooperative Highway Research Program

NCHRP is an applied research program that responds to the needs of state highway and



Christopher W. Jenks, Director, Cooperative Research Programs (CRP), briefs the Executive Committee on CRP management and research activities in January.

transportation departments. 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 2,707 research projects. More than 1,124 publications have appeared in the *NCHRP Report* and *NCHRP Synthesis of Highway Practice* series, in addition to 360 volumes of *Research Results Digest* and 55 volumes of *Legal Research Digest*, as well as 250 other documents published electronically.

NCHRP projects for federal fiscal year (FY)



John Halikowski
Chair
AASHTO Standing
Committee on
Research



Keith Parker
Chair
TCRP Oversight and
Project Selection
Committee



Cheryl A. Burke
Chair
HMCRP Technical
Oversight Panel



Lillian C. Borrone
Chair
NCFRP Oversight
Committee



James A. Wilding
Chair
ACRP Oversight
Committee



Christopher W. Jenks
Director
Cooperative
Research Programs



Crawford F. Jencks
Deputy Director
Cooperative
Research Programs

2011 were placed under contract as funds became available. Proposal solicitations for 42 research projects in federal FY 2012 (October 1, 2011, through September 30, 2012) were released starting in August 2011; depending on the availability of the funding authorized in federal legislation, contracts should be executed in the first three months of 2012.

Under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and various resolutions continuing the legislation, Federal-Aid Highway State Planning and Research Funds have been increasing slightly, affecting NCHRP funding proportionally. Funding available for NCHRP in FY 2007 totaled \$36.5 million; in FY 2008, \$36.7 million; in FY 2009, \$37.5 million; in FY 2010, \$40.3 million; and in FY 2011, \$42.1 million.

AASHTO considered 136 new problem statements submitted by states, AASHTO committees, and FHWA for the FY 2012 program. The quantity and quality of the requests ensure optimal use of the authorized funds. In September, AASHTO began to formulate the FY 2013 program and will determine the program content in March 2012. NCHRP reports published during the past 12 months are listed on pages 67 and 68. A total of 198 projects were under contract as of September 1, 2011, with 120 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 through 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 160 project meetings in 2011; more than 2,375 volunteers offered their time, energy, and expertise as panel members, attending meetings and reviewing materials, primarily for the challenges and the satisfaction of making contributions to the field.

Many NCHRP research projects have had a direct impact on practice through products such as recommended specifications, manuals, and guidelines. NCHRP emphasizes working with practitioners who will use the research



The American Association of State Highway and Transportation Officials' Standing Committee on Research met in March to select 42 NCHRP projects for the coming federal fiscal year.

results. Impacts on Practice, a new series of web postings, highlights successful applications of NCHRP research results and encourages use by others.¹

The program's close relationship with AASHTO committees is important in achieving the goal of improving practice—approximately 82 percent of the research funds for new projects in FY 2012 are allocated to 35 projects requested by 12 AASHTO committees. Experience has shown that AASHTO committees are more likely to adopt 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 pre-

¹ www.trb.org/NCHRP/NCHRPImpactsonPractice.aspx.



Crawford F. Jencks, CRP Deputy Director, presides at an orientation meeting for an NCHRP panel. Nearly 2,400 volunteers served on NCHRP panels in 2011. (Photo: Hilary M. Freer)

sent to the committee at the conclusion of the study. NCHRP projects frequently incorporate these three steps. The NCHRP web page includes a tally of products of direct interest to various AASHTO committees.²

Many NCHRP projects develop and recommend revisions to AASHTO publications at the request of committees. When AASHTO adopts an NCHRP project's recommendations as 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. General information on all projects is available in *NCHRP Summary of Progress, December 31, 2011* and on the web.²

Following is a sample of NCHRP projects completed in the past year that were of particular importance to AASHTO. All reports are available on the web.³

Administration and Management

Produced under NCHRP Project 08-69, the *AASHTO Transportation Asset Management Guide: A Focus on Implementation*, provides guidance to transportation decision makers in maximizing financial resources, preserving highway assets, and providing the services expected by customers. The guide focuses on the processes, tools, systems, and data to support asset management.⁴

² www.trb.org/NCHRP/NCHRP.aspx.

³ www.trb.org/Publications/PubsNCHRPPublications.aspx.

⁴ https://bookstore.transportation.org/collection_detail.aspx?ID=100.



NCHRP Report 689 examines the direct costs of alternative systems of generating revenue, such as this electronic toll collection plaza in Austin, Texas. (Photo: Central Texas Regional Mobility Authority)

NCHRP Report 685, *Strategies to Attract and Retain a Capable Transportation Workforce*, presents straightforward, implementable practices that human resources managers and hiring professionals can apply to improve the recruitment and retention of qualified employees.

NCHRP Report 689, *Costs of Alternative Revenue-Generation Systems*, offers a framework for analyzing the direct costs of generating revenues to support federal-aid and state highway construction, operations, and maintenance; the framework can produce estimates of unit costs for fuel taxes, tolling, vehicle-miles-of-travel fees, and cordon pricing schemes.

NCHRP Report 690, *A Guidebook for Successful Communication, Cooperation, and Coordination Strategies Between Transportation Agencies and Tribal Communities*, offers guidance to help state DOTs and tribal communities work together successfully to complete transportation projects on tribal lands.

NCHRP Report 692, *Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance*, describes a framework for systematic analysis and decision making for outsourcing and privatizing the maintenance of vehicle and equipment fleets.

NCHRP Report 695 presents a *Guide for Implementing a Geospatially Enabled Enterprisewide Information Management System for Transportation Agency Real Estate Offices*, to assist in managing rights-of-way according to a logical model.

Planning and Environment

The two-volume NCHRP Report 666, *Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies*, provides a framework for setting performance targets and for ensuring that appropriate data are available to support performance-based decision making. Volume I is the research report, and Volume II covers target setting and data management.

NCHRP Report 686 explores *Road Pricing: Public Perceptions and Program Development* and includes guidelines for project planning and integrating pricing into regional and state planning processes, as well as for communicating strategies and engaging affected groups.

Project Development and Design

NCHRP Report 663, *Design of Roadside Barrier Systems Placed on MSE Retaining Walls*, explores design procedures for roadside barrier systems mounted on the edge of a mechanically stabilized earth (MSE) wall. The procedures follow AASHTO load and resistance factor design (LRFD) practices.

Materials and Pavements

NCHRP Report 669, *Models for Predicting Reflection Cracking of Hot-Mix Asphalt Overlays*, explores mechanistic-based models for predicting the extent and severity of reflection cracking in overlays of hot-mix asphalt (HMA).

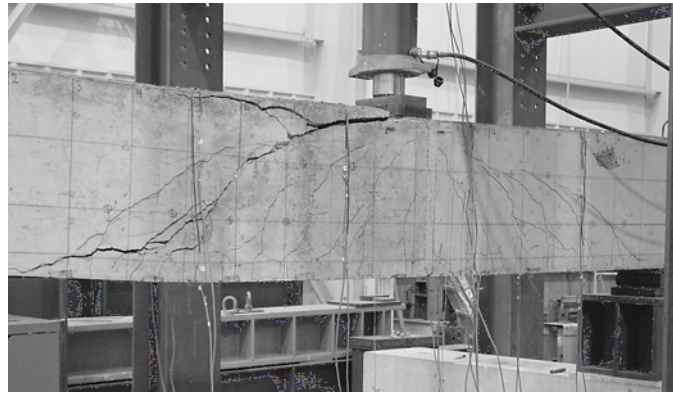
Advances in materials characterization and in HMA mix design technology since the conclusion of the first Strategic Highway Research Program (SHRP) are traced in NCHRP Report 673, *A Manual for Design of Hot-Mix Asphalt with Commentary*.

NCHRP Report 691, *Mix Design Practices for Warm-Mix Asphalt*, explores a method tailored to the material properties of warm-mix asphalt (WMA) technologies. The reduced production temperatures of WMA promise environmental and health benefits, such as lower greenhouse gas emissions, lower fuel consumption, and reduced exposure of workers to asphalt fumes.

Bridges and Other Structures

NCHRP Report 678, *Design of FRP Systems for Strengthening Concrete Girders in Shear*, proposes design guidelines for strengthening concrete girders with externally bonded fiber-reinforced polymer (FRP) systems. NCHRP Report 679,

Tests on a barrier on a mechanically stabilized earth (MSE) wall are described in NCHRP Report 663, *Design of Roadside Barrier Systems Placed on MSE Retaining Walls*.



Full-scale tests of prestressed beams reinforced with high-strength steel are analyzed in NCHRP Report 679.

Design of Concrete Structures Using High-Strength Steel Reinforcement, evaluates the AASHTO LRFD Bridge Design Specifications related to the use of high-strength reinforcing steel and other grades of reinforcing steel that have no discernible yield plateau.

Construction and Maintenance

NCHRP Report 680, *Manual for Emulsion-Based Chip Seals for Pavement Preservation*, examines chip performance, highlights design and construction considerations, and explores procedures for selecting appropriate chip seal materials.

A process for projecting a highway agency's full costs in performing highway maintenance is presented in NCHRP Report 688, *Determining Highway Maintenance Costs*.

State DOTs interested in establishing pavement warranty programs can find directions in NCHRP Report 699, *Guidelines for the Use of Pavement Warranties on Highway Construction Projects*.

Traffic Operations and Safety

A fundamental highway safety training course—including course materials, instructor's guide, and student workbook—is assembled in NCHRP Report 667, *Model Curriculum for Highway Safety Core Competencies*.

NCHRP Report 670, *Recommended Procedures for Testing and Evaluating Detectable Warning Systems*, explores a set of tests for evaluating the durability of detectable warning systems in the context of the accessibility guidelines of the Americans with Disabilities Act. NCHRP Report 674 provides details on *Crossing*





In NCHRP Report 674, authors present research on safe crossings for visually impaired pedestrians at nontraditional intersections such as roundabouts and channelized turn lanes.

Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities.

NCHRP Report 687, *Guidelines for Ramp and Interchange Spacing*, is designed to assist in decision making about new ramps or interchanges, modifying ramps and interchanges, or planning and designing new highway and interchange facilities.

Continuing Projects

NCHRP supports several continuing projects:

- Project 20-5, Synthesis of Information Related to Highway Problems, produces state-of-the-practice reports (see page 36, Studies and Special Programs Division section).
- 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 test innovative concepts and to initiate product development (see page 38, Studies and Special Programs Division section).
- 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 shares expenses with FHWA for international scanning tours.
- Project 20-68, U.S. Domestic Scan Program, conducts three to four domestic scans annually.

- Project 20-83, Long-Range Strategic Issues Facing the Transportation Industry, comprises a series of projects to develop scenarios for 30 to 50 years into the future. Research will produce guidance for tracking the phenomena that are shaping the scenarios and for making adjustments to the projected changes.
- NCHRP Projects 20-07 for Highways, 8-36 for Planning, 25-25 for the Environment, and 20-65 for Public Transportation directly support the work of several AASHTO standing committees; Project 20-24, Administration of Highway and Transportation Agencies, assists the AASHTO Board of Directors.

Transit Cooperative Research Program

Authorized by the Intermodal Surface Transportation Efficiency Act 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 APTA. A three-way memorandum of agreement by FTA, TDC, and TRB outlines the program’s operating procedures. In its 19 years, TCRP has undertaken 617 studies; of these, 531 have been completed and 86 are in progress.

TCRP receives submissions of research problem statements throughout the year and has considered approximately 2,500 since 1992.



Kathryn Waters, American Public Transportation Association, discusses passenger safety in rail stations at the TCRP Oversight and Project Selection committee meeting in October at the Keck Center.



Robert Sahm, King County Metro Transit (*center*), and members of a TCRP screening panel rate FY 2012 proposals and determine their feasibility for projects and syntheses at an August meeting.

In early 2011, TCRP issued a call for FY 2012 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 94 problem statements for FY 2012.

TRB submits quarterly progress reports on TCRP to FTA, describing the work accomplished during the quarter and anticipated for the next period. Details on the program's progress since 1992 can be found in the 2011 TCRP Annual Report.

TCRP project oversight panels develop requests for proposals, select contractors, and monitor the research. In 2010, TCRP panels held a total of 51 meetings: 19 panel meetings to prepare research problem statements and to select research agencies; 25 interim project meetings to review project status at midcourse; and 7 meetings on special projects. These meetings involved approximately 400 professionals and represented more than 500 days of volunteer time. The TOPS Committee also met twice during the year.

TCRP published 29 project reports in 2011, bringing the total to 563 publications: 193 Reports, 90 Syntheses of Transit Practice, 102 Research Results Digests, 39 Legal Research Digests, 53 IDEA reports, 51 web-only documents, and 35 CD-ROMs.

Research Dissemination

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

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 project findings to practitioners.

The J-1 Program has developed a TCRP dissemination website maintained by APTA; has distributed catalogs of publications; has coordinated industry mailings and surveys to ascertain use and awareness of the program's products; and has produced informational CDs. TCRP reports are available online through APTA's TCRP dissemination website⁵ and through TRB's TCRP web page.⁶

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

Transit Vehicles and Maintenance

TCRP Report 146, *Guidebook for Evaluating Fuel Choices for Post-2010 Transit Bus Procurements*, and its accompanying life-cycle costs and life-cycle emissions model spreadsheet, *FuelCost2*, provide tools to simplify the process of developing an alternative fuel strategy by identifying the issues, costs, and benefits associated with the conversion to alternative fuel technologies. The report updates, expands on, and replaces TCRP Report 38, *Guidebook for Evaluating, Selecting, and Implementing Fuel Choices for Transit Bus Operations*.

TCRP Research Results Digest 101, *Funding*

⁵ <http://www.tcrponline.org/index.cgi>.

⁶ www.trb.org/Publications/PubsTCRPPublications.aspx.



Hybrid and other alternative energy sources for transit buses are explored in TCRP Report 146, *Guidebook for Evaluating Fuel Choices for Post-2010 Transit Bus Procurements*. (Photo: National Renewable Energy Laboratory)

for Infrastructure Maintenance: Achieving and Sustaining a State of Good Repair—International Transit Studies Program Report on the Spring 2010 Mission, examines how bus and rail agencies and operators in several European cities implement sustainable funding strategies for transit assets, operations, and maintenance.

TCRP Project E-6, *Transit Bus Mechanics: Building for Success—The ASE Transit Bus Maintenance Certification Test Series*, has developed tests through the Institute for Automotive Service Excellence (ASE). The certification tests are similar to those for the automotive, medium- and heavy-duty truck, and school bus industries.

In 2011, ASE administered nine transit bus tests—electrical and electronics; brakes; diesel engines; electronic diesel engine specialist; heating, ventilation, and air conditioning; transmission and drivetrain; suspension and steering; compressed natural gas engines; and preventive maintenance inspections. Approximately 3,000 technicians have passed 8,500 transit bus tests. Subject-matter experts have started work on developing the final test in the series, on transit bus hybrid systems, but introduction will be delayed pending further development of the technologies and an increase in the number of technicians to take the test.

The ASE Board of Directors has approved

an ASE Transit Bus Master Technician designation for those who pass seven tests—electrical and electronics; brakes; diesel engines or compressed natural gas engines; heating, ventilation, and air conditioning; transmission and drivetrain; suspension and steering; and preventive maintenance inspections. Approximately 400 have attained the ASE Transit Bus Master Technician status.

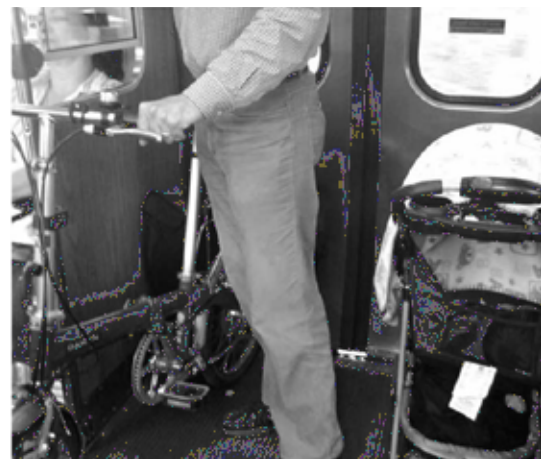
The development of the ASE transit bus test series has involved coordination with organized labor to ensure the availability of relevant training. In combination with the ASE tests, the training serves as a means for developing the bus maintenance workforce.

Operations and Safety

TCRP Report 149, *Improving Safety-Related Rules Compliance in the Public Transportation Industry*, provides a comprehensive approach, including screening and selecting employees, training and testing, communication, monitoring rules compliance, responding to noncompliance, and safety management. The report presents best practices for a prototype safety reporting system for public transportation.

TCRP Synthesis 88, *Strollers, Carts, and Other Large Items on Buses and Trains*, documents the state of the practice in managing capacity on vehicles with customers carrying large items and includes a review of vehicle designs that accommodate large items.

The use of electronic video surveillance



A folding bike and stroller share space on a rail car in Chicago. TCRP Synthesis 88 surveys the state of the practice in capacity management on transit vehicles with passengers carrying large items. (Photo: Chicago Transit Authority)

technology by passenger rail agencies, onboard railcars, as well as in the right-of-way, is documented in TCRP Synthesis 90, *Video Surveillance Uses by Rail Transit Agencies*.

Human Resources

TCRP Report 148, *Practical Resources for Recruiting Minorities for Chief Executive Officers at Public Transportation Agencies*, provides strategies and offers resources to assist governing boards in recruiting minority CEOs. The report also assesses the transit industry's recruitment processes for CEOs and documents the benefits of minorities in public transportation leadership.

TCRP Research Results Digest 100, *Professional Certification and Credentialing Program for the Transit Industry*, examines a potential program and identifies organizational options.

Planning

Strategies for planning, designing, building, and operating multimodal corridors—with freeways and high-capacity transit lines running parallel—are presented in TCRP Report 145, *Reinventing the Urban Interstate: A New Paradigm for Multimodal Corridors*. Under the paradigm, freeways and transit can be structured to carve out travel market niches, allowing each mode to work together and thrive within the corridor.

TCRP Synthesis 89, *Public Participation Strategies for Transit*, describes the state of the practice in informing and engaging the public, provides ideas and insights into practices and techniques that have proved successful, and explores the challenges.

Specialized Transportation

TCRP Report 150, *Communication with Vulnerable Populations: A Transportation and Emergency Management Toolkit*, describes a scalable, adaptable process for communicating with vulnerable populations about their transportation options in emergencies, working through a network of agencies in the public, private, and non-profit sectors.

TCRP Research Results Digest 99 focuses on *Improving Mobility for Veterans*, illustrating strategies for community transportation providers. Follow-on research will elaborate on the issues and will provide guidance for maximizing service options with available resources.



Multimodal corridors such as Chicago's Red Line and Dan Ryan Expressway are the subject of TCRP Report 145, *Reinventing the Urban Interstate*. (Photo: Peter Van den Bossche)

Rural Public Transportation

TCRP Report 147, *Toolkit for Estimating Demand for Rural Intercity Bus Services*, provides a sketch-planning guide and supporting CD-ROM-based tools; the tools use several methods to estimate demand, and the report describes key considerations in drawing up estimates.

Information Technology

TCRP Report 84, Volume 9, *e-Transit: Electronic Business Strategies for Public Transportation—Transit Enterprise Architecture and Planning Framework*, presents multifaceted methods, tools, and examples to help agencies implement technologies successfully, connect their business with the technologies, build the business case for specific investments, explore financing options, employ an enterprisewide approach, and show the benefits of a technology investment.

Legal Research for Public Transportation Systems

TCRP Project J-5, *Legal Aspects of Transit and Intermodal Transportation Programs*, provides authoritatively researched, specific, limited-scope studies of legal issues and problems that have national significance and application to transit agencies. Four publications were released in 2011:

- TCRP Legal Research Digest 35, *Reductions in Transit Service or Increases in Fares: Civil Rights, ADA, Regulatory, and Environmental Justice Implications*, discusses issues associ-



TCRP Report 150 examines communicating emergency transportation options to vulnerable populations.

ated with transit agencies' compliance with constitutional requirements, Title VI of the Civil Rights Act of 1964, and the ADA in relation to service reductions and fare increases implemented in response to budget shortfalls.

- TCRP Legal Research Digest 36, *Transit-Oriented and Joint Development: Case Studies and Legal Issues*, provides a review of the legal issues related to several transit-oriented development and joint development case studies since 1999 and summarizes FTA guidelines and other applicable legal standards.
- TCRP Legal Research Digest 37, *Legal Arrangements for Use and Control of Real-Time Data*, addresses the implications of a transit agency's ownership and sharing of real-time data.
- TCRP Legal Research Digest 38 reviews the *Legal Aspects Relevant to Outsourcing Transit Functions Not Traditionally Outsourced*.

Transit Lessons from Abroad

Since 1994, TCRP Project J-3, International Transit Studies Program, has sponsored 34 leadership development missions to expand the horizons of U.S. transit managers; more than 440 professionals have participated in missions to Europe, Asia, Canada, South America, New Zealand, Africa, and Australia. The findings and observations of the participants are published in the TCRP Research Results Digest Series.⁷

⁷ TCRP Research Results Digests 20, 22, 27, 31, 33, 36, 42, 47, 49, 53, 54, 58, 62, 64, 66, 68, 70, 71, 77, 81, 85, 88, 89, 92, 95, 96, 101, and 102.

Through the International Transit Studies Program, transit managers from the United States have had the opportunity to learn from systems like this microbus transfer station in Cairo, Egypt.



Airport Cooperative Research Program

The Vision 100—Century of Aviation Reauthorization Act established ACRP, which undertakes research and other technical activities in response to the needs of airport operators on issues involving administration, environment, legal matters, policy, planning, safety, security, human resources, design, construction, maintenance, and operations. ACRP is sponsored by FAA and managed by the National Academies through TRB, under a memorandum of agreement signed in October 2005. TRB manages the program in coordination with the Airports Council International–North America, the Airport Consultants Council, the American Association of Airport Executives, the National Association of State Aviation Officials, and the Air Transport Association of America; representatives of airport operating agencies provide oversight and governance.

ACRP carries out applied research on problems shared by airport operating agencies yet not adequately addressed in other 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 Vision 100 Act authorized \$10 million per year for ACRP through FY 2008, and funding has increased to \$15 million since FY 2009. To date, federal appropriations have included \$3 million in FY 2005; \$10 million in FY 2006, 2007, and 2008; and \$15 million in FY 2009, 2010, and 2011. Although the funding for FY 2012 awaits congressional deliberations, authorization and appropriation of \$15 million is anticipated for the coming program year.

The ACRP Oversight Committee (AOC), appointed by the U.S. Secretary of Transportation, met twice in 2011 and selected 25 new research projects and 6 continuation projects for the FY 2012 program. To date, the AOC has authorized 290 projects in a variety of subject areas of interest to the airport community. The AOC will meet in early 2012 to review progress.

In 2011, ACRP issued 35 publications (20 Reports, 10 Syntheses, 1 Research Results Digest, 2 Legal Research Digests, and 2 web-only documents).⁸ Nearly 700 individuals from the

⁸ www.trb.org/Publications/PubsACRPPublications.aspx.



The ACRP Oversight Committee met in January at the Keck Center to review the program's status.

airport community participate on ACRP project panels, which held approximately 80 meetings and 50 conference calls during 2011 to develop scopes of work, select research contractors, and review interim products. This volunteer assistance from project panel members ensures that the research and products are relevant to airport practitioners.

The following ACRP activities were in progress or were completed during the year.

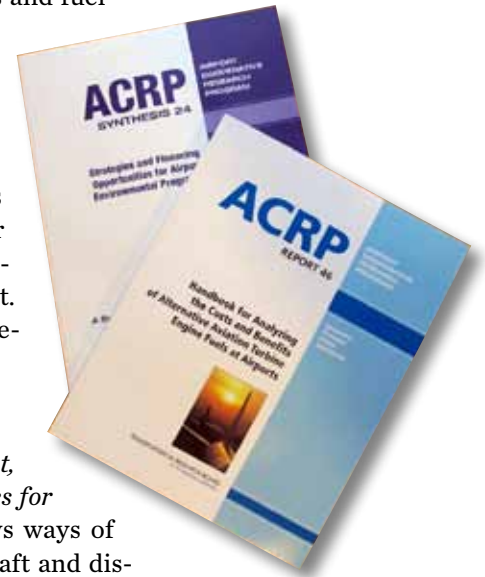


Joseph Navarrete, TRB, presents a staff report at the ACRP Oversight Committee meeting. The committee selected 31 projects for FY 2012.

Environmental Issues

ACRP Synthesis 24, *Strategies and Financing Opportunities for Airport Environmental Programs*, summarizes public and private funding opportunities and strategies to help airports pursue environmental programs and objectives.

ACRP Report 46, *Handbook for Analyzing the Costs and Benefits of Alternative Aviation Turbine Engine Fuels at Airports*, consists of the Alternative Fuel Investigation Tool (AFIT), a handbook on the use of AFIT, and a report on its development. AFIT is an analytical model designed to help airport operators and fuel suppliers evaluate the costs associated with introducing drop-in alternative turbine engine fuel, as well as the benefits in reduced emissions. Supplied on a CD-ROM, AFIT takes into account options for using alternative fuel for other airside equipment, including diesel-powered ground support equipment. The report also describes requirements for switching to alternatives.



Safety Issues

ACRP Synthesis 23, *Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airports*, reviews ways of reducing bird collisions with aircraft and discusses the effectiveness of each method.

ACRP Report 51, *Risk Assessment Method to Support Modification of Airfield Separation Standards*, supports requests to modify standards when design criteria cannot be met for the separation between taxiways or taxilanes and other taxiways, taxilanes, or fixed or movable objects, or between taxiways and runways.

ACRP Report 50, *Improved Models for Risk Assessment of Runway Safety Areas*, analyzes aircraft veer-offs, the use of declared distances, the implementation of the engineered material arresting system, and the incorporation of a risk approach for consideration of obstacles in or near the runway safety area. An interactive risk analysis tool, included in a CD-ROM, quantifies risk and supports planning and engineering decisions to meet acceptable levels of safety for runway areas at various types and sizes of airports.

ACRP Report 45, *Optimizing the Use of Aircraft Deicing and Anti-Icing Fluids*, provides



An interactive risk analysis tool, RSARA, is presented in ACRP Report 50, *Improved Models for Risk Assessment of Runway Safety Areas*.

guidance on procedures and technologies to reduce the use of aircraft deicing and anti-icing fluids (ADAF) while maintaining safe aircraft operations across the range of winter weather in the United States and Canada. The report highlights best management practices, as well as findings and recommendations from experiments involving holdover time, spot deicing for aircraft frost removal, and ADAF dilutions.

Economic Issues

ACRP Report 44, *A Guidebook for the Preservation of Public-Use Airports*, describes why public-use airports close and identifies measures and strategies to preserve operations and to prevent closings. Included are step-by-step procedures for identifying risk factors and for formulating an effective airport preservation program, as well as practical checklists for addressing issues as part of a comprehensive, strategic program for preservation.

ACRP Report 49, *Collaborative Airport Capital Planning Handbook*, provides guidance on developing, financing, managing, and overseeing an airport capital plan. The handbook indicates appropriate performers for each task in the collaborative planning process and defines and describes ways to ensure effective communication between internal and external stakeholders.

ACRP Report 47, *Guidebook for Developing and Leasing Airport Property*, explores issues in developing and leasing available airport land and summarizes best practices from the perspective of the airport sponsor. Case studies

show approaches that airports have taken to develop and lease property for aeronautical and nonaeronautical uses. Two presentation templates, available online, provide content, examples, and definitions for briefings of community stakeholders.

ACRP Report 48, *Impact of Jet Fuel Price Uncertainty on Airport Planning and Development*, helps airport operators and planners measure the impact of changes in jet fuel price on supply and demand for air service at commercial service airports. The report includes background research; a computer model, available online and in CD-ROM, to help evaluate the impact of uncertainty on airport development and finance; and a user manual. The supporting research examines historical changes in fuel prices in the context of changing economic conditions and assesses risk in adhering to air traffic forecasts when planning airport improvements or expansion.

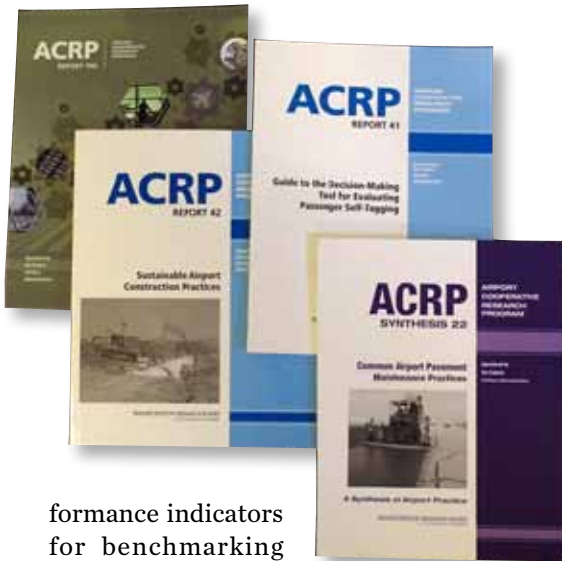
ACRP Report 54, *Resource Manual for Airport In-Terminal Concessions*, provides guidance on the development and implementation of airport concession programs, including the processes involved; concession goals and potential customers; concession mixes and space plans; the Airport Concessions Disadvantaged Business Enterprise program; and concession procurement, contracting, and management.

Airport Performance

ACRP Report 19A, *Resource Guide to Airport Performance Indicators*, explores airport per-



ACRP Report 49 explores best practices in airport capital planning and outlines a process for developing, implementing, and overseeing a collaborative airport capital planning process.



formance indicators for benchmarking and performance measurement, sorted by functional type and criticality to the airport strategic plan. More than 800 performance indicators are presented in three main categories: core or fundamental indicators, for operation of the airport; key or departmental indicators, for the operations of airport functions and departments; and other indicators of departmental unit performance.

ACRP Synthesis 22, *Common Airport Pavement Maintenance Practices*, presents a management program for airport pavement maintenance, including inspecting and tracking pavement condition, scheduling maintenance, and treating distresses in asphalt and concrete pavements.

ACRP Report 42, *Sustainable Airport Construction Practices*, explores best practices, methods, procedures, and materials that may have a sustainable and positive economic, operational, environmental, or social effect if implemented during construction. The report includes a collection of sustainable airport construction practices on a searchable CD-ROM.

ACRP Report 41, *Guide to the Decision-Making Tool for Evaluating Passenger Self-Tagging*, provides the information and tools—on a CD-ROM—necessary for an airport or airline to determine the appropriateness of passenger self-tagging if allowed in the United States.

Other Airport Issues

ACRP Web Document 12, *Risk Assessment of Proposed ARFF Standards*, explores air carrier

passenger aircraft accidents to help determine if changes to Aircraft Rescue and Fire Fighting (ARFF) standards would have reduced the number of fatalities or serious injuries in past accidents. The report compares standards set forth by FAA with the standards of the International Civil Aviation Organization and of the National Fire Protection Association to make determinations about potential reductions in the number of fatalities and serious injuries associated with each accident.

National Cooperative Freight Research Program

Authorized in 2005 under SAFETEA-LU, NCFRP is sponsored by RITA and managed by TRB, with program guidance provided by an oversight committee comprising a representative cross section of freight stakeholders. The total available funds in FY 2006 were \$2.65 million; in FY 2007, \$2.9 million; in FY 2008, \$2.93 million; in FY 2009, \$3.9 million; in FY 2010, \$3.4 million; and in FY 2011, another \$3.4 million. Program planning for FY 2012 assumes funding at the same level, subject to the reauthorization of surface transportation legislation.

NCFRP conducts applied research on freight industry problems not adequately addressed by other research programs. The NCFRP strategic plan has five objectives:

- **Analyze the business of freight transportation.** Trends in the global and national movement of freight and business logistics

Lillian C. Borrone guides a meeting of the NCFRP Oversight Committee in January. The committee chose eight projects for FY 2011.





NCFRP project panels conduct research on freight industry issues including data collection and analysis, market developments, operational improvements, and physical and institutional capacity.

are likely to increase demands on the nation's freight transportation system. NCFRP research will improve information and provide insight into the market-driven factors that lead and respond to freight demand.

- **Develop reliable data and tools for the analysis of freight transportation.** Successful decision making depends on credible and reliable analysis, which requires high-quality data. NCFRP research will identify improvements in collecting, analyzing, and using data and will develop tools for analyzing and managing the economic, safety, security, environmental, health, energy, and community impacts of freight transportation decisions.
- **Explore operational improvements for freight transportation.** Enhancing system performance should focus not only on providing new infrastructure but on operational strategies and on the efficient management of capacity. NCFRP research will provide guidance on implementing improvements in operations and system management.
- **Evaluate investment decisions for adding physical capacity to the freight transportation system.** Quantifying benefits—including the return on investment—is a key consideration in decision making. NCFRP research will provide information and guidance on making sound decisions for adding capacity when the investment makes economic sense.
- **Identify ways to strengthen the institutional framework for the freight transportation system.** Institutional capacity is often a prerequisite for successful planning and implementation of freight-oriented strategies.

NCFRP research will identify institutional barriers, organizational capacity issues, and innovative solutions to freight transportation challenges. Of particular interest is the evolving concept of public-private partnerships that often cross jurisdictional boundaries and the traditional dividing lines between government and business.

The Freight Research Oversight Committee met in January 2011 and selected 8 projects for the FY 2011 program; all are under way. The Oversight Committee will meet again in February 2012 to select the FY 2012 program.

Four reports were published in 2011⁹:

- NCFRP Report 10, *Performance Measures for Freight Transportation*, explores measures for the performance of the freight transportation system. A freight system report card presents the information in three formats, each increasingly detailed, to serve a variety of users.
- NCFRP Report 11, *Truck Drayage Productivity Guide*, is designed to help improve drayage productivity and capacity while reducing emissions, costs, and congestion at deepwater ports. The guide identifies and quantifies the impacts of bottlenecks, associated gate processes, exceptions, logistics, congestion, and disruption at marine container terminals and describes the impacts in terms of hours, costs, and emissions estimated with the Environmental Protection Agency's DrayFLEET model.
- NCFRP Report 12, *Framework and Tools for Estimating Benefits of Specific Freight Network Investments*, provides a comprehensive analytical framework and related tools for private- and public-sector use in estimating the benefits of new or improved freight infrastructure.
- NCFRP Report 13, *Freight Facility Location Selection: A Guide for Public Officials*, describes key private-sector criteria in decision making about where to build new logistic facilities.

Three additional reports entered the publication process in 2011 and address the siting of

⁹ www.trb.org/Publications/PubsNCFRPPublications.aspx.



Marine terminal entrance gate at the Port of Los Angeles, California. NCFRP Report 1.1 compiles metrics to help improve truck drayage productivity and reduce economic and environmental impacts. (Photo: Port of Los Angeles)

intermodal and warehouse distribution facilities, preserving and protecting freight infrastructure, and multistate corridor organizations and investment plans.

Hazardous Materials Cooperative Research Program

SAFETEA-LU authorized a pilot cooperative research program on hazardous materials transportation. HMCRP was initiated in September 2006 under the sponsorship of PHMSA, to complement other U.S. DOT research programs as a stakeholder-driven, problem-solving program, funding research on real-world, day-to-day operational issues with near- to midterm time frames. The total available funding in FY 2006 was \$0.88 million; in FY 2007, \$0.97 million; in FY 2008, \$0.98 million; in FY 2009, \$1.28 million; in FY 2010, \$1.2 million; and in FY 2011, \$1.1 million. Program planning for FY 2012 has assumed a budget of \$1.1 million, pending the reauthorization of surface transportation legislation.

The Hazardous Materials Technical Oversight Panel met in December 2010 and chose four projects, now under way, for the FY 2011 program. The Oversight Panel met in December to select projects for FY 2012.

Five reports were published in 2011¹⁰:

- HMCRP Report 2, *Assessing Soil and Groundwater Impacts of Chemical Mixture Releases from Hazardous Materials Transportation Incidents*, provides a tool to help assess, classify, predict, and communicate the fate and transport characteristics of chemical mixtures released into the soil and groundwater by hazardous materials transportation incidents. The tool also can assist in determining whether to ship certain chemicals separately or in mixtures and the effect on the cost of an incident and in estimating the relative costs and time frame of cleanup after an incident.
- HMCRP Report 3, *Guidebook for Conducting Local Hazardous Materials Commodity Flow Studies*, supports risk assessment, emergency response preparedness, resource allocation, and analyses of hazardous commodity flows across jurisdictions. The guidebook updates the U.S. DOT's *Guidance for Conducting Hazardous Materials Flow Surveys*.
- HMCRP Report 4, *Emerging Technologies Applicable to Hazardous Materials Transportation Safety and Security*, explores near- and longer term technologies that may enhance the safety and security of hazardous materials transportation for shippers, carriers, emergency responders, or government regulatory and enforcement agencies.
- HMCRP Report 5, *A Guide for Assessing Community Emergency Response Needs and Capabilities for Hazardous Materials Releases*, presents a step-by-step assessment of hazardous materials emergency response needs



¹⁰ www.trb.org/Publications/PubsHMCRPPublications.aspx.



An HMCRP peer exchange convenes at the Keck Center. The program produced five reports in 2011.

at the state, regional, and local levels. The report shows how to match capabilities with potential emergencies involving different types of hazardous materials and indicates how quickly resources can be brought to bear in an emergency.

- HMCRP Report 6, *Feasibility of a Consolidated Security Credential for Persons Who Transport Hazardous Materials*, examines the possibility of consolidating several security credentials into a single credential for all transportation modes.

National Cooperative Rail Research Program

Authorized by the Passenger Rail Investment and Improvement Act and initiated under TRB management in late 2011, NCRRP is sponsored by FRA. The program will carry out applied research on problems that

- Address intercity rail passenger and freight rail services, including rail passenger and freight technologies and speeds, incrementally enhanced rail systems and infrastructure, and new high-speed, wheel-on-rail systems;
- Address ways to expand the transport of international trade by rail, enhance the efficiency of intermodal interchange at ports and other intermodal terminals, and increase the capacity and availability of rail service for seasonal freight needs;

- Consider research on the interconnectedness of commuter rail, passenger rail, freight rail, and other rail networks; and
- Consider regional concerns about rail passenger and freight transportation, including research needs common to designated high-speed corridors, long-distance rail services, and regional intercity rail corridors, projects, and entities.

The NCRRP Oversight Committee (ROC), appointed by the Secretary of Transportation, will select research projects. A memorandum of agreement between FRA and TRB outlines the program's operating procedures. At its first meeting, tentatively scheduled for early 2012, the ROC will select initial research projects.



The Michigan Central Railway Tunnel connects Detroit, Michigan, with Windsor, Ontario, under the Detroit River. International rail transportation is among the research areas identified for the upcoming National Cooperative Rail Research Program. (Photo: Wikimedia Commons)

STAFF NEWS

Natalie Barnes was promoted to Senior Editor in July.

Sharon Lamberton started in August as an Assistant Editor.

Megha Khadka and **Jeff Oser** started as Senior Program Assistants in April and July, respectively.

Senior Program Officer **Charles Niessner** retired in November (see page 6).

STRATEGIC HIGHWAY RESEARCH PROGRAM | SHRP 2

The mission of the second Strategic Highway Research Program (SHRP 2) is to advance innovative methods for the planning, renewal, operation, and safety of the nation's highway system. The program's most distinctive feature is its strategic approach to developing innovative processes, tools, and methods for transportation agencies and their partners to apply in addressing increasingly complex challenges.

The strategic approach focuses energy and resources on a small number of large problems confronting transportation agencies. The problems are taken apart to determine the components that will yield to research. This strategic deconstruction has revealed new pathways through familiar territory, leading to



The SHRP 2 naturalistic driving study uses in-car sensors and cameras to collect data on driving behavior and crash risk. The study currently has more than 1,000 participants in six sites in the United States.

new efficiencies that can move innovation into everyday use.

More than 100 products will develop from the research. As research products become tools and resources, continuing the strategic approach can magnify the benefits and advances in reducing crashes and congestion and in renewing the highway system. Congress authorized SHRP 2 in August 2005 as a short-term program to target critical issues.

Progress in 2011 gained visibility after years of foundational activity focused on planning, contracting, and project management. With more than 100 contracts in progress or completed, the project activities are more evident—for example, 51 pilot tests and field demonstrations in 24 states, 35 published documents, data collection from nearly 1,400 cars in the naturalistic driving study, and five invitational work sessions to prepare for the implementation of SHRP 2 products.

In addition, partners at the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials are refining their roles in integrating SHRP 2 products into an array of resources to strengthen the highway transportation system that supports the U.S. economy. These early and ongoing collaborations will be the basis for continued product development and successful implementation.

SHRP 2 also is gaining visibility internationally, coordinating with highway research institutions—primarily in Europe, East Asia, and Australia—to exchange information, avoid duplication of effort, and identify contributions that may be useful to the program. This year, for example, SHRP 2 and the Forum of European Highway Research Laboratories held a second joint workshop at the TRB Annual Meeting; Kenneth Campbell, Chief Program Officer—Safety, served as an adviser to a meeting about a naturalistic driving study sponsored by the European Union; and Director Neil Hawks and a



Kirk T. Steudle
Chair
SHRP 2 Oversight
Committee



Neil F. Hawks
Director
SHRP 2



Ann M. Brach
Deputy Director
SHRP 2



SHRP 2 experiences with equipment, recruitment, and testing were shared at a June workshop for Prologue, the European Commission's naturalistic driving study, in Vienna, Austria. (Photo: Austrian Road Safety Board)

small delegation of staff and researchers participated in a technical exchange in Beijing at the invitation of the Research Institute of Highways, part of China's Ministry of Transportation. Journals and newsletters in Canada, France, the Netherlands, and across the European Union have published news of SHRP 2 research, often through the efforts of visiting professionals whose work at SHRP 2 is sponsored by their home organizations.

To meet its charge, SHRP 2 is conducting research in four focus areas. Highlights in each area are noted in the following updates.



Safety



Volunteer drivers in six states are pioneering in the SHRP 2 naturalistic driving study, the largest study of driving behavior ever conducted. Driving behavior is the primary cause of crashes, but for the first time, technologies can be combined to gather objective, scientific information about what happens when people driving in vehicles crash, when they experience a near-crash, and when they drive without incident. What scientists and engineers learn from the volunteers and the sensors in the cars will lead to significant improvements in highway safety, working from real-world data about crashes and contributing conditions.

With all sites operating, and with driver recruitment approaching the desired levels, preparing for analysis of the data collected during the study becomes a priority. SHRP 2 has awarded four contracts for the development of data analysis methods to yield new information and insights on critical safety issues and lead to safety benefits. The methods will be tested on small samples of data from the study, and a full analysis will be conducted in a second phase, applying the most resilient and promising methods. The data analysis will contribute to a new understanding of driving behavior, which will guide the policies and technologies to improve safety on the nation's roadways.

Capacity



The capacity focus area objective is to integrate environmental, economic, and community requirements systematically into planning for new highway capacity. Approximately half of the projects are completed.

Three major web-based products are available in test versions, and workshops are gaining user input for implementation. Products include TCAPP, a framework for making collaborative decisions to speed project delivery; T-Viz, a tool that helps communities visualize a transportation project, building collaboration into planning and design and reducing project delays; and TPICS, which helps assess the economic impacts of planned transportation projects.

Ten pilot tests are under way in six states:



Capacity area products include the web-based visualization tool T-Viz, which facilitates community collaboration on transportation projects.

two tests are related to integrating traveler choice and road network conditions into travel demand models, four others are testing sections of TCAPP, and four are testing ecological approaches to environmental protection in highway project planning and design.

Of special interest is work to advance freight demand models and to improve the data for forecasting freight demand to reflect industry needs. A strategic plan and a road map for the



Improved freight demand forecasting data can increase travel efficiency, a key industry need. (Photo: Washington State DOT)

much-needed improvements will enable research to build on this work under a shared vision.

Reliability



The reliability focus area has the goal of providing reliable travel times by reducing and preventing nonrecurring congestion.

Five projects are complete, and 13 are active. Several projects emphasize the integration of highway systems operations and management strategies into transportation agency business processes and across institutional divisions to achieve the benefits of reduced congestion. The *Guide to Integrating Business Processes to Improve Travel Time Reliability* is one of the first products in this area.¹ SHRP 2 is developing a framework of exemplary, successful practices and materials that help make the case for focusing on improved travel time reliability.

Reliability research also is developing new tools for data collection and analysis. Transportation agencies and practitioners soon will have a new guide on establishing a monitoring program to gather and convey reliability data useful in strategic decision making.

Designing for reliable travel times is an area of great promise. One product will enable users to identify and evaluate the costs and effectiveness of design features that can improve reliability. More than 50 design treatment examples can be analyzed; future work will develop the basis for cost-benefit analyses.

Renewal

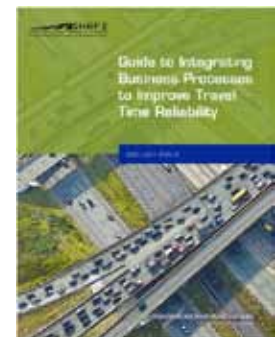


Rapid renewal projects in SHRP 2 include accelerated construction methods, as well as project delivery, design, and operational and maintenance features that minimize project time and produce long-lasting facilities. Five renewal projects have been completed, and 23 more are active. Eleven products are being tested in 17 states.

Products from renewal research will provide new strategies and tools for pavements, bridges, nondestructive testing, coordination with



Travel times posted along US-50 in Maryland. With nearly 20 projects completed or in process, SHRP 2 reliability research aims to reduce congestion through incident reduction, management, response, and mitigation. (Photo: Jennifer J. Weeks)



¹ www.trb.org/Publications/Blurbs/165284.aspx.

STAFF NEWS



As part of a SHRP 2 demonstration of accelerated bridge construction techniques, Iowa DOT replaced a road bridge over Keg Creek in Pottawattamie County in October. The three-span, 210- by 47-ft structure was replaced with minimal disruption to traffic—it was closed for only two weeks. (Photo: Iowa DOT and HNTB)

railroads and utility companies, and speeding project delivery. For example, new tools and resources for locating and identifying underground utility lines can help in matching a technology to site conditions, keeping projects on schedule, reducing conflicts with utilities, and minimizing the risk of injury or property damage. Six projects related to utilities will produce a suite of new resources.



Nondestructive bridge testing techniques are among the research topics in the SHRP 2 renewal focus area.

Deputy Director **Ann M. Brach** succeeds Neil F. Hawks as Director of SHRP 2 in January 2012. Brach joined TRB in 1999 to manage the congressionally requested policy study that led to SHRP 2 and coordinated the Cooperative Research Program projects that shaped the SHRP 2 research agenda.

Hans van Saan, a visiting professional from Rijkswaterstaat, the Dutch highway agency, has returned to Delft after two years helping advance SHRP 2 projects in the reliability focus area.

Onno Tool joined SHRP 2 from Rijkswaterstaat in August, contributing expertise in highway operations and intelligent transportation systems. He is working with FHWA on implementation plans for SHRP 2 reliability products.

Ralph Hessian, former Director of Highway Engineering Services, Nova Scotia Department of Transportation and Public Works, has been working with SHRP 2 as a visiting professional through an arrangement with the Canadian Council of Deputy Ministers Responsible for Transportation and Highway Safety. Hessian is shouldering projects in the reliability and capacity focus areas, facilitating collaboration on a naturalistic driving study in Canada modeled on SHRP 2, and strengthening ties between TRB and several Canadian transportation organizations.

Through an agreement with the French Institute of Science and Technology for Transport, Development, and Networks, or IFSTTAR, in Paris, **Abdelmeneame Hedhli** has joined SHRP 2 as a visiting professional, working on reliability projects in corridor planning and management and intelligent transportation systems.

James Hedlund, former Associate Administrator for Traffic Safety Programs at the National Highway Traffic Safety Administration, has joined SHRP 2 as Special Consultant for Safety Research Coordination.

ADMINISTRATION AND FINANCE



Senior financial assistants Shantia L. Douglas (*left*) and G. Raymond McDaniel (*second from right*) review contracts with financial officers James W. Henson (*second from right*) and Eduardo Cusicanqui (*right*).

The TRB Administration and Finance Division provides financial, technological, and administrative support for the work of TRB staff; financial oversight of the contracts and grants related to TRB activities; 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 \$125 million (see graph, page 60). A statement of income and expenditures appears on pages 62–63.

Affiliate and Sponsor Services

TRB's Core Programs have five main 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 based on the level of services selected.

Individual and student affiliates' benefits include reduced registration fees for the TRB Annual Meeting; a complimentary subscription to *TR News*; discounts on most TRB books and reports—including access to TRR Online, the web posting of papers from TRB's journal; 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, complimentary registrations for the TRB Annual Meeting, and marketing



Michael P. LaPlante
Director
Finance and Business
Operations



Michigan DOT's exhibit at the Annual Meeting featured a simulator showing connected vehicle technology. TRB's organizational affiliates receive marketing and exhibit opportunities at the meeting, as well as complimentary registrations and other benefits.

and exhibit opportunities at the Annual Meeting. Organizational affiliate contributions range from \$4,600 to \$12,000, 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 of the services and publications received. The minimum annual contribution is \$15,000.

Sponsors are the major source of financial support for TRB’s core programs. Federal, state, and local government agencies and professional societies and organizations that represent industry groups are eligible to participate as TRB sponsors. Fees and services are negotiated to fit each sponsor’s needs and to assure fundamental support for the Board’s programs and activities of interest to the entire transportation community. The minimum annual sponsor fee is \$65,000. Sponsors are represented on the TRB Executive Committee. (See pages 70–71 for a list of TRB sponsors and sustaining affiliates.)

Publication Sales and Distribution

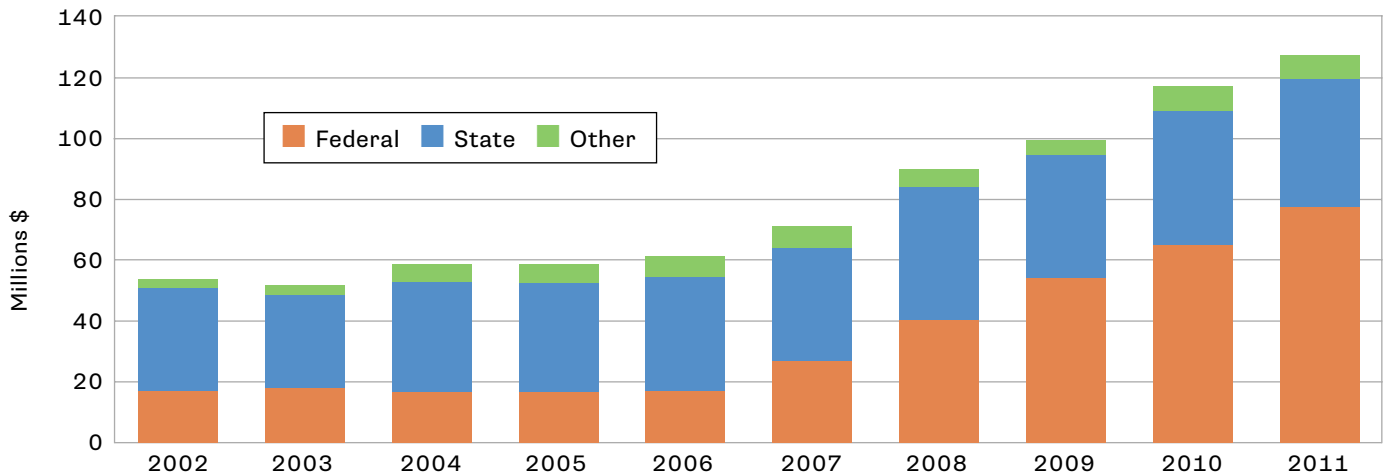
TRB’s timely distribution of publications disseminates the results of transportation research and technology worldwide. TRB releases selected publications—some exclusively—in electronic format. A list of TRB publications issued from January 1 through December 31, 2011, appears on pages 66–69.



Kelvin Jordan, TRB, assists customers purchasing publications at the Annual Meeting.

In 2011, TRB began beta-testing a publication distribution system, working with several state departments of transportation (DOTs), to assess the readiness of TRB sponsors to migrate from mainly hard-copy publication delivery to online access to TRB titles. The guiding principle for the test is “online first, library second, and hard copy as needed.” Under the program, state DOT libraries and research centers receive as many full sets of TRB publications as needed, but the automatic direct delivery of publications to individual state DOT employees ceases. TRB sponsors have online access to nearly all TRB reports; the test reinforces the ease and convenience of access to TRB electronic publications through three methods:

TRB Activity Level by Year



1. A TRB RSS feed can be placed on a sponsor's public or internal website, to highlight new TRB publications and offer immediate access to the titles online and to an order form to request a free hard copy as needed.

2. Individuals can sign up for RSS feeds from TRB directly to their e-mail.

3. The weekly *TRB Transportation Research E-Newsletter* offers direct access to TRB's online publications. Employees of TRB sponsors can select publications from the newsletter and can tailor the newsletter to deliver only topics of interest; from the newsletter, individuals can access the publications online or they can click a button to request a hard copy.

By reinforcing access to TRB online publications, TRB will be able to cut back on the printing, mailing, storage, and distribution of hard-copy publications directly to individuals in federal agencies and in the states participating in the beta test.



Michael LaPlante, Director, Finance and Business Operations, updates the Executive Committee on the online-focused publication distribution system beta test.



TRB sponsors participating in the beta test can customize publications preferences using an RSS feed.

— — STAFF NEWS — —

Eduardo N. Cusicanqui and **Daniel R. B. Somerset** were promoted to Financial Officers, and **Shantia L. Douglas** and **Sophia T. Ramirez** were promoted to Senior Financial Assistants.

Cyndi Johnson received a promotion to Supervisor, Publications Sales.

Rhonda A. Levinowsky joined the staff as Publications Sales Representative in October.

Transferring to TRB after more than 10 years in other divisions of the National Academies, **Amy M. Przybocki** took on the role of Financial Officer in November.

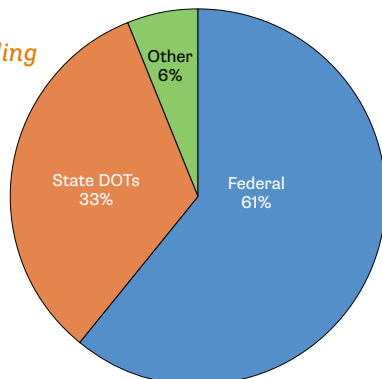
Mazaratti T. White started as a Financial Assistant in October.

STATEMENT OF ACTIVITIES

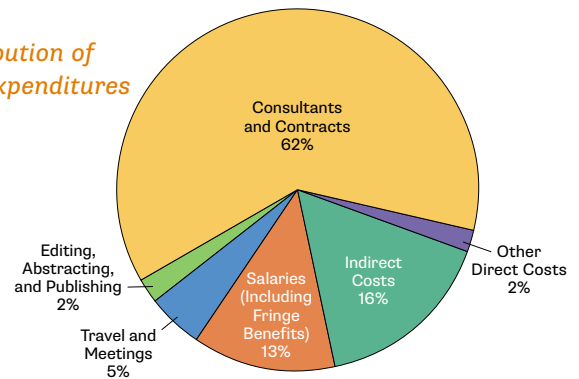
Funding Support by Program and Expenditures
Calendar Years 2010 and 2011

	2010 (Actual)	2011 (Projected)*
Core Technical Activities		
State Highway and Transportation Departments (State DOTs)	\$7,340,000	\$7,340,000
Federal Government		
Federal Highway Administration (FHWA)	2,300,000	2,300,000
Research and Innovative Technology Administration (RITA)	300,000	300,000
Federal Transit Administration (FTA)	250,000	250,000
National Highway Traffic Safety Administration	200,000	200,000
Bureau of Indian Affairs, U.S. Department of the Interior	80,000	80,000
Federal Motor Carrier Safety Administration (FMCSA)	75,000	75,000
Federal Aviation Administration (FAA)	65,000	65,000
Federal Railroad Administration (FRA)	65,000	65,000
Science and Technology Directorate, U.S. Department of Homeland Security	65,000	65,000
U.S. Army Corps of Engineers	65,000	65,000
Subtotal, Federal Government	\$3,465,000	\$3,465,000
Other		
American Public Transportation Association	65,000	65,000
American Transportation Research Institute	65,000	65,000
Association of American Railroads	65,000	65,000
South Coast Air Quality Management District, California	0	65,000
Fees and Sales	5,137,000	5,335,000
Subtotal, Other	\$5,332,000	\$5,595,000
Total, Core Technical Activities	\$16,137,000	\$16,400,000
Marine Board Core Program		
U.S. Coast Guard	100,000	100,000
National Oceanic and Atmospheric Administration	30,000	65,000
Office of Naval Research, U.S. Navy	0	40,000
Bureau of Ocean Energy Management, Regulation, and Enforcement	30,000	30,000
U.S. Army Corps of Engineers	30,000	30,000
Office of the Supervisor of Salvage and Diving, U.S. Navy	25,000	25,000
Maritime Administration	10,000	10,000
Total, Marine Board Core Program	\$225,000	\$300,000
Cooperative Research Programs		
National Cooperative Highway Research Program (State DOTs)	33,685,592	31,896,000
Airport Cooperative Research Program (FAA)	11,026,869	12,356,000
Transit Cooperative Research Program (FTA)	7,492,249	7,372,000
National Cooperative Freight Research Program (RITA)	3,564,344	3,340,000
Hazardous Materials Cooperative Research Program (Pipeline and Hazardous Materials Safety Administration)	1,247,606	1,006,000
Total, Cooperative Research Programs	\$57,016,660	\$55,970,000

TRB Funding Support



Distribution of TRB Expenditures



	2010 (Actual)	2011 (Projected)*
Strategic Highway Research Program 2	\$30,840,505	\$42,945,000
Continuing Programs		
Pavement Research Program Review (FHWA)	\$448,897	\$407,000
Research and Technology Coordinating Committee (FHWA)	\$121,938	\$124,000
Innovations Deserving Exploratory Analysis (IDEA)		
NCHRP IDEA (State DOTs)	1,355,227	1,043,000
Transit IDEA (FTA)	553,095	426,000
Safety IDEA (FRA and FMCSA)	234,540	212,000
Rail IDEA (FRA)	25,865	28,000
Subtotal, IDEA Programs	\$2,168,727	\$1,709,000
Synthesis Programs		
NCHRP Synthesis (State DOTs)	1,376,830	1,074,000
ACRP Synthesis (FAA)	652,698	855,000
TCRP Synthesis (FTA)	658,204	748,000
Commercial Truck and Bus Safety Synthesis (FMCSA)	181,910	282,000
Subtotal, Synthesis Programs	\$2,869,642	\$2,959,000
Legal Programs		
NCHRP Legal (State DOTs)	203,168	226,000
ACRP Legal (FAA)	279,837	197,000
TCRP Legal (FTA)	347,043	131,000
Subtotal, Legal Programs	\$830,048	\$544,000
Total, Continuing Programs	\$6,439,252	\$5,753,000
Policy Studies	\$3,298,324	\$3,301,000
Conferences and Workshops	\$2,842,329	\$2,559,000
TRB TOTAL	\$116,799,070	\$127,228,000
Sources of Funds		
Federal	65,260,508	77,949,000
State DOTs	43,960,816	41,579,000
Other	7,577,746	7,700,000
	\$116,799,070	\$127,228,000
Expenditures by Major Cost Category		
Salaries (including fringe benefits)	14,636,687	15,563,000
Travel and Meetings	5,762,436	6,053,000
Editing, Abstracting, and Publishing	2,547,167	2,890,000
Consultants and Contracts	68,968,239	77,869,000
Other Direct Costs	2,651,931	2,788,000
Indirect Costs	19,291,405	20,294,000
Total Expenditures	\$113,857,864	\$125,457,000
TRB Reserve Fund		
Fund balance, end of previous fiscal year	\$10,123,888	\$13,065,094
Plus (minus) current fiscal year income over (under) expenditures	2,941,206	1,771,000
Balance, current fiscal year	\$13,065,094	\$14,836,094

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.

* Calendar Year 2011 data use actual data for the first three quarters and an estimate for the fourth.

TRB CONFERENCES AND WORKSHOPS (January 1, 2011-December 31, 2011)

	JANUARY		
22	International Symposium on Durable and Innovative Bridges	25	Geophysical Exploration, Nondestructive Evaluation, and Monitoring Techniques for Landslides, Rockfalls, and Other Geohazards
23-27	TRB 90th Annual Meeting	25-26	6th New York City Bridge Conference*
	FEBRUARY	25-27	Waste Management and Resource Efficiency Workshop
7-11	2nd International Conference on Construction Management*	25-28	TRB-AASHTO Joint Geometric Design Meeting
	MARCH		AUGUST
13-16	Geo-Frontiers 2011*	1-2	20th Biennial Visibility Symposium
16-18	Joint Rail Conference: Shared Corridors, Shared Interests*	20-23	6th International Visualization in Transportation Symposium
30-	5th University Network Summit:	22-25	Transportation Hazards and Security Summit
April 1	Catastrophes and Complex Systems*	29-	Rethinking Energy and Climate
	MAY	Sept. 1	Strategies for Transportation
1-3	International Transportation Economic Development Conference: Economic Impact of Connecting People, Goods, Markets, Employment, Services, and Production*	30-	Emerging Issues in Safe and Sustainable
8-12	13th TRB National Transportation Planning Applications Conference	Sept. 1	Mobility for Older People
10-11	Transportation Planning, Land Use, and Air Quality Conference		SEPTEMBER
18-20	3rd International Conference on Roundabouts	2	Operating in the Ocean Environment: Forum on Offshore Energy Development*
18-21	4th International Transportation Systems Performance Measurement Conference	7-8	Performance Measures for Transportation and Livability*
	JUNE	13-16	SmartRivers 2011: Systems Thinking*
2-3	5th International Conference on Bituminous Mixtures and Pavements*	14-16	3rd International Conference on Road Safety and Simulation
5-8	28th International Bridge Conference*		OCTOBER
6-7	Using National Household Travel Survey Data for Transportation Decision Making Workshop	2-6	7th World Congress on Joints, Bearings, and Seismic Systems for Concrete Structures*
7-9	13th Annual Harbor Safety Committees and Area Maritime Security Committees Conference*	10-12	European Transport Conference*
9-11	2nd GeoHunan International Conference: Emerging Technologies for Design, Construction, Rehabilitation, and Inspection of Transportation Infrastructure*	12-13	Fatigue in Transit Operations: A Symposium
13-14	Symposium on Mileage-Based User Fees*	16-20	World Congress on Intelligent Transport Systems
14-17	1st International Conference on Access Management*	25	TRB-FAA Workshop on Commercial Aviation Forecast Assumptions
27-30	6th International Driving Symposium on Human Factors in Driver Assignment, Training, and Vehicle Design*	25-27	Using Census Data for Transportation Applications Conference
28-	6th International Symposium on Highway		NOVEMBER
July 1	Capacity and Quality of Service	2-3	Improving Transportation Safety Programs Through University-Agency Partnerships Conference
	JULY	7-9	2nd Road Dust Best Management Practices Conference*
10-13	TRB Joint Summer Meeting	15-19	8th International Conference on Managing Pavement Assets*
11-13	National Summit for Rural Traffic Safety Culture*		DECEMBER
11-14	Southern African Transport Conference*	5-7	Strategies for Meeting Critical Data Needs for Decision Making in State and Metropolitan Transportation Agencies
14-15	6th SHRP 2 Safety Research Symposium	7-10	1st Conference of the Transportation Research Group of India
17-20	50th Annual Workshop on Transportation Law	15-16	Operating in the Ocean Environment: Workshop on Offshore Renewable Energy Development*
21-22	FAA-TRB Business and General Aviation Forecasting Workshop		
24-27	10th International Conference on Low-Volume Roads		

*TRB was cosponsor of the meeting.

TRB Webinars 2011

FEBRUARY

- 9 Understanding Common Use and Passenger Self-Tagging
- 16 Improved Practices for Dowel Bars in Concrete Pavement
- 23 Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies

MARCH

- 9 Roundabouts: An Informational Guide—2nd Edition
- 24 Climate Change Adaptation, Part 1: Climate Adaptation Resources and a State Department of Transportation (DOT) Case Study

APRIL

- 7 Climate Change Adaptation, Part 2: Two State DOT Case Studies
- 20 Improved Practices for Design and Construction of Continuously Reinforced Concrete Pavements, Part 1: Design

MAY

- 4 Expedited Planning and Environmental Review of Highway Projects
- 5 Communicating the Value of Research: Focus on Successful State DOT Practices and Case Studies
- 11 Microscopic Traffic Simulation Models: Why and How to Calibrate Them
- 25 Community Visioning Approach to Support the Collaborative Decision-Making Framework for Transportation Investments

JUNE

- 1 Improved Practices for Design and Construction of Continuously Reinforced Concrete Pavements, Part 2: Construction
- 29 Moisture Impacts on Pavement Performance

JULY

- 13 Policy Options for Saving Energy and Reducing Greenhouse Gas Emissions from Transportation
- 20 Signals for Pedestrians Who Are Blind: Overview of Current Issues and Available Training

AUGUST

- 3 Six Top Road Safety Papers from the 2011 Annual Meeting
- 10 Advancing Technologies for Working with Underground Utilities: Current SHRP 2 Research
- 11 Entering and Managing Project Records in the Research in Progress Database
- 17 Crossing Solutions at Roundabouts and Channelized Right-Turn Lanes for Pedestrians with Visual Impairments
- 24 Principles and Practices of Quieter Pavements
- 31 Railroad-DOT Institutional Mitigation Strategies

SEPTEMBER

- 12 Special Mixture Design Considerations and Methods for Warm-Mix Asphalt
- 21 Keeping Up with Communication Technology: Online Workshop on the Practical Uses of Social Media
- 26 Greenhouse Gas Emission Inventory Methods for State Transportation Departments

OCTOBER

- 12 Advanced Models to Characterize and Design Asphalt Pavements: Implementation and Application Examples
- 20 Equity of Evolving Transportation Finance Mechanisms
- 24 Wildlife vs. Aviation: Repelling and Detering Techniques

NOVEMBER

- 2 Guidelines for Pavement Warranties
- 9 Simple Low-Cost Soil Testing: How to Do It and How to Use the Results
- 14 Current Trends at Airports: Rights and Responsibilities
- 17 Truck Drayage Productivity Guide

DECEMBER

- 1 Searching TRID: The Transportation Research Information Services and International Transport Research Documentation Database
- 5 Small Airports: Practical Guidance for Survival
- 12 TRB 91st Annual Meeting: How to Survive and Thrive
- 13 Freight Facility Location Selection: Guide for Public Officials
- 14 Guidelines for Ramp and Interchange Spacing
- 21 Optimization of Tack Coat for Hot-Mix Asphalt Placement

Transportation Research Records

- 2203 Low-Volume Roads 2011, Vol. 1
- 2204 Low-Volume Roads 2011, Vol. 2
- 2205 Low-Volume Roads 2011, Vol. 3
- 2206 Public-Sector Aviation: Graduate Research Award Papers, 2009-2010
- 2207 Asphalt Materials and Mixtures 2011, Vol. 1
- 2208 Asphalt Materials and Mixtures 2011, Vol. 2
- 2209 Asphalt Materials and Mixtures 2011, Vol. 3
- 2210 Asphalt Materials and Mixtures 2011, Vol. 4
- 2211 Research and Education 2011
- 2212 Soil Mechanics 2011
- 2213 Highway Safety Management; Safety Workforce Development; School Transportation
- 2214 Aviation 2011
- 2215 Information Systems, Geographic Information Systems, and Advanced Computing 2011
- 2216 Transit 2011, Vol. 1
- 2217 Transit 2011, Vol. 2
- 2218 Transit 2011, Vol. 3
- 2219 Transit 2011, Vol. 4
- 2220 Maintenance and Preservation of Structures and Equipment
- 2221 Revenue, Finance, and Economics
- 2222 Marine Transportation and Marine Terminal Operations 2011
- 2223 Operational Effects of Geometrics and Access Management 2011
- 2224 Freight Systems 2011: Modeling and Performance Measures
- 2225 Pavement Management 2011, Vol. 1
- 2226 Pavement Management 2011, Vol. 2
- 2227 Pavement Management 2011, Vol. 3
- 2228 Construction 2011
- 2229 Freeway Operations; Regional Systems Management and Operations; Managed Lanes 2011
- 2230 Travel Behavior 2011, Vol. 1
- 2231 Travel Behavior 2011, Vol. 2
- 2232 Geomaterials 2011
- 2233 Environment 2011
- 2234 Critical Infrastructure Protection and Resilience; Emergency Evacuation 2011
- 2235 Maintenance and Preservation of Pavements
- 2236 Safety Data, Analysis, and Evaluation 2011, Vol. 1
- 2237 Safety Data, Analysis, and Evaluation 2011, Vol. 2
- 2238 Freight Operations 2011
- 2239 Developing Countries 2011
- 2240 Concrete Materials 2011
- 2241 Highway Safety Performance, Statistical Methods, and Visualization
- 2242 Sustainability and Livability; Economic, Environmental, and Societal Impacts
- 2243 Intelligent Transportation Systems and Vehicle-Highway Automation 2011
- 2244 Planning 2011, Vol. 1
- 2245 Planning 2011, Vol. 2
- 2246 Travel Survey Methods, Freight Data Systems, and Asset Management 2011
- 2247 Bicycles 2011
- 2248 Human Performance, Simulation, and User Information
- 2249 Traffic Flow Theory 2011: Simulation Modeling
- 2250 Traffic Control Devices, Visibility, and Highway-Rail Grade Crossings 2011
- 2251 Structures 2011
- 2252 Energy and Global Climate Change 2011
- 2253 Geology and Properties of Earth Materials 2011
- 2254 Travel Forecasting 2011, Vol. 1
- 2255 Travel Forecasting 2011, Vol. 2
- 2256 Urban and Traffic Data Systems
- 2257 Highway Capacity and Quality of Service 2011

- 2258 Maintenance Services and Surface Weather 2011
- 2259 Traffic Signal Systems 2011
- 2260 Traffic Flow Theory and Characteristics 2011
- 2261 Railways 2011—Including 2011 Thomas B. Deen Distinguished Lecture
- 2262 Highway Design 2011
- 2263 Network Modeling 2011
- 2264 Pedestrians 2011
- 2265 Highway and Traffic Safety: Vehicles, Behavior, and Roundabouts

Special Reports¹

- 302 Federal Funding of Transportation Improvements in BRAC Cases
- 303 Equity of Evolving Transportation Finance Mechanisms
- 304 How We Travel: A Sustainable National Program for Travel Data
- 305 Structural Integrity of Offshore Wind Turbines: Oversight of Design, Fabrication, and Installation
- 306 Naval Engineering in the 21st Century: The Science and Technology Foundation for Future Naval Fleets
- 307 Policy Options for Reducing Energy Use and Greenhouse Gas Emissions for U.S. Transportation
- 308 Making Driving Safer: The Promise and Challenge of Automotive Electronics

Conference Proceedings¹

- 46 Women's Issues in Transportation: Summary of the 4th International Conference, Vol. 2: Technical Papers

Conference Proceedings on the Web

- 4 Offshore Wind Energy Projects: Summary of a Workshop

Letter Reports (online)

- Long-Term Pavement Performance Committee, January 20, 2011
- Review of the Federal Railroad Administration Research and Development Program, March 9, 2011
- Long-Term Pavement Performance Committee, August 5, 2011
- Review of U.S. Department of Transportation Study on Implementation of Changes to the Section 4(f) Process, September 15, 2011
- Transit Research Analysis Committee, November 17, 2011

Transportation Research E-Circulars (online)

- 147 Development in Asphalt Binder Specifications
- 148 Critical Issues in Aviation and the Environment
- 149 75 Years of the Fundamental Diagram for Traffic Flow Theory: Greenshields Symposium
- 150 Advancing Regional Transportation Operations: A National Workshop
- 151 Modeling Operating Speed
- 152 Adapting Transportation to the Impacts of Climate Change: State of the Practice 2011
- 153 Dynamic Traffic Assignment: A Primer
- 154 Development of Warranty Programs for Hot-Mix Asphalt
- 155 Sensitivity Analyses for Flexible Pavement Design with the *Mechanistic-Empirical Pavement Design Guide*
- 156 Automated Imaging Technologies for Pavement Distress Surveys
- 157 TRIS Turns 40: Results of a 2007 User Satisfaction Survey on the Transportation Research Information Service
- 158 Commodity Flow Survey Workshop
- 159 Teamwork in U.S. Railroad Operations: A Conference

TR News

Nos. 272-277

Online Newsletters

Intercity Rail Passenger Systems, Nos. 17 and 18
TRB Transportation Research E-Newsletter

Airport Cooperative Research Program (ACRP) Reports²

- 19A Resource Guide to Airport Performance Indicators
- 33 Guidebook for Developing and Managing Airport Contracts
- 41 Guide to the Decision-Making Tool for Evaluating Passenger Self-Tagging
- 42 Sustainable Airport Construction Practices
- 43 Guidebook of Practices for Improving Environmental Performance at Small Airports
- 44 A Guidebook for the Preservation of Public-Use Airports
- 45 Optimizing the Use of Aircraft Deicing and Anti-Icing Fluids
- 46 Handbook for Analyzing the Costs and Benefits of Alternative Aviation Turbine Engine Fuels at Airports
- 47 Guidebook for Developing and Leasing Airport Property
- 48 Impact of Jet Fuel Price Uncertainty on Airport Planning and Development
- 49 Collaborative Airport Capital Planning Handbook
- 50 Improved Models for Risk Assessment of Runway Safety Areas
- 51 Risk Assessment Method to Support Modification of Airfield Separation Standards
- 52 Wayfinding and Signing Guidelines for Airport Terminals and Landside
- 53 A Handbook for Addressing Water Resource Issues Affecting Airport Development Planning
- 54 Resource Manual for Airport In-Terminal Concessions
- 55 Passenger Level of Service and Spatial Planning for Airport Terminals
- 56 Handbook for Considering Practical Greenhouse Gas Emission Reduction Strategies for Airports
- 57 The Carbon Market: A Primer for Airports
- 58 Airport Industry Familiarization and Training for Part-Time Airport Policy Makers

ACRP Syntheses of Airport Practice²

- 22 Common Airport Pavement Maintenance Practices
- 23 Bird Harassment, Repellent, and Deterrent Techniques for Use on and near Airports
- 24 Strategies and Financing Opportunities for Airport Environmental Programs
- 25 Strategies for Reuse of Underutilized or Vacant Airport Facilities
- 26 Current Airport Inspection Practices Regarding Foreign Object Debris or Damage (FOD)
- 27 Airport Self-Inspection Practices
- 28 Investigating Safety Impacts of Energy Technologies on Airports and Aviation
- 29 Ramp Safety Practices
- 30 Airport Insurance Coverage and Risk Management Practices
- 31 Airline and Airline-Airport Consortia to Manage Terminal and Equipment

ACRP Research Results Digests²

- 12 Synthesis of Information Related to Airport Practices

ACRP Legal Research Digests²

- 11 Survey of Minimum Standards: Commercial Aeronautical Activities at Airports
- 12 Fair Disclosure and Airport Impact Statements in Real Estate Transfers

ACRP Web-Only Documents

- 10 Appendix to ACRP Report 41
- 12 Risk Assessment of Proposed Aircraft Rescue and Fire Fighting Standards (ARFF)

Hazardous Materials Cooperative Research Program (HMCPR) Reports²

- 2 Assessing Soil and Groundwater Impacts of Chemical Mixture Releases from Hazardous Materials Transportation Incidents
- 3 Guidebook for Conducting Local Hazardous Materials Commodity Flow Studies
- 4 Emerging Technologies Applicable to Hazardous Materials Transportation Safety and Security

- 5 A Guide for Assessing Community Emergency Response Needs and Capabilities for Hazardous Materials Releases
- 6 Feasibility of a Consolidated Security Credential for Persons Who Transport Hazardous Materials

HMCPR Research Results Digests²

- 2 Hazardous Materials Cooperative Research Program: A Status Report

National Cooperative Freight Research Program (NCFRP) Reports²

- 6 Impacts of Public Policy on the Freight Transportation System (Revised)
- 9 Guidance for Developing a Freight Transportation Data Architecture
- 10 Performance Measures for Freight Transportation
- 11 Truck Drayage Productivity Guide
- 12 Framework and Tools for Estimating Benefits of Specific Freight Network Investments
- 13 Freight Facility Location Selection: A Guide for Public Officials

NCFRP Research Results Digests²

- 3 National Cooperative Freight Research Program: A Status Report

NCFRP Web-Only Documents

- 1 Background Research Material for NCFRP Report 13
- 2 Multistate Freight Transportation Organizations

National Cooperative Highway Research Program (NCHRP) Reports³

- 673 A Manual for Design of Hot-Mix Asphalt with Commentary
- 674 Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities
- 675 Load and Resistance Factor Design (LRFD) Metal Loss and Service-Life Strength Reduction Factors for Metal-Reinforced Systems
- 678 Design of Fiber-Reinforced Polymer (FRP) Systems for Strengthening Concrete Girders in Shear
- 679 Design of Concrete Structures Using High-Strength Steel Reinforcement
- 680 Manual for Emulsion-Based Chip Seals for Pavement Preservation
- 681 Development of a Precast Bent Cap System for Seismic Regions
- 682 Scour at Wide Piers and Long Skewed Piers
- 683 Protocols for Collecting and Using Traffic Data in Bridge Design
- 684 Enhancing Internal Trip Capture Estimation for Mixed-Use Developments
- 685 Strategies to Attract and Retain a Capable Transportation Workforce
- 686 Road Pricing: Public Perceptions and Program Development
- 687 Guidelines for Ramp and Interchange Spacing
- 688 Determining Highway Maintenance Costs
- 689 Costs of Alternative Revenue-Generation Systems
- 690 A Guidebook for Successful Communication, Cooperation, and Coordination Strategies Between Transportation Agencies and Tribal Communities
- 691 Mix Design Practices for Warm-Mix Asphalt
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- 694 Evaluation and Performance Measurement of Congestion Pricing Projects
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