

Transportation Research Board

2013 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,

In January 1922, 30 transportation practitioners and researchers from around the country gathered for the first annual meeting of an organization that was then known as the Advisory Board on Highway Research and is now known as the Transportation Research Board (TRB). Right from the start, the meeting was a success, immediately becoming the Board's most visible activity.

While TRB's portfolio of activities is much broader now, the Annual Meeting is still TRB's most visible activity, and it has grown from modest beginnings to become the world's largest annual gathering of transportation professionals concerned with research and innovation. The



meeting is known not only for its scale but also for its diversity in subject matter and attendees. The program covers all transport modes, and attendees include everyone from students entering the field to our most senior professionals, representatives from dozens of countries, and a mix of government, private-sector, and academic interests.

More than 11,700 transportation research professionals attended the 2013 TRB Annual Meeting in Washington, D.C., including a record number of new and young attendees. (Photo: Risdon Photography)



Robert E. Skinner, Jr., TRB Executive Director (left), and Deborah H. Butler, Executive Committee Chair. (Photo: Risdon Photography)

ACCOMMODATING GROWTH

The 2013 Annual Meeting set a new attendance record—11,700. Program highlights included presentations at the TRB Chairman's Luncheon by then U.S. Transportation Secretary Ray LaHood and outgoing American Association of State Highway and Transportation Officials (AASHTO) Executive Director John Horsley; a special session on the transportation impacts of Superstorm Sandy; numerous sessions on the recently passed Moving Ahead for Progress in the 21st Century (MAP-21) legislation; and a debate between high school teams from Baltimore, Maryland, and New York City

Ray LaHood (*top photo*), then concluding his service as U.S. Secretary of Transportation, and John Horsley, then about to retire as longtime AASHTO Executive Director, were among the notable figures who delivered addresses at the Annual Meeting. (Photos: Risdon Photography)



on whether the U.S. federal government should substantially increase investment for transportation infrastructure.

Behind the scenes, TRB has implemented a variety of tools to accommodate the growth in the meeting's attendance. We were an early adopter of electronic registration, and TRB relies on a web-based tool to manage paper submittals and the peer review process. The exhaustive Annual Meeting program is available on the web in a format that allows attendees to construct custom schedules. New in 2013 were an Annual Meeting "app" for smart phones and mobile devices that delivered the program, navigational information, and much more; a Twitter account for first-time Annual Meeting attendees; and an interactive Google Maps web page displaying the locations of services and facilities.

FAMILIARITY AND CHANGE

Despite the meeting's increase in size, the new technologies, and the evolving format—such as the addition of poster sessions and the expansion of the exhibits—the experience of attending a TRB Annual Meeting has a comforting familiarity. Long-time attendees know the ins

and outs of the Marriott Wardman Park Hotel, home to the Annual Meeting since 1956, when it was known as the Sheraton Park Hotel; the Omni Shoreham, which was added a few years later; and the Washington Hilton Hotel, which was added in 1993. The local Washington, D.C., area meeting venue has been a constant.

This set of Connecticut Avenue hotels has served TRB well for many years, but 2014 will be the last year TRB's Annual Meeting will convene at these locations. In 2015, the Annual Meeting will move to the Walter E. Washington Convention Center in the heart of downtown Washington. This venue will provide the capacity and flexibility for the Annual Meeting in the years ahead, and TRB's leadership and staff are looking forward to the move.

But first, TRB has one more meeting at the Connecticut Avenue hotels. The 2014 meeting will offer an opportunity to celebrate a rich heritage. As TRB transitions to the Convention Center, TRB staff and leaders are committed to preserving all that worked so well at past Annual Meetings—a comprehensive program, committee meetings, opportunities for networking, and an extensive number of associated group meetings and social activities. Attendees will find the



A new app for mobile devices debuted at the 2013 Annual Meeting and was downloaded more than 6,000 times. (Photo: Risdon Photography)



Thomas O'Brien, California State University, Long Beach, discusses operational strategies to mitigate the impact of terminals and hubs at a joint international conference on city logistics research, sponsored by the European Commission; the Research and Innovative Technology Administration, U.S. Department of Transportation; and TRB.

Convention Center and downtown location the right venue for the Annual Meeting in the years ahead and will develop a comforting familiarity with this venue as well.

ADDRESSING CRITICAL ISSUES

In addition to a record attendance, the 2013 TRB Annual Meeting set new highs with more than 4,600 papers received and peer-reviewed and more than 750 sessions and workshops. More than 6,000 downloaded the TRB Annual Meeting app for smartphones and mobile devices, and users gave it rave reviews.

TRB also sponsored 20 conferences in 2013 and cosponsored approximately 20 others. The conferences addressed some of the most critical issues facing the transportation community, including automated vehicles, big data, building a safety culture, climate change and energy, sustainability, congestion pricing, meeting needs in a constrained fiscal environment, and many more.

TRB also sponsored or cosponsored more than a dozen international conferences, including the first of four annual symposia in partnership with the European Commission and the U.S. Department of Transportation's (DOT's) Research and Innovative Technology Administration (RITA). The first symposium explored City Logistics Research: A Transatlantic Perspective.

AHEAD OF THE CURVE

The TRB Technical Activities Division expanded efforts to increase the involvement of key stakeholders in TRB standing committee activities. The number of state DOT employees serving as members of standing committees increased to almost 800, the highest total in recent memory. Standing committees have made a concerted effort to enhance opportunities for participation that do not depend on travel. Almost all standing committees now have a communications coordinator, and these volunteers have shared experiences and pooled efforts to take advantage of new tools to involve individuals in committee activities.

The TRB Young Members Council presented the first TRB Outstanding Young Member Achievement Award at the 2013 Annual Meeting, to Stephanie Camay, Parsons Brinckerhoff. In addition, a record number of new and young Annual Meeting attendees volunteered to participate in TRB standing committees, enhancing the diversity of committee membership by setting new highs for the involvement of women and minorities.

The Technical Activities Division began to lay the groundwork for a training initiative, "Ahead of the Curve: Mastering the Management of Transportation Research and Innovation Programs." The certificate program aims to enhance the knowledge, skills, and abilities of transportation research and innovation managers on a coordinated and continuing basis. The launch is planned for late 2014 or early 2015.



Committee Communications Coordinators Council members J. D. Allen, Alliance Transportation Group; Council Chair Jeffrey Western, Western Management and Consulting; Lisa Marflak, TRB; and Julie Lorenz, Burns and McDonnell Engineering Company, met in January. Each standing committee can designate one member as a communication coordinator, who maintains the committee's communication portfolio. (Photo: Risdon Photography)



Stephanie Camay, Parsons Brinckerhoff (second from left), received the inaugural TRB Outstanding Young Member Award from (from left) Joung Lee, AASHTO and 2012-2013 Chair of the TRB Young Members Council; Marsha Anderson Bomar, Stantec Consulting; and Katherine F. Turnbull, Texas A&M Transportation Institute and Chair of the TRB Technical Activities Council. (Photo: Risdon Photography)

KEY POLICY ADVICE

Federal programs typically include transportation infrastructure spending to stimulate the economy in response to recessions, but this approach often is criticized for not pumping funds fast enough into the economy. Special Report 312, *Transportation Investments in Response to Economic Downturns*—to be released in January 2014—reviews the arguments for and against infrastructure spending and identifies steps to have projects ready to fund when the next recession occurs.

Controversy over the proposed Keystone XL pipeline to move bitumen extracted from Canada’s tar sands region to U.S. refineries resulted in a TRB study to address claims that bitumen diluted to move by pipeline is more likely than other crude oils to cause pipeline failures. Special Report 311, *Effects of Diluted Bitumen on Crude Oil Transmission Pipelines*, finds no evidence that diluted bitumen poses any additional risk of pipeline spills.

Important new studies were begun late in 2013 addressing reinvestment needs on the Inland Waterway System and the adequacy of the Surface Transportation Board in balancing shipper and rail carrier needs in setting rates.

SUPPORTING IDEAS

An innovation developed with assistance from TRB’s Innovations Deserving Exploratory

Analysis (IDEA) programs received the highest award of the American Society of Civil Engineers (ASCE) in 2013. Inventor John Hillman was presented with ASCE’s Pankow Award for the development of the hybrid composite bridge beam. The IDEA programs involved were supported by the Federal Railroad Administration and the National Cooperative Highway Research Program.

DIVERSE RESEARCH PRODUCTS

TRB’s cooperative research programs had a very productive year, issuing approximately 125 publications despite significant uncertainty in program funding and some funding reductions after federal authorization and appropriation processes.

After marking its 50th anniversary last year, the National Cooperative Highway Research Program (NCHRP) published approximately 60 research reports addressing diverse topics in highway planning, materials, design, construction, maintenance, management, and operations. Of particular note was a publication providing potential guidelines for riveted and bolted gusset-plate connections for steel bridges. Cofunded by the Federal Highway Administration (FHWA), this research was conducted at the recommendation of the National Transportation Safety Board after the collapse of the I-35W bridge in Minnesota. The research explored and tested the failure modes of steel truss bridge gusset-plate connections.

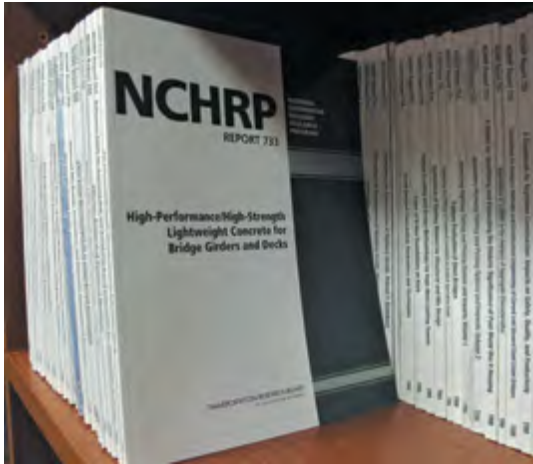
The Transit Cooperative Research Program



The U.S. Army Corps of Engineers Nashville District oversees a foundation remediation project to stop seepage at the Wolf Creek Dam in Jamestown, Kentucky. The needs of the U.S. Inland Waterway System are the subject of a current TRB policy study. (Photo: Leon Roberts, USACE)



The award-winning hybrid composite bridge beam, used in the construction of Knickerbocker Bridge in Boothbay, Maine, was developed with assistance from the Innovations Deserving Exploratory Analysis program.



The 60 titles published by the National Cooperative Highway Research Program in 2013 covered research topics from highway planning and design to management and operations.

(TCRP) published 19 project reports in 2013, bringing the total to more than 600 for the program's 21-year history. Funding for TCRP has been reduced significantly over the past several years, however, from \$10 million in Fiscal Year (FY) 2011 to \$6.5 million in FY 2012 to \$3.5 million in FY 2013. MAP-21 authorized \$7.0 million in funding for TCRP for FY 2013 and FY 2014; however, the appropriations have not met the authorized level.

The reduced funding has led to a reduction in the number of new research projects selected. In addition, TCRP has made several changes to reduce costs, including publishing reports electronically to eliminate printing expense. TRB is investigating a print-on-demand service for a fee for those who prefer to receive TCRP publications in hard copy.

Of particular note during 2013 was the publication of the third edition of the TCRP *Transit Capacity and Quality of Service Manual*. Previous editions have been among the most requested TCRP publications. The volume is intended as a complement to TRB's long-standing *Highway Capacity Manual*.

This year, the Airport Cooperative Research program (ACRP) published 37 reports covering a range of topics, including airport leadership development, airfield capacity, opportunities for alternative fuel distribution programs, integration of GIS into emergency management, airport sound insulation programs, and operational and business continuity planning for prolonged

airport disruptions. In addition, ACRP product dissemination expanded significantly to include e-videos, webinars, workshops, speaker presentations, the ACRP Ambassadors, conference exhibits, and more.

Work continued on the new National Cooperative Rail Research Program. With one year of program funding, all initially selected projects are under way, and results will emerge next year. The reauthorization of the Passenger Rail Investment and Improvement Act (PRIIA) will determine the continuation of the program; discussions on PRIIA reauthorization are under way.

COMPLETING THE TASKS

Finally, the National Cooperative Freight Research Program (NCFRP) published six reports, and the Hazardous Materials Cooperative Research Program (HMCRP) published three in 2013. NCFRP publications addressed such topics as environmental benchmarking in freight transportation, freight data cost elements, smart growth and urban goods movement, freight data sharing, and developing subnational commodity flow data. HMCRP publications addressed highway hazardous materials bulk package accident performance data collection, a technical assessment of dry ice limits on aircraft, and a state of the practice in hazardous materials transportation risk assessment. As indicated last year, MAP-21 did not reauthorize either NCFRP or HMCRP. Work continues to complete all research that was in process.



The Sunset Transit Center in Portland, Oregon. The Transit Cooperative Research Program published the third edition of the highly valued *Transit Capacity and Quality of Service Manual* in 2013.



Data collection equipment awaits deinstallation from a test vehicle by researchers with the second Strategic Highway Research Program's Naturalistic Driving Study. The collection phase of the landmark study ended in November. (Photo: SHRP 2)

PIVOTING INTO IMPLEMENTATION

This was a pivotal year for the second Strategic Highway Research Program (SHRP 2), which is conducting research on effective ways to rebuild highway infrastructure, reduce congestion, and improve safety by addressing driver error and behavior. The focus has turned to converting research results into tools and resources for delivery to users. The results have taken shape in many forms, including more than 30 web-based resources, guides, curricula and other training materials, analytical models, and data sets.

SHRP 2 products are at work in transportation projects across the nation, including several on the Tappan Zee Bridge project over the Hudson River. Some products are being tested in demonstration or pilot projects, while others involve full implementation of final products.

Data collection for the SHRP 2 Naturalistic Driving Study was completed in November 2013. A total of 3,100 drivers participated, generating nearly 30 million vehicle miles of real-world driving data, 5 million trips, and 12,500 miles of data about the roadways traveled. TRB is working with FHWA, AASHTO, and the National Highway Traffic Safety Administration on the organizational and technological means to make the data available to as many researchers and safety practitioners as possible.

Four projects in the Reliability focus area are related to national training for traffic incident responders from all the disciplines that have a role at an incident scene. FHWA is offering the multidisciplinary training, which is in great demand—as of November, nearly 21,000 responders had completed the training.

Pilot tests have become a major source of information to improve the main product of the Capacity focus area, a web-based resource called Transportation for Communities: Achieving Projects Through Partnerships (TCAPP), which encompasses many of the Capacity research products. Transportation agencies in California, Colorado, Minnesota, Oregon, South Carolina, Washington State, Virginia, and West Virginia have used TCAPP and its applications to support an array of needs in transportation planning, programming, and project development.

A series of free webinars called SHRP 2 Tuesdays debuted this year to provide substantive summaries of research projects and to intro-

duce the results to potential users. The ambitious pace of two webinars a month is likely to increase in 2014 to accommodate the number of projects reaching completion.

As the SHRP 2 research program nears its end date in March 2015, much has been accomplished and much remains to be done. Nearly 75 percent of the work has been completed on the 131 contracts awarded.

INFORMATION TECHNOLOGY INITIATIVE

In the past 20 years, TRB has invested in information technology to develop and refine systems that are critical to its mission—for example, to support the review of thousands of Annual Meeting papers by hundreds of volunteers; make transportation research results and information on research in progress more accessible; and disseminate information through the World Wide Web, webinars, electronic newsletters, and social media.

After a 2012 strategic assessment of its IT applications, TRB undertook a major initiative this year to upgrade its volunteer membership information system. The new system, to be unveiled in early 2014, will improve the Board's efficiency in managing this key database. Volunteers will be able to update their own data, and the system will contain information on all TRB committees, panels, and task groups; support sponsor and affiliate services; and modernize TRB's publication sales and subscription management.



Washington State Transportation Secretary Lynn Peterson chats with longshoremen at an event supporting the Puget Sound Gateway Project, which pilot-tested the SHRP 2 Transportation for Communities: Advancing Projects Through Partnerships decision-making tool. (Photo: Washington State DOT)

LOOKING TO THE FUTURE

Setting the course for the future is an important challenge that all organizations face. We hope that TRB is continually making the proper course corrections in its programs and activities, but this year, the foundation has been laid for a more exhaustive examination of our programs.

TRB's Executive Committee completed and released the latest edition of *Critical Issues in Transportation*. For more than a year, it had been working on this statement, which describes the issues, elaborates on the challenges they present to the transportation world, and identifies key TRB policy studies and other work that address these issues. Also this year, the National Research Council conducted a triennial review of TRB programs through a panel led by Dr. Anita Jones, University Professor Emerita, University of Virginia. The review was very positive but identified a number of topics that TRB should address in its programs.

Together, *Critical Issues* and the triennial review provide a firm basis for a comprehensive update of TRB's strategic plan, which was last undertaken seven years ago. Led by TRB's Executive Committee and Subcommittee on Planning and Policy Review, this strategic planning effort will include outreach via surveys and focus groups with TRB volunteers, sponsors, and other constituencies. We expect the plan to be ready for final action by the Executive Committee at the January 2015 Annual Meeting.

STAFF CHANGES

The division reports that follow note several retirements and other staff changes. A prominent change is the retirement of Suzanne B. Schneider, TRB's Associate Executive Director, who joined TRB as the Assistant to the Executive Director in 1986 and steadily expanded her portfolio of responsibilities. When she retired in October, Dr. Schneider oversaw our publications, communications, and information technology services units, and she managed TRB committee and panel appointment, report review, and other activities connected with National Research Council processes.

Anyone who has worked with Suzanne knows that this list of responsibilities understates her crucial role in keeping TRB's operations func-



At their midyear meeting, TRB Executive Committee members applauded the contributions of Associate Executive Director Suzanne B. Schneider (center), who retired in September after 27 years with TRB.

tioning smoothly. She will be greatly missed. Her retirement has prompted other staff changes in the TRB Executive Office that are described elsewhere in the report.

NATIONAL ACADEMIES NEWS

On July 1, 2013, C. D. (Dan) Mote, Jr., began a six-year term as president of the National Academy of Engineering. Dr. Mote is also Regents Professor, on leave, from the University of Maryland, College Park, where he served as president for 12 years. Before the Maryland presidency, Dr. Mote held an endowed chair in mechanical engineering and served as vice chancellor at the University of California, Berkeley.

His predecessor, NAE President Emeritus Charles M. Vest, died in December. Dr. Vest was President Emeritus of the Massachusetts Institute of Technology and a 2006 recipient of the National Medal of Technology.



C. D. (Dan) Mote, Jr.

Deborah H. Butler
Chair, Executive Committee

Robert E. Skinner, Jr.
Executive Director

Transportation Research Board 2013 Executive Committee*

Chair: Deborah H. Butler, Executive Vice President, Planning, and CIO, Norfolk Southern Corporation, Norfolk, Virginia
Vice Chair: Kirk T. Steudle, Director, Michigan Department of Transportation, Lansing
Executive Director: Robert E. Skinner, Jr., Transportation Research Board

Victoria A. Arroyo, Executive Director, Georgetown Climate Center, and Visiting Professor, Georgetown University Law Center, Washington, D.C.

Scott E. Bennett, Director, Arkansas State Highway and Transportation Department, Little Rock

William A. V. Clark, Professor of Geography (emeritus) and Professor of Statistics (emeritus), Department of Geography, University of California, Los Angeles

James M. Crites, Executive Vice President of Operations, Dallas-Fort Worth International Airport, Texas

Malcolm Dougherty, Director, California Department of Transportation, Sacramento

John S. Halikowski, Director, Arizona Department of Transportation, Phoenix

Michael W. Hancock, Secretary, Kentucky Transportation Cabinet, Frankfort

Susan Hanson, Distinguished University Professor Emerita, School of Geography, Clark University, Worcester, Massachusetts

Steve Heminger, Executive Director, Metropolitan Transportation Commission, Oakland, California

Chris T. Hendrickson, Duquesne Light Professor of Engineering, Carnegie Mellon University, Pittsburgh, Pennsylvania

Jeffrey D. Holt, Managing Director, Bank of Montreal Capital Markets, and Chairman, Utah Transportation Commission, Huntsville, Utah

Gary P. LaGrange, President and CEO, Port of New Orleans, Louisiana

Michael P. Lewis, Director, Rhode Island Department of Transportation, Providence

Joan McDonald, Commissioner, New York State Department of Transportation, Albany

Donald A. Osterberg, Senior Vice President, Safety and Security, Schneider National, Inc., Green Bay, Wisconsin

Steve Palmer, Vice President of Transportation, Lowe's Companies, Inc., Mooresville, North Carolina

Sandra Rosenbloom, Professor, University of Texas, Austin (Past Chair, 2012)

Henry G. (Gerry) Schwartz, Jr., Chairman (retired), Jacobs/Sverdrup Civil, Inc., St. Louis, Missouri

Kumares C. Sinha, Olson Distinguished Professor of Civil Engineering, Purdue University, West Lafayette, Indiana

Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy; Director, Institute of Transportation Studies, University of California, Davis



Butler



Steudle



Skinner



Arroyo



Bennett



Clark



Crites



Dougherty



Halikowski



Hancock



Hanson



Heminger



Hendrickson



Holt



LaGrange



Lewis



McDonald



Osterberg



Palmer



Rosenbloom



Schwartz



Sinha



Sperling

* Membership as of December 2013.



Thomas



Trombino



Washington



Brewster



Ferro



Gray



Huerta



Jaenichen



Melaniphy



Mendez



Papp



Priddy



Quarterman



Rogoff



Rutland



Strickland



Szabo



Trottenberg



Van Antwerp



Wallerstein



Winfree



Wright

Gary C. Thomas, President and Executive Director, Dallas Area Rapid Transit, Dallas, Texas

Paul Trombino III, Director, Iowa Department of Transportation, Ames

Phillip A. Washington, General Manager, Regional Transportation District, Denver, Colorado

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

Anne S. Ferro, Administrator, Federal Motor Carrier Safety Administration, U.S. Department of Transportation (ex officio)

John T. Gray II, Senior Vice President, Policy and Economics, Association of American Railroads, Washington, D.C. (ex officio)

Michael P. Huerta, Administrator, Federal Aviation Administration, U.S. Department of Transportation (ex officio)

Paul N. Jaenichen, Sr., Acting Administrator, Maritime Administration, U.S. Department of Transportation (ex officio)

Michael P. Melaniphy, President and CEO, American Public Transportation Association, Washington, D.C. (ex officio)

Victor M. Mendez, Administrator, Federal Highway Administration, U.S. Department of Transportation (ex officio)

Robert J. Papp (Adm., U.S. Coast Guard), Commandant, U.S. Coast Guard, U.S. Department of Homeland Security (ex officio)

Lucy Phillips Priddy, Research Civil Engineer, U.S. Army Corps of Engineers, Vicksburg, Mississippi, and Chair, TRB Young Members Council (ex officio)

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)

Craig A. Rutland, U.S. Air Force Pavement Engineer, Air Force Civil Engineer Center, Tyndall Air Force Base, Florida (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, Under Secretary for 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, Administrator, Research and Innovative Technology Administration, U.S. Department of Transportation (ex officio)

Frederick G. (Bud) Wright, Executive Director, American Association of State Highway and Transportation Officials, Washington, D.C. (ex officio)



Executive Office

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; 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.



Subcommittee for NRC Oversight (SNO) members for 2013 (*left to right*): William A. V. Clark, University of California, Los Angeles; Deborah H. Butler, Executive Committee Chair; Susan Hanson, SNO Chair; H. Gerard (Gerry) Schwartz, Jr., SNO Vice Chair; Sandra Rosenbloom, past Executive Committee Chair; John Halikowski, Arizona Department of Transportation; and Suzanne B. Schneider, TRB Associate Executive Director. (Photo: Risdon Photography)



SNO Chair Susan Hanson reports to the Executive Committee at its meeting in January.

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 Executive Committee's Subcommittee for NRC Oversight (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.

Susan Hanson, TRB Division Chair for NRC Oversight, heads this subcommittee and represents TRB as an ex officio member on the NRC Governing Board. Henry G. (Gerry) Schwartz, Jr., serves as the SNO Vice Chair, with oversight responsibilities for the second Strategic High-



Susan Hanson
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
Immediate Past
Associate Executive
Director



Russell W. Houston
Assistant Executive
Director

way 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 technical 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. In addition to print, TRB publishes the majority of its titles electronically, some exclusively in electronic format.

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

- *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 2013—the 50th year of the journal—the Board published 75 volumes containing 935 papers grouped by subject. TRR Online,

inaugurated 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. TRR Online includes all journal papers published since 1996, providing access to more than 13,500 papers in the TRR series.¹ The service allows all visitors to identify papers of interest and to review abstracts of those papers. Access to the full papers is available to service subscribers and employees of TRB sponsors. Papers also may be purchased individually.

- The bimonthly magazine *TR News* features timely articles on innovative and state-of-the-art research and practice in all modes of transportation. News items of interest to the transportation community, profiles of trans-

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



Ann Petty (left), managing editor, and Juanita Green (right), production manager, oversee the production of the 75-volume 2013 series of the *Transportation Research Record*, now in its 50th year of publication.



TRB published 75 volumes of the *Transportation Research Record: Journal of the Transportation Research Board* in 2013; other series include *TR News*, special reports, conference proceedings, conference proceedings on the web, and electronic Transportation Research Circulars.

portation professionals, book summaries, meeting announcements, and highlights of TRB activities also are included. *TR News* marked its fiftieth anniversary in February, and the March–April 2013 issue celebrated this milestone in an article that recaps highlights of the magazine’s fifth decade. The May–June 2013 theme issue, “Railroads and Research: Sharing Track,” focused on research investments that have anticipated and helped meet the railroad industry’s needs; the July–August issue highlighted the logistics of disaster response and business continuity; environmental sustainability in transportation supplied the theme for articles in September–October; and feature articles in the November–December issue explored the impacts and implementation of SHRP 2 research products. Other special features this year covered research and solutions to Alaska’s infrastructure built on melting permafrost; the history, achievements, and future directions of TransTech Academy, the District of Columbia’s transportation high school; the research initiatives supporting the connected vehicles program; and the first four years of TRB’s Minority Student Fellows Program. Selected features are posted on the TRB website, and the full issue is made accessible on the web on a four-month delay.²

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

- *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 2013 included *Worker Health and Safety on Offshore Wind Farms*, *Effects of Diluted Bitumen on Crude Oil Transmission Pipelines*, and *Framing Surface Transportation Research for the Nation’s Future*. 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. *Performance Measurement of Transportation Systems: Summary of the Fourth International Conference* and *City Logistics Research: A Transatlantic Perspective* were printed and posted on the web.⁴ Several titles were released in the Conference Proceedings on the Web series, including *Meeting Critical Data Needs for Decision Making in State and Metropolitan Transportation Agencies*, *Using Census Data for Transportation Applications*, *Safe Navigation in the U.S. Arctic*, and *Adapting Freight Models and*

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

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



Members of the 2013 Minority Fellows program gathered at the Annual Meeting to present their research and network with fellow transportation professionals. (Photo: Risdon Photography)



Russell Houston discussed the *Transportation Research E-Newsletter*, TRB's popular webinar series, and other communications initiatives at the January meeting of the Executive Committee.

*Traditional Freight Data Programs for Performance Management.*⁵

- *Transportation Research E-Circulars* collect research problem statements, reports, and technical information from the work of TRB technical activities committees. Titles this year covered such topics as roadside safety design and devices, countermeasures to address impaired driving offenders, a glossary of transportation construction quality assurance terms, roadway departure crashes, a 400-page proceedings of the 2012 international light rail conference, new directions for the national household travel survey, preventing teenage driver crashes, and more. 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 comprehensive, 650-page resource, *Rockfall: Characterization and Control (2012)*.

In addition, the Cooperative Research Programs and SHRP 2 produce an array of titles in several publications series. For a list of all TRB publications, see pages 55–58.

⁵ <http://www.trb.org/Publications/PubsConferencesandWorkshopsWeb.aspx>.

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

COMMUNICATIONS

TRB has undertaken a variety of initiatives to improve the communication and public awareness of transportation issues and to enhance the dissemination of research findings worldwide.

Among the Board's most successful communications initiatives is the weekly *Transportation Research E-Newsletter*,⁷ which reports on transportation research and research-related events within TRB and beyond. Circulation of the free newsletter is currently more than 45,000 and growing. Approximately one-fifth of the readership is from countries outside the United States. In 2013 TRB moved the distribution of the newsletter to a different service, to enhance delivery to employees of state transportation agencies.

TRB's website is designed to help users 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), Google-based search, Facebook, e-mail to a friend, and Twitter—allow users to keep up with and to share the latest developments in transportation research.

Through TRB's popular web briefing or webinar series, transportation professionals share

⁷ www.trb.org/Publications/PubsTRBENewsletter.aspx.



With sections highlighting federal, state, university, and TRB research, the *TRB Transportation Research E-Newsletter* provides a survey of transportation research news.



With more than 8,300 followers, TRB's Twitter account (@TRBofNA) disseminates news about transportation research and TRB events to a wide audience.

and receive information online in a conference-like atmosphere without leaving their offices. The webinars disseminate information on new TRB reports, TRB Annual Meeting sessions, and topics requested by TRB committees.⁸ Because of the quality of its webinar program, TRB is authorized to issue professional development hours and American Institute of Certified Planners credits for select live webinars.

In 2013 TRB produced 60 webinars—25 more than in 2012. The 2013 sessions attracted an average attendance of nearly 400; a July 2013 webinar on roundabout signing and marking set the record with 1,100 participants.

In the social networking arena, TRB's Twitter, Facebook, Google+, and LinkedIn activities highlight TRB and National Academies products and meetings, as well as other transportation-related news.⁹ Since their launches, TRB's social media sites have attracted more than 8,300 Twitter followers and 3,000 Facebook fans.

⁸ www.trb.org/ElectronicSessions/ConferenceRecordings.aspx.

⁹ www.trb.org/ElectronicSessions/Twitter.aspx.

Staff News

ROBERT E. SKINNER, JR., received a President's Transportation Award from the American Association of State Highway and Transportation Officials in October.

RUSSELL HOUSTON was promoted to Assistant Executive Director, overseeing communications, information technology, and the Executive Office Publications Office.

LISA BERARDI MARFLAK was promoted to Director, Communications and Media.

Also promoted was **KAREN S. FEBEY** to Senior Report Review Officer.

LEA M. CAMARDA was promoted to Associate Editor.

RYAN C. BROWN joined the staff in November as Distance Learning Program Coordinator.

Washington Book Publishers cited publication project managers **JANET McNAUGHTON**, **JUANITA GREEN**, and **JAVY AWAN** in awarding a second place to *Rockfall: Characterization and Control* in the category of technical publications.

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

on more than 200 standing committees to carry out activities on behalf of TRB sponsors and the transportation community.

The TRB Technical Activities Council oversees the organization and activities of the standing committees. Katherine F. Turnbull, Executive Associate Director of the Texas



TRB standing committees share information and identify research needs. Above, the Transportation Network Modeling Committee addresses upcoming activities and projects at the 2013 Annual Meeting. (Photo: Risdon Photography)



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



James S. Thiel
Chair
Legal Resources Group



Paul P. Jovanis
Chair
Safety and System Users Group



David C. Wilcock
Chair
Public Transportation Group



Anthony D. Perl
Chair
Rail Group



Barbara A. Ivanov
Chair
Freight Systems Group



Peter B. Mandel
Chair
Aviation Group



Thomas H. Wakeman III
Chair
Marine Group



Harold R. (Skip) Paul
State DOT Representative



Lucy Phillips Priddy
Young Members Council Representative



Mark R. Norman
Director
TRB Technical Activities Division



The 2013 series marks the 50th year of TRB's journal, which is peer-reviewed by members of Technical Activities committees. In all, TRB has published more than 25,000 papers since 1963 in volumes of the *Highway Research Record*, the *Transportation Research Record*, and the *Transportation Research Record: Journal of the Transportation Research Board*.



Katherine F. Turnbull, Texas A&M Transportation Institute, chairs the Technical Activities Council and oversees the work of the more than 200 standing committees. (Photo: Risdon Photography)

Transportation Institute at Texas A&M University, chairs the council. TRB representatives in each state DOT, in each TRB sponsoring organization, in more than 150 universities, and in 25 transit agencies serve as liaisons to the transportation community.

ACHIEVING FIRSTS

The division recorded many firsts in 2013:

- Setting new highs with 11,700 Annual Meeting attendees, more than 4,600 papers received and peer reviewed, and more than 750 sessions and workshops on the Annual Meeting program;
- Introducing the TRB Annual Meeting “app,” downloaded by more than 6,000 individuals for smartphones and mobile devices;
- Committing to move the Annual Meeting to the Washington, D.C., Convention Center in 2015, the first major change in venue in almost 60 years;
- Presenting the first Technical Activities Council Blue Ribbon Awards to four TRB standing committees, and the first Outstanding Young Member Achievement Award;
- Reviewing a record 5,200 papers submitted for presentation at the 2014 Annual Meeting and publication in the 2014 *Transportation Research Record* series;
- Involving almost 800 state DOT employees



The chairs of four standing committees accepted Blue Ribbon Awards on behalf of their committees (from left): for communications, Jennifer L. Weeks, Public Involvement in Transportation Committee; for community building and mentoring, Stephen Popkin, Railroad Operation Safety Committee; for advancing research, John Milton, Highway Safety Performance Committee; and for contributing to TRB and the transportation community, Srinivas Peeta, Transportation Network Modeling Committee. (Photo: Risdon Photography)



Meltem Saplioglu, Süleyman Demirel University; Lyn Smith, University of South Florida; and Rich Taylor, Federal Highway Administration, network at an Annual Meeting event for young professionals. The Young Members Council provides outreach to transportation professionals 35 years of age or under. (Photo: Risdon Photography)

as standing committee members—the highest total in recent memory; and

- Sponsoring more than a dozen international conferences, including City Logistics Research: A Transatlantic Perspective, the first of four annual symposia in partnership with the European Commission and the U.S. Department of Transportation’s Research and Innovative Technology Administration (RITA).

Additional highlights for 2013 from the portfolio of the Technical Activities Division span the range of transportation disciplines and modes and are detailed in the following sections.

POLICY AND ORGANIZATION

Transportation Policy and Administration

TRB Policy Committees conducted workshops, sessions, and webinars to address topics and issues in performance measures, finance, and strategic management:

- A webinar on Transportation Funding Challenges and Opportunities in the Age of the Moving Ahead for Progress in the 21st Century (MAP-21) Legislation attracted more than 450 participants.

- An Annual Meeting session, Measuring Reliability in the Context of MAP-21, highlighted products and tools developed under the second Strategic Highway Research Program (SHRP 2) to assist states in developing performance measures.
- Committees from the TRB Policy, Aviation, and Social, Economic, and Cultural Factors Sections held a combined midyear meeting to explore common challenges and opportunities in surface and air transportation revenue and finance and to discuss opportunities for a federal role in regional transportation programs and services.
- The Congestion Pricing Committee and subcommittees convened at the Federal Highway Administration's (FHWA's) National Congestion Pricing Conference, cosponsored by TRB.

Security

The committees that focus on research related to the stewardship of critical transportation infrastructure were involved in several key activities in 2013:

- The Critical Transportation Infrastructure Protection Committee and the Task Force on Disaster Response and Business Continuity sponsored a special Annual Meeting session on Superstorm Sandy: Transportation Challenges and Research Opportunities in the Aftermath of a Disaster.
- In August, TRB sponsored the Transportation Hazards and Security Summit and Peer Exchange in Irvine, California, addressing such topics as intermodal security training,



Amanda J. Wilson (left), National Transportation Library; Timothy J. Klein, Research and Innovative Technology Administration; and other sponsors of TRB research met with the Technical Activities Council in June. (Photo: Kim Fisher)



New York City transit crew works to restore service after storm flooding. Superstorm Sandy was the topic of a special Annual Meeting session sponsored by the Critical Transportation Infrastructure Protection Committee and the Task Force on Disaster Response and Business Continuity. (Photo: Metropolitan Transportation Authority)

grant writing, the role of state DOT emergency managers in disaster resilience, and the impact of computer failures on operations and emergency response.

- The Task Force on Logistics of Disaster Response and Business Continuity organized the July–August 2013 *TR News* theme issue on disaster response and recovery, emergency management, business continuity, and the associated logistics challenges and infrastructure impediments during and after catastrophic events.¹

Data and Information Systems

Committees in the Data and Information Systems Section initiated events to examine how data and technology can help organizations operate more efficiently and improve decision making:

- More than 100 professionals met in April in Washington, D.C., to improve the state-of-the-practice in using freight data and models to develop effective performance measures for freight systems.
- In October, also in the nation's capital, more than 50 presenters provided examples of geographic information systems (GIS) technology to improve transit operations and planning and defined the next key steps.



The Task Force on Logistics of Disaster Response and Business Continuity assembled a theme issue of *TR News*.

¹ www.trb.org/Publications/Blurbs/169547.aspx.



A Joint Midyear Meeting for TRB and the American Association of State Highway and Transportation Officials convened 18 committees at the National Academy of Sciences main building in Washington, D.C., in June.

- Eighteen committees met in June to grapple with the information needs of states and metropolitan planning organizations, discuss the data mandates in MAP-21 and the expectations of decision makers, and explore ways to improve preparation and response to extreme weather events.
- Two small, targeted events examined technologies for (a) improving the integration of multiple GIS data sets and (b) the potential of TransXML for integrating transportation data, especially for the design community.

Research and Education

The five Research and Education Section standing committees worked to improve transportation research methods, the coordination of critical research, and the dissemination of the results. The committees conducted the following Annual Meeting workshops:

- Back to Basics: Fostering and Nurturing Research Agendas for TRB Standing Committees;
- Pursuing Entrepreneurial Innovation: Role of Business in Creating a Safer, More Efficient, and More Durable Transportation System;
- Deploying News Alerts to the Transportation Research Community: Delivering Things Smarter, Better, Faster;
- Deploy! Case Studies of Successful Technol-



Virginia DOT hosts a career fair in Manassas. Committees in the Research and Education Section organized Annual Meeting sessions on such topics as career development and workforce training. (Photo: Tom Saunders, Virginia DOT)

ogy Deployment Methods from Across the Highway Transportation Spectrum;

- Implementing SHRP 2 Innovations: The Road from Research to Action; and
- Workforce Planning and Training to Support Industry Needs and Career Development.

PLANNING AND ENVIRONMENT

Transportation System Planning

The planning committees were busy throughout 2013:

- The 14th National Transportation Planning Applications Conference in Columbus, Ohio,

Island Explorer, a transit system in Acadia National Park in Maine, was the focus of a visit by the Transportation Needs of National Parks and Federal Lands Committee. (Photo: Kim Fisher)



provided an opportunity in May for planners to learn from their peers.

- The Committee on the Transportation Needs of National Parks and Federal Lands spent two days in Maine and explored the unique, multimodal transportation system in Acadia National Park.
- Several planning committees met with marine and freight committees to explore common issues and gain an understanding of each community's approaches.
- The Statewide Multimodal Transportation Planning Committee and the Transportation Programming and Investment Decision Making Committee met with AASHTO subcommittees in Minneapolis and developed several new initiatives and collaborative projects.
- The Travel Forecasting Resource project restarted with funding from FHWA as a collaborative effort to collect travel forecasting resources to be augmented with the practical understanding of the travel forecasting community.²

Social, Economic, and Environment

- Seven of the eight Environment and Energy Section committees met during the summer for in-depth discussions on topics ranging from new ecological practices to reduce transportation's impact on wildlife, to stormwater permit compliance for municipal sewer systems, to changes in the environmental planning regulations that affect transportation.
- The Environment and Energy Section assembled a special issue of *TR News* on Environmental Sustainability in Transportation.³
- The Special Task Force on Climate Change, the Transportation Energy Committee, and the Alternative Transportation Fuels and Technologies Committee met in Pacific Grove, California, in conjunction with the biennial conference sponsored by the University of California, Davis, to explore the impacts of climate change during an energy boom.
- The Sustainability Committee met in conjunction with the summer meeting of the Energy and the Alternative Fuels Committees to discuss the nexus of economic, social, and environmental concerns.

²TFResource.org.

³www.trb.org/Main/blurbs/169927.aspx.



A joint workshop of the Roadside Safety Design Committee and AASHTO addressed cable barriers and other methods of reducing the severity of roadside departure crashes. (Photo: Washington State DOT)

- The opening session of a summer meeting of the Economic Development, the Social and Economic Factors, and the Environmental Justice Committees in Washington, D.C., explored the potential federal role in addressing mobility, employment, health, and changing demographics in regional transportation programs and services.

DESIGN AND CONSTRUCTION

Design

Standing committees in the Design Section examined research needs, priorities, and findings:

- The Geometric Design Committee cosponsored a workshop on the Safety Effects of Geometric Design Decisions, July 30–August 1, in Irvine, California, focusing on transportation agency experiences and lessons learned from applications of the *Highway Safety Manual* at various stages of project development. Also discussed was a future edition of AASHTO's *Policy on Geometric Design of Highways and Streets*, known as the Green Book; emerging research needs were identified to support a revision.
- The Roadside Safety Design Committee held a joint workshop with the AASHTO Technical Committee on Roadside Safety on Safe System Approaches to Roadway Departure Crashes, July 7–10, in New Orleans, Louisi-



A *TR News* theme issue sponsored by the Environment and Energy Section examined sustainability in transportation.

ana. The workshop identified critical research needed to reduce the number and severity of roadway departure crashes.

Committees in the Structures Section cosponsored international conferences on innovative technology approaches, seismic considerations, and bridges.

Construction and Materials

Committees in the Construction, Asphalt Materials, and Concrete Materials Sections focused on such emerging topics and current issues as intelligent construction systems, variations in best-value selection, megaproject and accelerated project delivery, Disadvantaged Business Enterprise partnering for better project delivery, accelerated bridge construction, phased-array ultrasonics in steel fabrication and inspection, green asphalt paving, thermal segregation of hot-mix asphalt, recycled materials in asphalt mixtures, moisture damage in asphalt mixtures, performance grade-based emulsified asphalt specifications, ground tire rubber-modified asphalt, nanotechnology applications for asphalt and concrete materials, alkali-aggregate reactivity, innovative concrete curing, advances in concrete materials to enable faster construction and evaluation, pavement materials and the urban climate, and potential impacts of climate change on transportation infrastructure.

Examples of specific noteworthy accomplish-



The effects of climate change and of transportation related to new energy sources—such as wind turbines (*above*)—on roads and other infrastructure were among the many topics explored by committees in the Construction, Asphalt Materials, and Concrete Materials Sections. (Photo: Oregon DOT)

ments by the committees include the publication of three electronic circulars:

- *Durability of Concrete: Second Edition*⁴;
- *Glossary of Transportation Construction Quality Assurance Terms: Sixth Edition*⁵; and
- *Risk-Based Adaptation Frameworks for Climate Change Planning in the Transportation Sector: A Synthesis of Practice*.⁶

Geotechnical Engineering

The geotechnical engineering committees focused on technology transfer by organizing workshops, sessions, and webinars on topics of concern to practitioners. Noteworthy activities included the following:

- A workshop on recent advances in culvert design, maintenance, materials, and manufacturing that could save money and ensure long-term, maintenance-free service;
- A workshop on successfully deployed soil and rock instrumentation systems that practitioners can use every day;
- A workshop on proactive maintenance and other strategies to strengthen low-volume roads and pavements that are carrying an increased traffic of heavy trucks with the recent boom in the natural gas, wind and solar energy, and biofuel industries;
- A panel discussion on the selection of soil and rock properties appropriate for various load and resistance factor design options; and
- A session on the effects of geotechnical asset management on the performance of transportation infrastructure.

OPERATIONS

Operations continues to be a significant and active area for transportation research, with more than 600 technical papers peer-reviewed by the 13 committees in the Operations Section, which assembled the content for more than 60 sessions and the agendas for more than 75 meetings at the 2013 TRB Annual Meeting. Midyear meetings or conferences included the following:

⁴Circular E-C171, www.trb.org/Publications/Blurbs/169467.aspx.

⁵Circular E-C173, www.trb.org/Publications/Blurbs/169083.aspx.

⁶Circular E-C181, www.trb.org/main/blurbs/169958.aspx.

- The Intelligent Transportation Systems and the Vehicle–Highway Automation Committees cosponsored the 2nd Workshop on Road Vehicle Automation at Stanford University, attracting more than 325 participants from academia, industry, public agencies, and consulting firms;
- The Freeway Operations and the Managed Lanes Committees and the joint Subcommittee on Active Traffic Management cosponsored a Workshop on Managed Lanes and Active Traffic Management in Atlanta, Georgia;
- The Traffic Flow Theory Committee cosponsored the 20th International Symposium on Transportation and Traffic Theory in the Netherlands;
- The Operational Effects of Geometrics and the Access Management Committees cosponsored the Workshop on Safety Effects of Geometric Design Decisions in Irvine, California; and
- The Traffic Signals Systems Committee conducted a Workshop on Performance Measurement for Traffic Signal Systems in Portland, Oregon.

MAINTENANCE AND PRESERVATION

The high level of activity of the maintenance and preservation committees reflected the high priority that transportation agencies are placing on these topics. The 13 standing committees in the TRB Maintenance and Preservation Section sponsored a variety of workshops and sessions during the 2013 TRB Annual Meeting, including international perspectives on bridge and tunnel safety and security; in-place pavement recycling; reducing the risks and costs of climate change through preparedness and adaptation in the face of increasingly extreme weather; controlling costs and protecting the environment in transportation operations and maintenance; practical health monitoring for transportation structures; bridge performance measures; steel bridge coating systems; nondestructive evaluation of transportation structures; infrastructure corrosion; anti-icing and deicing chemical performance; snowplow routing, fleet size, and data collection for winter maintenance; best practices and safety benefits of pavement marking management; measuring traffic sign retroreflec-



The Roundabouts Committee sponsored a popular series of webinars that addressed roundabout safety and other topics. (Photo: Una Smith, Wikimedia Commons)

tivity and performance; and driver and worker behavior in work zones.

SAFETY

The 19 Standing Committees and Task Forces of the Safety and Systems Users Group had a busy and fruitful year in 2013:

- The Highway Safety Performance Committee received a 2013 TRB Blue Ribbon Award for efforts that led to the development of the *Highway Safety Manual*.
- The committee joined with the Safety Data, Analysis, and Evaluation Committee and several others to hold a successful workshop on the Safety Effects of Geometric Design Decisions.
- The Task Force on Highway Safety Workforce Development gained status as a standing committee.
- Information from the 2011 Symposium on dealing with impaired driving offenders was published in the electronic Transportation Research Circular series.⁷
- The Roundabouts Committee produced a popular series of webinars, each attracting several hundred participants.

⁷Circular E-C174, www.trb.org/Publications/Blurbs/169412.aspx.

- TRB sponsored the 1st National Roadway Safety Culture Summit in Washington, D.C., in August.

LEGAL RESOURCES

The Legal Resources Group has conducted the Annual Workshop on Transportation Law for 52 years, providing a focused source of information for federal and state transportation attorneys. This year's workshop, held in Nashville, Tennessee, in July, attracted approximately 130 participants. Other committee developments and endeavors included the following:

- The Environmental Issues in Transportation Law Committee resumed publication of its newsletter, *The Natural Lawyer*.
- The Emerging Technology Law Committee focused on driverless and connected vehicles in sessions at the TRB Annual Meeting, summer workshops, and a 2013 U.S. DOT listening session and helped launch a joint subcommittee to explore the topic.
- The Tort Liability and Risk Management Committee sponsored sessions on Preserving the Art of Geometric Design, Enterprise Risk Management, and Insurance Basics for Transportation Professionals.
- The Eminent Domain and Land Use Committee explored the problems confronting state DOTs over access to highways and the ethical considerations that arise in the condemnation process.



Testing the Google Car, a self-driving vehicle. The Emerging Technology Law Committee has conducted research on the legal ramifications of driverless and connected vehicles. (Photo: Steve Jurvetson)

AVIATION

TRB's Aviation Group committees held several midyear meetings in Washington, D.C., to give industry practitioners the opportunity to discuss new developments in the aviation industry:

- The Aviation System Planning and the Intergovernmental Relations in Aviation Committees exchanged ideas and shared information on coordination efforts with various regulatory bodies that address airport projects and planning;
- The Environmental Impacts of Aviation Committee discussed an update to the e-circular documenting critical issues in aviation and the environment;
- The Airfield and Airspace Capacity and Delay Committee considered advances in NextGen technologies and funding; and
- The subcommittees of the Light Commercial and General Aviation Committee explored the state of the market for business aircraft and civil helicopters, as well as regulatory changes to pilot qualifications and the effects on regional airlines.

FREIGHT SYSTEMS

The TRB Freight Systems Group has pursued research questions that have arisen from the implementation of the freight provisions in MAP-21 and has engaged in the following activities:

- Partnered with the Marine Group in organizing four Freight Day sessions at the 2013 Annual Meeting, focusing on national freight policy and supply chain competitiveness, economic trends, planning, and corridors and gateways.
- Jointly organized a midyear meeting and conference in July in Washington, D.C., convening 20 committees addressing freight, marine, and planning issues to explore the implementation of MAP-21 freight provisions, the use of natural gas for freight transport, freight planning tools, and system resiliency.
- Set plans to address supply chain reliability, transportation workforce issues, freight-related energy consumption and emissions,



Rear Admiral Gerd Glang (second from right) of the National Oceanic and Atmospheric Administration participates in a focus session on navigation at the 2013 Marine Board Summer Meeting. (Photo: Scott Brotemarkle)

and freight traffic and congestion management at the 2014 Annual Meeting.

MARINE

The Marine Group committees and the National Research Council's Marine Board, administered by TRB, together address issues in marine transportation:

- The Marine Group committees played a key role in the success of the Freight Day sessions at the 2013 Annual Meeting and in the 2013 Joint Summer Meeting of the Marine, Freight Systems, and Planning Committees.
- The Marine Board's spring meeting in Washington, D.C., in April featured a session conducted for the Bureau of Safety and Environmental Enforcement and other regulatory agency sponsors on Building a Positive Culture of Safety in a Regulatory Organization. The topic is an outgrowth of the National Research Council's extensive work for federal agencies in the aftermath of the 2010 *Deepwater Horizon* oil spill in the Gulf of Mexico.
- The Marine Board's fall meeting addressed Electronic Aids to Navigation, a key topic for the U.S. Coast Guard.

PUBLIC TRANSPORTATION

The Public Transportation Group planned and assembled more than 70 sessions, meetings,

workshops, and poster sessions for the TRB Annual Meeting. The anticipated changes to transit planning and management practices under MAP-21 served as a unifying theme that has continued throughout the year. Highlights included the following:

- The inaugural William W. Millar Award, recognizing excellence in research on public transportation, was presented to Graham Currie, Alexa Delbosc, and James Reynolds for "Modeling Dwell Time for Streetcars in Melbourne, Australia, and Toronto, Canada."
- Conferences explored the evolution of transit and technology, including GIS in Transit, October 2013 in Washington, D.C.; the Shared Use Mobility Summit, October 2013, in San Francisco, California; and Strategy Day on Emerging Trends in Public Transportation and Vehicle Automation, in July at Stanford University, in conjunction with the TRB Workshop on the Future of Road Vehicle Automation.

RAIL

The Rail Group began the year with a stellar workshop at the TRB Annual Meeting on the Economic and Social Impacts of High-Speed Rail Systems. Federal Railroad Administrator Joseph Szabo provided opening remarks and introduced the workshop's keynote speaker, U.S. Secretary of Transportation Ray LaHood.



Howard L. Slavin, Caliper Corporation, presents research on a web-based accessibility toolkit for transportation planners at the Transit GIS Conference in October.



Wick Moorman, Chief Executive Officer, Norfolk Southern Corporation, delivered the keynote address at the Joint Rail Conference in April. (Photo: Norfolk Southern)

Other Rail Group activities throughout the year included the following:

- Cosponsorship of the Joint Rail Conference in Knoxville, Tennessee, in April, keynoted by Wick Moorman, CEO of Norfolk Southern Corporation;
- The Rail Group Executive Board Midyear Meeting in July at the Transportation Test Center in Pueblo, Colorado, featuring a tour of the world's foremost transportation research facility;

- Publication of the special theme issue of *TR News*, "Railroads and Research: Sharing Track"⁸; and
- The Freight Rail Transportation Committee's annual midyear meeting, known as Summerail, held this year in cooperation with the TRB marine committees and featuring extensive tours of the rail and barge facilities in and around Louisville, Kentucky.

⁸www.trb.org/Publications/Blurbs/169265.aspx.

Staff News

Senior Program Officer for Marine and Intermodal Freight, and Staff Director of the Marine Board, **JOEDY W. CAMBRIDGE**, retired in April. Cambridge joined TRB in 1996.

FRANK N. LISLE, Senior Program Officer for Preservation and Maintenance, retired in May after 25 years of service to TRB.

RICHARD F. PAIN, Senior Program Officer for Safety, retired in late 2013, after 25 years of service to TRB.

JAMES W. BRYANT, JR., was appointed Senior Program Officer of Preservation and Maintenance, transferring from SHRP 2.

SCOTT BABCOCK joined TRB as Senior Program Officer for Rail and Freight Systems.

JENNIFER L. WEEKS joined TRB as Senior Program Officer for Public Transportation.

MAI Q. LE was promoted to Senior Program Associate.



Longtime senior program officers Joedy W. Cambridge (*left photo*), Frank N. Lisle (*center photo*), and Richard F. Pain (*right photo*) retired in 2013. (Photos, left and right: Risdon Photography)

Major Awards Presented in 2013

The Frank Turner Medal for Lifetime Achievement in Transportation was presented to **C. Michael Walton**, Professor of Civil Engineering and the Ernest H. Cockrell Centennial Chair in Engineering at the University of Texas at Austin (UT). Walton was recognized for his influential 40-year career in transportation as a university professor and researcher, his engagement with the private sector, and his outstanding service to professional organizations and to state and federal governments. He has contributed to more than 500 publications in the field of transport systems engineering and policy analysis; in 1993, he was elected to the National Academy of Engineering.

After working for the North Carolina State Highway Commission and the U.S. Department of Transportation, he joined UT in 1971, becoming Professor in 1983 and, in 1988,



Chairman of the Civil Engineering Department. He has held a joint academic appointment in UT's Lyndon B. Johnson School of Public Affairs since 1987.

Walton served as Chair of the TRB Executive Committee in 1991 and from 2004 to 2012 as the Division Chair for National Research Council (NRC) Oversight and *ex officio* member of the NRC Governing Board. He has served on many TRB policy study committees, standing committees, conference planning committees, and project panels. Walton is a past recipient of the W. N. Carey, Jr., Distinguished Service Award and the Thomas B. Deen Distinguished Lectureship.

John C. Horsley, former Executive Director of the American Association of State Highway and Transportation Officials (AASHTO), received the 2013 W. N. Carey, Jr., Distinguished Service Award for his leadership in national transportation research and longtime support of TRB. Horsley served as Associate Deputy Secretary, U.S. Department of Transporta-



tion, before being named AASHTO Executive Director in 1999.

As AASHTO Executive Director, Horsley reinforced the relationship between TRB and state transportation departments (DOTs) and promoted the value of transportation research and implementation. In 1999, he joined the TRB Executive Committee as an *ex officio* member. He represented state DOT interests and promoted effective collaboration among individual state DOTs, AASHTO, TRB, and the Federal Highway Administration through the National Cooperative Highway Research Program (NCHRP) and served as an *ex officio* member of the Oversight Committee for the second Strategic Highway Research Program (SHRP 2).

Horsley is a past President of the National Association of Counties and was founding Chairman of the Rebuild America Coalition.

David L. Greene (*center*, with Deborah H. Butler and Robert E. Skinner, Jr.), Corporate Fellow at the Oak Ridge National Laboratory, Oak Ridge, Tennessee, was the 2013 recipient of the Roy W. Crum Award for achievement in transportation research. Greene is also a Senior Fellow of the Howard H. Baker, Jr., Center for Public Policy and a Research Professor of Economics at the University of Tennessee.

Greene's research on transportation energy and related issues integrates technical knowl-



edge with an understanding of the broader context of policy making and the ways in which markets operate and governments behave. He has authored more than 250 publications and has provided expert testimony to U.S. Congressional committees on issues related to transportation and energy. He has researched transportation energy policy issues for the U.S. government at the Oak Ridge National Laboratory for 35 years.

Greene is a longtime member of TRB standing committees, policy study committees, and project panels. He is an Emeritus Member of the TRB standing committees on Transportation Energy and on Alternative Transportation Fuels and Technologies and currently serves on the NRC Committees on Fuel Economy of Light-Duty Vehicles and on the Potential for Light-Duty Vehicle Technologies, 2010-2050.



The career achievements of **John P. Broomfield**, consulting engineer from Surrey, England, were recognized with the Thomas B. Deen Distinguished Lectureship. A leading international expert in the field of corrosion and corrosion control of steel in concrete, Broomfield has been engaged in the development of a range of techniques for the investigation and remediation of corrosion-damaged, reinforced concrete structures for the past 25 years. His textbook, *Corrosion of Steel in Concrete: Understanding, Investigation, and Repair*, is in its second edition.

Broomfield is an Emeritus Member of the Corrosion Committee, which he joined in 1987 and chaired from 2000 to 2006. He has served as a panel member and contractor for NCHRP projects and was a technical contract manager on the staff of the first SHRP.

Broomfield is a Chartered Engineer (PE) and a Chartered Scientist. His lecture examined a holistic approach to transportation infrastructure maintenance and preservation.



Studies and Special Programs



Sandra Rosenbloom
Chair
Subcommittee on
Planning and Policy
Review



Stephen R. Godwin
Director
Studies and Special
Programs

The Studies and Special Programs Division conducts policy studies at the request of the U.S. Congress, 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, and airport operations, and manages Innovations Deserving Exploratory Analysis (IDEA) programs in highways, transit, and rail 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 also 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 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 Sandra Rosenbloom, University of Texas,



TRB Executive Director Robert E. Skinner, Jr., discusses critical issues in transportation at a meeting of the Subcommittee for Planning and Policy Review (SPPR). In 2013, the SPPR produced a report on various critical issues in transportation to facilitate debate and to encourage research.



Austin. Since 1998, all completed policy study reports are posted on the TRB website.¹

Completed Reports

Transportation infrastructure programs are typically included in federal programs to stimulate the economy in response to recessions but are often criticized for not pumping funds into the economy fast enough. A committee chaired by Therese McGuire, Northwestern University, produced Special Report 312, *Transportation*

¹ www.trb.org/Publications/PubsPolicyStudiesSpecialReports.aspx and www.trb.org/Publications/PubsPolicyStudiesLetter-Reports.aspx.



A Marine Board project reviewed safety-enhancing technologies for offshore oil and gas operations for the Bureau of Safety and Environmental Enforcement. (Photo: Phil Hollman, Wikimedia Commons)

Investments in Response to Economic Downturns, which contains guidance for Congress and the states regarding the role of transportation infrastructure investments during economic recessions. The report will be released in early 2014.

Controversy over the proposed TransCanada XL pipeline, which would move bitumen extracted from Canada's tar sands region to U.S. refineries, prompted Congress to request a study by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Bitumen is diluted with liquid hydrocarbon by-products to allow shipping by pipeline, and some have maintained that this product is more likely than other crudes to cause pipelines to fail. PHMSA asked TRB to convene an independent, expert review of this question. In Special Report 311, *Effects of Diluted Bitumen on Crude Oil Transmission Pipelines*, a committee chaired by Mark Barteau, University of Michigan, presents findings that diluted bitumen poses no additional risk of pipeline failure compared with other heavy crudes.

In response to a request by the Federal Transit Administration (FTA), an expert committee chaired by Brian Taylor, University of California, Los Angeles, provided an independent peer review of the agency's model for estimating the backlog of transit capital investment requirements. In *Review of FTA's Transportation Economic Requirements Model (TERM)*, the committee offers suggestions to strengthen the model's estimates.

Several projects were completed in 2013 under the auspices of the Marine Board for a variety of sponsors:

- TRB Special Report 310, *Worker Health and Safety on Offshore Wind Farms*, advises the Bureau of Offshore Energy Management (BOEM) and the Bureau on Safety and Environmental Enforcement (BSEE) about regulatory overlaps and gaps addressing worker safety on the Outer Continental Shelf (OCS). Vice Admiral James Card, U.S. Coast Guard (retired), chaired the committee.
- *Best Available and Safest Technologies for Offshore Oil and Gas Operations* advises BSEE about options to assess the safety and costs of new technologies to enhance safety. Donald Winter, University of Michigan, chaired the committee.²
- *Review of the Buzzards Bay Risk Assessment (BBRA)* provides an independent review for the Massachusetts Department of Environmental Protection of a risk assessment of barge transportation through Buzzards Bay. The committee was chaired by Paul Fischbeck, Carnegie-Mellon University.
- Conference Proceedings on the Web 11, *Safe Navigation in the U.S. Arctic*, provides a summary of an October 2012 workshop held in Seattle, Washington. The workshop was supported by several sponsors. James Card, who chaired the committee that planned the event, moderated the workshop.³

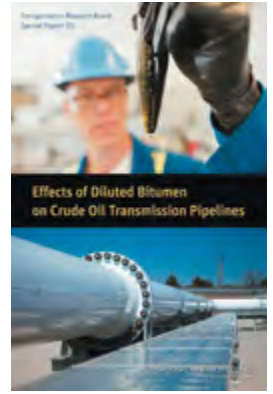
TRB Policy Study committees continue to provide guidance to policy makers on research programs and projects:

² www.trb.org/Main/Blurbs/169620.aspx; www.nap.edu/catalog.php?record_id=18545.

³ www.trb.org/Publications/Blurbs/168726.aspx.



Sue McNeil, University of Delaware (right), chairs a meeting of the Committee on National Research Frameworks: Application to Transportation. The committee authored Special Report 313, *Framing Surface Transportation Research for the Nation's Future*.





The Long-Term Pavement Performance (LTPP) Committee guides the planning and execution of the LTPP studies, which began in 1987 and provide data on the performance of pavements that are subjected to heavy traffic loads under a variety of environmental conditions.

- In response to a request from Congress in Moving Ahead for Progress in the 21st Century (MAP-21), a committee chaired by Mortimer Downey, Parsons Brinckerhoff, provided a peer review of the U.S. DOT's Research and Development Strategic Plan 2013–2018; and
- In Special Report 313, *Framing Surface Transportation Research for the Nation's Future*, a committee chaired by Sue McNeill, University of Delaware, provides guidance to policy makers on actions to integrate the variety of transportation and transportation-related research and development (R&D) activities and priority setting across the federal government.

Committees continue to provide peer review of the R&D programs of the Federal Highway Administration (FHWA), Federal Railroad Administration, and FTA as well as for major FHWA research activities: the Long-Term Pavement Performance Program (LTPP); Long-Term Bridge Performance Program; and the Intelligent Construction Systems and Technology Program.

New and Ongoing Studies

- *Reinvesting in Inland Waterways: What Policy Makers Need to Know* is a study initiated by the TRB Executive Committee to assess the reinvestment needs of the Inland Waterway System within a broad context of costs and benefits. Chris T. Hendrickson, Carnegie Mellon University, chairs the committee.

- *Freight Rail Transportation and Regulation* is a study requested by Congress to address how well the Surface Transportation Board has balanced shipper and railroad interests since the deregulation of railroads in 1980. The committee is chaired by Richard L. Schmalensee, Sloan School of Management, Massachusetts Institute of Technology.
- *Review of the U.S. DOT Truck Size and Weight Study* is a peer review requested by U.S. DOT of a study mandated by Congress in MAP-21. James Winebrake, Rochester Institute of Technology, chairs the committee.
- *Intercity Passenger Travel: Opportunities and Issues in Short-Haul Markets* is a study initiated by the TRB Executive Committee to examine the potential for expanded intercity rail travel in the context of consumer demand for all modes of intercity travel. The committee is chaired by Martin Wachs, RAND Corporation.
- *Review of the Federal Aviation Administration's (FAA's) Air Traffic Control Staffing Model* is a study requested by Congress to review the adequacy of FAA's models and processes for planning and hiring air traffic controllers. Amy Pritchett, Georgia Tech University, chairs the committee.

In addition, the Policy Studies staff is assisting the U.S. Maritime Administration by arranging for peer reviews of the agency's ongoing study



A current TRB study requested by Congress examines the ways in which the Surface Transportation Board has addressed freight and railroad concerns since railroad deregulation in 1980. (Photo: William Grimes)



A parking lot in Arlington, Virginia, hosts an electric vehicle charging station. These stations are the subject of a study for the U.S. Department of Energy by TRB and the National Research Council Board of Energy and Environmental Systems.

of the possible impacts of the Panama Canal expansion on U.S. ports and freight movements. The staff also is assisting NRC's Board of Energy and Environmental Systems on three projects: evaluating fuel conservation technologies for light-duty vehicles and medium- and heavy-duty trucks, both for the National Highway Traffic Safety Administration; and studying options for funding electric vehicle recharging stations, for the Department of Energy.

INFORMATION SERVICES

Transportation Research Information Services

In late 2012, less than two years after it was launched, TRID—TRB's Transportation Research Information Services database and the International Transport Research Documentation⁴ (ITRD) database—reached one million records. This milestone arrived sooner than anticipated, with the addition of the ARRB Group's Australian Transport Index (ATRI) database in the fall of 2012. TRID's one millionth record references TCRP Legal Research Digest 40, *Legal Issues Involving Surety for Public Transportation Projects*.

TRID is a comprehensive bibliographic data-

⁴ ITRD is a project of the Joint Research Center of the International Transport Forum and the Organization of Economic Cooperation and Development (OECD).

base of citations and abstracts of transportation research in all modes and disciplines.⁵ Records comprise published or ongoing research in English, German, French, or Spanish; more than 108,000 records link to full-text publications. The service offers simple and advanced searching and allows users to download, e-mail, and share results via social media. TRID is available free of charge on TRB's website.

Publications Index

The TRB Publications Index includes citations and abstracts for all TRB, Highway Research Board (HRB), Strategic Highway Research Program (SHRP), and Marine Board publications since 1923.⁶ The index offers simple and advanced searching and allows users to download and e-mail the results in a variety of formats. Records contain links to available full-text documents and to ordering information.

Research Needs Statements Database

The Research Needs Statements (RNS) database is a dynamic collection of highest-priority topics developed by TRB technical standing committees.⁷ The RNS database serves as a tool for reviewing research needs, setting research priorities, and identifying gaps in current research. More than 1,000 statements are posted.

Research in Progress Database

Research in Progress (RiP) is a database of approximately 10,000 records of active or recently completed research projects.⁸ The current awareness service notifies users about new and updated project records in specified subject areas. TRID offers users an option for searching the RiP database or the RiP and TRID databases simultaneously.

TRB Library

The TRB Library provides research and reference services to TRB sponsors, committee members, and staff. The library subscribes to more than 400 serial titles and contains the complete collection of TRB, HRB, SHRP, and Marine Board publications.

⁵ <http://trid.trb.org>.

⁶ <http://pubsindex.trb.org>.

⁷ <http://rns.trb.org>.

⁸ <http://rip.trb.org>.



The Transit Cooperative Research Program's Legal Research Digest 40 is the one millionth record in the TRID database.



A project is under way to digitize the entire collection of TRB publications in the TRB Library.

The TRB Library participates in the Eastern Transportation Knowledge Network and in the National Transportation Knowledge Network.

SYNTHESIS PROGRAMS

Under the sponsorship of the Cooperative Research Programs administered by TRB—specifically the Airport Cooperative Research Program (ACRP), the National Cooperative Highway Research Program (NCHRP), and the Transit Cooperative Research Program (TCRP)—the Synthesis Programs unit prepares reports on current practice and knowledge on a range of key airport, highway, and transit 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 2013, the panels selected 9 new airport, 15 new highway, and 5 new transit 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 56–57. Approximately 2,500 copies of each report are published in hard

copy, and 2,300 of these are distributed to state departments of transportation (DOTs), transit agencies, airport operators, and TRB topic-area subscribers. The reports are also posted on the TRB website.⁹

TRB maintains an inventory of hard-copy Synthesis reports for sale.¹⁰ Following are summaries of illustrative airport, highway, and transit reports published in 2012.

ACRP Synthesis Reports

- ACRP Synthesis 36, *Exploring Airport Employee Commute and Parking Strategies*, by Diane M. Ricard, analyzes what is known about airport employee commute patterns and commute modes. The report addresses alternatives to the drive-alone commute for airport employees and the effectiveness and challenges of airport employee commute options programs. This report received the 2013 Excellence in Scholarship Award from the Association for Commuter Transportation.
- ACRP Synthesis 40, *Issues with Airport Organization and Reorganization*, by Kimberly A. Kenville and James F. Smith, examines organizational design and current trends and practices in airport management. The report includes a flight plan of critical considerations for airport managers organizing or reorganizing airport functions for maximum effectiveness. This report was featured in a successful webinar.
- ACRP Synthesis 45, *Model Mutual Aid Agreements for Airports*, by James F. Smith and Kimberly A. Kenville, addresses nearly every type of emergency that could affect airports and require outside resources. The report assists airport operators in creating and sustaining effective mutual aid partnerships for emergency management.
- ACRP Synthesis 43, *Environmental Assessment of Air and High-Speed Rail Corridors*, by Mikhail Chester and Megan Smirti Ryerson, provides examples comparing specific environmental effects of the modes from academic research and NEPA environmental impact

⁹ www.trb.org/Publications/PubsNCHRPSynthesisReports.aspx; www.trb.org/Publications/PubsTCRPSynthesisReports.aspx; and www.trb.org/Publications/PubsACRPSynthesisReports.aspx.

¹⁰ www.trb.org/Finance/Bookstore.aspx.

reports and identifies additional research needed to improve assessment of the environmental effects of both modes.

NCHRP Synthesis Reports

- A webinar in 2013 on Low-Cost, Sustainable Shallow Slope Stabilization and Erosion Treatments featured NCHRP Synthesis 430, *Cost-Effective and Sustainable Road Slope Stabilization and Erosion Control*, and attracted significant participation from international practitioners. The 2012 report, by Laura Fay, Michelle Akin, and Xianming Shi, presents information on road slope stabilization techniques, with a focus on shallow or near-surface slope stabilization and related erosion control methods for low-volume roads.
- NCHRP Synthesis 439, *Use of Transportation Asset Management Principles in State Highway Agencies*, by Neal Hawkins and Omar Smadi, reports the current state of the practice for asset management among state highway agencies. The synthesis complements Volume 2 of the *AASHTO Transportation Asset Management Guide—A Focus on Implementation*, which provides a step-by-step process for agencies to align investment decisions to their strategic goals. The findings of Synthesis 439 have been presented at TRB, AASHTO, and International Road Federation meetings and are the basis for a National Highway Institute course on asset management.
- NCHRP 441, *High-Performance Concrete Specifications and Practices for Bridges*, by Henry G. Russell, documents specifications used by state transportation agencies and



High-performance concrete, used for the deck and substructure of Lake Champlain Bridge in New York State, is the focus of NCHRP Synthesis 441. (Photo: New York State Department of Transportation)



The West Midtown Ferry Terminal in Hudson River Park at West 39th Street in New York City. TCRP Synthesis 102 explores the integration of ferry service and public transportation. (Photo: Nelson\Nygaard Consulting Associates)

identifies practices that have improved concrete performance, as well as others that have been less successful.

- NCHRP Synthesis 443, *Practical Highway Design Solutions*, by Hugh W. McGee, presents information on the application of design solutions that reduce costs for specific roadway projects, allowing transportation agencies to address critical needs of the entire roadway system.

TCRP Synthesis Reports

- TCRP Synthesis 91, *Use and Deployment of Mobile Device Technology for Real-Time Transit Information*, by Carol Schweiger, documents the state of the practice, covering the technology to generate the information, the mobile technology for dissemination, the characteristics of the information, the resources to deploy the information successfully on mobile devices, and the contribution of mobile messaging to an agency's communications strategy. A White House meeting acknowledged the report for providing relevant electronic-age information.
- TCRP Synthesis 93, *Practices to Protect Bus Operators from Passenger Assault*, by Yuko Nakanishi, documents the state of the practice and reports on the policies implemented by transit agencies to deter and mitigate assaults on bus operators. The report incorporates up-to-date information on workplace violence and on security measures and practices by bus operators. The Amalgamated Transit Union published excerpts from the



Ignition highlights news about the IDEA programs, investigators, and projects.

report in its newsletter.

- TCRP Synthesis 102, *Integrating Passenger Ferry Service with Mass Transit*, by Tim Payne, documents the state of the practice in integrating land- and water-based transit systems and explores aspects of successful and seamless integrations. The report assembles information from several locations around the United States, supplemented with examples from Canada, Australia, and Bermuda. A webinar on the report is in planning.

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 2013:

- The state DOTs collectively fund highway-related research through the NCHRP IDEA program.
- Research on innovations applicable to transit practice is carried out under the Transit IDEA program, funded by FTA through TCRP.
- FRA sponsors the Safety IDEA program, which supports projects to improve the safety of railroad operations.
- The Reliability IDEA program, funded by SHRP 2, supports projects to increase the consistency and dependability of travel times,



Stefan Hurlbaeus, Texas A&M Transportation Institute, illustrates a project for determining longitudinal stress in rails at a meeting of the Safety IDEA Program Committee.



Philip Winters, University of South Florida, presented information on a travel assistance device to help transit riders at a 2013 Annual Meeting poster session on IDEA projects. (Photo: Risdon Photography)

improve the prediction of travel time, and inform travelers and other highway system users about dealing with unexpected delays.

Structure and Activities

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 2013 TRB Annual Meeting, the transit, highway, and safety programs conducted poster sessions highlighting 23 of the most promising current projects. Each session attracted a constant stream of interested visitors who interacted directly with the inventors.

Each of the IDEA programs publishes an annual report that includes summaries of completed and current projects. The summaries also are posted on the IDEA page of the TRB website, along with the IDEA program announcement, which contains forms and guidelines for submitting proposals.¹¹ Contractor final reports for completed IDEA projects also are posted on

¹¹ www.trb.org/IDEAProgram/IDEAProgram.aspx.

the TRB website.¹² A less formal publication, *Ignition*, features interviews with IDEA investigators and transportation leaders, plus articles that highlight promising projects.¹³

Recent Successes

- **Automated Mobile Retroreflectivity Measurement of Pavement Markings**, funded by NCHRP IDEA, developed a vehicle-mounted unit for the rapid and reliable measurement of the reflectivity of pavement markings in vehicle headlights. Highway agencies need to maintain a minimum level of retroreflectivity for signs and pavement markings to ensure a safe driving environment. In field tests, the device developed in the IDEA project measured retroreflectivity accurately, cost-effectively, and rapidly. FHWA's Highways for LIFE program is funding production of a unit for additional field trials.
- **Automated and Continuous Aggregate Sampling and Laser Targeting System**, funded by NCHRP IDEA, uses laser scanning for real-time quality control of aggregate for highway construction projects by characterizing the suitability of the aggregate properties in the field. Testing of the system is under way at a quarry in Albany, New York. Several state DOTs are involved in the field validation through a pooled-fund study. AASHTO

¹² www.trb.org/Publications/PubsIDEAHighwayFinalReports.aspx; www.trb.org/Publications/PubsIDEAHighSpeedRailFinalReports.aspx; www.trb.org/Publications/PubsIDEASafetyFinalReports.aspx; and <http://www.trb.org/Publications/PubsIDEATransitFinalReports.aspx>.

¹³ www.trb.org/Publications/PubsIDEAIgnitionMagazines.aspx.



A vehicle-mounted unit for measuring the reflectivity of pavement markings was developed by Terry Lee with support from NCHRP IDEA. (Photo: Terry Lee)



John Hillman (holding award) received the Charles Pankow Award for Innovation from the American Society of Civil Engineers for the Hybrid Composite Beam, developed with support from TRB's IDEA program. (Photo by David Hathcox, ASCE)

- is drafting a standard of practice and a test method for the laser scanning technology.
- The Hybrid Composite Beam is a high-strength, lightweight, corrosion-resistant beam for bridge construction that was developed with funding from the former High-Speed Rail IDEA program and the NCHRP IDEA program. The inventor, John Hillman, received the 2013 Charles Pankow Award for Innovation from the American Society of Civil Engineers.

Staff News

HARVEY BERLIN, Senior Program Officer who worked with the Transit and Safety IDEA programs, retired in August after 14 years with TRB.

NORMA HANSELL-PRICE retired after 13 years of service, including 9 years as Acquisition Assistant for the TRIS database; she previously worked in the National Academies' Office of Human Resources.

NANCY D. CHOUDHRY, retired in June as Senior Abstractor after 40 years of service with the TRIS database.

JANET S. DALY joined TRIS as Senior Abstractor in May.



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), sponsored by the Federal Railroad Administration (FRA).

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

A forum for coordinated and collaborative research, NCHRP addresses issues integral to the functions of state departments of transportation (DOTs) and transportation professionals at all levels of government and private practice. NCHRP assists the transportation community in finding objectively derived solutions to pres-



Crawford Jencks (center) leads discussion of research needs and upcoming NCHRP projects at a meeting of the American Association of State Highway and Research Officials (AASHTO) Standing Committee on Research.

ing problems and in developing innovations to improve practice.

State support for NCHRP is voluntary and is drawn from State Planning and Research (SPR) funds in the Federal-Aid Highway apportionment. The funds can be spent only for the administration of projects approved by at least two-thirds of the states.

NCHRP's close association with AASHTO and its position within the National Academies have enabled the program to carry out research with sound, practical, and nationally important results. Stakeholder involvement throughout the NCHRP process guarantees that the program addresses high-priority research needs and develops products that are ready for implementation by practitioners. Founded in 1962,



Director Christopher W. Jenks discusses news and research activities of the six Cooperative Research Programs at a January meeting of the TRB Executive Committee. (Photo: Risdon Photography)

NCHRP has completed 51 years of service to state DOTs and the industry.

NCHRP manages projects in research areas that run the gamut from highway and bridge planning, materials, design, construction, and operations, to economics and finance, policy, land use, environmental issues, and workforce development. The results of these research projects appear in more than 1,250 publications in the NCHRP Report and NCHRP Synthesis of Highway Practice series, as well as in 385 Research Results Digests, 61 Legal Research Digests, and 268 other documents published electronically. NCHRP reports published during the past 12 months are listed on pages 56–57.

Proven Process

AASHTO considered 143 problem statements for the FY 2014 program and selected 15 for continuing projects and 50 new projects. Each NCHRP project 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 DOTs, and other organizations.

NCHRP panels convened for more than 150 project meetings in 2013; more than 2,600 volunteers offered their time, energy, and expertise as panel members, attending meetings and reviewing materials, primarily for the challenges



Jeremy Raw (right), Federal Highway Administration, participates in a meeting of the NCHRP Project Panel on Establishing Application and Policy Sensitivity in Travel Demand Models.



John S. Halikowski
Chair
AASHTO Standing
Committee on
Research



Sherry E. Little
Chair
TCRP Oversight and
Project Selection
Committee



Cheryl A. Burke
Chair
HMCPR Technical
Oversight Panel



Lillian C. Borrone
Chair
NCFRP Oversight
Committee



James A. Wilding
Chair
ACRP Oversight
Committee



Howard R. Permut
Chair
NCRRP Oversight
Committee



Christopher W. Jenks
Director
Cooperative Research
Programs



Crawford F. Jencks
Deputy Director
Cooperative Research
Programs

and the satisfaction of making contributions to the field.

Most NCHRP research projects have had a direct impact on practice through products such as recommended specifications, manuals, and guidelines. NCHRP partners with AASHTO to ensure that the research products are deployed by state DOTs. Examples of NCHRP successes can be found in the *Impacts on Practice* series.¹

The following is a sampling of NCHRP reports published in the past year that were of particular importance to AASHTO. All reports are available on the TRB website.² General information on all projects is available in the NCHRP Summary of Progress, December 31, 2013, and on the web.³

Report Highlights

NCHRP Report 733, *High-Performance, High-Strength Lightweight Concrete for Bridge Girders and Decks*, presents proposed changes to the AASHTO Load and Resistance Factor Design (LRFD) bridge design and construction specifications.

NCHRP Report 740, *A Transportation Guide for All-Hazards Emergency Evacuation*, includes

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

² www.trb.org/NCHRP/NCHRP.aspx.

³ <http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp-annual2013.pdf>.

Mass evacuations in North Dakota in 2009 (right) and North Carolina in 1999 (below, right), are among the cases studied in NCHRP Report 740, *A Transportation Guide for All-Hazards Emergency Evacuation*. (Photos: Federal Emergency Management Agency)



guidance based on an all-hazards approach applicable to a range of emergency events with and without notice. The report follows the planning steps in the Federal Emergency Management Agency's *Comprehensive Preparedness Guide 101*.

NCHRP Report 741, *Evaluation of Methodologies for Visual Impact Assessments*, documents methodologies and approaches used in the United States and other countries, presents case studies from state DOTs, and highlights promising new developments.

NCHRP Report 744, *Fuel Usage Factors in Highway and Bridge Construction*, includes the Price Adjustment Calculator Tool, a spreadsheet to assist in calculating payment adjustments for construction projects by using fuel price indices or fuel prices.

The planning, design, and operation of traffic enforcement strategies, as well as administrative issues for consideration, are described in NCHRP Report 746, *Traffic Enforcement Strategies for Work Zones*.

NCHRP Report 748, *Guidelines for the Use of Mobile LIDAR in Transportation Applications*, presents mobile three-dimensional light detection and ranging (LIDAR) technology for use in state DOT operations.

NCHRP Report 750, *Strategic Issues Facing Transportation, Volume 1: Scenario Planning for Freight Transportation Infrastructure Investment*, analyzes the forces driving high-impact economic and social changes, as well as source-

ing patterns that may affect the U.S. freight transportation system. The report introduces scenario planning as a tool in conjunction with other methods to improve the quality of long-range transportation infrastructure planning.

NCHRP Report 751, *Renewable Energy Guide for Highway Maintenance Facilities*, covers applications for heating and cooling, lighting, and electrical power.

NCHRP Report 752, *Improved Mix Design, Evaluation, and Materials Management Practices for Hot-Mix Asphalt with High Reclaimed Asphalt Pavement Content*, proposes revisions to AASHTO R 35, Superpave Volumetric Design for Hot-Mix Asphalt, and to AASHTO M 323, Superpave Volumetric Mix Design, to accommodate mix designs with high reclaimed asphalt pavement content.

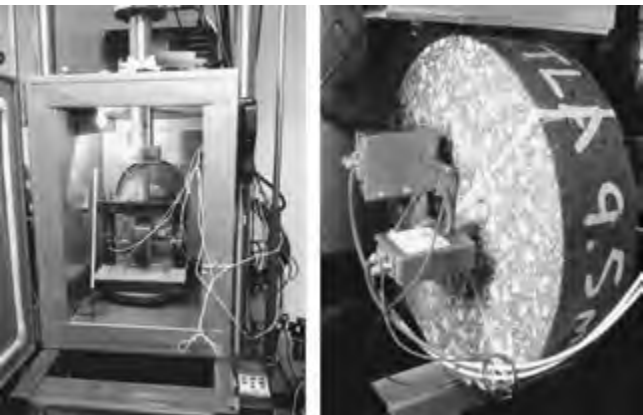
Other Series Highlights

NCHRP Web-Only Document 197, *Guidelines for the Load and Resistance Factor Design and Rating of Riveted and Bolted Gusset-Plate Connections for Steel Bridges*, reports on a project conducted at the recommendation of the National Transportation Safety Board after the 2007 collapse of the I-35W Bridge in Minnesota. Cofunded by FHWA, the project explored and tested the failure modes of steel truss bridge gusset-plate connections.

NCHRP Legal Research Digest 58, *Legal Issues Surrounding the Use of Digital Intellectual Property on Design and Construction Projects*, clarifies various legal issues related to ownership; updating and distribution rights; software



A solar-powered central receiver system in Daguerre, California. Renewable energy for highway maintenance facilities is explored in NCHRP Report 751. (Photo: Sandia National Laboratories)



The results of fracture energy tests, conducted using a servohydraulic loading frame, were analyzed in NCHRP Report 752.

interoperability; liability; copyright protection, nondisclosure agreements, trade secrets, and public information disclosure laws; protection of digital intellectual property; and digital signatures.

NCHRP Legal Research Digest 61, *Legal Aspects of Performance-Based Specifications for Highway Construction and Maintenance Contracts*, explores the differences between specifications and traditional design- or method-based specifications, particularly the differences in risk allocation.

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 21 years, TCRP has undertaken 679 studies; of these, 617 are complete and 62 are in progress. Details on the program's progress since 1992 can be found in the 2013 TCRP Annual Report.⁴

⁴<http://onlinepubs.trb.org/onlinepubs/tcrp/tcrpannual2013.pdf>.

Funding for TCRP has declined significantly over the past several years—from \$10 million in Fiscal Year (FY) 2011 to \$6.5 million in FY 2012 to \$3.5 million in FY 2013. The Moving Ahead for Progress in the 21st Century Act (MAP-21) authorized \$7.0 million funding for TCRP in FY 2013 and FY 2014; however, appropriations have not met the authorized level.

As a result, the number of research projects selected has declined. Several changes have been made to the TCRP process to reduce costs—for example, issuing TCRP products electronically, eliminating printing costs, and holding certain types of project panel meetings via teleconference, to reduce travel costs.

TCRP published 19 project reports in 2013, bringing the total to more than 600 publications. The following TCRP publications and projects of particular interest were completed during the year.

Operations, Maintenance, and Safety

TCRP Report 157, *State of Good Repair: Prioritizing the Rehabilitation and Replacement of Existing Capital Assets and Evaluating the Implications for Transit*, presents a framework to help transit agencies prioritize decisions about the rehabilitation and replacement of capital assets. Accompanying the report are four spreadsheet models that apply the framework.

TCRP Report 160, *Paratransit Emergency Preparedness and Operations Handbook*, provides paratransit service providers with guidance, strategies, tools, and resources to plan and prepare for, respond to, and recover from a range of emergencies. The guidance applies to urban,



Carolyn Flowers, Charlotte Area Transit System, takes part in a meeting of the TCRP Oversight and Project Selection Committee in October. The committee chooses research projects for the program.



Case studies in TCRP Report 159, *Transforming Public Transportation Institutional and Business Models*, include the Metropolitan Transportation Authority in New York and its consolidation of business service functions. (Photo: Marc A. Hermann, MTA New York City Transit)

suburban, rural, and tribal paratransit operating environments; to in-house paratransit operations and paratransit services operated under contract; and to Americans with Disabilities Act (ADA) paratransit and general public demand-response operations.

TCRP Project E-6, *Transit Bus Mechanics: Building for Success*—The ASE Transit Bus Maintenance Certification Test Series, has developed transit bus maintenance technician certification 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 2013, ASE continued to administer eight transit bus tests developed through TCRP—electrical and electronics; brakes; diesel engines; 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 more than 10,000 transit bus tests.

In addition, the ASE Board of Directors has approved a Transit Bus Master Technician designation for those who pass seven of the eight tests. Approximately 570 have attained the status of ASE Transit Bus Master Technician.

Similarly, TCRP Project E-7, *Initiating a National Transit Industry Rail Vehicle Techni-*

cian Program: Building for Success, has developed a proposed program for the training and certification of rail vehicle maintenance technicians in several technical areas. Several major rail transit agencies have piloted the program, and formal implementation through the Transportation Learning Center is under discussion.

Management and Administration

TCRP Report 159, *Transforming Public Transportation Institutional and Business Models*, provides an analysis of and strategy for defining and implementing transformative change in institutional and business models for operating and maintaining public transportation systems. The report addresses a range of issues, including capital asset management, long-term planning, improving and expanding the expertise and technical skill sets of the workforce, identifying and implementing innovative funding mechanisms, applying performance measures, and instituting collaborative practices.

TCRP Report 162, *Building a Sustainable Workforce in the Public Transportation Industry: A Systems Approach*, is a guidebook that presents practical recommendations in four modules: strategies for recruitment, retention, training, and development, and professional capacity building; metrics to evaluate the effectiveness of human resources practices; strategies for image management; and a framework for a benchmarking process. Examples present successful programs, initiatives, and practices.

Planning

TCRP Report 158, *Improving ADA Paratransit Demand Estimation: Regional Modeling*, provides a sketch-planning model and regional models (a) to improve the ability of metropolitan planning organizations and transit operators to estimate the demand for ADA complementary paratransit service and (b) to predict travel by ADA paratransit-eligible individuals on all modes. The report includes model parameters and coefficients, and an enclosed CD-ROM contains a fully implemented version.

TCRP Report 161, *Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation: Final Workbook*, offers step-by-step procedures for quantifying the need for passenger transportation services and the demand that is likely to be generated. The

workbook includes a spreadsheet model for implementing the procedures.

TCRP Report 165, *Transit Capacity and Quality of Service Manual, Third Edition*, is a reference document that contains background, statistics, and graphics on the various types of public transportation and provides a framework for measuring transit availability, comfort, and convenience from the passenger and transit provider points of view. The manual presents quantitative techniques for calculating the capacity of bus, rail, demand-responsive, and ferry transit services, as well as transit stops, stations, and terminals.

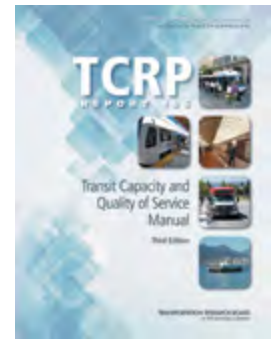
AIRPORT COOPERATIVE RESEARCH PROGRAM

The Airport Cooperative Research Program (ACRP) is a national resource for the airport industry, fulfilling the vital needs of airport practitioners by providing industry-driven research to airports of all sizes across the country. After eight years of operation, ACRP has engaged thousands of public- and private-sector airport practitioners, academicians, consultants, advocates, and students to identify the airport industry's most pressing challenges and to fund research to document, mitigate, and create tools to surmount and resolve the challenges.

Established through The Vision 100—Century of Aviation Reauthorization Act and reauthorized in the FAA Modernization and Reform Act of 2012, ACRP undertakes research and other technical activities in response to the needs of airport operators on issues involving administration, environment, legal matters, policy, planning, safety, human resources, design, construction, maintenance, and operations at airports.

Under a memorandum of agreement signed with FAA in October 2005, ACRP is managed by the National Academies through TRB, in coordination with the American Association of Airport Executives, the Airports Council International—North America, the Airport Consultants Council, the National Association of State Aviation Officials, and Airlines for 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. The ACRP Oversight Committee (AOC), appointed by the U.S. Secretary of Transportation, met twice in 2013 and selected 28 new research projects and 10 continuation projects for the FY 2014 program. To date, the AOC has authorized more than 350 projects in a variety of subject areas.



TCRP released the third edition of the *Transit Capacity and Quality of Service Manual*, a practical, mainstay reference.



The ACRP Oversight Committee met in July to manage ACRP operations and prioritize research needs. (Photo: Michael Salamone)



The ACRP Project Panel on Integrating Airport Wildlife Management into the Safety Management System held its second meeting in November. More than 600 volunteers participate on ACRP panels each year.

Outreach Initiatives

In 2013, ACRP issued 37 publications, many with CDs containing additional material and tools. Each year, more than 600 individuals from the airport community have participated on ACRP project panels, which in 2013 held approximately 110 meetings and 60 conference calls 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.

In addition to publishing reports on industry-driven research priorities, ACRP works to ensure that the products reach those who need them most. In 2013, dissemination efforts reached a respectable “cruising altitude” through several coordinated outreach initiatives, including e-videos, webinars, workshops, speaker presentations, publications on applied results, the ACRP Ambassadors, conference exhibits, and more.

ACRP released the following notable publications in 2013. Additional information can be found at the ACRP website⁵ and in the 2013 ACRP Annual Report.⁶

Notable Publications

ACRP Report 75, *Airport Leadership Development Program*, provides industry associations, academic institutions, airport organizations,

⁵ www.trb.org/ACRP/ACRP.aspx.

⁶ <http://onlinepubs.trb.org/onlinepubs/acrp/acrapprannual2013.pdf>.

and others with a turnkey program to assess, obtain, and refine leadership skills. The program includes forms for a complete individual assessment of core leadership traits, as well as a facilitator guide and participant workbooks and materials.

ACRP Report 79, *Evaluating Airfield Capacity*, is a guidebook to assist planners with methods and modeling techniques for evaluating capacity at a range of airports. Best practices and modeling techniques are presented, along with specifications for new models, tools, and enhancements. The guidebook includes descriptions of available modeling tools, an explanation of the tools created as part of the research, and a decision tool to help select a capacity evaluation technique.

ACRP Report 83, *Assessing Opportunities for Alternative Fuel Distribution Programs*, provides a guidebook and toolkit for airports to introduce and market alternative fuels, including alternative jet fuel, green diesel, biodiesel, ethanol, compressed natural gas, liquefied petroleum gas, and electricity. The guidebook identifies a variety of economic, environmental, and policy issues to address. An accompanying CD-ROM offers two spreadsheets for evaluating the marketing and distribution of alternative fuels.

ACRP Report 88, *Guidebook on Integrating GIS in Emergency Management at Airports*, consists of a guidebook and a CD-ROM with worksheets to help airports identify needs and assess capabilities for using geographical information systems (GIS) in emergency management (EM). The information collected in the worksheets becomes the backbone of a GIS-EM integration plan. A PowerPoint presentation available on the TRB website⁷ outlines the benefits of integrating GIS into EM.

ACRP Report 89, *Guidelines for Airport Sound Insulation Programs*, addresses the sound insulation of residential and other noise-sensitive buildings—such as schools, hospitals, and churches—to assist airport and nonairport sponsors in developing and managing aircraft noise insulation projects. The research significantly expands information available on best practices and on standards and requirements for sound insulation of homes and noise-sensitive buildings.

⁷ www.trb.org/Publications/Blurbs/169302.aspx.



ACRP Report 89 provides updated guidelines for the effective development and management of aircraft noise insulation projects in residential and other noise-sensitive buildings. (Photo: The Jones Payne Group, Inc.)

ACRP Report 90, *Impact of Regulatory Compliance Costs on Small Airports*, identifies and quantifies the cumulative costs of regulatory requirements at small hub and nonhub airports. The research analyzed aviation transportation, environmental, security, and occupational safety and health requirements from initial implementation through ongoing maintenance and estimated the associated costs for 2000 to 2010.

ACRP Report 92, *Guidebook to Creating a Collaborative Environment Between Airport Operations and Maintenance*, provides tools and strategies, including exercises, case studies, and other resources, as well as methods to identify warning signs of collaboration issues between operations and maintenance staffs.

ACRP Report 93, *Operational and Business Continuity Planning for Prolonged Airport Disruptions*, provides a guidebook and a software tool for airport operators to plan and prepare for disruptive and catastrophic events that may cause prolonged airport closures, with adverse impacts to the airport and to the local, regional, and national economy. The guidebook presents best practices and develops a critical path framework to identify immediate and long-term needs and to establish priorities for recovery.

NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM

Authorized in 2005 under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (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.⁸ Annual funding has averaged \$3.4 million per year, but MAP-21 repealed NCFRP. Although the program will be closing down, all research activity funded through FY 2012 will be completed as planned.

Six reports were published in 2013:

- NCFRP Report 21, *Handbook on Applying Environmental Benchmarking in Freight Transportation*, provides an overview of the benchmarking process and describes a framework for freight carriers, shippers, and freight hubs.

⁸www.trb.org/NCFRP/NCFRP.aspx.



NCFRP reports addressed such topics as environmental benchmarking, smart growth and urban goods movement, and data sharing in 2013. (Photo: Thomas Hawk)

- NCFRP Report 22, *Freight Data Cost Elements*, identifies specific types of direct freight transportation cost data elements required for public investment, policy, and regulatory decision making.
- Policies and practices for managing freight activity in metropolitan areas are the subject of NCFRP Report 23, *Synthesis of Freight Research in Urban Transportation Planning*. Although the focus is on last-mile, first-mile strategies, the report also addresses issues relating to the environment and to trading hubs or nodes.
- NCFRP Report 24, *Smart Growth and Urban Goods Movement*, identifies the interrelationships between the transportation of goods in the urban environment and land use patterns.
- NCFRP Report 25, *Freight Data Sharing Guidebook*, provides guidelines for sharing freight data, primarily between public and private freight stakeholders.
- NCFRP Report 26, *Guidebook for Developing Subnational Commodity Flow Data*, informs state DOTs and other subnational agencies about obtaining and compiling commodity flow data useful for local analyses.

HAZARDOUS MATERIALS COOPERATIVE RESEARCH PROGRAM

SAFETEA-LU, enacted in 2005, authorized a pilot cooperative research program on hazardous materials transportation. HMCPR 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.⁹ Annual funding averaged \$1.1 million, but MAP-21 provided no new funding beyond FY 2012, which concluded October 1, 2012. The program will close down in the next two years, when the research activity funded through FY 2012 will be completed.

Three reports were published in 2013:

- HMCRP Report 10, *Feasibility Study for Highway Hazardous Materials Bulk Package Accident Performance Data Collection*, explores methods to collect and analyze performance data for U.S. DOT-specified hazardous materials bulk packages, such as portable tanks and cargo tank motor vehicles. The report identifies and evaluates institutional challenges to data collection and suggests ways to overcome the challenges.
- A technical approach to determining the maximum quantity of dry ice that may be safely carried aboard aircraft is described in HMCRP Report 11, *Technical Assessment of Dry Ice Limits on Aircraft*. The report includes guidelines for determining safe limits for the carriage of dry ice on commercial airplanes, as well as a CD-ROM-based software tool to assist in determining appropriate dry ice loadings.
- HMCRP Report 12, *Hazardous Materials Transportation Risk Assessment: State of*

⁹www.trb.org/HMCRP/HMCRP.aspx.

the Practice, examines tools, methodologies, approaches, and key sources of data for assessing hazardous materials transportation risks in the public and private sectors and characterizes the capabilities and limitations.

NATIONAL COOPERATIVE RAIL RESEARCH PROGRAM

Authorized by the Passenger Rail Investment and Improvement Act (PRIIA), NCRRP was initiated under TRB management in 2012 with the sponsorship of FRA.¹⁰ The program is intended to carry out applied research on problems that

- Address intercity rail passenger and freight rail services, including rail passenger and freight technologies and operating speeds, 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,

¹⁰www.trb.org/NCRRP/NCRRP.aspx.



Dry ice often is used in the food carts on board passenger aircraft. HMCRP Report 11 analyzed measurements of carbon dioxide levels on two separate passenger flights: one with dry ice in the cargo compartment and one without.



A freight train passes the Amtrak station in Whiting, Indiana. An NCRPP project addresses shared-track issues for intercity passenger rail and freight rail. (Photo: vxla, Flickr)

and regional intercity rail corridors, projects, and entities.

The NCRPP Oversight Committee, appointed by the Secretary of Transportation in early 2012, met for the first time in May 2012 to select initial research topics. All research projects selected are currently under way:

- Comparison of Passenger Rail Energy Consumption with Competing Modes;

- Intercity Passenger Rail Service and Development Guide;
- Intercity Passenger Rail in the Context of Dynamic Travel Markets;
- Building and Retaining Workforce Capacity for the Railroad Industry;
- Alternative Financing Approaches for Passenger and Freight Rail Projects;
- Developing Multistate Institutions to Implement Intercity Passenger Rail Programs;
- Inventory of Federal and State Passenger and Freight Rail Programs;
- Legal Aspects of Rail Programs; and
- NCRPP Strategic Plan and Research Agenda.

NCRPP's continuation depends on the PRIIA reauthorization process and subsequent appropriations, currently pending.

Staff News

CRAWFORD F. JENCKS, CRP Deputy Director and Manager of NCHRP, NCFRP, and HMCRRP, retired December 31, after 34 years with TRB.

CHRISTOPHER J. HEDGES was named NCHRP Manager, effective January 1, 2014.

THERESA C. CREAN started as a Senior Editorial Assistant in May.



Second Strategic Highway Research Program | SHRP 2

The second Strategic Highway Research Program (SHRP 2) addresses the need to speed the delivery of transportation projects that meet users' expectations for safe and reliable trips on roads planned, built, and operated to help communities thrive. With less than two years remaining in TRB's cooperative agreement with the Federal Highway Administration (FHWA), SHRP 2 continues to carry out a full agenda while working to transfer the knowledge developed during the program to FHWA, the American Association of State Highway and Transportation Officials (AASHTO), and implementing agencies, such as state departments of transportation (DOTs). Project activities in all four focus areas—Safety, Capacity, Reliability, and Renewal—will continue well into 2014.



Michael Lewis, Rhode Island DOT; Jim McDonnell, AASHTO; and Gordon Proctor, Gordon Proctor & Associates, Inc., present strategies for implementation of SHRP 2 research results at a 2013 Annual Meeting session. (Photo: Risdon Photography)



Paul Jodoin (left), FHWA, shares information about the research results implementation assistance program, SHRP 2 Solutions, at the Annual Meeting. (Photo: Risdon Photography)

SUPPORTING IMPLEMENTATION

This past year was pivotal, as SHRP 2 turned much of its focus to converting research results into tools and resources for delivery to users. Like the program itself, these activities responded to user goals and were carried out in collaboration with stakeholders and partners.

More than 700 transportation experts have served on SHRP 2 committees, including representatives from 40 states; 37 states have had hands-on involvement through 119 field activities, such as pilot tests, demonstration projects, data collection, and specifications development. Findings from these activities, along with the insights and experiences of participating transportation agencies, are applied to develop and improve products before the FHWA and AASHTO implementation programs and activities make them widely available. The results

have taken many forms, including more than 30 web-based resources, as well as guides, curricula and other training materials, analytical models, and data sets.

In February, FHWA and AASHTO initiated the SHRP 2 Implementation Assistance Program, which offers incentives for transportation agencies to adopt the products of the research program, known as SHRP 2 Solutions. The first round of assistance funding was available for the implementation of six products; as a result, transportation agencies in 34 states and the District of Columbia undertook 108 projects. The second round of the program offered four products in August, and two additional solicitation rounds are planned for 2014. The SHRP 2 Solutions website serves as a resource for information about implementation.¹

By design, SHRP 2 research addresses big challenges that confront transportation leaders across the country. The challenges include increasingly urgent needs to rebuild highway infrastructure, to reduce congestion, and to address the primary factor in most crashes—driver error and behavior. These challenges were addressed in four research focus areas; the following sections describe accomplishments in each focus area during the past year.

RENEWAL

The Renewal focus area addresses the need for a consistent and systematic approach to delivering highway projects quickly, with minimal disruption to traffic and communities, while pro-



¹www.fhwa.dot.gov/goSHRP2.



Kirk T. Steudle
Chair
SHRP 2 Oversight
Committee



Ann M. Brach
Director
SHRP 2



Stephen J. Andrie
Deputy Director
SHRP 2



Neil J. Pedersen
Deputy Director,
Implementation and
Communications
SHRP 2

ducing long-lasting facilities. Of 31 Renewal projects, 19 are complete, 8 projects are being pilot-tested, and 4 are still active.

Many innovative methods that could save time and money have not been widely used for a variety of reasons. Renewal research has addressed these reasons by developing products and methods that transportation agencies can apply with confidence. Examples include next-generation project management tools; standard and customizable plans for innovative bridge designs; tools for managing utility conflicts; performance specifications to speed construction, reduce oversight, and encourage innovative approaches; an online tool to select the appropriate nondestructive testing techniques for pavements, bridges, and tunnels; and resources that streamline permitting processes and reduce delays on projects that include railroads.

New York State DOT is using 12 Renewal products, including several on the Tappan Zee Bridge project over the Hudson River. Some products are being tested as part of demonstration or pilot projects, while others involve full implementation of final products. Seven Renewal projects are included in the first two rounds of the FHWA Implementation Assistance Pro-

Construction of the New NY Bridge, which will replace the Tappan Zee Bridge over the Hudson River in New York, is applying several SHRP 2 Renewal products. (Photo: New York State Thruway Authority)



gram, which will quickly build expertise among transportation agencies across the nation.

SAFETY

SHRP 2 undertook a study of unprecedented scope and scale in conducting the Naturalistic Driving Study to develop an objective way to understand the role of driver behavior and performance in crash causation. Approximately 3,100 volunteer drivers in data collection areas in six states participated in the study by allowing researchers to install cameras and sensors in their vehicles to capture real-world driving data.

The data collection, which ended in November 2013, yielded data for 5 million trips that will be available for analysis. Data also were collected on more than 12,500 centerline miles of roads that study participants drove to determine the relationship of crash risk to characteristics such as grade, curvature, cross slope, posted speed limits, and intersections. A spatial database of roadway characteristics, features, and other data will describe the context in which participants drove. Additional data were collected in the six study sites, including the five-year crash history, traffic information, weather, work zones, changes to infrastructure, and aerial imagery.

The data offer the highway safety community an extraordinary opportunity to study direct relationships between driver behavior and safety outcomes. Benefits to safety will come from analysis of the data to develop improved countermeasures, including targeted policies for mitigating risky driving behavior, safer roadway



Cameras installed in the cars of Naturalistic Driving Study participants collected data on the real-world driver behavior and performance of approximately 5 million car trips. (Photo: SHRP 2)



Jeffrey F. Paniati (left), FHWA Executive Director, and Frederick G. (Bud) Wright, AASHTO Executive Director, were featured speakers at the 8th SHRP 2 Safety Research Symposium in July.

design, more effective deployment of countermeasures, in-vehicle safety technology, and other crash reduction actions. Three data analysis projects, addressing driver distraction and safety at intersections and rural two-lane roads, are under way and findings will be available in 2014.

In addition to completing data collection in the field, work in 2013 focused on developing methods for researchers to access and analyze the data while protecting personal information about participants. Selected data will be available through a website, and all data will be available to qualified researchers under sharing agreements that protect the confidentiality of the participant drivers.

The newly formed Committee on the Long-Term Stewardship of Safety Data from SHRP 2 met twice in 2013 to examine the stewardship requirements and to advise on strategies for meeting the requirements. All of these activities will support use of the data to address issues such as distracted driving, speeding, aggressive driving, seat belt use, impaired driving, highway design, traffic control device standards, and vehicle design.

RELIABILITY

Research conducted under the Reliability focus area is providing a comprehensive approach to reducing unexpected delays and congestion caused by events such as crashes, special events, work zones, weather events, and surges in demand.



The research products provide transportation agencies new tools and methods for organizing their agencies, evaluating appropriate countermeasures, planning projects, and operating highway systems in ways that improve travel time reliability.

With the core research now mostly complete, the focus this year has been on converting research results into products through validation and pilot-testing projects. In one project, teams including transportation agencies in California, Florida, Minnesota, and Washington are testing combinations of Reliability products that provide new resources for data collection; for the analysis of design treatments, methods to enhance capacity, and benefit-costs; and for decision making during planning or programming. These projects are ongoing through June 2014.

Four Reliability projects are related to national training for traffic incident responders from all the disciplines that have roles at an incident scene. FHWA is already offering this multidisciplinary training, which is in great demand. As of September, nearly 15,000 responders in 23 states had completed the training.

The two active projects include conversion of the curriculum to an e-learning tool and finalizing a tool to assess the usefulness of the training for the individual and the agency. Both projects will be completed by early 2014.

Three other projects will help ensure dissemination and knowledge transfer of the Reliability research. One is a web portal to access compre-

hensive information about travel time reliability; another will develop five regional operations forums to provide transportation agencies with education and training on the best use of SHRP 2 Reliability products; and the third will establish an archive to make data collected through the SHRP 2 Reliability projects available for research.

CAPACITY

While the Reliability focus area addresses the costly and complex problem of congestion through improvements in transportation operations, the Capacity focus area addresses ways to reduce congestion by systematically speeding the delivery of transportation projects that can increase capacity.



Many stakeholders with diverse points of view and goals are represented in the process of planning and delivering highway capacity, and finding the most appropriate solutions is inherently difficult. To achieve its objectives, the research has addressed collaborative decision making; ecological approaches to integrating environmental protection and transportation planning; the consideration of freight in the planning process; the economic impacts of highway investments; and the development of tools for analyzing travel demand.

AASHTO conducted a series of workshops this year with practitioners across the country. Participants provided valuable input for refining and finalizing the main product of the Capacity focus area, a web-based resource called Transportation for Communities: Achieving Projects Through Partnerships (TCAPP), which encompasses many of the Capacity research products. At its core, TCAPP offers a basic decision support system for planning, programming, and project development activities by providing information that practitioners need.

Additional research topics, including freight and operations, are being incorporated as TCAPP moves from the beta version to its final form and host agency FHWA. Pilot test projects have become a major source of information to improve TCAPP, with 12 teams of practitioners providing insights into to what is most valuable and what is still needed. Transportation agencies in California, Colorado, Minnesota, Oregon,



A March workshop allowed research teams from transportation agencies in California, Florida, Minnesota, and Washington to demonstrate analytical products from SHRP 2 designed to reduce travel delays caused by unexpected congestion.



Pikes Peak Highway in Colorado. SHRP 2 pilot-tested the TCAPP collaborative decision-making tool as part of the development of the Pikes Peak Area Council of Governments long-range transportation plan. (Photo: Alan Stark)

South Carolina, Washington State, Virginia, and West Virginia have used TCAPP and its applications to support an array of transportation planning, programming, and project development needs.

PUBLICATIONS AND COMMUNICATIONS

New this year in the communications toolkit is a webinar series, SHRP 2 Tuesdays. Twice a month, from May through December 2013, free webinars have provided substantive technical overviews of research projects and results. Where possible, SHRP 2 Tuesdays have included a first-person account from someone who has used or tested the product. Registered participants can earn professional development hour credits.



The pace will quicken in 2014 to accommodate the number of completed projects—three webinars are scheduled each month from February through June. The schedule is posted on the SHRP 2 website, and announcements are sent via the TRB E-Newsletter.

Formal research reports describe the work done in each SHRP 2 project, and many projects also produce guides, toolkits, and other publications. In 2013, the program published 22 documents; nearly 90 SHRP 2 publications are available for download²; many are also available in print and can be purchased from the TRB Bookstore. E-book versions for iPad, Kindle, and Google have been developed for 16 reports, available from e-book vendors.

Each research project is summarized in a 4- to 8-page Project Brief, available on the website; 30 Project Briefs have been published. Videos, articles, brochures, and product charts that offer detailed information about the research results are also available on the website.

²www.TRB.org/SHRP2/researchreports.

Staff News

ABDELMENNAME HEDHLI, on loan to SHRP 2 from IFSTTAR, the French Institute of Science and Technology, and **ONNO TOOLE**, on loan from Rijkswaterstaat Centre for Transport and Navigation in the Netherlands, both completed their assignments and returned to their home agencies this year.

CYNTHIA ALLEN joined the publications team as Editor in September.

JERRY DIMAGGIO, who has coordinated implementation activities and had held staff responsibilities for many Renewal projects, is retiring in January 2014.



Administration and Finance

The TRB Administration and Finance Division provides financial management services 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; and maintenance of the benefits and services for sponsor and affiliate organizations; and acts as 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 expenditures are estimated at \$113 million for the calendar year 2013 (see graph, page 52). A statement of income and expenditures appears on pages 50–51.



Finance and Business Operations Director Gary Walker presents updates on TRB's financial status at the Executive Committee meeting in January. (Photo: Risdon Photography)

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 may also 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 for individual affiliates, organizational affiliates receive most publications at no cost, complimentary registrations for the TRB Annual Meeting, as well as marketing and exhibit opportunities at the Annual Meeting. Organizational affiliate contributions range from \$4,600 to \$11,300, depending on the level of benefits selected.

Sustaining affiliates are agencies and organizations committed to TRB's mission of providing leadership in transportation innovation

(continued on page 52)



Gary J. Walker
Director
Finance and Business
Operations

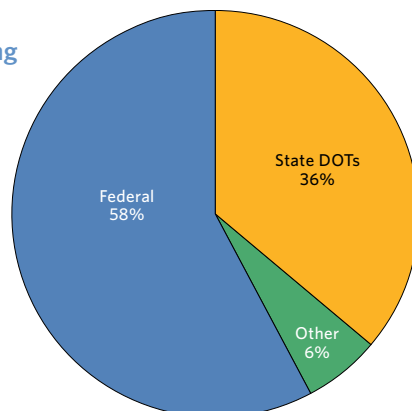
Statement of Activities

Funding Support by Program and Expenditures

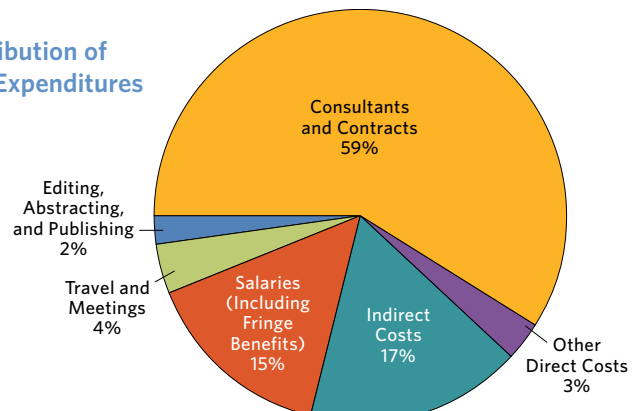
Calendar Years 2012 and 2013

	2012 (Actual)	2013 (Projected)*
Core Technical Activities		
State Highway and Transportation Departments (State DOTs)	\$7,340,000	\$7,156,500
Federal Government		
Federal Highway Administration (FHWA)	2,300,000	2,104,500
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
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
Air Force Civil Engineer Center	0	65,000
U.S. Army Corps of Engineers	65,000	65,000
Science and Technology Directorate, Department of Homeland Security	65,000	0
Subtotal, Federal Government	\$3,385,000	\$3,189,500
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	65,000	65,000
Fees and Sales	5,454,000	5,563,000
Subtotal, Other	\$5,714,000	\$5,823,000
Total, Core Technical Activities	\$16,439,000	\$16,169,000
Marine Board Core Program		
U.S. Coast Guard	96,000	75,000
National Oceanic and Atmospheric Administration	40,000	40,000
U.S. Army Corps of Engineers	25,000	25,000
Bureau of Safety and Environmental Enforcement	0	20,000
Maritime Administration	10,000	10,000
U.S. Navy	25,000	10,000
Total, Marine Board Core Program	\$196,000	\$180,000
Cooperative Research Programs (CRP)		
National Cooperative Highway Research Program (State DOTs)	29,010,000	29,973,000
Airport Cooperative Research Program (FAA)	12,024,000	13,346,000
Transit Cooperative Research Program (FTA)	6,597,000	6,377,000
National Cooperative Freight Research Program (RITA)	2,074,000	2,340,000
Hazardous Materials Cooperative Research Program (Pipeline and Hazardous Materials Safety Administration)	956,000	986,000
National Cooperative Rail Research Program (FRA)	213,000	694,000
Total, Cooperative Research Programs	\$50,874,000	\$53,716,000

TRB Funding Support



Distribution of TRB Expenditures



	2012 (Actual)	2013 (Projected)*
Strategic Highway Research Program 2 (SHRP 2)	\$35,419,000	\$32,540,000
Continuing Programs		
Innovations Deserving Exploratory Analysis (IDEA)		
NCHRP IDEA (State DOTs)	1,003,000	1,329,000
Transit IDEA (FTA)	490,000	594,000
Safety IDEA (FRA and FMCSA)	334,000	256,000
Rail IDEA (FRA)	12,000	0
Subtotal, IDEA Programs	\$1,839,000	\$2,179,000
Synthesis Programs		
NCHRP Synthesis (State DOTs)	1,636,000	1,684,000
ACRP Synthesis (FAA)	1,161,000	869,000
TCRP Synthesis (FTA)	740,000	437,000
Commercial Truck and Bus Safety Synthesis (FMCSA)	97,000	0
Subtotal, Synthesis Programs	\$3,634,000	\$2,990,000
Legal Programs		
TCRP Legal (FTA)	189,000	219,000
NCHRP Legal (State DOTs)	272,000	222,000
ACRP Legal (FAA)	114,000	170,000
Subtotal, Legal Programs	\$575,000	\$611,000
Total, Continuing Programs	\$6,048,000	\$5,780,000
Policy Studies	\$3,641,000	\$3,350,000
Conferences and Workshops	\$1,982,000	\$1,405,000
TRB TOTAL	\$114,599,000	\$113,140,000
Sources of Funds		
Federal	67,723,000	65,412,000
State DOTs	39,261,000	40,365,000
Other	7,615,000	7,363,000
	\$114,599,000	\$113,140,000
Expenditures by Major Cost Category		
Salaries (including fringe benefits)	16,272,000	16,392,000
Travel and Meetings	6,013,000	4,855,000
Editing, Abstracting, and Publishing	2,823,000	2,628,000
Consultants and Contracts	65,455,000	66,888,000
Other Direct Costs	2,744,000	2,734,000
Indirect Costs	19,583,000	19,188,000
Total Expenditures	\$112,890,000	\$112,685,000

TRB Reserve Fund

Fund balance, end of previous fiscal year	\$15,199,000	\$16,908,000
Plus (minus) current fiscal year income over (under) expenditures	1,709,000	455,000
Balance, current fiscal year	\$16,908,000	\$17,363,000

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 2013 comprises actual data through September and estimates for the rest of the year.



Adrienne Blackwell, TRB, assists with Cooperative Research Programs publications sales at the 2013 Annual Meeting. (Photo: Risdon Photography)

(continued from page 49)

and progress through research and information exchange. The minimum annual contribution is \$19,000 and specific benefits are tailored to the needs of each affiliate.

Sponsors are the major source of financial support for TRB's core programs. Federal, state, and local government agencies, professional societies, and organizations that represent industry groups are all 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 contribution is \$65,000. Sponsors are represented on the TRB Executive Committee. (See pages 59–60 for a list of TRB sponsors and sustaining affiliates.) In 2013, TRB welcomed the Air Force Civil Engineer Center as a new federal sponsor of core programs.

PUBLICATION SALES AND DISTRIBUTION

Through the timely distribution of publications, TRB disseminates the results of transportation research and technology worldwide. TRB releases selected publications—some exclusively—in electronic format. Sponsors and subscribers have the option to receive all publi-



Members of the TRB Publications Sales and Affiliate Services team (from left) Cydni Johnson, Kelvin R. Jordan, Kenny Yang, and Rhonda A. Levinowsky check in-house inventory.

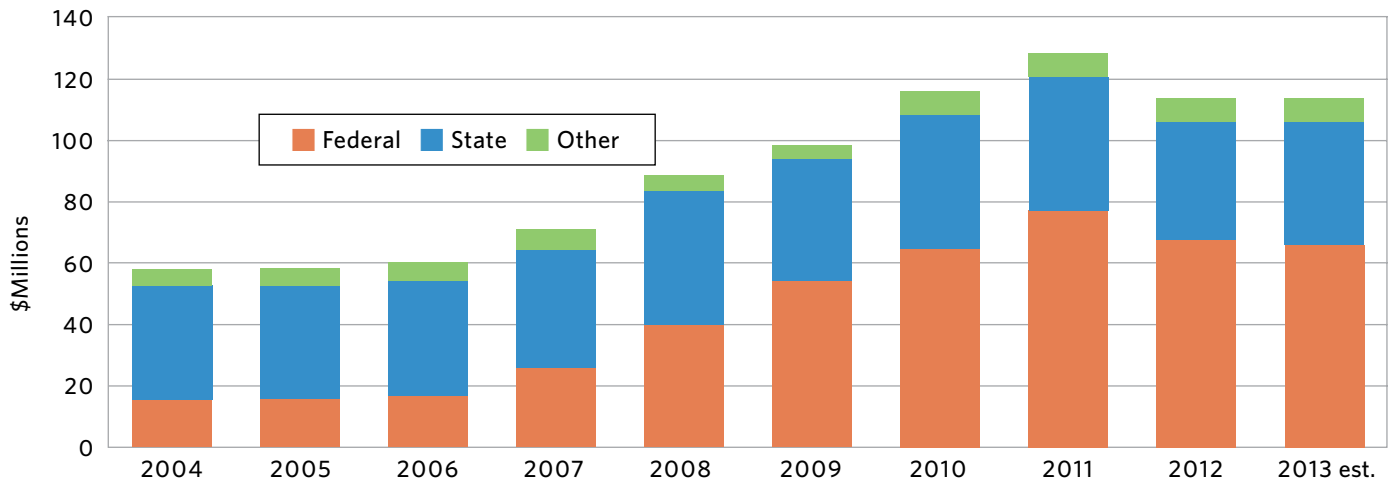
cations released by TRB or to receive only those in a particular transportation mode or area of interest. A complete listing of TRB publications issued from January 1 through December 31, 2013, appears on pages 55–58.

Staff News

ROSALIND J. GOMES was promoted to Senior Financial Assistant in February.

KENNY YANG was promoted to Publications Sales Representative in June.

TRB Activity Level by Year



TRB Conferences and Workshops (JANUARY 1, 2013–DECEMBER 31, 2013)

JANUARY

- 12 2013 TransportationCamp*
- 12 Data Analysis Working Group Forum on Pavement Performance Data Analysis
- 13-17 TRB 92nd Annual Meeting

APRIL

- 15-18 Joint Rail Conference: Next Generation Rail—Meeting Challenges of the Future
- 16-18 International Highway Technology Summit: Delivering Innovative Approaches and Best Practices*
- 30-May 1 Adapting Freight Models and Traditional Freight Data Programs for Performance Measurement

MAY

- 4-5 Integrating Transportation Agency Spatial and Business Data for Improved Management Reporting
- 5-9 14th TRB National Transportation Planning Applications Conference
- 15-17 Road Safety on Four Continents*
- 20-22 7th National Seismic Conference on Bridges and Highways*

JUNE

- 2-3 10th International Symposium on Cold Regions Development*
- 2-6 30th International Bridge Conference*
- 10-12 International RILEM Symposium on Multiscale Modeling and Characterization of Infrastructure Materials*
- 10-12 Meeting State and Metropolitan Planning Organization Information Needs in a Constrained Fiscal Environment: Joint Midyear Meeting for TRB and American Association of State Highway and Transportation Officials Committees
- 17-20 7th International Driving Symposium on Human Factors in Driver Assessment Training and Vehicle Design*
- 23-26 Freeway and Managed Lane Operations Meeting and Conference
- 23-27 International Conference on Ecology and Transportation

JULY

- 9-10 National Congestion Pricing Conference*
- 11-12 8th SHRP 2 Safety Symposium
- 14-17 8th International Conference on Road and Airfield Pavement Technology*
- 14-17 Waste Management and Resource Efficiency in Transportation Summer Conference
- 16-19 Workshop on the Future of Road Vehicle Automation
- 17-19 20th International Symposium on Transportation and Traffic Theory*
- 21-24 52nd Annual Workshop on Transportation Law
- 22-25 Transportation: Driving a Sustainable Urban Environment
- 30-31 The Future Locomotive: How to Manage What You Have Today with a View to the Future
- 30-Aug. 1 Workshop on the Safety Effects of Geometric Design Decisions

*TRB was cosponsor of the meeting.



Participants collaborate in a 2013 Annual Meeting workshop on freight in megaregions. (Photo: Risdon Photography)

AUGUST

- 4-7 International Symposium of Climatic Effects on Pavements and Geotechnical Infrastructure*
- 14-16 Barge and Rail Symposium: Moving Freight Between Multimodal Systems*
- 19-23 Transportation Hazards and Security Summit and Peer Exchange
- 20-21 Roadway Safety Culture Summit
- 26-27 7th New York City Bridge Conference*

SEPTEMBER

- 9-12 Site Characterization and Monitoring for Highway Engineering Problems
- 23-27 Smart Rivers 2013*

OCTOBER

- 10-11 Shared-Use Mobility Summit*
- 16-17 Transit Geographic Information Systems Conference*
- 21-22 Innovations in Freight Modeling and Data: Integrating Supply-Chain Models and Data into Public-Sector Freight Demand Modeling
- 23-25 7th International Visualization in Transportation Symposium: Visualization for Big Data

DECEMBER

- 2-6 2nd International Conference on Connected Vehicles and Expo*
- 11 Development of a Formalized Process for the Adoption, Development, Maintenance, and Enhancement of TransXML Schemas Workshop
- 12-15 2nd Conference of the Transportation Research Group of India*

TRB Webinars 2013

JANUARY

- 30 Promising Practices on Prevention of Moisture-Induced Damage in Asphaltic Pavements

FEBRUARY

- 7 Global Sensitivity Analysis of the *Mechanistic-Empirical Pavement Design Guide* for Rigid Pavement Performance
- 27 Renewable Energy Guide for Highway Maintenance Facilities

MARCH

- 25 Automated Enforcement for Speeding and Red Light Running
- 27 Using the New Roadside Analysis Program, Version 3, to Design Roadsides

APRIL

- 11 Guidelines for the Use of Mobile LIDAR in Transportation Applications
- 18 Highway Preservation Starts with Effective Communication
- 25 Environmental Planning for Airport Winter Operations
- 30 Promising Practices for Concrete Paving for New Engineers

MAY

- 7 SHRP 2 Tuesdays: New Strategies for Managing Complex Projects
- 8 Improving the Quality of Pavement Management Data
- 14 Transportation Funding Challenges and Opportunities in the Age of the Moving Ahead for Progress in the 21st Century Legislation
- 16 Roundabout Design and Development Review
- 21 SHRP 2 Tuesdays: Nondestructive Testing Technologies for Concrete Bridge Decks
- 23 Life-Cycle Cost Analysis
- 29 Subsurface Drainage for Slope Stabilization, Part 1 of 2
- 30 Airport Organization and Workforce Development

JUNE

- 4 SHRP 2 Tuesdays: Expedited Planning and Environmental Review of Highway Projects
- 11 SHRP 2 Tuesdays: Performance Specifications for Rapid Renewal
- 12 Managing Small Airports
- 19 Community Outreach: Successful Outcomes for Roundabout Implementation
- 26 Subsurface Drainage for Slope Stabilization, Part 2 of 2

JULY

- 9 SHRP 2 Tuesdays: Department of Transportation (DOT) and Railroad Collaborations—Best Practices for Expediting Agreements and Successfully Delivering Projects
- 10 Airport Planning with Uncertainty in Traffic and Fuel Price Forecasting
- 24 Fuel Usage Factors in Highway and Bridge Construction
- 29 Roundabout Signing and Marking: State Perspectives and Case Studies
- 30 SHRP 2 Tuesdays: Identification of Utility Conflicts and Solutions



Ryan Brown, Distance Learning Coordinator, conducts a webinar.

AUGUST

- 6 SHRP 2 Tuesdays: Establishing Monitoring Programs for Mobility and Travel Time Reliability
- 8 High-to-Low-Speed Transition Zone Design and Mitigation
- 19 Airport Emergency Management and Irregular Operations
- 20 SHRP 2 Tuesdays: Managing Risk in Rapid Renewal Contracts
- 27 Low-Cost, Sustainable Shallow Slope Stabilization and Erosion Control Treatments

SEPTEMBER

- 3 Fill Types for Mechanically Stabilized Earth Walls with Galvanized Steel: North Carolina DOT's Use of NCHRP Report 675
- 10 Impacts of Wide Base Tires on Pavement Performance
- 17 SHRP 2 Tuesdays: Incorporating Reliability Performance Measures into the Transportation Planning and Programming Processes
- 19 Understanding and Mitigating Disease Transmission at Airports
- 23 Lessons Learned from State DOT Activities Addressing Data for Decision Making and Performance Measures
- 24 SHRP 2 Tuesdays: Modular Pavement Technology

OCTOBER

- 1 SHRP 2 Tuesdays: Advances in Travel Demand Forecasting
- 10 Capital Planning Considerations for Airport Improvements
- 23 Pavement Drainage Practices to Achieve Long-Lived Pavements
- 29 SHRP 2 Tuesdays: Bridges for Service Life Beyond 100 Years—Innovative Systems, Subsystems, and Components
- 30 Slag Cement for Sustainable Concrete
- 31 *Highway Capacity Manual 2010*: New Urban Streets Methodology—Bicycle, Pedestrian, and Transit Modes

NOVEMBER

- 5 SHRP 2 Tuesdays: Incorporation of Travel Time Reliability into the *Highway Capacity Manual*
- 7 Airport Emission Inventories and Reduction Strategies
- 14 Successful Practices for Effective Tribal Consultation
- 19 SHRP 2 Tuesdays: SHRP 2 Economic Impact Tools
- 20 *Highway Capacity Manual 2010*: What's New with Unsignalized Intersection Methodologies
- 26 Highway Noise Abatement Considering Noise Barriers and Quieter Pavement

DECEMBER

- 3 SHRP 2 Tuesdays: SHRP 2 Composite Pavement Systems
- 4 Asphalt Healing for Extended Pavement Sustainability
- 9 State-of-the-Art Use of Probe Vehicle Data
- 11 Airport Sustainability Practices and Strategies
- 12 Management Consideration and Decision Making for Mobile LIDAR Use in Transportation
- 16 Expediting Future Technologies for Enhancing Transportation System Performance
- 17 SHRP 2 Tuesdays: Integrating Freight Considerations into Collaborative Decision Making for Additions to Highway Capacity

TRB Publications (JANUARY 1, 2013–DECEMBER 31, 2013)

Transportation Research Records

- 2325 Public-Sector Aviation: Graduate Research Award Papers, 2011–2012
2326 Marine Environment, Safety, and Human Factors 2013
2327 School Transportation; Operator Education and Regulation; and Traffic Law Enforcement 2013
2328 Research and Education
2329 Winter Maintenance and Preservation 2013
2330 Marine Transportation and Terminal Operations 2013
2331 Structures 2013, Volume 1
2332 Structures 2013, Volume 2
2333 Network Modeling 2013, Volume 1
2334 Network Modeling 2013, Volume 2
2335 Geomaterials 2013
2336 Aviation 2013
2337 Maintenance Services 2013
2338 Urban and Traffic Data Systems 2013, Volume 1
2339 Urban and Traffic Data Systems 2013, Volume 2
2340 Air Quality 2013, Volume 1
2341 Air Quality 2013, Volume 2
2342 Concrete Materials 2013
2343 Travel Demand Forecasting 2013, Volume 1
2344 Travel Demand Forecasting 2013, Volume 2
2345 Policy 2013: Finance, Economics, and Equity Considerations, Volume 1
2346 Policy 2013: Finance, Economics, and Equity Considerations, Volume 2
2347 Construction 2013
2348 Operational Effects of Geometrics and Access Management
2349 Geology and Properties of Earth Materials 2013
2350 Transit 2013, Volume 1
2351 Transit 2013, Volume 2
2352 Transit 2013, Volume 3
2353 Transit 2013, Volume 4
2354 Travel Surveys; Asset Management; and Freight Data 2013
2355 Traffic Signal Systems 2013, Volume 1
2356 Traffic Signal Systems 2013, Volume 2
2357 Performance Indicators, Sustainability, and Socioeconomic Factors 2013
2358 Highway Design 2013
2359 Carsharing; Demand Management; and Parking 2013
2360 Maintenance and Preservation 2013, Volume 1; Including 2013 Thomas B. Deen Distinguished Lecture
2361 Maintenance and Preservation 2013, Volume 2
2362 Environment 2013
2363 Soil Mechanics 2013
2364 Safety Management 2013
2365 Human Performance; User Information; and Simulation 2013
2366 Pavement Management 2013, Volume 1
2367 Pavement Management 2013, Volume 2
2368 Pavement Management 2013, Volume 3
2369 Pavement Management 2013, Volume 4
2370 Asphalt Materials and Mixtures 2013, Volume 1
2371 Asphalt Materials and Mixtures 2013, Volume 2
2372 Asphalt Materials and Mixtures 2013, Volume 3
2373 Asphalt Materials and Mixtures 2013, Volume 4
2374 Railroads 2013
2375 Energy and Global Climate Change 2013
2376 Emergency Evacuation and System Vulnerabilities 2013
2377 Road Safety Design 2013
2378 Freight Modeling and Logistics 2013
2379 Freight Operations 2013
2380 Intelligent Transportation Systems 2013, Volume 1
2381 Intelligent Transportation Systems 2013, Volume 2
2382 Travel Behavior 2013, Volume 1
2383 Travel Behavior 2013, Volume 2
2384 Traffic Control Devices, Visibility, and Highway–Rail Grade Crossings 2013
2385 Alternative Fuels and Technologies 2013
2386 Safety Data, Analysis, and Evaluation 2013
2387 Bicycles 2013: Planning, Design, Operations, and Infrastructure
2388 Trucks, Buses, Motorcycles, and Mopeds 2013
2389 Roundabouts 2013
2390 Traffic Flow Theory and Characteristics 2013, Volume 1
2391 Traffic Flow Theory and Characteristics 2013, Volume 2
2392 Statistical Methods and Visualization 2013
2393 Pedestrians 2013
2394 Developing Countries 2013
2395 Highway Capacity and Quality of Service 2013
2396 Freeway Operations; Regional Systems Management and Operations; Managed Lanes 2013
2397 Planning 2013
2398 Highway Safety Performance 2013
2399 Information Systems; Geospatial Information; State Data; and Advanced Computing 2013

Special Reports¹

- 310 Worker Health and Safety on Offshore Wind Farms
311 Effects of Diluted Bitumen on Crude Oil Transmission Pipelines
313 Framing Surface Transportation Research for the Nation's Future

Conference Proceedings¹

- 49 Performance Measurement of Transportation Systems
50 City Logistics Research: A Transatlantic Perspective

Conference Proceedings on the Web (online)

- 8 Improving Roadway Safety Programs Through University–Agency Partnerships
9 Meeting Critical Data Needs for Decision Making in State and Metropolitan Transportation Agencies
10 Using Census Data for Transportation Applications
11 Safe Navigation in the U.S. Arctic
12 Adapting Freight Models and Traditional Freight Data Programs for Performance Management

Letter Reports (Online)

- Long-Term Pavement Performance Committee Letter Report, February 12, 2013
Long-Term Bridge Performance Committee Letter Report, February 19, 2013
Review of the Federal Transit Administration's Transit Economic Requirements Model, March 29, 2013
Review of the U.S. DOT Strategic Plan for Research, Development, and Technology 2013–2018, April 30, 2013
Committee for Intelligent Construction Systems and Technology: Program Review Letter Report, May 13, 2013
Research and Technology Coordinating Committee Letter Report, July 9, 2013
Long-Term Pavement Performance Committee Letter Report, August 8, 2013
Letter Report on a Technical Peer Review of the Buzzards Bay Risk Assessment, October 24, 2013
Committee for Intelligent Construction Systems and Technology: Program Review Letter Report, November 26, 2013

Transportation Research E-Circulars (online)

- 171 Durability of Concrete: Second Edition
172 Roadside Safety Design and Devices: International Workshop
173 Glossary of Transportation Construction Quality Assurance Terms: Sixth Edition
174 Countermeasures to Address Impaired Driving Offenders: Toward an Integrated Model
175 Strategic Directions on Roadway Departure Crashes: Supporting the Decade of Action
176 Integrating Spatial and Business Data for Improved Decisions: A Peer Exchange
177 Sustaining the Metropolis: Light Rail Transit and Streetcars for Super Cities

- 178 Exploring New Directions for the National Household Travel Survey: Phase One Report of Activities
- 179 Theory, Explanation, and Prediction in Road Safety: Promising Directions
- 180 Motor Vehicle Crashes and Injuries Involving Teenage Drivers: Future Directions for Research
- 181 Risk-Based Adaptation Frameworks for Climate Change Planning in the Transportation Sector: A Synthesis of Practice

TR News

Nos. 278–289

Online Newsletters

Intercity Rail Passenger Systems, No. 21
 TRB Transportation Research E-Newsletter

Airport Cooperative Research Program (ACRP) Reports²

- 75 Airport Leadership Development Program (with CD-133)
- 82 Preparing Peak Period and Operational Profiles: Guidebook (with CD-126)
- 83 Assessing Opportunities for Alternative Fuel Distribution Programs (with CD-129)
- 84 Guidebook for Preparing Airport Emissions Inventories for State Implementation Plans (with CD-131)
- 85 Developing and Maintaining Support for Your Airport Capacity Project
- 86 Environmental Optimization of Aircraft Departures: Fuel Burn, Emissions, and Noise (with CD-136)
- 87 Procuring and Managing Professional Services for Airports
- 88 Guidebook on Integrating GIS in Emergency Management at Airports (with CD-139)
- 89 Guidelines for Airport Sound Insulation Programs
- 90 Impact of Regulatory Compliance Costs on Small Airports
- 91 Infectious Disease Mitigation in Airports and on Aircraft
- 92 Guidebook to Creating a Collaborative Environment Between Airport Operations and Maintenance
- 93 Operational and Business Continuity Planning for Prolonged Airport Disruptions (with CD-140)
- 94 Integrating Web-Based Emergency Collaboration Tools into Airport Operations: A Primer
- 95 Integrating Community Emergency Response Teams at Airports
- 96 Apron Planning and Design Guidebook
- 97 Measuring PM Emissions from Aircraft Auxiliary Power Units, Tires, and Brakes
- 98 Understanding Airline and Passenger Choice in Regions with Multiple Airports
- 99 Guidance for Treatment of Deicing-Impacted Airport Stormwater

ACRP Syntheses of Airport Practice²

- 39 Airport Wildlife Population Management
- 40 Issues with Airport Organization and Reorganization
- 41 Conducting Aeronautical Special Events at Airports
- 42 Integrating Environmental Sustainability into Airport Contracts
- 43 Environmental Assessment of Air and High-Speed Rail Corridors
- 44 Environmental Management System Development Process
- 45 Model Mutual Aid Agreements for Airports
- 46 Conducting Airport Peer Reviews
- 47 Repairing and Maintaining Airport Parking Structures While in Use
- 48 How Airports Measure Customer Service Performance
- 49 Helping New Maintenance Hires Adapt to the Airport Operating Environment

ACRP Research Results Digest²

- 17 Synthesis of Information Related to Airport Practices 2013

ACRP Legal Research Digests²

- 18 Buy America Requirements for Federally Funded Airports
- 19 Legal Issues Related to Developing Safety Management Systems and Safety Risk Management at U.S. Airports
- 20 Airport Responsibility for Wildlife Management
- 21 Compilation of DOT and FAA Airport Legal Determinations and Opinion Letters Through December 2012 (with CD-141)

ACRP Web-Only Documents (online)

- 9 Enhanced Modeling of Aircraft Taxiway Noise, Volume 2: Aircraft Taxi Noise Database and Development Process
- 14 Guidelines for Preparing Peak Period and Operational Profiles
- 15 Data Supporting the Impact of Regulatory Compliance Costs on Small Airports
 Volume 1: Appendixes A, B, and C
 Volume 2: Technical Appendixes

Hazardous Materials Cooperative Research Program (HMCRP) Reports²

- 10 Feasibility Study for Highway Hazardous Materials Bulk Package Accident Performance Data Collection (with CD-128)
- 11 Technical Assessment of Dry Ice Limits on Aircraft (with CD-118)
- 12 Hazardous Materials Transportation Risk Assessment: State of the Practice

HMCRP Web-Only Document (online)

- 2 Model Education Curricula and Toolkit for the Transportation of Hazardous Materials

National Cooperative Freight Research Program (NCFRP) Reports²

- 22 Freight Data Cost Elements
- 23 Synthesis of Freight Research in Urban Transportation Planning
- 24 Smart Growth and Urban Goods Movement
- 25 Freight Data Sharing Guidebook
- 26 Guidebook for Developing Subnational Commodity Flow Data

NCFRP Web-Only Document (online)

- 5 Carbon Footprint of Supply Chains: A Scoping Study

National Cooperative Highway Research Program (NCHRP) Reports³

- 733 High-Performance, High-Strength Lightweight Concrete for Bridge Girders and Decks
- 735 Long-Distance and Rural Travel Transferable Parameters for Statewide Travel Forecasting Models
- 738 Evaluating Pavement Strategies and Barriers for Noise Mitigation
- 740 A Transportation Guide for All-Hazards Emergency Evacuation (with CD-132)
- 741 Evaluation of Methodologies for Visual Impact Assessments
- 743 Predicting the Initial Retroreflectivity of Pavement Markings from Glass Bead Quality
- 744 Fuel Usage Factors in Highway and Bridge Construction
- 745 Left-Turn Accommodations at Unsignalized Intersections
- 746 Traffic Enforcement Strategies for Work Zones
- 747 Guide for Conducting Forensic Investigations of Highway Pavements (with CD-135)
- 748 Guidelines for the Use of Mobile LIDAR in Transportation Applications
- 749 Methods for Evaluating Fly Ash for Use in Highway Concrete
- 750 Strategic Issues Facing Transportation
 Volume 1: Scenario Planning for Freight Transportation Infrastructure Investment (with CD-130)
 Volume 3: Expediting Future Technologies for Enhancing Transportation System Performance
- 751 Renewable Energy Guide for Highway Maintenance Facilities
- 752 Improved Mix Design, Evaluation, and Materials Management Practices for Hot-Mix Asphalt with High Reclaimed Asphalt Pavement Content
- 753 A Pre-Event Recovery Planning Guide for Transportation
- 754 Improving Management of Transportation Information
- 755 Comprehensive Costs of Highway–Rail Grade Crossing Crashes
- 756 Highway Safety Research Agenda: Infrastructure and Operations (with CD-127)
- 757 Long-Term Performance of Epoxy Adhesive Anchor Systems
- 758 Trip-Generation Rates for Transportation Impact Analyses of Infill Developments
- 759 Effective Removal of Pavement Markings
- 760 Improving the Quality of Motorcycle Travel Data Collection
- 761 Reference Guide for Applying Risk and Reliability-Based Approaches for Bridge Scour Prediction
- 762 Laboratory Validation of an Endurance Limit for Asphalt Pavements

NCHRP Syntheses of Highway Practice³

- 435 Recycled Materials and Byproducts in Highway Applications: Summary Report, Volume 1
- 439 Use of Transportation Asset Management Principles in State Highway Agencies
- 440 Performance-Based Seismic Bridge Design
- 441 High-Performance Concrete Specifications and Practices for Bridges
- 442 Practices and Performance Measures for Local Public Agency Federally Funded Highway Projects
- 443 Practical Highway Design Solutions
- 444 Pollutant Load Reductions for Total Maximum Daily Loads for Highways
- 445 Practices for Unbound Aggregate Pavement Layers
- 446 Use of Advanced Geospatial Data, Tools, Technologies, and Information in Department of Transportation Projects
- 447 Active Traffic Management for Arterials
- 448 State Department of Transportation Small Business Programs
- 449 Strategies to Mitigate the Impacts of Chloride Roadway Deicers on the Natural Environment
- 450 Forecasting Highway Construction Staffing Requirements
- 451 Emergency Medical Services Response to Motor Vehicle Crashes in Rural Areas

NCHRP Research Results Digests³

- 371 Quality-Related Pay Adjustment Factors for Pavements
- 372 Sensitivity Evaluation of MEPDG Performance Prediction
- 377 Continuing Project to Synthesize Information on Highway Problems 2013
- 380 Guidelines for Geofoam Applications in Slope Stability Projects
- 381 Guidebook for Construction Management Practices for Rural Projects
- 382 Measuring Cement Particle Size and Surface Area by Laser Diffraction
- 383 Potential Impacts of Federal Health Care Reform on Public Transit
- 384 New Small Urbanized Area System: A Guidance Brief
- 385 The Legal Definitions of “First Responder”

NCHRP Legal Research Digests³

- 58 Legal Issues Surrounding the Use of Digital Intellectual Property on Design and Construction Projects
- 59 Enforceability of Local Hire Preference Programs
- 60 Legal Aspects of Conservation Easements: A Primer for Transportation Agencies
- 61 Legal Aspects of Performance-Based Specifications for Highway Construction and Maintenance Contracts

NCHRP Web-Only Documents (online)

- 192 Deployment, Use, and Effect of Real-Time Traveler Information Services
- 193 Development of Left-Turn Lane Warrants for Unsignalized Intersections
- 194 Traffic Law Enforcement in Work Zones: Phase II Research
- 195 Driving Forces Influencing Future Freight Flows
- 196 Final Research Report: A Transportation Guide for All-Hazards Emergency Evacuation
- 197 Guidelines for the Load and Resistance Factor Design and Rating of Riveted and Bolted Gusset-Plate Connections for Steel Bridges
- 198 Sag Vertical Curve Design Criteria for Headlight Sight Distance
- 199 Estimating Joint Probabilities of Design Coincident Flows at Stream Confluences
- 200 Command-Level Decision Making for Transit Emergency Managers (jointly released as TCRP Web-Only Document 60)

Transit Cooperative Research Program (TCRP) Reports²

- 95 Traveler Response to Transportation System Changes, Chapter 1: Introduction
- 160 Paratransit Emergency Preparedness and Operations Handbook
- 161 Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation: Final Workbook
- 162 Building a Sustainable Workforce in the Public Transportation Industry: A Systems Approach
- 165 Transit Capacity and Quality of Service Manual, Third Edition (with CD-138)

TCRP Syntheses of Transit Practice²

- 102 Integrating Passenger Ferry Service with Mass Transit
- 103 Transit Station and Stop Adoption Programs
- 104 Use of Electronic Passenger Information Signage in Transit
- 105 Use of Market Research Panels in Transit
- 106 Energy Savings Strategies for Transit Agencies
- 108 Transit Bus Operator Distraction Policies

TCRP Research Results Digests²

- 106 Synthesis of Information Related to Transit Problems 2013
- 107 Developing Partnerships Between Transportation Agencies and the Disability and Underrepresented Communities

TCRP Legal Research Digests²

- 43 Contractual Means of Achieving High-Level Performance in Transit Contracts
- 44 Legal Issues in Public Emergency Planning and Operation

TCRP Web-Only Documents (Online)

- 58 Methods for Forecasting Demand and Quantifying Need for Rural Passenger Transportation
- 59 Using Pictograms to Make Transit Easier to Navigate for Customers with Communication Barriers
- 60 Command-Level Decision Making for Transit Emergency Managers (jointly released as NCHRP Web-Only Document 200)
- 61 Millennials and Mobility: Understanding the Millennial Mindset and New Opportunities for Transit Providers

Cooperative Research Programs CD-ROMs

- 118 Dry Ice Calculator for HMCRRP Report 11
- 126 Guidebook and Toolboxes for ACRP Report 82
- 127 Safety Research Prioritization Worksheet (SRPW) for NCHRP Report 756
- 128 Appendices for HMCRRP Report 10
- 129 Toolkit for Evaluating Alternative Fuel Distribution Programs and Appendixes to ACRP Report 83
- 130 Future Freight Flows, World Scenarios 2037: Scenario Planning Toolkit to Accompany NCHRP Report 750, Volume 1 (Disks 1 and 2)
- 131 Airport Emissions Estimator Tool and Other Support Material for ACRP Report 84
- 132 Tools and Appendix for NCHRP Report 740
- 133 Supplemental Materials for ACRP Report 75: Airport Leadership Development Program
- 134 Performance-Based Clauses and Standards for TCRP Legal Research Digest 43
- 135 Example Forms for Conducting Forensic Investigations of Highway Pavements (NCHRP Report 747)
- 136 Departure Optimization Investigation Tool (DOIT) (ACRP Report 86)
- 137 The Vector-Borne Disease Airport Importation Risk Tool
- 138 Supporting Material and Tools to Accompany TCRP Report 165
- 139 Tool Set for Integrating GIS in Emergency Management at Airports (ACRP Report 88)
- 140 Airport Business Continuity Planning Software Tool (ACRP Report 93)
- 141 Compilation of DOT and FAA Airport Legal Determinations and Opinion Letters Through December 2012 (ACRP Legal Research Digest 21)

Strategic Highway Research Program 2 (SHRP 2) Capacity Research Reports¹

- 9.1 Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Process
- 20.1 Freight Demand Modeling and Data Improvement

SHRP 2 Reliability Research Reports¹

- 3.1 Analytical Procedures for Determining the Impacts of Reliability Mitigation Strategies
- 11.1 Evaluating Alternative Operations Strategies to Improve Travel Time Reliability

SHRP 2 Renewal Research Reports¹

- 4.2 Innovative Bridge Designs for Rapid Renewal: ABC Toolkit
- 5.1 Precast Concrete Pavement Technology
- 6A.1 Nondestructive Testing to Identify Concrete Bridge Deck Deterioration
- 6B.1 Evaluating Applications of Field Spectroscopy Devices to Fingerprint Commonly Used Construction Materials
- 6C.1 Using Infrared and High-Speed Ground-Penetrating Radar for Uniformity Measurements on New HMA Layers
- 6D.1 Nondestructive Testing to Identify Delaminations Between HMA Layers, Volume 1
- 6E.1 Real-Time Smoothness Measurements on Portland Cement Concrete Pavements During Construction
- 21.2 Composite Pavement Systems, Volume 1: HMA-PCC Composite Pavements
- 21.3 Composite Pavement Systems, Volume 2: PCC-PCC Composite Pavements

SHRP 2 Capacity Research Reports (online)

- 4.1 Improving Our Understanding of How Highway Congestion and Pricing Affect Travel Demand
- 9.2 Practitioner's Guide to Incorporating Greenhouse Gas Emissions into the Collaborative Decision-Making Process
- 18A Pilot Test of the TCAPP Collaborative Decision-Making Framework, Including a Self-Assessment Methodology: Washington State's SR-509 Project
- 18B Long-Range Transportation Planning Process: Puget Sound TCAPP Pilot Test
- 18C A New Route to Complete Streets? Using the TCAPP Model in Grand Rapids, Minnesota
- 18D Assessment of Pikes Peak Area Council of Governments' Use of TCAPP in Developing a Long-Range Transportation Plan: Technical Evaluation
- 20 Symposium Papers: Innovations in Freight Demand Modeling and Data
- 20.2 Freight Demand Modeling and Data Improvement Strategic Plan
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