

Transportation Research Board 2014 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,

Some of us are old enough to remember the iconic Volkswagen Beetle print ads of the 1960s. Some of those ads reminded readers that although the car looked the same from one year to the next, improvements were constantly being made beneath the surface—as one ad asked, “Can you see the 27 changes?” TRB is something like that—more is going on beneath the surface in the evolution of programs and activities than may be apparent to the casual observer. But incremental changes add up, and before long, significant changes have occurred.



(Left to right:) Kirk Steudle, Executive Committee Chair; Robert E. Skinner, Jr., TRB Executive Director; and Daniel Sperling, Executive Committee Vice Chair. (Photo: Risdon Photography)

TRB’s foundation is information exchange, primarily through professional meetings, technical committees, and publications, but early on, the organization occasionally was called on to manage large research projects and to conduct special studies. In the 1960s, research management became a continuing activity, and in the 1980s, TRB established a policy studies unit. For many years, communications relied exclusively on face-to-face meetings and print publications, but that changed in the early 1990s with the emergence of the Internet, web pages, and electronic publications and—more recently—with webinars.

Perhaps nothing has changed as much and as gradually as TRB’s signature event, the Annual Meeting. The organization and the tone of the Annual Meetings remained stable as hotels were added to the Sheraton Park Hotel—now the Marriott Wardman Park Hotel—and as attendance doubled between 1956 and 1974 and again by 1997. In parallel, the TRB committees that organize Annual Meeting sessions gradually increased in number, as did their memberships, and their technical portfolios evolved to maintain relevance to current issues and emerging technologies.

For the most part, TRB is reminiscent of those old Volkswagens that looked unchanged on the outside from year to year despite the innovations beneath the surface. Just as Volkswagen eventually had to change the exterior, TRB ultimately has had to move its Annual Meeting to a new venue. Much of 2014 was spent preparing for the shift from the Marriott Wardman Park and other Connecticut Avenue hotels, the sites



A 1960s Volkswagen ad emphasizes not only the consistency of the car’s appearance over the years but also the under-the-hood improvements. Similarly, TRB’s mission remains constant, but several major changes are on the horizon. (Photo: Martin Schilder Groep)



For the first time in more than 50 years, the TRB Annual Meeting is changing locations—to the Walter E. Washington Convention Center and the Marriott Marquis Hotel in Washington, D.C., in January 2015.

since 1956, to more commodious facilities at the Walter E. Washington Convention Center and the Marriott Marquis Hotel. For attendees and staff to feel at home in the new facilities may take time, but the opportunities that the new venue will provide for ever-better Annual Meetings are exciting, and with time the new venue will become as much a part of TRB tradition as the old one.

The following summary of this year’s activities includes more about the TRB Annual Meeting, along with highlights from each of TRB’s major programs.

In High Style

The 2014 Annual Meeting closed out a nearly 60-year run at the Marriott Wardman Park and neighboring Connecticut Avenue hotels in high style. The meeting set records with 11,900 in attendance and 5,200 papers submitted for presentation. Highlights included the Chairman’s Luncheon address by U.S. Secretary of Transportation Anthony Foxx, three special sessions with state department of transportation (DOT) CEOs discussing the challenges and opportunities for their states, and more than 35 sessions and workshops focused on the spotlight theme, Celebrating Our Legacy, Anticipating Our Future. TRB welcomed 11 Minority Student Fellows, the largest group yet; each presented a paper at a podium or poster session.

TRB sponsored or cosponsored more than 60

specialty conferences and workshops in 2014, including a growing number of international meetings. Particularly notable was the second in a European Union–U.S. symposium series cosponsored by U.S. DOT, the European Commission, and TRB. In addition, the latest in a workshop series on Women’s Issues in Transportation convened in conjunction with the Transport Research Arena meeting in Paris, with support from IFSTTAR, the French transportation research agency.

TRB’s standing committees continued to increase the diversity of their memberships and are making concerted efforts to equip young members for leadership roles. The committees oversee the peer review process for papers submitted for the Annual Meeting and the *Transportation Research Record*, TRB’s journal, which recently reached an all-time high in its citation impact factor.



The 2014 TRB Annual Meeting featured (above) an address by U.S. Secretary of Transportation Anthony Foxx and (below) a series of roundtable discussions with leaders of state departments of transportation (DOTs). (Photos: Risdon Photography)



The Travel Analysis Methods Section conducts business at the 2014 Annual Meeting. TRB standing committees continued efforts to reach out to young members and to increase diversity. (Photo: Risdon Photography)

Guidance for Practitioners

Despite continued funding uncertainty, TRB's Cooperative Research Programs had a productive year. During 2014, the six Cooperative Research Programs administered by TRB produced 138 publications covering a variety of topics of interest to practitioners throughout the various modes.

The National Cooperative Highway Research Program (NCHRP) issued 68 publications addressing topics in planning, environment, materials, design, construction, safety, maintenance, management, and operations. Of particular note was the release of four additional volumes in the NCHRP Report 750 series, *Strategic Issues Facing Transportation*. The series provides information on trends that may develop in the next 30 to 50 years that could have an impact on the transportation system and offers insights on actions that transportation agencies can take now to prepare.

The four volumes issued in 2014 address climate change, extreme weather events, and the highway system; sustainability as an organizing principle for transportation agencies; preparing state transportation agencies for an uncertain energy future; and the effects of sociodemographics on travel demand. Two preceding volumes dealt with scenario planning for freight transportation infrastructure investment and expediting technologies for enhancing trans-

portation system performance. NCHRP funding depends on the reauthorization or the temporary extension of the Moving Ahead for Progress in the 21st Century Act (MAP-21).

Funding for the Transit Cooperative Research Program (TCRP) declined again in 2014. TCRP funding was reduced from \$10 million in FY 2011 to \$3 million in FY 2014. As a result, the number of new research projects has dropped. Nevertheless, TCRP issued 21 publications in 2014, many from previously selected projects.

Notable 2014 publications present research findings on best-practices guidelines for improving bus operator health and retention; establishment of a national qualification program for transit rail vehicle technicians; accommodations for mobility devices on paratransit vehicles and buses; a guide to the use of fixed-route transit by people with disabilities; travel training for older adults; guidance on developing a transit asset management plan; and community tools to improve transportation options for veterans, military service members, and their families.

This year, the Airport Cooperative Research Program (ACRP) published 40 reports on a range of topics including best practices for working in or near airport movement areas; defining and measuring aircraft delay and airport capacity thresholds; risk assessment of runway veer-offs, based on location distribu-



A changing climate leads to long-lasting fires like the 2011 Pains Bay fire in coastal North Carolina. The effects of extreme weather on transportation are examined in the National Cooperative Highway Research Program (NCHRP) Report 750 series, *Strategic Issues Facing Transportation*. (Photo: U.S. Fish and Wildlife Service)

tion; the compatibility of energy facilities with airports and airspace; airport terminal incident response planning; habitat management to deter wildlife at airports; electric vehicle charging stations at airport parking facilities; safety reporting systems at airports; the use of social media to engage airport customers; best practices for general aviation aircraft fuel-tank sampling; the impacts of sustainability practices on airport operations and maintenance; improving terminal design to increase revenue generation and customer satisfaction; the development of airport–airline consortiums; and general aviation facility planning.

Work continued in the National Cooperative Rail Research Program (NCRRP) during 2014, with release of the program’s first publication—NCRRP Research Results Digest 1, *A Potential Strategic Plan and Research Agenda for the National Cooperative Rail Research Program*. The NCRRP Oversight Committee will refer to this agenda if the program receives additional funding. The remaining NCRRP projects are scheduled for completion in 2015. The program’s continuation depends on the Passenger Rail Investment and Improvement Act reauthorization and subsequent appropriations. To date, NCRRP has received funding only for a single fiscal year.

Finally, seven National Cooperative Freight Rail Program (NCFRP) and two Hazardous Materials Cooperative Research Program (HMCRP) reports were published. NCFRP pub-



The National Cooperative Freight Research Program published reports on topics from sustainability strategies to performance measures.

lications addressed such topics as sustainability strategies to reduce supply-chain air emissions; innovative strategies for obtaining comprehensive truck activity data; making U.S. ports resilient as part of extended intermodal supply chains; and a web-based screening tool for shared-use rail corridors. HMCRP publications addressed test procedures and classification criteria for release of toxic gases from water-reactive materials, as well as communicating emergency response information for natural gas and hazardous liquid pipelines.

MAP-21 did not reauthorize either NCFRP or HMCRP. Work is under way to complete all research in progress; after that, the programs will be discontinued. All work is slated for completion by early 2016.

Piloting the Findings

The research component of the second Strategic Highway Research Program (SHRP 2) concludes in March 2015. The deadline drove activities during the past year in each of the program’s four focus areas—Safety, Capacity, Renewal, and Reliability.

In the Safety area, projects to pioneer use of



Lateral Runway Safety Area Risk Analysis software, a template for runway veer-off location distribution risk assessment and reporting, was among the many products developed by the Airport Cooperative Research Program in 2014.

data on driving behavior from the SHRP 2 Naturalistic Driving Study (NDS) were completed, supplying a baseline for the Phase 1 Safety Data Implementation Program, which TRB will manage. Phase 1 is a five-year program to develop and test strategies for making the NDS data set available, facilitate its productive use, evaluate efforts to ensure confidentiality, and identify long-term and sustainable funding strategies for subsequent phases.

A cornerstone product in the Capacity area is the web-based framework for collaborative decision making in planning new highway projects. Transportation agencies can use the framework to navigate critical decision points in planning, programming, and environmental review and permitting. Pilot projects completed this year improved the content and usability of the framework, which FHWA will rebrand as PlanWorks, to be launched in spring 2015.

Advanced techniques for bridges, nondestructive testing, pavements, project delivery, and underground utilities were developed through Renewal research. Several videos illustrate use of the techniques, separately and in combination, to improve transportation renewal project efficiency and outcomes. The video collection is available on the multimedia page of FHWA's GoSHRP2 website.

In the Reliability focus area, work in the past year has woven together research from projects that addressed ways to include the value of reliability in project decision making and has created an archive of all SHRP 2 Reliability-related data



An animated video produced by the National Academies illustrates the SHRP 2 tools for transportation agencies to improve safety, reduce congestion, and rebuild highways and bridges. (Image: The National Academies)



Paul Jodoin, Federal Highway Administration, conducts a workshop on the National Traffic Incident Management Responder Training Program, a SHRP 2 initiative, at the 2014 TRB Annual Meeting. (Photo: Risdon Photography)

and operations training to help agencies deliver travel time reliability at the regional level. Four pilot projects were completed, carrying out independent assessments of the suite of SHRP 2 Reliability data and analysis tools.

Knowledge transfer activities to prepare TRB's implementation partners at AASHTO and FHWA for delivering SHRP 2 products and for building awareness among the user communities were a priority this year. The activities included webinars, workshops, and meetings with TRB staff and research contractors. A webinar series, called SHRP2 Tuesdays, ran from April 2013 through September 2014, offering substantive summaries of research projects to more than 13,000 participants.

Through the SHRP2 Implementation Assistance Program of FHWA and AASHTO, 24 SHRP2 Solutions are at work in 200 transportation projects across the nation. In January 2015, implementation assistance will be available for eight additional products.

Timely Policy Advice

This was a light year in terms of completing policy studies and releasing policy reports, but the work under way will yield many titles in 2015. Early in 2014, TRB released Special Report 312, *Transportation Investments in Response to Eco-*



Air traffic controllers direct incoming and outgoing aircraft at Chicago O'Hare International Airport; a 2014 TRB policy study explored staffing needs. (Photo: Federal Aviation Administration)

conomic Downturns, which reviews the arguments for and against infrastructure spending and identifies steps to have projects ready to fund when the next recession occurs.

Another policy study released this year concerns the appropriate number of air traffic controllers at each of the Federal Aviation Administration's (FAA's) 315 air traffic control facilities, a longtime subject of dispute both locally and nationally. In response to a study requested by Congress, TRB released a committee's assessment of the uneven adequacy of the models that FAA uses to estimate the number of air traffic controllers needed at the facilities. The committee emphasized the need to develop shift schedules for all facility types to reduce the risk of controller fatigue.

An array of policy work is addressing such timely topics as the reinvestment needed for the inland waterway system, whether railroads are charging fair prices to some shippers, the prospects for expanded intercity passenger rail in the context of the demand for other modes, the potential safety and economic consequences of liberalizing the dimensions and gross weights of intercity trucks, and the innovative—but disruptive—technology applications for urban ridesharing services that have spawned strikes by taxi operators worldwide. Reports from most of these studies will be released by mid-2015.

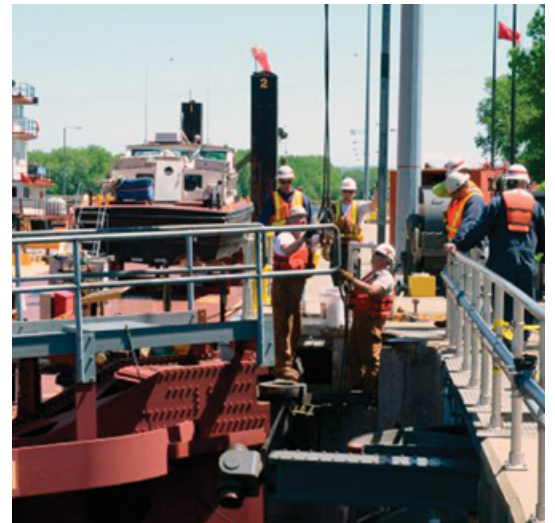
Offshore Safety

Long the locus of National Academies projects addressing offshore oil and gas exploration and safety, the Marine Board has fostered a spate of studies since the Macondo Well–*Deepwater Horizon* blowout, including reviews of the U.S. Department of the Interior's requirements for safety and environmental management systems, the offshore industry's use of best available and safest technologies, the structural integrity of offshore wind turbines, and worker health and safety on offshore wind farms. In 2014, the Marine Board began development of an overview of offshore industry safety culture and an assessment of real-time monitoring technologies to enhance drilling safety.

Worldwide Research

Transportation Research Information Documentation (TRID) is a comprehensive bibliographic database containing more than 1 million records of citations and abstracts of transportation research in all modes and disciplines. TRID was created in 2011 by combining TRB's Transportation Research Information Services database with the International Transport Research Documentation database of Europe's Organisation for Economic Co-operation and Development.

Available free of charge on TRB's website,



Crew members install a temporary gate at Lock and Dam 5A near Minnesota City, Minnesota. TRB is studying the need for infrastructure investments on inland waterways. (Photo: U.S. Army Corps of Engineers)



Technical Activities Council Chair Daniel S. Turner (*center*) participates in discussion of the new TRB strategic plan at a meeting of the Subcommittee on Planning and Policy Review in April.

TRID records comprise published or ongoing research in English, German, French, or Spanish; more than 123,000 records link to full-text publications. In January 2014, TRID began incorporating transportation records from Japan's Science and Technology Agency's research database.

TRB's Strategic Plan

TRB completed efforts to develop and adopt a new strategic plan. Anyone who has ever developed a strategic plan for an organization knows that the process can be as important as the plan. A successful process must involve the organization's stakeholders. This engagement taps an important source of information about the organization's performance and direction and provides the stakeholders with a sense of ownership. This is particularly pertinent for TRB as an organization that depends on voluntary financial support and on active involvement in its activities.

The TRB Executive Committee devoted nearly a year to reaching out to stakeholders. The resulting plan, adopted by the TRB Executive Committee in June, reflects this input and calls on TRB to pursue the following strategies in the next five years:

1. Develop and implement processes to identify and address emerging and critical transportation issues in a more strategic and proactive way.
2. Take steps to involve a broader cross section of stakeholders and constituencies in TRB programs and activities.
3. Conduct strategic reviews of the portfolio of TRB legacy programs and products and introduce new activities to meet critical needs in today's marketplace.
4. Apply more systematic approaches for identifying and tracking the impacts of TRB's research programs.
5. Strengthen the long-term financial stability of TRB by augmenting traditional federal and federally derived sources of funding.
6. Develop and implement coordinated approaches to communicate information on TRB activities and products that address emerging and critical issues.
7. Provide TRB staff with the knowledge, resources, and tools to meet and exceed the expectations of TRB stakeholders and customers.

Work is under way to pursue these strategies, as demonstrated in the following pages of this annual report.

Leadership Transitions

On July 1, 2014, Victor J. Dzau began a six-year term as President of the Institute of Medicine (IOM), which with the National Academy of Sciences and the National Academy of Engineering administers the National Research Council, TRB's parent organization. Dzau is Chancellor Emeritus for Health Affairs and James B. Duke Professor of Medicine at Duke University and past President and CEO of the Duke University Health System. Previously, he was the Hersey Professor of Theory and Practice of Medicine and Chairman of Medicine at Harvard Medical School's Brigham and Women's Hospital, as well as Chairman of the Department of Medicine at Stanford University. Dzau succeeds Harvey Feinberg, who served as IOM president from 2002 to 2014.

Robert E. Skinner, Jr., is completing his final year as TRB Executive Director, a post he has held since 1994. He is retiring at the end



Victor J. Dzau



Neil Pedersen, Deputy Director of SHRP 2 and past chair of the TRB Executive Committee—(above) guiding the business agenda in 2012—will succeed Robert E. Skinner, Jr., as TRB Executive Director in 2015. (Photo: Risdon Photography)

of January 2015. He will be succeeded by Neil Pedersen, Deputy Director of SHRP 2, who was selected after a national search. Pedersen joined the National Academies in 2012 after 29 years

in management and leadership positions at the Maryland DOT's State Highway Administration, including more than eight years as chief executive officer. Before joining the staff, Pedersen had been an active volunteer at TRB, serving on many committees and panels. He is a past chair of the TRB Executive Committee, the Technical Activities Council, and the SHRP 2 Technical Coordinating Committee for Capacity Research.

A handwritten signature in black ink that reads "Kirk Steudle".

Kirk T. Steudle
Chair, Executive Committee

A handwritten signature in black ink that reads "Robert E. Skinner, Jr.".

Robert E. Skinner, Jr.
Executive Director

Champion of Transportation Research Retires

AFTER MORE THAN 30 YEARS of service to the Transportation Research Board (TRB)—including 21 as Executive Director—Robert E. Skinner, Jr., is retiring in January 2015. Under his guidance as staff leader, TRB strengthened the multimodal and multidisciplinary range of its programs, inaugurated major communications initiatives, fostered international research partnerships and coordination, and worked to enhance the diversity of the Board's committees, programs, and staff.

During his tenure, the size and scope of the Board's activities expanded dramatically—the annual budget rose from \$35 million to \$113 million, and Annual Meeting attendance climbed from 7,000 to 12,000. TRB created the Airport Cooperative Research Program; established the second Strategic Highway Research program; increased participation by women and members of minority groups in activities and leadership positions; and promoted transportation as a career to young people, through TRB's Minority Student Fellows Program and Young Members Council.

Before becoming Executive Director in 1994, Skinner headed TRB's policy study activities, supervising the conduct of more than 30 studies that helped guide federal and state policy decisions. These included

Skinner briefs the Technical Activities Council. Under his leadership, diversity of committees, staff, and programs has increased. (Photo: Risdon Photography)



studies that led to the development of geometric design guidelines for highway resurfacing, restoration, and rehabilitation; that helped promote the establishment of the U.S. DOT's Bureau of Transportation Statistics; and that examined the impacts of airline deregulation.

Before joining TRB in 1983, Skinner was a Vice President of Alan M. Voorhees and Associates, managing the transportation consulting firm's activities in the eastern United States.

In addition to his service to TRB, Skinner has chaired the Special Advisory Panel for the Stem-to-Stern Safety Review of the Boston Central Artery-Tunnel Project and

TRB Executive Director Robert E. Skinner, Jr., delivers his report to the Executive Committee in January. Skinner joined TRB in 1983, headed the policy studies division, and became Executive Director in 1994. (Photo: Risdon Photography)

served on the Metrolink (Los Angeles) Commuter Rail Safety Review Panel. He was a member of the Board of Trustees for the School of Engineering and Applied Science at the University of Virginia, the Advisory Board for the Center for Urban Transportation Research at the University of South Florida, the External Review Committee for the Massachusetts Institute of Technology (MIT) Portugal Project, the Advisory Council for the Carnegie-Mellon Transportation Center, and the Visiting Committee for MIT's Engineering Systems Division.

Skinner earned a bachelor's degree in civil engineering from the University of Virginia and a master's degree in civil engineering from MIT. A registered professional engineer, he received the James Laurie Prize from the American Society of Civil Engineers; the P. D. McLean Memorial Award from the Washington, D.C., Road Gang; and the Director's Research Champion Award from the Texas A&M Transportation Institute. He was named recipient of the 2015 Frank Turner Medal for Lifetime Achievement in Transportation.



Transportation Research Board 2014 Executive Committee*

Chair: Kirk T. Steudle, Director, Michigan Department of Transportation, Lansing
Vice Chair: Daniel Sperling, Professor of Civil Engineering and Environmental Science and Policy; Director, Institute of Transportation Studies, University of California, Davis
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
Deborah H. Butler, Executive Vice President, Planning, and CIO, Norfolk Southern Corporation, Norfolk, Virginia (Past Chair, 2013)
James M. Crites, Executive Vice President of Operations, Dallas-Fort Worth International Airport, Texas
Malcolm Dougherty, Director, California Department of Transportation, Sacramento
A. Stewart Fotheringham, Professor and Director, Centre for Geoinformatics, School of Geography and Geosciences, University of St. Andrews, Fife, United Kingdom
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
Abbas Mohaddes, President and CEO, Iteris, Inc., Santa Ana, California
Donald A. Osterberg, Senior Vice President, Safety and Security, Schneider National, Inc., Green Bay, Wisconsin
Steven W. 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
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



Steudle



Sperling



Skinner



Arroyo



Bennett



Butler



Crites



Dougherty



Fotheringham



Halikowski



Hancock



Hanson



Heminger



Hendrickson



Holt



LaGrange



Lewis



McDonald



Mohaddes



Osterberg



Palmer



Rosenbloom



Schwartz

* Membership as of December 2014.



Sinha



Thomas



Trombino



Washington



Bostick



Butters



Conway



Darling



Friedman



Gishi



Gray



Huerta



Jaenichen



McMillan



Melaniphy



Nadeau



Rogoff



Rutland



Szabo



Wallerstein



Winfree



Wright



Zukunft

Thomas P. Bostick (Lt. General, U.S. Army), Chief of Engineers and Commanding General, U.S. Army Corps of Engineers, Washington, D.C. (ex officio)

Timothy P. Butters, Acting Administrator, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation (ex officio)

Alison Jane Conway, Assistant Professor, Department of Civil Engineering, City College of New York, New York, and Chair, TRB Young Members Council (ex officio)

T. F. Scott Darling III, Acting Administrator and Chief Counsel, Federal Motor Carrier Safety Administration, U.S. Department of Transportation (ex officio)

David J. Friedman, Acting Administrator, National Highway Traffic Safety Administration, U.S. Department of Transportation (ex officio)

LeRoy Gishi, Chief, Division of Transportation, Bureau of Indian Affairs, U.S. Department of the Interior, Washington, D.C. (ex officio)

John T. Gray 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)

Therese W. McMillan, Acting Administrator, Federal Transit Administration, U.S. Department of Transportation (ex officio)

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

Gregory G. Nadeau, Acting Administrator, Federal Highway Administration, U.S. Department of Transportation (ex officio)

Peter M. Rogoff, Under Secretary for Policy, 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)

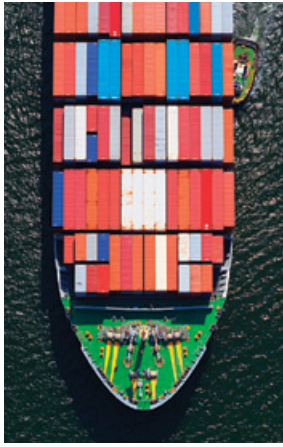
Joseph C. Szabo, Administrator, Federal Railroad Administration, U.S. Department of Transportation (ex officio)

Barry R. Wallerstein, Executive Officer, South Coast Air Quality Management District, Diamond Bar, California (ex officio)

Gregory D. Winfree, Assistant Secretary for Research and Technology, Office of the Secretary, 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)

Paul F. Zukunft (Adm., U.S. Coast Guard), Commandant, U.S. Coast Guard, U.S. Department of Homeland Security (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, information technology services, and the Minority Student Fellows program; 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



Bruce Darling, National Research Council Executive Officer (center), participates in a midyear SNO meeting in June.

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 2014 (left to right): H. Gerard (Gerry) Schwartz, Jr., SNO Vice Chair; Kirk T. Steudle, Executive Committee Chair; Susan Hanson, SNO Chair; Deborah H. Butler, past Executive Committee Chair; Daniel Sperling, Executive Committee Vice Chair; John Halikowski, Arizona Department of Transportation; Sandra Rosenbloom, past Executive Committee chair; and A. Stewart Fotheringham, University of St. Andrews. (Photo: Risdon Photography)

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 repre-

sents 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 Highway Research Program (SHRP 2).

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

Publications

To fulfill one of its oldest missions, TRB disseminates transportation research results and 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



Susan Hanson
Chair
Subcommittee for NRC Oversight



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



Robert E. Skinner, Jr.
Executive Director



Russell W. Houston
Assistant Executive Director

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 2014, the Board published 71 volumes containing 932 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 14,250 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 TRR Online subscribers and to 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. The Research Pays Off series, news items of interest to the transportation community, profiles of transportation professionals, book summaries, and highlights of TRB activities also are included. In 2014, *TR News* published theme issues on Performance Management in Practice and on Transportation in Tribal Lands: Challenges and Initiatives. Other special features covered innovative bridge designs for rapid renewal, applying a



Stacy Holton, Jackson State University, evaluates porcelain-enamel coated steel-fiber reinforcement in cementitious and geopolymeric composite materials at a poster session on concrete durability at the 2014 Annual Meeting. Holton was a 2014 TRB Minority Student Fellow. (Photo: Risdon Photography)

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



complex, often controversial, topics. Special reports published in 2014 included *Transportation Investments in Response to Economic Downturns*; *Framing Surface Transportation Research for the Nation's Future*; and *The Federal Aviation Administration's Approach for Determining Future Air Traffic Controller Staffing Needs*. 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. *Transportation Research Implementation: Application of Research Outcomes*, released in December, reported on the second European Union–U.S. symposium in Paris.⁴ Several titles were released in the Conference Proceedings on the Web series, including *Access to International Transportation Research Information*; *Sustainable Energy and Transportation Strategies, Research, and Data*; and *Making Progress: Transportation Planners and Programmers Turn Ideas into Reality*.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 monitoring bicyclist and pedestrian travel; critical issues in aviation and the environment; the future of TransXML, the markup language for storing and exchanging transportation data; freight fluidity performance measures; enhancing the durability of asphalt pavements; innovative applications of the *Highway Capacity Manual 2010*; and more. Circulars are available exclusively in electronic format on the TRB website.⁶
- *Meeting Summaries*, a new series, adapt a model pioneered by another NRC unit to accelerate publication of officially approved reports on conferences. The first title in

toolkit developed under the second Strategic Highway Research Program; the energy sector's impacts on road infrastructure, as well as the implications for transportation from the improving U.S. energy outlook; leveraging social media and online tools to increase research report distribution; advances, expectations, and research areas to watch in automated vehicle technology; and the financing and construction of the King Coal Highway in West Virginia through a public–private partnership. Selected features are posted on the TRB website, and the full issue is made accessible on the web on a four-month delay.²

- *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

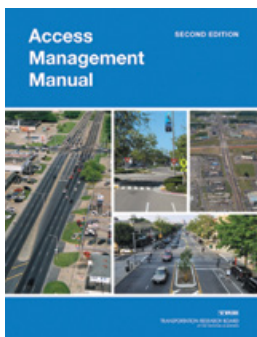
² www.trb.org/Publications/PubsTRNewsMagazine.aspx.

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

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

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

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



TRB published the second edition of the *Access Management Manual*, revised and expanded under a National Cooperative Highway Research Program project, in December.



Thomas Berry, MITRE (left), and Jeffrey Hamiel, Metropolitan Airports Commission, Minneapolis, Minnesota (right), present information on aviation issues at the 2014 Executive Committee policy session. (Photo: Risdon Photography)

TRB's series reported highlights from the 10th National Conference on Transportation Asset Management.⁷

- *Miscellaneous Reports* include special publications like the *Highway Capacity Manual 2010* and the comprehensive, 650-page resource, *Rockfall: Characterization and Control* (2012). *Access Management Manual, Second Edition*, was released in December, with a companion volume on applications of the manual slated for release in 2015.

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 59–62.

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*,⁸ which reports on transportation research and research-related events within TRB and beyond. Circulation of

⁷ www.trb.org/main/blurbs/171353.aspx.

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

the free newsletter is more than 58,000 and growing. Nearly 20 percent of the subscribers are employed by a federal, state, or local government agency. In 2014, the newsletter added more than 10,000 new subscribers, its largest annual increase.

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 webinar series, transportation professionals share 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.⁹ Because of the quality of its webinar program, TRB is authorized to issue professional development hours and certification maintenance credits through the American Institute of Certified Planners for select live webinars.

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



The TRB Facebook page shares news, photos, information on upcoming events, and transportation facts.



A spring webinar on large trucks and oversized loads at roundabouts had more than 1,100 participants—a record attendance.



Distance Learning Program Coordinator Ryan Brown conducts one of the nearly 100 webinars TRB produced in 2014.

In 2014 TRB produced 93 webinars—30 more than in 2013. The 2014 sessions attracted an average attendance of more than 300 for each session; a March 2014 webinar on accommodating large trucks and oversized loads at roundabouts set the yearly attendance record with more than 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.¹⁰ Since their launches, TRB's social media sites have attracted more than

¹⁰ www.trb.org/ElectronicSessions/Twitter.aspx.

11,000 Twitter followers and approximately 4,000 Facebook fans.

Information Technology

TRB relies on several software systems—some relatively unique—to meet program requirements. The systems are used to maintain committee records, build and maintain TRB's extensive website, build and make available the TRID bibliographic database, support the Annual Meeting paper submittal and peer review process, and help manage and monitor the progress of Cooperative Research Programs products.

In 2014, under an ongoing, long-term effort to replace and upgrade these specialty software systems, TRB introduced a new system to manage committee member records, upgrade the online bookstore, and enhance the publication subscription distribution system. TRB also launched MyTRB, a web-based portal designed to provide TRB technical standing committee leaders with a suite of tools to manage committees online. MyTRB also allows committee members and other volunteers to manage their own profiles and their contact information. The software will be used next in implementing a new system to manage the Annual Meeting paper submission, paper peer review, and program development processes.



Technical Activities

The 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 Technical Activities Council oversees the organization and activities of the TRB standing committees. Daniel S. Turner, Emeritus Professor of Civil Engineering, University of Alabama, chairs the Council. TRB representatives in each state department of transportation (DOT), in each sponsoring organization, in more than 150



Katherine F. Turnbull, Texas A&M Transportation Institute (*left*), concluded her three-year term as Technical Activities Council Chair in April 2014. Daniel Turner, University of Alabama, Tuscaloosa (*right*), currently serves as chair. (Photos: Risdon Photography)

universities, and in 25 transit agencies serve as liaisons to the transportation community.

As called for in the new TRB Strategic Plan, the Technical Activities Division pursued several key initiatives during 2014, including the following:

- Making preparations to move the TRB Annual Meeting to the Walter E. Washington Convention Center in Washington, D.C., in January 2015—the first major change in venue in almost 60 years;
- Taking steps to address critical and emerging issues more strategically and proactively, including an array of programs and activities to identify and address research needs associated with connected and automated vehicles;
- Collecting and distributing hundreds of examples of successful research projects generated



The Technical Activities Council identifies critical transportation issues, fosters research initiatives, and facilitates knowledge exchange. (Photo: Risdon Photography)



The Statewide Multimodal Transportation Planning Committee discusses initiatives and activities to stimulate and disseminate transportation research across modes. (Photo: Risdon Photography)

by the standing committees, to demonstrate the significant returns from investments in transportation research and innovation;

- Expanding international activities by sponsoring conferences, including the second of four annual symposia with the European Commission and the U.S. DOT Office of Research and Technology, on the implementation of transportation research;
- Strengthening TRB's relationships with traditional stakeholders—the number of state DOT employees serving on TRB standing

committees reached an all-time high; state DOT CEO Roundtable sessions were introduced at the 2014 TRB Annual Meeting; and TRB began working with the Council of University Transportation Centers to enhance collaboration with the academic community;

- Strengthening TRB's relationships with non-traditional stakeholders—providing complimentary registrations at the 2014 Annual Meeting to nontraditional stakeholders invited to participate in committee activities and working directly with telecommunications providers and automotive industry organizations in presenting events on connected and autonomous vehicles;
- Continuing to increase the diversity of TRB standing committee membership and empowering young members to take leadership roles;
- Realizing an all-time high in the citation impact factor for the *Transportation Research Record*; and
- Initiating a pooled-fund arrangement to enable state DOTs to support TRB conferences on key issues.

Additional highlights for 2014 from the Technical Activities Division portfolio span the transportation disciplines and modes, as detailed in the following sections.



Daniel Turner
Council Chair
Technical Activities



Hyun-A Park
Chair
Policy and
Organization Group



Mark Kross
Chair
Planning and
Environment Group



Thomas Kazmierowski
Chair
Design and
Construction Group



Peter Briglia
Chair
Operations and
Preservation Group



James Thiel
Chair
Legal Resources Group



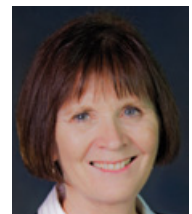
Paul Jovanis
Chair
Safety and System
Users Group



David Wilcock
Chair
Public Transportation
Group



Stephen Popkin
Chair
Rail Group



Barbara Ivanov
Chair
Freight Systems Group



Alessandro Damiani, European Commission, addresses future transportation objectives of the European Union (EU) at an Annual Meeting session on EU's Horizon 2020 Program. (Photo: Risdon Photography)

Policy and Organization

POLICY AND ADMINISTRATION

Highlights of activities by committees related to policy and administration included the following:

- The committees of the Leadership and Management Section met during the 10th National Conference on Transportation Asset Management in Miami, Florida, in April. The conference drew more than 450 transportation professionals.
- More than 175 professionals met in July at the 5th TRB International Conference on Surface Transportation Financing in Irvine, California. The standing committees on Revenue and Finance, Congestion Pricing, Transportation Economics, and Managed Lanes, as well as several subcommittees, convened for mid-year meetings during the conference to discuss innovative financing strategies and tools.

INTERNATIONAL

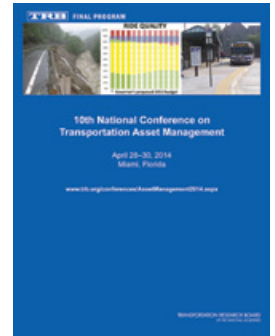
TRB's international activities are expanding, and the number of international paper presentations and attendees at TRB Annual Meetings continues to increase.

- In conjunction with the U.S. DOT Office of Research and Technology and the European Union, TRB conducted a Symposium on the Implementation of Transportation Research in Paris.
- The International Cooperation Committee led several events at the 2014 TRB Annual Meeting, including a workshop on the Transportation Impacts of the Global Economic Crisis, which engaged a diverse group of transportation experts and included presentations from eight international perspectives.

SECURITY

The committees with purview over critical transportation infrastructure protection focused on risk and resilience:

- The Critical Transportation Infrastructure Protection Committee and the Task Force on Disaster Response and Business Continuity sponsored an Annual Meeting session featuring top officials on Carrying Forward the Lessons of Superstorm Sandy.
- Sessions, committee discussions, and calls for papers by security-related committees continue to reflect the themes of climate change and disaster resiliency. Cybersecurity and the economic impacts of risk mitigation strategies also emerged as priority topics.
- The Task Force on Logistics of Disaster Response and Business Continuity gained standing committee status, and a new section focusing on transportation resiliency includes



The Policy and Organization group conducted several meetings in 2014, including the 10th National Conference on Transportation Asset Management (*program cover, top*) and the 5th TRB International Conference on Surface Transportation Financing.



Mary Ellen Eagan
Chair
Aviation Group



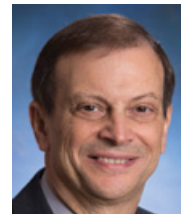
Thomas Wakeman
Chair
Marine Group



Harold (Skip) Paul
State DOT
Representative



Alison Conway
Young Members
Council Representative



Mark R. Norman
Director
TRB Technical
Activities Division



Jo-Ellen Darcy, Assistant Secretary of the U.S. Army, Civil Works, presents the keynote address at an Annual Meeting session on lessons learned from Superstorm Sandy. (Photo: Risdon Photography)

the new committee along with the Emergency Evacuation and the Critical Transportation Infrastructure Protection Committees.

DATA AND INFORMATION TECHNOLOGY

Data and information technology initiatives continued to examine traditional and evolving application areas:

- The traffic monitoring conference served as a venue for state and local government data collectors and users to refine methods and to explore new approaches and challenges.
- Sessions at the North American Travel Monitoring Exposition and Conference, or NAT-MEC, addressed the growing demand for improved bicycle and pedestrian data. An electronic circular described the state of the practice in monitoring bicycle and pedestrian travel.¹
- Using data to support decisions is an ongoing theme. A CEO panel at the 2014 TRB Annual Meeting discussed the value of improved information support, as well as emerging needs for data and information. A peer

¹ Circular E-C183, www.trb.org/Publications/Blurbs/170452.aspx.



Inductance loops and infrared sensors on Lance Armstrong Bikeway in Austin, Texas, along with other traffic counting technologies, were presented in Transportation Research Circular E-C183, *Monitoring Bicyclist and Pedestrian Travel and Behavior*. (Photo: Jim Lyle, TTI)



The Conduct of Research Committee encourages effective planning, management, and operational practices by transportation research organizations. (Photo: Risdon Photography)

exchange on aligning data for communication brought together CEOs and communications and information technology professionals to prioritize initiatives.

- The freight fluidity workshop addressed the use of supply chain information to support public agencies in managing and improving freight system performance.²
- A Task Force on Understanding Big Data in Freight Transportation is examining approaches to large and complex data sets for the freight transportation community.

RESEARCH AND EDUCATION

The five standing committees in the Research and Education Section worked to improve transportation research methods, the coordination of critical research, and the dissemination of results. A new task force assumed the continuing development and implementation of the Ahead-of-the-Curve initiative, a TRB training program to enhance the knowledge, skills, and abilities of research program managers. A task force workshop at the 2014 Annual Meeting provided opportunity for discussion of the program and input into its development.

The committees also began working with the Council of University Transportation Centers to strengthen relationships between TRB and the academic community. Other sessions and workshops at the Annual Meeting included the following:

² Circular E-C187, www.trb.org/Publications/Blurbs/171541.aspx.

- E-Books and Transportation: Familiar Technology in a New Setting;
- Tapping into International Expertise for Research Development, Governance, and Administration;
- Framing U.S. Surface Transportation Research for the Future;
- Excelling at Research Program Performance Measurement;
- Crowdsourcing: Exploring a Fast-Growing Citizen Engagement Tool for Transportation Research;
- Student Learning and Training: What Works, What Doesn't, and Why;
- Benefits of Learning and Understanding Skill Set Needs in Transportation-Related Careers; and
- Open Access Initiative at the U.S. Department of Transportation.

Planning and Environment

TRANSPORTATION SYSTEM PLANNING

Planning committees' activities in 2014 included the following:

- The 14th National Tools of the Trade Conference on Transportation Planning in Small and Medium-Sized Communities, in July in Burlington, Vermont, featured case studies, project reports, and research findings.



National Park Ranger Emily Zivot leads participants in the Conference on Transportation and Federal Lands: Enhancing Access, Mobility, Sustainability, and Connections on a walking tour of Theodore Roosevelt Island in Washington, D.C., in September.



(Left to right:) Katy Ware, United Kingdom representative to the International Maritime Organization; Katherine F. Turnbull, TTI Associate Executive Director; and Marsha Anderson-Bomar, senior principal at Stantec Consulting, Inc., discuss transportation professions at the 5th International Conference on Women's Issues in Transportation in April in Paris. (Photo courtesy Marsha Anderson-Bomar)

- The 5th Innovations in Travel Modeling Conference, in Baltimore, Maryland, in April, focused on the latest developments in travel modeling and in deploying cutting-edge computational methods.
- TRB's first Conference on Transportation and Federal Lands, in September in Washington, D.C., explored innovative approaches for improving access, internal mobility, and links to gateway communities.
- The Statewide Multimodal Transportation Planning Committee and the Transportation Programming and Investment Decision Making Committee met with several committees of the American Association of State Highway and Transportation Officials (AASHTO) in Phoenix, Arizona, and conducted a peer exchange on Performance Outcomes Beyond the Mainstream.

SOCIAL AND ECONOMIC ISSUES

The committees involved in Social and Economic Issues conducted an array of events and activities, as shown in the following examples:

- The Women's Issues in Transportation Committee contributed to the planning and implementation of the 5th International Conference on Women's Issues in Transportation, April 14–16, 2014, in Paris. The conference highlighted the latest research on gender



The September–October issue of *TR News*, coordinated by the Native American Transportation Issues Committee, examined tribal sovereignty and the challenges and opportunities for transportation projects in tribal lands.



Liisa Itkonen, Community Planning Association of Southwest Idaho, presents her research at an Annual Meeting session on environmental analysis in transportation. (Photo: Risdon Photography)

issues in the use of transportation systems.

- The Native American Transportation Issues Committee assembled a special issue of *TR News* on Transportation in Tribal Lands: Challenges and Initiatives.³
- The Subcommittee on Health and Transportation led a 2014 Annual Meeting session on Raising Public Health Issues to a Higher Level in the Transportation Sector. Panelists included three state DOT executives and a state health commissioner who are leading efforts in this area.

ENVIRONMENT, ENERGY, AND CLIMATE CHANGE

The Special Task Force on Climate Change and Energy focused on outreach and communications on climate change adaptation and on resiliency planning and analysis. Special Task Force activities included the following:

- Planning a series of webinars in collaboration with the Critical Transportation Infrastructure Protection Committee on topics targeted to states, including DOT Climate Change Adaptation and Local Resilience Coordination: An Operations Perspective and Challenges of Climate Data and Tools for DOTs'

³ TR News No. 294, www.trb.org/Publications/Blurbs/171622.aspx.

Development and Implementation of Climate Change Plans;

- Issuing a call for submissions for the Best Paper on Climate Change and planning for a 2015 conference on Climate Change Adaptation and Resiliency; and
- Initiating plans for a series of articles on climate change issues to appear in *TR News*.

Seven of the eight committees in the Environment and Energy Section sponsored conferences in 2014 for in-depth discussions on topics including the environmental challenges of connected vehicle technologies, the use of renewable energies in transportation systems, best management practices for maintaining historic bridges, and the latest innovations in the abatement and mitigation of transportation noise.

Design and Construction

DESIGN

Standing committees in the Design Section examined research needs, priorities, and findings via webinars, midyear meetings, and conferences:

- The Roadside Safety Design Committee held a joint workshop with the AASHTO Technical Committee on Roadside Safety on Roadway Departure: Addressing Present Challenges and Planning for Future Needs, in July in Portland, Maine. The workshop identified new data sources that may help in understanding roadway departure crashes and the performance of safety hardware.
- The committees on Rigid Pavement Design and on Portland Cement Concrete Pavement Construction met in June in El Dorado Hills, California, to discuss innovations in concrete pavements and to develop research needs statements.
- Committees in the Structures Section cosponsored international conferences on new developments and advances in the design and construction of bridges, including accelerated bridge construction.
- Committees in the Pavement Management Section cosponsored conferences on pavement evaluation techniques and life-cycle assessment.



Bob McGenniss, HollyFrontier Companies, updates the Characteristics of Asphalt Materials Committee on Asphalt Materials Section initiatives. (Photo: Risdon Photography)

CONSTRUCTION AND MATERIALS

Construction and Materials committees focused on emerging topics such as digital project delivery, civil integrated management, nanotechnology, and infrastructure sustainability. Other topics included accelerated project delivery, alternative project delivery, construction of two-lift portland cement concrete pavements, hot- and warm-mix asphalt moisture susceptibility, integrating asphalt concrete mix design, structural design and construction quality control, steel bridge fabrication, and the changing landscape of the Disadvantaged Business Enterprise program.

Examples of noteworthy accomplishments by the committees include a workshop in collaboration with the National Institute of Building Sciences to explore digital project delivery on horizontal and vertical projects and the publication of four electronic circulars:

- *Progress Toward Performance-Graded Emulsified Asphalt Specifications*⁴;
- *Enhancing the Durability of Asphalt Pavements*⁵;
- *Application of Reclaimed Asphalt Pavement and Recycled Asphalt Shingles in Hot-Mix Asphalt: National and International Perspectives on Current Practice*⁶; and

⁴ Circular E-C182, www.trb.org/Publications/Blurbs/170143.aspx.

⁵ Circular E-C186, www.trb.org/Publications/Blurbs/171408.aspx.

⁶ Circular E-C188, www.trb.org/Publications/Blurbs/171585.aspx.

- *Application of Asphalt Mix Performance-Based Specifications*.⁷

GEOTECHNICAL ENGINEERING

The Geotechnical Engineering committees addressed practitioner concerns through workshops on the following topics:

- The cost-benefit and risk assessment of foundation reuse, along with guidelines on design, testing, construction, and maintenance;
- Case studies on the benefits of geotechnical instrumentation in design and construction;
- Data management and visualization techniques that facilitate collection, compilation, and interpretation of geotechnical engineering data; and
- Nonnuclear methods and devices that state DOTs have used for the compaction control of unbound materials.

Several Annual Meeting sessions focused on achievements in the past 50 years:

- The influence of TRB and its publications on the practice of engineering geology, specifically on site characterization and remote sensing, slope stability and rockfall mitigation design, and management of geotechnical assets;
- Engineering innovations for culverts and developments in culverts and soil-structure interaction; and
- Progress in the United States in the use of geosynthetics.

Operations

Operations continues to be a significant area of transportation research, with more than 700 technical papers peer-reviewed in 2014 by committees in the Operations Section. All operations-related committees held midyear meetings or conferences, including the following:

- The Standing Committees on Intelligent Transportation Systems and on Vehicle-Highway Automation cosponsored the 3rd Symposium on Vehicle Automation, with

⁷ Circular E-C189, www.trb.org/Publications/Blurbs/171650.aspx.



Terry Bellamy, District of Columbia DOT (right), speaks with an attendee at an Annual Meeting session on systems management and operations culture, part of a three-part roundtable discussion with state DOT CEOs. (Photo: Risdon Photography)

more than 575 participants from academia, industry, public agencies, and consultancies convening in the San Francisco, California, Bay Area.

- The two committees also cosponsored the 3rd International Conference on Connected Vehicles and Exposition in Vienna, Austria.
- The Freeway Operations and the Regional Transportation Systems Management and Operations Committees cosponsored a workshop on Integrated Corridor Transportation Systems Management in Irvine.
- The Traffic Flow Theory Committee sponsored a symposium, Celebrating 50 Years of Traffic Flow Theory, in Portland, Oregon.
- The Operational Effects of Geometrics, Access Management, and Traffic Signal Systems Committees cosponsored the Symposium on Alternative Intersections and Interchanges in Salt Lake City, Utah.
- The Managed Lanes Committee cosponsored the 5th International Conference on Surface Transportation Financing: Innovation, Experimentation, and Exploration in Irvine.
- The Access Management Committee cosponsored the 2nd International Conference on Access Management in Shanghai, China.

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 Maintenance and Preservation Section added a new standing committee on Bridge Preservation in response to the growing need and interest in cost-effectively extending the service life of bridges.

The section's 14 standing committees sponsored a variety of workshops and sessions at the 2014 TRB Annual Meeting, including State-of-the-Art Use and Application of High-Performance Thin Asphalt Overlays; Advances in Pavement Preservation, Pavement Management Systems, and Their Integration; Bridge and Tunnel Safety and Security; Measuring and Assessing Bridge Performance; Advances in Winter Maintenance Materials, Equipment, Practices and Standards; Maintenance and Operations Management for Climate Change; Weather Impacts in Surface Transportation; and Critical Issues Affecting Maintenance Equipment in DOTs and Needed Research.

Safety

The 19 committees in the Safety and Systems Users Group pursued a variety of activities in 2014, including the following:

- The standing committees on Highway Safety Performance and on Safety Data, Analysis, and Evaluation held a joint midyear meeting to review research and needs, particularly for the development of the second edition of the *Highway Safety Manual*.



A new roundabout under construction in Valdosta, Georgia. The Safety and Systems Users Group sponsored a popular series of webinars on roundabouts, addressing such topics as accessibility, advances in roundabout design, and trucks and oversized loads. (Photo: Valdosta-Lowndes Metropolitan Planning Organization)

- The committees on Occupant Protection and on Traffic Law Enforcement, meeting concurrently, held a joint session exploring areas of common interest, including safety belt use, specifically by law enforcement personnel.
- The Alcohol, Other Drugs, and Transportation Committee held a symposium to evaluate the state of knowledge about cannabis and driving and to examine emerging challenges as the legal environment changes.
- The Roundabouts Committee held its fourth international conference and sponsored a series of webinars, each drawing approximately 1,000 participants.

Legal Resources

The 53rd Annual Workshop on Transportation Law, July 13–17 in San Francisco, convened approximately 180 representatives from state DOTs, transit agencies, and law firms—the largest participation in a decade—to discuss issues of legal concern to the transportation community. All committees in the Legal Resources Group participated. Among the issues highlighted were the following:

- Construction contracts—the prevalence of design–build arrangements prompted the Contracts Committee to propose a research project focusing on liability; and
- Environmental law—the implementation of provisions in the Moving Ahead for Progress in the 21st Century Act (MAP-21) relating to environmental reviews for highway and transit projects drew attention to such issues as categorical exclusions, new requirements for the use of planning decisions and studies, and revised procedures for federal decision making and dispute resolution.

Aviation

Several aviation standing committees—including Intergovernmental Relations in Aviation, Aviation System Planning, Environmental Impacts of Aviation, Airfield and Airspace Capacity and Delay, and Light Commercial and General Aviation—held summer meetings in Washington, D.C., to continue discussions about completed, ongoing, and needed research.



Aaron Gellman, Northwestern University, received the 2014 Francis X. McKelvey Award at a meeting of the Aviation Group Executive Board in January. (Photo: Risdon Photography)

- Committees in the Aviation Group developed, sponsored, and reviewed problem statements for the Airport Cooperative Research Program.
- The Environmental Impacts of Aviation Committee published an update to the electronic circular, *Critical Issues in Aviation and the Environment*.⁸
- The Aircraft–Airport Compatibility Committee met with the American Society of Civil Engineers in Orlando, Florida, at the 2nd Transportation and Development Institute Congress.
- The Light Commercial and General Aviation Committee cosponsored the 2014 Aerospace Forecast Conference in Washington, D.C.

⁸ Circular E-C184, www.trb.org/Publications/Blurbs/170577.aspx.



Construction on the Atlantic Lock, part of the Panama Canal expansion program. In commemoration of the centennial of the canal, the Freight Systems Group sponsored an Annual Meeting workshop focused on the history and future of the canal. (Photo: Courtesy of the Panama Canal Authority)



The MS *Viking Grace* is the first large-scale passenger ferry to be powered by liquefied natural gas (LNG). Issues related to vessels powered by LNG were on the agenda at the Marine Board's fall meeting. (Photo: Meyer Turku Oy)

Freight Systems

The Freight Systems Group committees have focused on global supply chains, supply chain resilience, and the effects of new energy trends on freight mobility:

- Partnering with the Marine Group, the Freight Systems Group committees sponsored four Freight Day sessions at the 2014 Annual Meeting, focusing on supply chain efficiency, connected vehicle technology, energy consumption and emissions, and workforce sustainability.
- The committees jointly organized a Workshop on Natural Gas as a Fuel for Freight Transport to determine the needs for research into the multimodal adoption of natural gas.
- The committees also organized a full-day Annual Meeting workshop on 100 Years of the Panama Canal: Legacy and Future, which included high-level speakers from industry and government. The workshop addressed the canal's history, effect on world trade patterns, and imminent expansion.

Marine

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

- The Marine Group committees contributed to the Freight Day sessions and the Panama Canal Workshop at the 2014 Annual Meeting, as well as the workshop on Natural Gas as a

Fuel for Freight Transport held at the Beckman Center in May.

- The Marine Board's spring meeting in Washington, D.C., in April featured a session on coastal resiliency with an emphasis on seaports and associated infrastructure and communities.
- The Marine Board's fall meeting addressed topics of interest to the U.S. Maritime Administration and the U.S. Coast Guard, including liquefied natural gas as a marine fuel and cruise ship safety.

Public Transportation

The Public Transportation Group focused in 2014 on policy issues related to safety and security and to state of good repair, with a view to rulemaking by the Federal Transit Administration in response to requirements in MAP-21. These issues influenced Annual Meeting sessions, as well as midyear meetings, and are ongoing.

The Public Transportation Group formed a Task Force on Transit Safety to develop a research agenda and engage in activities to address safety and security across the transit modes. The rapid growth of car and bicycle sharing, vehicle automation, and shared ride services also attracted the attention of Public Transportation Group committees:



Vice Adm. Peter Neffenger, 29th Vice Commandant of the U.S. Coast Guard, addresses the Marine Board at its fall meeting in Washington, D.C. (Photo: Scott Brotemarkle)



B-cycle, the first bikesharing service in San Antonio, Texas, has nearly two dozen stations throughout the city. The rapid growth of bikesharing in the United States was examined at the Shared Use Mobility Public Policy Summit in Washington, D.C. (Photo: Greg Griffin, American Institute of Certified Planners)



A BNSF train in Essex, Montana, returns to North Dakota for more Bakken crude oil. Research is examining the safety of transporting oil by rail. (Photo: Roy Luck, Flickr)

- The Emerging and Innovative Public Transport and Technologies committee cosponsored the Shared Use Mobility Public Policy Summit in Washington, D.C.
- The committees on Automated Transit Services and on Emerging and Innovative Public Transport and Technologies participated in the Automated Vehicles Symposium in July in San Francisco; several prominent transit leaders made presentations.

Rail

Implementation of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA), which requires states to provide funding to support intercity passenger trains traveling less than 750 miles, was a main topic during the year. The freight rail industry was interested in the

system effects from growth in the energy development sector.

Highlights of TRB Rail Group activity included the following:

- An Annual Meeting workshop featuring representatives from seven states offering perspectives on PRIIA implementation;
- Presentations on the risk analysis of transporting crude oil by rail and on the consequences of flammable-liquid fire, at the Joint Rail Conference cosponsored by TRB in Colorado Springs; and
- The midyear meeting of the Freight Rail Transportation Committee in Altoona, Pennsylvania, featuring presentations on the phenomenal growth of the energy development industry in the nearby Marcellus shale region.

Staff News

LINDA M. KARSON retired after almost 20 years of directing the department that runs the TRB Annual Meeting and other TRB conferences and meetings.

EDWARD G. LEONARDO was appointed Director of the Meetings Department.

MONICA A. STARNES rejoined TRB as Senior Program Officer for Transportation Policy and Administration; she also coordinates TRB international activities.

BRITTNEY N. GICK and **MICHAEL A. MILLER** joined the staff as Senior Program Associates.

RICHARD F. PAIN, who retired in 2013, received the 2014 Scott Falb Exceptional Achievement Award from the Association of Transportation Safety Information Professionals, recognizing his work in promoting data-driven decision making for traffic safety.

Major Awards Presented in 2014

Ralph Haas, Norman W. McLeod Engineering Professor and Distinguished Professor Emeritus, University of Waterloo, Canada, received the Roy W. Crum Award for outstanding transportation research leadership. A pioneer in the application of systems concepts for managing networks of paved roads, Haas has published more than 400 papers and authored or coauthored 12 books. His award-winning work has been used by municipal, provincial, state, and federal transportation agencies.



the Louisiana Department of Transportation and Development since 1976; he became Director of the Louisiana Transportation Research Center in 2006. He has served on more than 30 TRB councils, groups, sections, committees, panels, and task forces.

Paul led a major reorganization of TRB's standing committees as Chair of the Technical Activities Council. He is a longtime TRB state representative and a leader on the American Association of State Highway and Transportation Officials' (AASHTO's) Research Advisory Committee and Standing Committee on Research. He also is a past board member of the Association of Asphalt Paving Technologists and has participated on many Federal Highway Administration advisory groups.

Susan Martinovich, Director, North American Highway-Bridge Transportation Business Group,



CH2M Hill, received the George S. Bartlett Award, presented by AASHTO, the American Road and Transportation Builders Association, and TRB for career contributions to highway progress. A nationally recognized leader in transportation innovation and policy, Martinovich worked at the Nevada Department of Transportation (DOT) for more than 28 years; she was appointed director in 2007 and was the first woman and first Nevadan to serve as president of AASHTO.

At Nevada DOT, Martinovich championed alternative project delivery and transportation funding mechanisms; the agency successfully implemented construction manager-at-risk and design-build project delivery and pursued public-private partnerships. Martinovich served as a member of the TRB Executive Committee and of the SHRP 2 Oversight Committee, as well as the AASHTO Standing Committees on Highways, on Highway Traffic Safety, and on Research.

Beverly A. Scott, General Manager, Massachusetts Bay Transportation Authority, and Administrator, Rail and Transit Division, Massachusetts DOT, received the Sharon D. Banks Award for her dedication to diversity, fairness, and equity.

Named a Transportation Innovator of Change by President Barack Obama, Scott has led several public transit systems in her more than 30-year career. She has mentored staff and students and is known in the transit industry for her visionary leadership, results-driven management, and progressive approach to labor-management relations.

Scott is a former TRB Executive Committee member and has served on many TRB committees and Transit Cooperative Research Program panels. Past Vice Chair of the National Infrastructure Advisory Council, she chairs Rail-Volution and serves on the board



of directors for Reconnecting America, the Transportation Learning Center, and Americans for Transit.

Joseph L. Schofer, Professor of Civil and Environmental Engineering at Northwestern University, delivered the 2014 Thomas B. Deen Distinguished Lecture on performance measures and the value proposition for transportation projects. Schofer also serves as Associate Dean of Northwestern's Robert R. McCormick School of Engineering and Applied Science. His research and teaching focus on data in effective decision making, as well as on transportation policy, planning, and analysis.

Schofer has chaired or served on 38 TRB committees, sections, groups, panels, task forces, and expert task groups. TRB Special Reports produced under his leadership include *Equity of Evolving Transportation Finance Mechanisms* and *How We Travel: A Sustainable National Program for Travel Data*.



A member of the TRB Long-Term Pavement Performance Committee, Haas has participated in TRB and National Research Council (NRC) activities for nearly 45 years. His awards include Canada's highest civilian honor, the Order of Canada; its highest academic honor, Fellow of the Royal Society of Canada; and its highest engineering honor, Fellow of the Canadian Academy of Engineering. In 2007, Haas was named a National Associate of the National Academies.

The W. N. Carey, Jr., Distinguished Service Award was presented to **Harold R. (Skip) Paul** in recognition of his distinguished service to transportation research and to TRB. Paul is Director, Louisiana Transportation Research Center, Louisiana Department of Transportation and Development.

A retired Navy Reserve Intelligence Officer with 42 years of service, Paul has worked at



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



Chaired by Sandra Rosenbloom, the Subcommittee for Planning and Policy Review provides advice and direction on policy-oriented studies and develops new Executive Committee initiatives.

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.

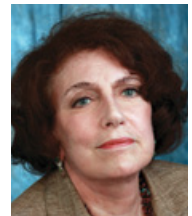
TRB's parent organization, the National Research Council (NRC), appoints the study committees to achieve a balance of expertise and perspectives. The U.S. Congress and the executive branch have adopted many recommendations from TRB policy reports, attesting to the substantive value of the findings.

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

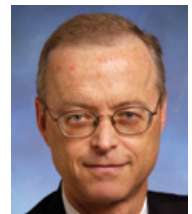
FORTHCOMING REPORTS

The Policy Studies group is nearing completion of several major studies, scheduled for release in 2015, examining important transportation policy issues:

- **Reinvesting in Inland Waterways: What Policy Makers Need to Know**, a study initiated by the TRB Executive Committee, is assessing the reinvestment needs of the U.S. Inland Water-



Sandra Rosenbloom
Chair
Subcommittee on
Planning and Policy
Review



Stephen R. Godwin
Director
Studies and Special
Programs

¹ www.trb.org/Publications/PubsPolicyStudiesSpecialReports.aspx and www.trb.org/Publications/PubsPolicyStudiesLetterReports.aspx.



Michael Bronzini, George Mason University, participates in discussion at a meeting of the Committee on Reinvesting in Inland Waterways: What Policymakers Need to Know in Washington, D.C., in March.

ways System within a broad context of costs and benefits. Chris T. Hendrickson, Carnegie Mellon University, chairs the committee.

- Freight Rail Transportation and Regulation, a study requested by Congress, examines the Surface Transportation Board's balancing of shipper and railroad interests since the deregulation of railroads in 1980. The committee is chaired by Richard L. Schmalensee, Massachusetts Institute of Technology.
- Review of the U.S. Department of Transportation (DOT) Truck Size and Weight Study is providing a peer review, requested by U.S. DOT, of a study that was mandated by Congress in the Moving Ahead for Progress in the 21st Century Act. The committee issued an initial letter report in mid-2014 and will release a final report. James Winebrake, Rochester Institute of Technology, chairs the committee.



As part of its mission to provide a peer review of a U.S. Department of Transportation (DOT) study required by Congress, the Committee for Review of U.S. DOT Truck Size and Weight Study produced a letter report in 2014.

- 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 passenger rail in the context of consumer demand for all modes of intercity travel. The committee is chaired by Martin Wachs, RAND Corporation.
- Innovative Urban Mobility Services, a project initiated by the TRB Executive Committee, is assessing the consequences of new urban mobility services made possible by mobile phone applications. The study will provide guidance to policy makers about ridesharing services, which are gaining popularity but generating controversy by competing with traditional taxi providers. Also of interest are the potential effects on travel behavior, residential location preferences, and vehicle ownership from mobility services such as carsharing, bikesharing, and integrated applications that provide real-time information on travel time and cost for urban mobility options. Brian Taylor, UCLA, serves as committee chair.

COMPLETED REPORTS

Establishing the proper number of air traffic controllers for safety and efficiency has long been a contentious issue. Congress, the Federal Aviation Administration (FAA), and the National Air Traffic Controllers Association (NATCA) have debated appropriate staffing levels in the aggregate and for individual facilities, as well as the budgets to support adequate staffing.

At the request of Congress, TRB assembled a committee of experts to assess the adequacy of the models FAA applies to estimate staffing for air traffic control (ATC). In TRB Special Report 314, *The Federal Aviation Administration's Approach for Determining Future Air Traffic Controller Staffing Needs*, the committee concludes that FAA's models are suitable for developing initial estimates of the number of controllers required at terminal areas and airport towers, but the models for the centers that control aircraft en route between airports can be improved. In addition, FAA should collaborate with NATCA to develop and implement for all facilities an enhanced tool capable of generating efficient work schedules that incorporate strategies to mitigate air traffic controller fatigue.



Jay Shambaugh, George Washington University (at top), presents findings from Special Report 312, *Transportation Investments in Response to Economic Downturns* (center, left), to the Executive Committee in January. Genevieve Giuliano, University of Southern California (at bottom), summarized recommendations of the committee that produced Special Report 313, *Framing Surface Transportation Research for the Nation's Future*. (Photos: Risdon Photography)

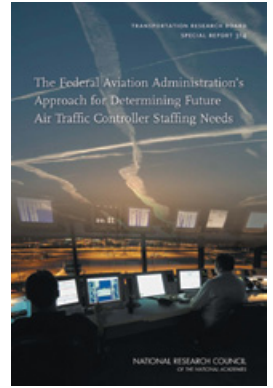
The committee also recommends that FAA examine accident and incident reports to determine more clearly the relationship between staffing levels and safety. Moreover, FAA should consider the staffing effects from the implementation of the Next-Generation Air Transportation System, a large-scale initiative to shift air traffic management from ground-based radar to a satellite system, which also will affect ATC technologies. Amy Pritchett, Georgia Institute of Technology, chaired the committee.

Other committees provide ongoing peer review of the research and development programs of the Federal Highway Administration (FHWA), the Federal Railroad Administration, and the Federal Transit Administration, as well as for other major FHWA research activities, such as the Long-Term Pavement Performance Program and Long-Term Bridge Performance Program. The committees that review these programs and major projects provide advice regularly via letter reports that are publicly available on TRB's website.²

NEW AND ONGOING STUDIES

- The Bureau of Safety and Environmental Enforcement (BSEE), which oversees the safety of offshore oil and gas operations, has asked TRB, under the auspices of the Marine Board, to initiate a study examining real-time technologies for monitoring offshore oil and gas exploration and production facilities. The study will advise BSEE on the state of the art

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



The Long-Term Bridge Performance (LTBP) program collects data to provide a detailed, long-range appraisal of bridge health. The Expert Task Group for LTBP Bridge Durability and Preservation met in Washington, D.C., in November.



The ad hoc Committee on the Offshore Oil and Gas Safety Culture Framing Study determines issues and knowledge gaps to be addressed in industry and government efforts and research to strengthen offshore industry safety culture.

and on ways that the offshore industry and BSEE can use the technologies to enhance safety. The chair of the study is Richard Sears, Stanford University.

- With funding from a settlement agreement negotiated by the U.S. Department of Justice, the Marine Board has initiated a study to examine the safety culture of the offshore oil and gas industry and to propose potential enhancements. The committee is chaired by Nancy Tippins, Valterra Corporation.
- Congress has asked TRB to review the technologies that the U.S. DOT's Connected Vehicle Initiative will apply for digital short-range communications, as well as the implementation plan. The chair of the study is Dennis Wilkie, formerly with Motorola and the Ford Motor Company.



TRB is assisting with an NRC study on Federal Motor Carrier Safety Administration hours-of-service regulations for commercial motor vehicle drivers and the effects on driver fatigue and safety. (Photo: Dave Lindblom, Flickr)

In addition, the Policy Studies staff are assisting the NRC Board on Energy and Environmental Systems on three projects: evaluating fuel conservation technologies for light-duty vehicles and for medium- and heavy-duty trucks, both for the National Highway Traffic Safety Administration; and a study of options for funding electric vehicle recharging stations, for the Department of Energy. TRB staff also are assisting the NRC Committee on National Statistics in a study for the Federal Motor Carrier Safety Administration; the study will provide advice on the research methods and data appropriate for assessing the effects that regulating the hours of operation have on driver fatigue and safety.

Information Services

TRANSPORTATION RESEARCH INFORMATION SERVICES

Transportation Research Information Documentation (TRID) is a comprehensive bibliographic database containing more than 1 million records of citations and abstracts of transportation research in all modes and disciplines, integrating TRB's Transportation Research Information Services database and the International Transport Research Documentation (ITRD) database.³ Since January 2014, TRID has included records from the Japan Science and Technology Agency's J-STAGE Database containing English-language abstracts. J-STAGE covers transportation-related topics in architecture and planning, civil engineering, mechanical systems, concrete, navigation, ocean engineering, electric vehicles, automotive engineering, and railroad technology.

TRID records comprise published or ongoing research in English, German, French, or Spanish; more than 123,000 records link to full-text publications. The service offers simple and advanced searching and allows users to download and e-mail results, as well as share 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

³ <http://trid.trb.org>. ITRD is a project of the Joint Research Center of the International Transport Forum and the Organization for Economic Cooperation and Development (OECD).



In January, TRID added records from the Japan Science and Technology Agency's J-STAGE database of English-language abstracts.

Board (HRB), Strategic Highway Research Program (SHRP), and Marine Board publications since 1923.⁴ 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.⁵ The RNS database serves as a tool for reviewing research needs, setting research priorities, and identifying gaps in current research. More than 1,100 statements are posted.

RESEARCH IN PROGRESS DATABASE

Research in Progress (RiP) is a database of approximately 11,300 records of active or recently completed research projects.⁶ 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.

⁴ <http://pubsindex.trb.org>.

⁵ <http://rms.trb.org>.

⁶ <http://rip.trb.org>.

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 for 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 2014, the panels selected nine new airport, 16 new highway, and five 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 60–61. Approximately 1,000 copies of each ACRP and NCHRP report are published in hard copy, with 600 to 700 distributed to state DOTs, airport operators, and TRB topic-area subscribers. Starting in 2014, TCRP reports are published on the TRB website only; ACRP and NCHRP reports are also available on the website.⁷

⁷ www.trb.org/Publications/PubsNCHRPSynthesisReports.aspx; www.trb.org/Publications/PubsTCRPSynthesisReports.aspx; and www.trb.org/Publications/PubsACRPSynthesisReports.aspx.



(Clockwise from far left:) Lisa L. Loyo, Information Services manager; Aryeh Cohen, senior librarian; Janet S. Daly, senior abstractor; Bill McLeod, database librarian; James W. Yates, Jr., library clerk; and library temp Karen King meet to discuss Transportation Research Information Services initiatives.



ACRP Synthesis 56 offers insights on ways that airports can use social media to engage customers. (Photo: George Martell/Pilot New Media)

TRB maintains an inventory of hard-copy Synthesis reports for sale.⁸ Following are summaries of illustrative airport, highway, and transit reports published in 2014.

ACRP SYNTHESIS REPORTS

The following four of the 10 ACRP reports published in 2014 are notable for the wide dissemination of research results. Principal investigators have presented findings via conference sessions and webinars to airport operators and interested stakeholders.

- ACRP Synthesis 56, *Understanding the Value of Social Media at Airports for Customer Engagement*, by Linda Perry, compiles cur-

⁸ www.trb.org/Finance/Bookstore.aspx.

rent literature and practice on airport operators' use of social media to engage customers.

- ACRP Synthesis 54, *Electric Vehicle Charging Stations at Airport Parking Facilities*, by Alice Richard, is a primer that covers policy approaches, infrastructure needs, and funding mechanisms for electric vehicle (EV) charging. The report highlights motivations for providing EV charging stations at airports, identifies technologies, and describes practices for installation and operation.
- ACRP Synthesis 51, *Impacts of Aging Travelers on Airports*, by Phil Mein, describes the challenges of wayfinding, fatigue, technology, and equipment for aging travelers, as well as airport practices to accommodate and improve elderly travelers' airport experience. The report helps airports define the issues and implement practices to accommodate aging travelers.
- ACRP Synthesis 50, *Effective Cooperation Among Airports and Local and Regional Emergency Management Agencies for Disaster Preparedness and Response*, by James F. Smith, focuses on establishing and sustaining working relationships between airports and emergency management partners, including identifying problems and building cooperation. The report describes a range of policies, programs, practices, and interactions that may help in establishing and sustaining good working relationships.

NCHRP SYNTHESIS REPORTS

- A webinar in March 2014 on NCHRP Synthesis 451, *Effective Emergency Medical Services Response to Motor Vehicle Crashes in Rural Areas*, by Erik Minge, attracted significant participation from the emergency medical services community, as well as from transportation practitioners. The report identifies practices that may reduce the time to locate crashes and to respond to and care for crash victims.
- NCHRP Synthesis 455, *Alternative Technical Concepts for Contract Delivery Methods*, by Douglas Gransberg, Mike Loulakis, and Ghada Gad, presents an approach for design and construction contractors to suggest contract modifications that would improve a project technically or reduce costs. An FHWA webinar on Alternative Contracting Methods



U.S. Coast Guard, Alaska Department of Transportation and Public Facilities, fire department, and other personnel take part in a live disaster drill at Kodiak State Airport. ACRP Synthesis 50 addresses effective cooperation between airport and local and regional emergency management agencies for disaster preparedness. (Photo: James Brooks, Flickr)



Emergency medical response to rural crashes is the topic of NCHRP Synthesis 451; a related webinar reviewed the successful practices. (Photo: National Highway Traffic Safety Administration)

highlighted the report in April 2014.

- NCHRP Synthesis 456, *Nonnuclear Methods for Compaction Control of Unbound Materials*, by Munir Nazzal, documents national and international experience with nonnuclear devices and methods for measuring the compaction of unbound materials. The report was the subject of a 2014 TRB Annual Meeting workshop.
- NCHRP Synthesis 462, *Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way*, by Edgar Kraus, surveys state DOTs to identify and synthesize exemplary practices for managing longitudinal utility installations on controlled-access highway rights-of-way. The report will be the subject of a session at the March 2015 CGA 811 Excavation Safety Conference and Expo.
- NCHRP Synthesis 463, *Pavement Patching Practices*, by Rebecca McDaniel, documents national and international experience in isolated pavement repair and patching, recognizing state DOTs and other public agencies that include pothole repair in maintenance preservation programs and the level of use. A webinar in spring 2015 will feature this report.

TCRP SYNTHESIS REPORTS

- TCRP Synthesis 101, *Implementation and Outcomes of Fare-Free Transit Systems*, by Joel Volinski, documents the experiences of public transit agencies that have planned, implemented, and operated fare-free systems. Presented at the 2014 TRB Annual Meeting, the synthesis garnered widespread attention and has been quoted in several news reports.

- TCRP Synthesis 107, *Rail Transit Track Inspection Practices*, by John Zuspan, offers information on track inspection practices and policies at a range of U.S. rail transit agencies. Two anecdotes indicate the popularity of the report: a panel member personally forwarded the report to a list of 100 rail industry colleagues who had requested it, and another reader deposited a copy in the base camp library at Mount Everest.

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.

Three IDEA programs were operating in 2014:

- NCHRP IDEA, through which state DOTs collectively fund highway-related research;
- Transit IDEA, funded by FTA through TCRP, for research on innovations applicable to transit practice; and
- Safety IDEA, sponsored by FRA, supporting projects to improve the safety of railroad operations.

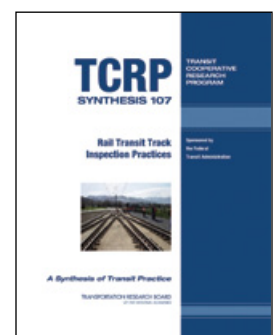
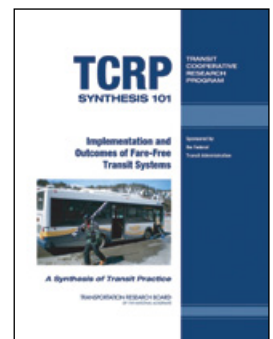
STRUCTURE AND ACTIVITIES

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, the funds are augmented through cost-share arrangements, nearly doubling the amount of research that can be supported through the IDEA programs.

At the 2014 TRB Annual Meeting, the transit, highway, and safety programs conducted poster sessions highlighting 22 of the most promising current projects. Each session attracted a constant stream of interested visitors who inter-



NCHRP Synthesis 456 examines national and international experience with nonnuclear devices and methods for measuring compaction of unbound materials. (Photo: Iowa State University, 2008)





Lytix—formerly DriveCam—developed the widely used DC3P Video Event Recorder, which received seed funding and early testing through TRB’s Intelligent Transportation Systems IDEA program. (Photo: Lytx, Inc.)

acted 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.⁹ Contractor final reports for completed IDEA projects also are posted on the TRB website.¹⁰ A less formal publication, *Ignition*, features interviews with IDEA investigators and transportation leaders, plus articles that highlight promising projects.¹¹

RECENT SUCCESSES

- With funding from TCRP IDEA, International Electronic Machines (IEM) devel-

⁹ www.trb.org/IDEAProgram/IDEAProgram.aspx.

¹⁰ www.trb.org/Publications/PubsIDEAHighwayFinalReports.aspx; <http://www.trb.org/Publications/PubsIDEATransitFinalReports.aspx>; www.trb.org/Publications/PubsIDEASafetyFinalReports.aspx.

¹¹ www.trb.org/Publications/PubsIDEAIgnitionMagazines.aspx.

oped the **handheld noncontact electronic rail wheel gauge** for transit rail cars. The device overcomes the economic, safety, and environmental deficiencies of current wheel measurement technologies. IEM is marketing the new technology to transit properties and railroads as Handwise.

- A project funded through Safety IDEA, **Reducing Wheel Climb at Switch Points to Reduce Derailments**, shows promise for implementation. The research team, led by Allan M. Zarembski of the University of Delaware, worked with Norfolk Southern Railroad to develop a series of handheld measurement gauges, based on European practice, to identify problems associated with the risk of wheel climb at switch points. Field evaluations showed that three of the gauges were valuable in identifying poor switch conditions that could cause a wheel-climb derailment.
- **DriveCam Video Event Recorder**, developed through the former Intelligent Transportation Systems IDEA, monitors driving activity by recording a video of the roadway, audio, and directional G-forces into a digital looping memory. The G-forces caused by activities such as hard braking, acceleration, harsh cornering, or collisions trigger the device to save a recording of the event. DriveCam has become one of the IDEA programs’ greatest successes, widely adopted by commercial trucking companies and bus transit services in Los Angeles, Dallas, Washington, D.C., San Francisco, and New Jersey, and by the Greyhound Bus Company.

Staff News

Jo Allen Gause, Senior Program Officer, undertook management of the Transit and Safety IDEA programs after completing assignments with SHRP 2.



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 Office of the Assistant Secretary for Research and Technology (OST-R);
- 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).

During 2014, these programs produced 138 publications on a range of topics valuable to practitioners.

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. Since 1962, NCHRP has helped the transportation community in finding practical solutions to pressing problems and implementing innovations to improve practice.

Support for NCHRP is voluntary, and funds are drawn from the states' Federal-Aid Highway apportionment for State Planning and Research. The funds can be spent only for the administration of projects approved by 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 applicable results. Stakeholder involvement throughout the process guarantees that the program addresses high-priority research needs and develops products ready for implementation.



Christopher Hedges, NCHRP Manager, briefs the members of a project panel on processes and their project's mission. More than 2,250 volunteers served on NCHRP panels in 2014.



Director Christopher W. Jenks updates the TRB Executive Committee on Cooperative Research Programs initiatives and funding. (Photo: Risdon Photography)



John S. Halikowski
Chair
AASHTO Standing
Committee on
Research



Sherry E. Little
Chair
TCRP Oversight and
Project Selection
Committee



Cheryl A. Burke
Chair
HMCRP Technical
Oversight Panel



Lillian C. Borrone
Chair
NCFRP Oversight
Committee



Kitty Freidheim
Chair
ACRP Oversight
Committee



Patricia Quinn
Vice Chair
NCRRP Oversight
Committee



Christopher W. Jenks
Director
Cooperative Research
Programs



NCHRP research has contributed to comprehensive manuals of practice published by AASHTO.

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 1,305 publications in the NCHRP Report and NCHRP Synthesis of Highway Practice series, in addition to 390 Research Results Digests and 63 Legal Research Digests, as well as 282 other documents published electronically. NCHRP reports published during the past 12 months are listed on pages 60–61.

PROVEN PROCESS

AASHTO considered 115 problem statements for the Fiscal Year (FY) 2015 program and selected 12 continuing projects and 46 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



The AASHTO Standing Committee on Research met in March and selected 58 NCHRP projects for Fiscal Year 2015, on topics from traffic control devices to extreme weather impacts.



David Huft, South Dakota DOT, guides the first project panel meeting on the Standard Definitions for Comparable Pavement Cracking Data in October.

process, and monitors the research from beginning to end. The panel's participation ensures the credibility of the research findings, facilitating adoption by AASHTO, state departments of transportation (DOTs), and other organizations.

NCHRP panels convened more than 133 project meetings in 2014; more than 2,250 volunteers contributed time, energy, and expertise as panel members, attending meetings and reviewing materials, primarily for the challenges and the satisfaction of assisting in advances in the field.

Most NCHRP research projects have had a direct impact on practice through products such as recommended specifications, manuals, and guidelines, often with AASHTO ensuring deployment by state DOTs. The *Impacts on Practice* series describes examples of NCHRP successes.¹

Following is a small sample of the 2014 NCHRP reports of particular importance to AASHTO. All reports are available on the TRB

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

website.² General information on all projects is available in the NCHRP Summary of Progress, December 31, 2014, and on the web.³

NCHRP REPORTS

NCHRP Report 750, Volume 2, *Climate Change, Extreme Weather Events, and the Highway System: Practitioner's Guide and Research Report*, provides guidance on strategies for adapting to the likely impacts of climate change through 2050—and of sea level rise through 2100—addressing planning, design, construction, operation, and maintenance of infrastructure assets in the United States.

NCHRP Report 750, Volume 4, *Sustainability as an Organizing Principle for Transportation Agencies*, offers an analytical framework and implementation approaches to assist state DOTs and other transportation agencies evaluate current and future capacity to support a sustainable society; the goal is to deliver transportation solutions in a rapidly changing social, economic, and environmental context in the next 30 to 50 years.

NCHRP Report 750, Volume 5, *Preparing State Transportation Agencies for an Uncertain Energy Future*, examines the likely effects of changes in energy supply and demand in the next 30 to 50 years on the mandate, role, funding, and operations of state DOTs. The report identifies potential strategies and actions that state DOTs can employ to plan and prepare.

NCHRP Report 768, *Guide to Accelerating New Technology Adoption Through Directed Technology Transfer*, presents a framework and



The diverging diamond interchange project at Pioneer Crossing in Utah is presented in NCHRP Synthesis 455, *Alternative Technical Concepts for Contract Delivery Methods*, as an innovative solution generated by alternative concepts in a design-build project. (Photo: S. Haines)

guidance for technology transfer to accelerate innovation within a state DOT or similar agency.

NCHRP Report 769, *A Guide for Public Transportation Pandemic Planning and Response*, assists transportation organizations to prepare for pandemics and the spread of infectious diseases, including seasonal flu. The report provides information, tools, tips, guidance, and recommendations from federal agencies and other resources.

NCHRP Report 776, *Bridge System Safety and Redundancy*, proposes revisions to the design philosophy section of the AASHTO Load and Resistance Factor Design (LRFD) bridge design specifications.

Through foundational planning principles, case studies, tips, and tools, NCHRP Report 777, *A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events*, explains the implementation of transportation planning for possible multijurisdictional disasters, emergencies, and other major events.

NCHRP Report 778, *Bridge Stormwater Runoff Analysis and Treatment Options*, presents information and an analysis process for identifying cost-effective, pollution-reducing strategies for the management of stormwater runoff from highway bridges.

NCHRP SYNTHESSES

NCHRP Synthesis 454, *Response to Extreme Weather Impacts on Transportation Systems*, examines eight recent cases of extreme weather in the United States from the perspectives of transportation operations, maintenance, design, construction, planning, communica-

² www.trb.org/NCHRP/NCHRP.aspx.

³ <http://onlinepubs.trb.org/onlinepubs/nchrp/nchrpanual2014.pdf>.



tions, interagency coordination, and data and knowledge management.

NCHRP Synthesis 455, *Alternative Technical Concepts for Contract Delivery Methods*, documents various methods for implementing alternative technical concepts during the highway contracting process. The methods promote transparency and fairness while protecting the industry's right to confidentiality.

The experience of transportation agencies in implementing the 2008 AASHTO *Mechanistic-Empirical Pavement Design Guide: A Manual of Practice* and the 2011 software program, AASHTOWare Pavement ME Design, is documented in NCHRP Synthesis 457, *Implementation of the AASHTO Mechanistic-Empirical Pavement Design Guide and Software*.

NCHRP Synthesis 458, *Roadway Safety Data Interoperability Between Local and State Agencies*, surveys the interoperability of state and local safety data and highlights agency practices that support a data-driven safety program for all public roads.

OTHER NCHRP TITLES OF NOTE

- NCHRP Research Results Digest 387, *Alternative Delivery Methods for Winter Maintenance Operations*, develops a decision-making framework to guide public road agencies' delivery of winter maintenance operations.
- NCHRP Web-Only Document 201, *Calibration of AASHTO LRFD Concrete Bridge Design Specifications for Serviceability*, explores the service limit states for concrete bridges in the AASHTO LRFD bridge design specifications. The cracking of reinforced concrete components, tensile stresses in prestressed concrete components, and fatigue of concrete and rein-



Sherry Little (center) leads the TCRP Oversight and Project Selection committee through the fall meeting agenda.



The panel for the TCRP project on Improving the Safety and Sustainability of Stray Current Control of DC-Powered Rail Transit Systems meets with members of the research team in November.

forcement are the limit states amenable to statistical calibration.

Transit Cooperative Research Program

Initially 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 selects 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 22 years, TCRP has undertaken approximately 700 research studies. Details on the program's progress since 1992 can be found in the 2014 TCRP Annual Report.⁴

Funding for TCRP has dropped significantly over the past several years—from \$10 million in FY 2011 to \$3.0 million in FY 2014. The Moving Ahead for Progress in the 21st Century Act (MAP-21) authorized \$7.0 million in funding for TCRP in FY 2013 and FY 2014; however, appropriations have not met the authorized levels. As a result, the number of new research projects has declined substantially.

Nevertheless, TCRP produced 21 publications in 2014, bringing the total to more than 600 publications since the program's inception. The fol-

⁴<http://onlinepubs.trb.org/onlinepubs/tcrp/tcrpannual2014.pdf>.

lowing TCRP publications of particular interest were completed during the year.

OPERATIONS, MAINTENANCE, AND SAFETY

TCRP Report 169, *Developing Best-Practice Guidelines for Improving Bus Operator Health and Retention*, describes approaches in the United States and Canada to address the health problems and safety of transit employees. The report includes a practitioner's guide and an evaluation and return-on-investment template for implementing programs to protect the health of bus operators and other employees.

TCRP Report 170, *Establishing a National Transit Industry Rail Vehicle Technician Qualification Program: Building for Success*, presents a system for qualifying rail vehicle technicians that integrates national training standards, progressive classroom curricula, introductory courseware, on-the-job learning modules, an apprenticeship framework, and mentoring. The system includes written and hands-on assessments to confirm practical knowledge and skills at the highest level and is available through the Transportation Learning Center.

TCRP Report 171, *Use of Mobility Devices on Paratransit Vehicles and Buses*, explores issues that limit the use of mobility devices in paratransit vehicles and buses; a separate guidance document assists transit systems, manufacturers, and transit users in implementing accessible design and accommodation solutions. The report addresses potential safety improvements and the level of service for larger, heavier occupied mobility devices in paratransit vehicles and buses.

In addition, summaries of current practice were published:

- TCRP Synthesis 107, *Rail Transit Track Inspection Practices*;
- TCRP Synthesis 109, *System-Specific Spare Bus Ratios Update*; and
- TCRP Synthesis 111, *Optimizing Bus Warranty*.

MANAGEMENT, ADMINISTRATION, AND CUSTOMER SERVICE

TCRP Report 163, *Strategy Guide to Enable and Promote Use of Fixed-Route Transit by People with Disabilities*, provides information, practical steps, and logical strategies for public transit providers to improve fixed-route bus and rail



Advertising and the sale of naming rights—as with the Healthline in downtown Cleveland, Ohio—are explored in TCRP Synthesis 112, *Maintaining Transit Effectiveness Under Major Financial Constraints*. (Photo: Wikimedia Commons)

transit service for people with disabilities. Strategies are presented for improved access to bus stops; marketing, public information, and travel training; fare incentives; more inclusive designs; and determining Americans with Disabilities Act eligibility for paratransit.

TCRP Report 168, *Travel Training for Older Adults: A Handbook*, offers guidelines for building and implementing training programs for older adults who use fixed-route public transit. The handbook addresses the primary components of a travel training program; defines the target market; identifies incentives and barriers to participation and use; describes marketing and outreach strategies; explores techniques for customized training; identifies methods to monitor outcomes; and emphasizes cost-effectiveness for providers and riders.

TCRP Report 172, *Guidance for Developing a Transit Asset Management Plan* presents a process for developing a plan to achieve a state of good repair. The accompanying Transit Asset Prioritization Tool consists of spreadsheet models designed to assist transit agencies in predicting the conditions of their assets and in prioritizing rehabilitation and replacement.

In addition, a summary of current practice was published as TCRP Synthesis 112, *Maintaining Transit Effectiveness Under Major Financial Constraints*.

PLANNING

TCRP Report 164, *Community Tools to Improve Transportation Options for Veterans, Military Service Members, and Their Families*, provides

a resource for assessing and improving public transit, specialized transportation, volunteer services, and other local transportation options for veterans, military service members, and their families, building on the concepts of transportation coordination and mobility management.

TCRP Report 166, *Characteristics of Premium Transit Services That Affect Choice of Mode*, provides information on key factors—beyond travel time and cost—that affect travelers’ choice of premium transit services. Models for forecasting ridership include nontraditional transit service attributes. The findings can help travel demand modelers and transit planners seeking to improve transit forecasting at metropolitan planning organizations.

TCRP Report 167, *Making Effective Fixed-Guideway Transit Investments: Indicators of Success*, presents a data-driven, indicator-based model for predicting the success of a fixed-guideway transit project from the expected ridership and the resulting changes in system use. The analytical model can help planners at local, regional, and state transportation agencies determine if a proposed improvement project merits a more detailed planning analysis. The analytical model encompasses a spreadsheet tool and a handbook.

LEGAL RESEARCH FOR PUBLIC TRANSPORTATION SYSTEMS

TCRP Project J-5, *Legal Aspects of Transit and Intermodal Transportation Programs*, provides authoritatively researched, specific, limited-scope studies of legal issues and problems that have national significance and application to transit agencies. Three publications were released in 2014:

- TCRP Legal Research Digest 45, *Transit Public-Private Partnerships: Legal Issues*, identifies the issues associated with negotiating public-private partnership (PPP) agreements for transit projects. The digest explores the rationale for using PPPs, innovative contracting and financing approaches, and the transfer of risks from the public to the private sector.
- TCRP Legal Research Digest 46, *How the Health Insurance Portability and Accountability Act (HIPAA) and Other Privacy Laws Affect Public Transportation Operations*, examines the application of the HIPAA privacy and



Kitty Freidheim (center) chairs a meeting of the ACRP Oversight Committee (AOC) in July. The AOC formulates the upcoming year’s research program and identifies topics for further study.

security rules to transit agencies that possess health information about patrons. The digest analyzes HIPAA’s definition of protected health information, discusses the privacy and security rules, and describes industry standards and best practices to protect the privacy of patrons’ health information.

- The legal issues confronting transit agencies seeking to obtain insurance for large transit capital projects—including Federal New Starts projects, alternative delivery projects, and large rolling stock acquisitions—are identified in TCRP Legal Research Digest 47, *Legal Issues with Obtaining Insurance for Large Transit Projects*. The digest presents the different types of insurance coverage required for large projects and the benefits, advantages, and disadvantages; how state laws can affect the ability to assign risk; current practices for drafting contract provisions; competitive procurement and cost analysis; obtaining comparative pricing; and the impacts on owner liability, project and contractor safety, and disadvantaged and small business enterprise participation.

Airport Cooperative Research Program

Established in 2005, ACRP is an applied research program that develops near-term practical solutions to problems faced by airport operators and their stakeholders and provides research publications to the industry. The program is managed by TRB and is sponsored by FAA. ACRP undertakes research and other technical activi-

ties across a diverse set of industry disciplines, including airport design, construction, legal issues, maintenance, operations, safety, policy, planning, human resources, and administration. The research aims to fill voids in knowledge and practice, address persistent problems, provide guidance on issues, and to spur innovation in airport management.

ACRP has authorized more than 381 research projects, each scoped and guided by a panel of industry experts. ACRP has engaged thousands of public- and private-sector stakeholders—airport practitioners, academicians, consultants, advocates, and students—to identify problem areas and develop innovative publications that provide guidance, extend knowledge, identify best practices, and offer practical tools to overcome challenges. ACRP applies a grassroots approach to engage practitioners and to ensure that the research captures the issues most relevant to the airport industry.

Through its library of more than 200 publications and through engagement with stakeholders, ACRP plays a key role in helping airports collaborate and share lessons learned, fulfill environmental responsibilities, and operate safely and efficiently. ACRP ensures that the work reaches the right audience by participating in conferences, hosting workshops and webinars, facilitating a speakers bureau, and managing the ACRP Ambassador program. The ACRP website also shares information, offering airport practitioners easy access to all ACRP publications.

In the past eight years, ACRP has built a network of industry experts representing all 50 states, Washington, D.C., and Puerto Rico and contributing to the program's research. A recent



ACRP Report 101, *Best Practices Manual for Working in or near Airport Movement Areas*, comprises a database, training tools, aids, checklists, and a video, "Staying Safe on the Airfield."

survey of practitioners confirms that ACRP has made meaningful inroads into the airport industry. A full description of the program's progress can be found on the ACRP website⁵ and in the 2014 ACRP Annual Report.⁶

PRACTICAL SOLUTIONS AND TOOLS

ACRP's practical, hands-on tools and resources provide airport practitioners and industry stakeholders with a reliable source of information for innovations and improvements. ACRP's growing library offers software guidance, modeling tools, sample planning documents, best practices, worksheets, checklists, and more.

Safe and Efficient Operations

Maintaining safe and efficient operations within a capacity-constrained system is critical. ACRP-produced resources help airport practitioners anticipate, prepare for, and implement solutions to meet challenges. Safety, policy and planning, design and construction, and operations are key research fields for ACRP and cover passenger service, airport capacity, fuel price uncertainties, emergency management, wildlife hazards, winter operations, airport parking, and more. In 2014, for example, ACRP produced the following publications:

- ACRP Report 101, *Best Practices Manual for Working in or near Airport Movement Areas*;
- ACRP Report 104, *Defining and Measuring Aircraft Delay and Airport Capacity Thresholds*;
- ACRP Report 107, *Development of a Runway Veer-Off Location Distribution Risk Assessment Model and Reporting Template*;
- ACRP Report 108, *Guidebook for Energy Facilities Compatibility with Airports and Airspace*;
- ACRP Report 112, *Airport Terminal Incident Response Planning*;
- ACRP Synthesis 52, *Habitat Management to Deter Wildlife at Airports*;
- ACRP Synthesis 54, *Electric Vehicle Charging Stations at Airport Parking Facilities*; and
- ACRP Synthesis 58, *Safety Reporting Systems at Airports*.



Best practices for safety related to planning, developing, and constructing energy production and transmission technologies in close proximity to airports are presented in ACRP Report 108, *Guidebook for Energy Facilities Compatibility with Airports and Airspace*. (Photo: Adam Parsons, Dallas-Fort Worth International Airport)

⁵www.trb.org/ACRP/ACRP.aspx.

⁶<http://onlinepubs.trb.org/onlinepubs/acrp/acrpannual2014.pdf>.

Community Engagement

Recognizing that streamlined management of an airport requires coordination between airport staff and affiliated organizations, ACRP designs guidebooks to highlight best practices for strengthening relationships and communicating clearly within the airport and to the broader community. ACRP research has addressed several issues relating to community engagement:

- ACRP Synthesis 56, *Understanding the Value of Social Media at Airports for Customer Engagement*; and
- ACRP Synthesis 55, *Backcountry Airstrip Preservation*.

Small Airport Management

ACRP research has resonated with the management of small airports. ACRP Report 16, *Guidebook for Managing Small Airports*, produced in 2008, remains a perennial favorite, as managers come from varied backgrounds and must deal with a range of challenges, such as budgets, debris on the runway, customer service, and emergency management planning. ACRP added the following resources offering practical guidance in financial, administrative, operational, and technical areas in 2014:

- ACRP Research Results Digest 21, *Best Practices for General Aviation Aircraft Fuel-Tank Sampling*; and
- ACRP Synthesis 57, *Airport Response to Special Events*.



A green roof is one of the environmentally friendly initiatives presented in ACRP Synthesis 53, *Outcomes of Green Initiatives: Large Airport Experience*.



ACRP Synthesis 51, *Impacts of Aging Travelers on Airports*, identifies the primary issues faced by elderly airplane passengers: wayfinding, fatigue, technology, and amenities. (Photo: Corgan)

Environmental Issues

Airport managers are addressing broader environmental issues in addition to sustainability and compliance. ACRP has sponsored extensive research on environmental topics, helping airports identify opportunities to become more environmentally responsible, demonstrate sensitivity to the impact of operations on surrounding communities, diversify fuel supplies, improve air quality, and implement energy efficiency measures to save money and reduce greenhouse gas emissions. In 2014, the following were added to ACRP's library of environmental research:

- ACRP Legal Research Digest 22, *The Role of the Airport Sponsor in Airport Planning and Environmental Reviews of Proposed Development Projects Under the National Environmental Policy Act (NEPA) and State Mini-NEPA Laws*;
- ACRP Report 105, *Guidelines for Ensuring Longevity in Airport Sound Insulation Programs*;
- ACRP Report 110, *Evaluating Impacts of Sustainability Practices on Airport Operations and Maintenance: User's Guide and Research Report*; and
- ACRP Synthesis 53, *Outcomes of Green Initiatives: Large Airport Experience*.

Terminal Design

One of the most popular and widely used publications, ACRP Report 25, *Airport Passenger Terminal Planning and Design*, released in 2010, provides guidance to airport operators on issues in the planning and design of airport passenger facilities. Information about terminal planning previously was available only through dozens of different documents. Finding the most applicable resources proved time consuming and burdensome for planners. ACRP collected, synthesized, and consolidated knowledge from the disparate documents into a convenient resource. ACRP continues to provide information to improve the practice of terminal planning. In 2014, related ACRP publications included the following:

- ACRP Report 109, *Improving Terminal Design to Increase Revenue Generation Related to Customer Satisfaction*; and
- ACRP Synthesis 51, *Impacts of Aging Travelers on Airports*.

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 OST-R and managed by TRB, with program guidance provided by an oversight committee comprising a representative cross



CMA CGM *Atilla* unloads at Terminal 18 at the Port of Seattle in Washington. NCFRP reports published in 2014 addressed such topics as port resiliency after a major disruption of services. (Photo: Don Wilson, Port of Seattle)



Strategies for obtaining truck activity data—GPS, surveys, and agent-based models—are addressed in NCFRP Report 29.

section of freight stakeholders.⁷ Annual funding averaged \$3.4 million during SAFETEA-LU, but MAP-21 repealed NCFRP. Although the program will be closing down, all research activity funded through FY 2012 will be completed as planned. As of the end of 2014, nine active projects remain. All work should be completed by early 2016. Seven reports were published in 2014.

- NCFRP Report 27, *Web-Based Screening Tool for Shared-Use Rail Corridors*, describes a practical tool for screening the feasibility of proposed shared-use passenger and freight rail corridor projects as defined in the FRA publication *Rail Corridor Transportation Plans: A Guidance Manual*. Because states have limited resources available for passenger rail service plans and projects, public agencies need a tool to identify projects that warrant further and more rigorous investigation. The web-based screening tool can be accessed via the FRA website.⁸
- NCFRP Report 28, *Sustainability Strategies Addressing Supply-Chain Air Emissions*, provides insight into the effects of nine suggested strategies to reduce supply-chain greenhouse gas emissions and offers domestic and international case studies.
- NCFRP Report 29, *Making Trucks Count: Innovative Strategies for Obtaining Compre-*

⁷ www.trb.org/NCFRP/NCFRP.aspx.

⁸ www.fra.dot.gov/Page/P0702.

hensive Truck Activity Data, develops and assesses strategies for obtaining comprehensive data on trucking activity to inform national and regional public policy decisions. Three approaches are developed: using GPS traces to understand trucking activities, conducting a reconceptualized Vehicle Inventory and Use Survey, and applying agent-based models.

- NCFRP Report 30, *Making U.S. Ports Resilient as Part of Extended Intermodal Supply Chains*, builds on NCHRP Report 732, *Methodologies to Estimate the Economic Impacts of Disruptions to the Goods Movement System*, and provides guidelines and case studies to help seaport authorities minimize the loss of throughput capacity from a major disruption. The report identifies and describes the steps for coordinating freight movements through ports after damage to facilities or to the connecting highway, rail, and waterway routes, to withstand and recover efficiently and cost-effectively.
- NCFRP Report 31, *Incorporating Truck Analysis into the Highway Capacity Manual*, presents capacity and level-of-service techniques that improve transportation agencies' abilities to plan, design, manage, and operate streets and highways to serve trucks and to evaluate the effects of trucks on other modes of transportation. These techniques are being incorporated into the next *Highway Capacity Manual* but are immediately applicable by planners and designers of projects with significant truck traffic.
- NCFRP Report 32, *Integrating Marine Transportation System (MTS) Commerce Data with Multimodal Freight Transportation Performance Measures to Support MTS Maintenance Investment Decision Making*, examines the feasibility of evaluating potential navigation operation and maintenance projects on the MTS in terms of waterborne commerce and of landside freight connections. A network optimization model maximizes multimodal system capacity by choosing projects that will accommodate expected demand or that will provide the greatest potential throughput within budget constraints.
- NCFRP Web-Only Document 5, *Carbon Footprint of Supply Chains: A Scoping Study*, defines a standardized, conceptual approach



A liquid natural gas production plant in Ohio. Natural gas pipelines are the subject of HMCRP Report 14, *Guide for Communicating Emergency Response Information for Natural Gas and Hazardous Liquid Pipelines*. (Photo: Bilfinger SE)

to assessing global greenhouse gas emissions from the transportation component of supply chains, critiques current methods and data for quantifying the emissions, and outlines a work plan for developing a decision tool to estimate the carbon footprint.

Hazardous Materials Cooperative Research Program

SAFETEA-LU authorized a pilot cooperative research program on hazardous materials transportation. HMCRP was initiated in September 2006 under the sponsorship of PHMSA to complement other U.S. DOT research efforts 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. The program will be discontinued at the completion of the remaining active project, initiated in July 2014 and expected by early 2016.

Two reports were published in 2014:

- HMCRP Report 13, *Test Procedures and Classification Criteria for Release of Toxic Gases from Water-Reactive Materials*, proposes an improved procedure for measuring the rate of

⁹ www.trb.org/HMCRP/HMCRP.aspx.

gas production when a water-reactive material—such as a flammable or a toxic gas—is combined with water.

- HMCRP Report 14, *Guide for Communicating Emergency Response Information for Natural Gas and Hazardous Liquid Pipelines*, provides guidance for natural gas and hazardous liquid pipeline operators and emergency responders, recommends ways to disseminate the guidance to emergency response organizations, and offers strategies for implementing an emergency response plan.

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 carries 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;

¹⁰ www.trb.org/NCRRP/NCRRP.aspx.



Studies in progress under the National Cooperative Rail Research Program include the relative energy consumption of rail and of other modes such as bus transportation. (Photo: SounderBruce, Flickr)

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

The NCRRP Oversight Committee (ROC), appointed by the Secretary of Transportation, selected initial research topics with one year of funding at \$5.0 million. NCRRP released its first publication in 2014—NCRRP Research Results Digest 1, *A Potential Strategic Plan and Research Agenda for the National Cooperative Rail Research Program*, providing direction if additional funding for the program gains approval.

Research projects currently under way include the following:

- Project 02-01, Comparison of Passenger Rail Energy Consumption with Competing Modes;
- Project 03-01, Intercity Passenger Rail Service and Development Guide;
- Project 03-02, Intercity Passenger Rail in the Context of Dynamic Travel Markets;
- Project 06-01, Building and Retaining Workforce Capacity for the Railroad Industry;
- Project 07-01, Alternative Financing Approaches for Passenger and Freight Rail Projects;
- Project 07-02, Developing Multistate Institutions to Implement Intercity Passenger Rail Programs;
- Project 07-03, Inventory of Federal and State Passenger and Freight Rail Programs; and
- Project 12-01, Legal Aspects of Rail Programs.

All are scheduled for completion in 2015. The pending PRIIA reauthorization process and appropriations will determine NCRRP's continuation.

Staff News

Christopher Hedges assumed the position of NCHRP Manager on January 1, 2014, replacing **Crawford Jencks**, who retired on December 31, 2013, after 34 years with TRB.





Second Strategic Highway Research Program | SHRP 2

By mid-2014, transportation agencies in every state and the District of Columbia had applied at least one product from TRB’s second Strategic Highway Research Program (SHRP 2). Preparing the way for an increased level and extent of engagement has been the program’s focus this year. Working closely with the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO), SHRP 2 has been driving innovation nationwide.

Although most of the research projects under the original plan for SHRP 2 were completed last year, the federal reauthorization of transportation funding made a series of development projects and pilot tests a priority for this year. The projects typically tested research products under real-world conditions, convened workshops and forums with potential users to gain input for refinements of the products, or created the web-based delivery for the products. In addition, projects were completed that pioneered use of the world’s largest source of data



Nondestructive testing products developed as part of SHRP 2 Renewal research are in use across the United States. (Photo: Nenad Gucunski, Rutgers University)

on driving behavior, collected in the SHRP 2 Naturalistic Driving Study (NDS), and plans were initiated for providing access to the data.

Focus Areas

SHRP 2 was created to find strategic solutions to three national transportation challenges: improving highway safety, reducing congestion, and improving methods for renewing roads and bridges. Research addressed the challenges through four focus areas:

- *Safety*: understanding driving behavior to improve safety and reduce crashes;
- *Renewal*: developing infrastructure renewal methods that have minimal impact yet deliver long-lasting structures;
- *Capacity*: systematically integrating environmental, economic, and community requirements into the planning and design of new highway capacity; and



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SHRP 2 Oversight
Committee



Ann M. Brach
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Stephen J. Andrie
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SHRP 2



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



Omar Smadi (right) and Zach Hans (left), Center for Transportation Research and Education at Iowa State University, discuss the Roadway Information Database (RID) at the 9th SHRP 2 Safety Symposium in July.

- **Reliability:** improving travel time reliability to address congestion.

The following sections summarize the activities in each focus area during the past year.

Safety

The nature and the scope of the SHRP 2 NDS posed a host of challenges that could have halted the project at many points during its design and conduct. The processing of the data collected from the cars of study participants, however, has confirmed that the goals of the study were met and—in some cases—were exceeded. The



SHRP 2 NDS database comprises 2 petabytes of driving data from 3,073 primary drivers—a total of 4,000 data years, 50 million data miles, 5 million trip files, and more than 1,100 crashes—plus 12,542 centerline miles of new roadway data and 200,000 centerline miles of roadway data from state transportation agencies.

The first three projects to use data from the SHRP 2 NDS were completed this year. The projects pioneered procedures for analyzing NDS data and gleaned insights into critical topics such as safety on rural two-lane curves, driver inattention, and offset left-turn lanes.

The three analysis projects were at the core of knowledge transfer activities as SHRP 2 staff and contractors worked with AASHTO and FHWA staff to support the Implementation Assistance Program and the transition to Phase 1 of the Safety Data Implementation program. Phase 1 is a five-year program that will develop and test strategies for making the data set available, to facilitate its use, to evaluate efforts to ensure confidentiality, and to identify strategies for long-term, sustainable funding for the subsequent phases.

A final data collection initiative acquired cell phone records from SHRP 2 NDS participants. With the cooperation of two major carriers, 620 participants agreed to provide records of their cell phone use that indicate the times of calls or text messages but do not include the content or phone numbers. This information will be merged with the driving data.

An NDS data access website was launched this year, providing descriptive information—but not



Jim Hedlund, Special Consultant for Safety Coordination, presents information on the SHRP 2 Naturalistic Driving Study to the TRB Executive Committee in January. (Photo: Risdon Photography)



NDS data have already been used in several projects, such as a study of safety on rural two-lane curves. (Photo: Arizona DOT)



More than 3,000 participants provided 50 million in-car data miles for the NDS. (Photo: Insight Data Access Website)

any personally identifying information—about the drivers, vehicles, and summary characteristics of each of the 5 million trips, including the crashes. Information linking the NDS trips with the roads traveled will be displayed on the website.¹

Renewal

All of the remaining research projects in the Renewal focus area were completed during 2014, bringing the total to 32. The products from this research include tools and resources to renew roads and bridges in less time, with less disruption to traffic and communities—for example, advanced methods addressing bridge replacement, non-destructive testing, pavements, project delivery, and underground utilities.

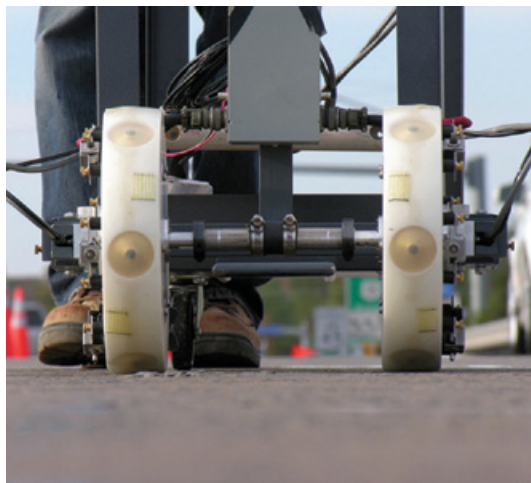
Several videos illustrate how the methods are being applied, separately and in combination, to improve the efficiency and outcomes of transportation renewal projects. The collection of videos is available on the multimedia page of the FHWA GoSHRP2 website.²

FHWA's Implementation Assistance Program has made 17 Renewal products available for transportation agency use. Preparing for the rollout of these products through knowledge exchanges was the primary focus for the SHRP 2 Renewal activities this year. The knowledge exchanges included user communities, as well



¹ insight.shrp2nds.us.

² www.fhwa.dot.gov/goshrp2/Resources/Multimedia.



Nondestructive testing technology on wheels collects data on pavement conditions.



Video still from a weekend replacement of two bridge spans using accelerated bridge construction technology. The new bridge was built on site, then the old bridge was demolished and the new one slid into place.

as staff from AASHTO and FHWA, which are taking the lead for implementation.

Reliability

Work in the Reliability focus area this past year wove together research from projects addressing ways to include the value of travel time reliability in project decision making. The initiative assembled an archive of all of the SHRP 2 Reliability-related data and operations training; the archive provides one-point access to resources that agencies can use to deliver travel time reliability at the regional level.

Four pilot projects were completed. Each carried out independent assessments of the suite of SHRP 2 Reliability data and analysis tools. Feedback from the pilot tests enabled updating and revision of the reports, guides, and analytical tools. For example, new versions of the Urban Street Travel Time Reliability software and user guide are now available.

In addition, improvements to the Freeway Reliability Methodology Computational Engine, Scenario Generator, and user guide have been incorporated into freeway evaluation methods. Other pilot projects continued the Regional Operations Forums that provide training in new strategies and technologies to improve transportation system operations.

These and other products from the 27 Reliability research projects offer opportunities to improve travel time reliability by reducing the



impact of the causes of congestion. The products address data quality, analytical tools, planning and programming, organizational capability, and innovation.

Capacity

The Capacity focus area celebrated the completion of all research and development work this year. The results of pilot tests on several major projects were incorporated into the research products.

For example, a web-based framework for collaborative decision making in the planning of new highway projects is a cornerstone product of the Capacity focus area. Transportation agencies can use the framework to navigate critical decision points in planning, programming, and environmental review and permitting. Four additional pilot projects this year tested the framework's functionality, and the findings were integrated into a revised version of the web tool, to be hosted by FHWA and rebranded as PlanWorks.

In addition, findings from the pilot tests led to the development of a practitioner's guide for considering market-driven freight issues in planning new capacity. The guide and many other products of the Capacity focus area have been integrated into PlanWorks.

During the research phase of SHRP 2, the Capacity focus area conducted 34 projects related to collaborative decision making, economic impact analysis, integrated models and networks that provide more realistic estimates of demand, conservation and environmental



The SHRP2 Solutions website offers information about data and research products that can lead to safer cars, crosswalks, and more. (Photo: Achilles Kourtellis and Pei-Sung Lin, University of South Florida)



review, and planning for freight demand. The resulting products support a systematic way to integrate community and national goals into highway planning and can help agencies deliver better transportation projects faster.

Publications and Communications

The SHRP 2 editorial staff has adeptly handled the expected influx of final research reports, publishing 39 reports and guides in 2014, as well as 56 additional deliverables, such as user's guides, software, spreadsheets, training materials, presentations, management plans, and technical documentation. After the final delivery, the total number of publications produced for SHRP 2 by this team of editorial experts will exceed 250.

SHRP 2 made good use of opportunities at the 2014 TRB Annual Meeting. At the request of 42 Technical Activities committees, SHRP 2 staff and contractors provided updates on research topics of interest. In addition, 12 podium sessions, six workshops, and three poster sessions featured SHRP 2 projects, and visitors to the TRB booth and to the SHRP2 Solutions booth staffed by AASHTO and FHWA in the exhibit hall learned more about the products and implementation opportunities.

Notable communications releases this year include the 90-second animated video, *Driving Innovation*, which conveys the essence of the program and encourages viewers to test-drive the products of SHRP 2 research. In addition, the popular SHRP 2 Products Chart was updated, describing each product in brief, the potential impact on practice, the availability, and the contact information for assistance with implementation.³

The series of four-page Project Briefs, which summarize research reports, increased to approximately 45 available online. The SHRP 2 Tuesdays webinar series, which began in April 2013, concluded at the end of September after a total of 37 programs; more than 13,000 enrolled to learn how the research was conducted and how the products can be used. The webinar recordings are posted online.⁴

³ www.trb.org/Publications/blurbs/170758.aspx.

⁴ www.trb.org/StrategicHighwayResearchProgram2SHRP2/SHRP2Webinars.aspx.



Emergency personnel participate in an outdoor training session, part of the National Traffic Incident Management Responder Training program developed by SHRP 2. (Photo: SAIC)



Nondestructive technologies such as Pave-IR for detecting defects in asphalt pavements during construction were pilot tested in Vermont in conjunction with FHWA's Every Day Counts program.

Implementation

FHWA and AASHTO are carrying out an ambitious implementation program to encourage adoption of SHRP 2 products by transportation agencies. The formal Implementation Assistance Program is rolling out SHRP 2 products and is offering technical and financial assistance in response to proposals from transportation agencies interested in learning to apply the advanced methods and new tools.

The next round of products eligible for assistance will be announced in January 2015. To date, the Implementation Assistance Program has delivered 24 SHRP2 Solutions that transportation agencies have used on approximately 250 projects. The GoSHRP2 website posts information about SHRP2 Solutions and implementation activities.⁵

SHRP 2 staff have served as a continuing resource for these efforts, participating in knowledge transfer through webinars and workshops for the AASHTO and FHWA staff responsible for SHRP 2 product-level implementation. In addition, SHRP 2 has responded to requests for in-person briefings from leaders of 18 state departments of transportation; in all, 40 states have received these briefings.

⁵www.fhwa.dot.gov/goshrp2/.



Janet D'Ignazio, ICF International, shares information on PlanWorks at an FHWA implementation planning session in November.

Staff News

Walter J. Diewald retired in February after 24 years with TRB in SHRP 2 and in the Studies and Special Programs division.

Alyssa M. Hernandez was promoted to Program Officer on the Phase 1 Safety Implementation team.



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; maintenance of the benefits and services for sponsor and affiliate organizations; and liaison to the administrative and financial offices of the National Academies.

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 \$114 million for the calendar year 2014 (see graph, page 56). A statement of income and expenditures appears on pages 54–55.



Director Gary Walker (second from left) updates and hears reports from Administration and Finance staff at a weekly meeting.

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.

(continued on page 56)



Gary J. Walker
Director
Finance and Business
Operations

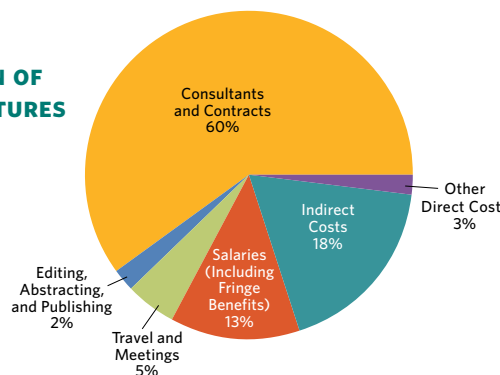
Statement of Activities

FUNDING SUPPORT BY PROGRAM AND EXPENDITURES

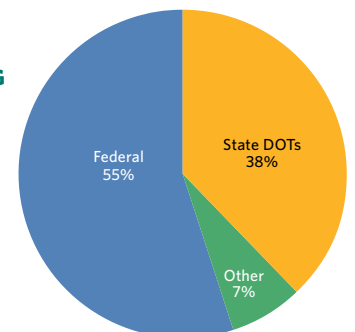
Calendar Years 2013 and 2014

	2013 (Actual)	2014 (Projected)*
Core Technical Activities		
State Highway and Transportation Departments (State DOTs)	\$7,157,000	\$6,973,000
Federal Government		
Federal Highway Administration (FHWA)	2,104,000	1,909,000
Office of the Assistant Secretary of Transportation for Research and Technology (OST-R)	300,000	300,000
Federal Transit Administration (FTA)	250,000	250,000
National Highway Traffic Safety Administration	200,000	200,000
Bureau of Indian Affairs, Department of the Interior	0	80,000
Federal Motor Carrier Safety Administration (FMCSA)	75,000	75,000
Air Force Civil Engineer Center	65,000	65,000
Federal Aviation Administration (FAA)	65,000	65,000
Federal Railroad Administration (FRA)	65,000	65,000
U.S. Army Corps of Engineers	65,000	65,000
Subtotal, Federal Government	\$3,189,000	\$3,074,000
Other		
American Public Transportation Association	65,000	65,000
American Transportation Research Institute	65,000	0
Association of American Railroads	65,000	65,000
South Coast Air Quality Management District, California	65,000	65,000
Fees and Sales	5,548,000	5,618,000
Subtotal, Other	\$5,808,000	\$5,813,000
Total, Core Technical Activities	\$16,154,000	\$15,860,000
Marine Board Core Program		
U.S. Coast Guard	75,000	75,000
U.S. Army Corps of Engineers	40,000	65,000
National Oceanic and Atmospheric Administration	40,000	40,000
Bureau of Safety and Environmental Enforcement	20,000	30,000
Maritime Administration	17,000	17,000
U.S. Navy	10,000	12,000
Total, Marine Board Core Program	\$202,000	\$239,000
Cooperative Research Programs (CRP)		
National Cooperative Highway Research Program (State DOTs)	32,149,000	33,588,000
Airport Cooperative Research Program (FAA)	14,046,000	13,669,000
Transit Cooperative Research Program (FTA)	6,227,000	4,600,000
National Cooperative Freight Research Program (OST-R)	2,211,000	2,227,000
National Cooperative Rail Research Program (FRA)	850,000	1,789,000
Hazardous Materials Cooperative Research Program (Pipeline and Hazardous Materials Safety Administration)	904,000	184,000
Total, Cooperative Research Programs	\$56,387,000	\$56,057,000

DISTRIBUTION OF TRB EXPENDITURES



TRB FUNDING SUPPORT



	2013 (Actual)	2014 (Projected)*
Strategic Highway Research Program 2 (SHRP 2)	\$31,414,000	\$29,754,000
Continuing Programs		
Innovations Deserving Exploratory Analysis (IDEA)		
NCHRP IDEA (State DOTs)	1,474,000	925,000
Transit IDEA (FTA)	450,000	575,000
Safety IDEA (FRA and FMCSA)	230,000	285,000
Subtotal, IDEA Programs	\$2,154,000	\$1,785,000
Synthesis Programs		
NCHRP Synthesis (State DOTs)	1,684,000	1,737,000
ACRP Synthesis (FAA)	280,000	1,031,000
TCRP Synthesis (FTA)	283,000	490,000
Subtotal, Synthesis Programs	\$2,247,000	\$3,258,000
Legal Programs		
NCHRP Legal (State DOTs)	218,000	278,000
TCRP Legal (FTA)	139,000	198,000
ACRP Legal (FAA)	136,000	188,000
Subtotal, Legal Programs	\$493,000	\$664,000
Total, Continuing Programs	\$4,894,000	\$5,707,000
Policy Studies	\$3,438,000	\$3,688,000
Conferences and Workshops	\$1,327,000	\$2,518,000
TRB TOTAL	\$113,816,000	\$113,823,000
Sources of Funds		
Federal	63,803,000	62,328,000
State DOTs	42,682,000	43,501,000
Other	7,331,000	7,994,000
	\$113,816,000	\$113,823,000
Expenditures by Major Cost Category		
Salaries (including fringe benefits)	16,527,000	15,453,000
Travel and Meetings	5,015,000	5,160,000
Editing, Abstracting, Publishing	2,568,000	2,775,000
Consultants and Contracts	66,975,000	67,567,000
Other Direct Costs	2,805,000	2,767,000
Indirect Costs	19,333,000	20,201,000
Total Expenditures	\$113,223,000	\$113,923,000

TRB Reserve Fund

Fund balance, end of previous fiscal year	\$16,908,000	\$17,501,000
Plus (minus) current fiscal year income over (under) expenditures	593,000	-100,000
Balance, current fiscal year	\$17,501,000	\$17,401,000

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 2014 comprises actual data through October and estimates for the rest of the year.

(continued from page 53)

- In addition to the many benefits offered to an organizational affiliate, TRB **sustaining affiliates** are entitled to complimentary registration for any webinar offered by TRB. In 2014 TRB conducted more than 90 webinars on a variety of transportation-related topics, offering more than 100 professional development hours for professional engineers; planners had the opportunity to earn more than 50 hours of certification maintenance credits from the webinars approved by the American Institute of Certified Planners. The minimum annual contribution for a sustaining affiliate is \$19,000.
- **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 eligible to participate as TRB sponsors. Fees and services are negotiated to fit each sponsor’s needs and to assure fundamental support for the Board’s programs and activities of interest to the entire transportation community. The minimum annual sponsor fee is \$65,000. Sponsors are represented on the TRB Executive Committee. (See pages 63–64 for a list of TRB sponsors and sustaining affiliates.)

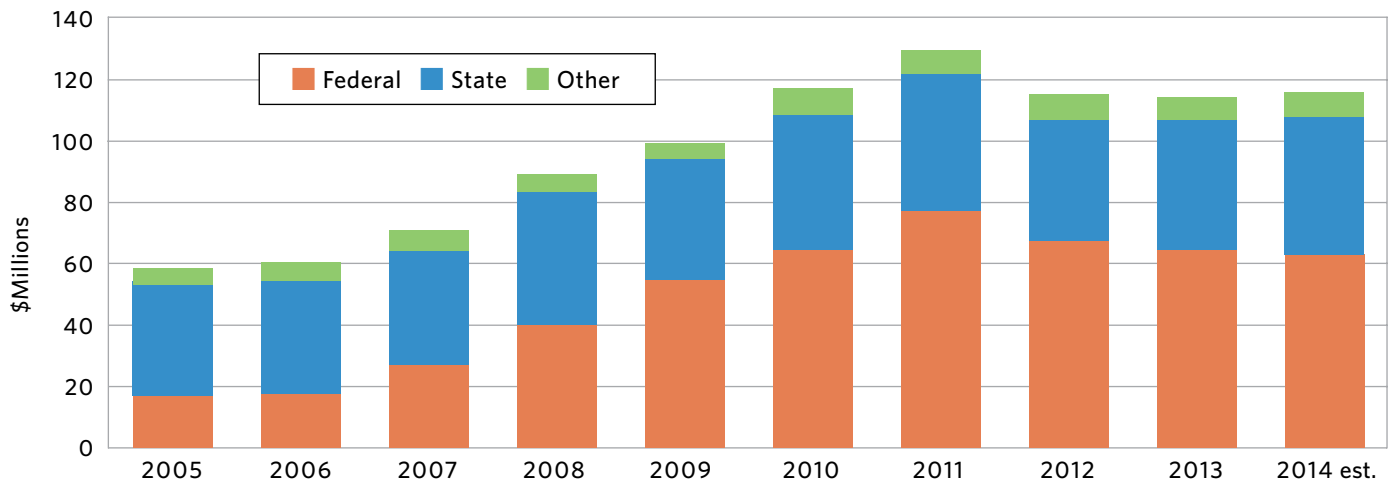


Kevin Clarke (left) and Sunil Ganesh (right), Guyana Ministry of Public Works, peruse copies of the *Transportation Research Record: Journal of the Transportation Research Board* at the TRB Annual Meeting in January. (Photo: Risdon Photography)

Publication Sales and Distribution

TRB’s timely distribution of publications disseminates the results of transportation research and technology worldwide. TRB releases selected publications—some exclusively—in electronic format. Sponsors and subscribers have the option to receive all publications released by TRB or to receive only those publications in a particular transportation mode or select area of interest. A complete listing of TRB publications issued from January 1 through December 31, 2014, appears on pages 59–62.

TRB ACTIVITY LEVEL BY YEAR



TRB Conferences and Workshops *(January 1, 2014–December 31, 2014)*

January

- 11 2014 TransportationCamp*
- 12–16 TRB 93rd Annual Meeting

February

- 4–5 Road Dust Best Management Practices Conference*

March

- 3–4 Transportation Planning, Land Use, and Air Quality Conference*
- 13–14 Federal Aerospace Forecast Conference

April

- 1–4 Joint Rail Conference*
- 9–11 5th International Transportation and Economic Development Conference*
- 14–16 5th International Conference on Women's Issues in Transportation*
- 14–17 Transport Research Arena Conference*
- 16–18 4th International Conference on Roundabouts
- 21–24 Global Symposium on Connected Vehicles and Infrastructure*
- 22–25 NAFTANext: Energizing Sustainable Trade Corridors Across North America—The Intersection of Energy, Environment, Jobs, and Growth*
- 22–25 3rd International Conference on Transportation Infrastructure*
- 27–30 Innovations in Travel Modeling 2014
- 28–30 10th National Conference on Transportation Asset Management

May

- 5–8 American Association of State Highway and Transportation Officials Geographic Information Systems for Transportation Symposium*
- 6–7 Transportation and Energy Sector Developments*
- 11–14 North American Conference on Elderly Mobility: Best Practices from Around the World—A Decade of Progress*
- 13 Workshop on Natural Gas as a Fuel for Freight Transport
- 21–22 Development of Freight Fluidity Performance Measurements
- 26–28 GeoShanghai International Conference 2014*

June

- 4–6 International Conference on Engineering and Applied Sciences Optimization*
- 8–11 American Society of Civil Engineers' 2nd Transportation and Development Institute Congress*
- 8–12 31st International Bridge Conference*
- 9–12 National Equipment Fleet Management Conference*
- 10–11 Innovation in Mobility Public Policy Summit*

- 22–24 Integrated Corridor Transportation Management System Workshop and Joint Midyear Meeting

- 24–26 Innovative Technologies for a Resilient Marine Transportation System: 3rd Biennial Research and Development Conference

- 29–July 2 North American Travel Monitoring Exposition and Conference (NATMEC): Improving Traffic Data Collection, Analysis, and Use

July

- 7 Geosynthetics in Roadway Design
- 7–11 7th International Conference on Bridge Maintenance, Safety, and Management*
- 9–11 5th International Conference on Surface Transportation Financing: Innovation, Experimentation, and Exploration
- 10 9th Strategic Highway Research Program Safety Symposium
- 13–16 53rd Annual Workshop on Transportation Law
- 15–17 Automated Vehicles Symposium
- 15–18 9th International Conference on Short- and Medium-Span Bridges*
- 20–23 GeoHubei International Conference*
- 20–23 Alternative Intersections and Interchanges Symposium
- 21–23 14th National Conference on Transportation Planning for Small and Medium-Sized Communities: Tools of the Trade
- 23–24 Workshop on the Value of Transportation Infrastructure

August

- 3–8 Global Level Crossing Safety and Trespass Prevention Symposium*
- 11–13 Istanbul Bridge Conference*
- 11–13 Symposium Celebrating 50 Years of Traffic Flow Theory*
- 18–22 NURail and Summerail Conference*

- 25–27 15th Biennial Harbor Safety Committee and Area Maritime Security Committee Conference

- 25–28 4th International Symposium on Naturalistic Driving Research

- 26–29 Transportation-Related Environmental Analysis Summer Conference

September

- 15–17 Conference on Transportation and Federal Lands: Enhancing Access, Mobility, Sustainability, and Connections
- 15–18 Pavement Evaluation 2014*
- 21–24 6th Biennial Northeast Transportation and Wildlife Conference*
- 25–27 2nd International Conference on Access Management*
- 29–Oct. 1 European Transport Conference*

October

- 14–16 International Symposium on Pavement Life-Cycle Assessment
- 26–29 21st National Conference on Rural Public and Intercity Bus Transportation: Setting Our Course for the Future*
- 29–31 Shaping the New Future of Paratransit: An International Conference on Demand Responsive Transit

November

- 3–7 3rd International Conference on Connected Vehicles and Expo*

December

- 4–5 National Accelerated Bridge Construction Conference*
- 10–11 8th University Transportation Center Spotlight Conference on the Role of Transportation in Economic Competitiveness

* TRB was cosponsor of the meeting.

TRB Webinars *(January 1, 2014–December 31, 2014)*

January

- 8 Organizational Approaches and Analytic Tools to Improve Operations Capability
- 21 SHRP 2 Tuesdays: Freight Demand Modeling and Data Improvement Strategic Plan

February

- 4 SHRP 2 Tuesdays: Pavement Renewal Solutions
- 5 Technical Considerations for Mobile Lidar Use in Transportation Applications
- 11 Getting More Out of Airport Mutual Aid
- 18 SHRP 2 Tuesdays: Analytic Procedures for Determining the Impacts of Reliability Mitigation Strategies

- 26 Ensuring Productive Regional Freight Operations and Economic Benefits

March

- 6 Department of Transportation (DOT) Climate Change Adaptation and Local Resilience Coordination: An Operations Perspective
- 7 Accommodating Large Trucks and Oversize Loads at Roundabouts: Concerns and Some Solutions
- 11 SHRP 2 Tuesdays: SHRP 2 Naturalistic Driving Study
- 12 Potential Use of Social Media in the National Environmental Policy Act (NEPA) Process

- 13 Airport Terminal Planning and Design: Models and Analytical Methods to Support Decision Making
- 20 Emergency Medical Services Response to Motor Vehicle Crashes in Rural Areas
- 24 Safety Management Systems: Tools and Strategies for Implementation
- 25 SHRP 2 Tuesdays: Real-Time Smoothness Measurements on Portland Cement Concrete Pavements During Construction

April

- 1 SHRP 2 Tuesdays: SHRP 2 Community Visioning and Performance Measurement Products
- 2 Lessons Learned from State DOT Activities Addressing Data for Decision Making and Performance Measures
- 3 Techniques for Successful Airport Wildlife Management Programs
- 7 Using Peer Exchanges to Improve the Effectiveness of a State's Strategic Highway Safety Plan
- 8 SHRP 2 Tuesdays: Roadway Information Data from the SHRP 2 Naturalistic Driving Study
- 10 Conducting Forensic Investigations of Highway Pavements
- 22 SHRP 2 Tuesdays: Mapping Defects in or Behind Tunnel Linings
- 24 Rockfall: Characterization and Analysis
- 29 SHRP 2 Tuesdays: Worker Fatigue Risk Management
- 30 Rockfall: Mitigation and Management

May

- 1 Internal Curing: A Technology to Improve the Performance of Concrete
- 6 SHRP 2 Tuesdays: Bridges Beyond 100 Years—Innovative Systems
- 13 SHRP 2 Tuesdays: Innovative Bridge Designs for Rapid Renewal
- 15 Transportation Asset Management Implementation Tips and Tricks
- 19 Highlights from the Tools and Technology Track of the 10th National Transportation Asset Management Conference
- 22 Peer to Peer: Detailed Looks at MAP-21 Asset Management Plan Pilot States
- 27 SHRP 2 Tuesdays: Developing and Testing a National Geospatial System That Integrates Ecological Tools and Data Sets
- 28 Roundabout Accessibility: What Designers Should Know About National Research and Policy
- 29 Effects of Aviation Noise

June

- 3 SHRP 2 Tuesdays: Evaluating Hot-Mix Asphalt Using Nondestructive Technologies
- 5 Challenges of Climate Data and Tools for DOT's Development and Implementation of Climate Change Plans
- 10 SHRP 2 Tuesdays: Strategic Approaches at the Corridor and Network Levels to Minimize Disruption from the Renewal Process

- 11 Highlights from the 10th National Transportation Asset Management Conference: Adaptation to Extreme Weather Events and Climate Change
- 12 Aeronautical and Nonaeronautical Special Event Planning at General Aviation Facilities
- 19 Durability of Concrete: An Overview of the Recently Updated Circular
- 24 SHRP 2 Tuesdays: Assessment of Continuous Deflection Measuring Technologies
- 30 Research Advisory Committee 101

July

- 2 Improved Mix Design and Materials Management Practices of Hot-Mix Asphalt with High Reclaimed Asphalt Pavement Contents
- 9 Gaussian Process Metamodels for Sensitivity Analysis of Traffic Simulation Models
- 10 Transportation Quality Assurance Terms and Improved Communications Practices
- 17 Airport Legal Research Digests: Understanding Procurement Requirements
- 22 SHRP 2 Tuesdays: Analysis of In-Vehicle Field Study Data and Countermeasure Implications
- 29 10th National Asset Management Conference Post Conference Webinar: Transit State of Good Repair
- 30 Performance Measurement for Asset Management: MAP-21 and Beyond
- 31 Preparing State Transportation Agencies for an Uncertain Energy Future

August

- 5 Network Level Pavement Friction Testing: Policy and Promising Practices
- 8 Entering and Updating Records in the Research in Progress Database
- 13 Concrete Maturity Protocol Development and Application
- 14 Wake Recategorization
- 18 Estimating Demand for Nonmotorized Travel
- 19 SHRP 2 Tuesdays: A Framework for Collaborative Decision Making on Additions to Highway Capacity
- 20 Is North America Ready for the Turbo Roundabout? Development and Advantages With and Without Raised Curbs
- 25 Best Practices for Crack Treatments
- 26 Ternary Mixtures: Past, Present, and Future
- 26 SHRP 2 Tuesdays: Traveler Information and Travel Reliability
- 28 Network-Level Pavement Marking Retroreflectivity Practices: Collection, Management, and Use

September

- 3 Advancing the Use of Long-Span Culvert Structures as Highway Buried Bridges
- 9 SHRP 2 Tuesdays: Local Methods for Modeling, Economic Evaluation, Justification, and Use of the Value of Travel Time Reliability in Transportation Decision Making
- 10 Evaluating and Improving Airport Environmental Sustainability Practices

- 16 SHRP 2 Tuesdays: Incorporating Reliability Performance Measures in Operations and Planning Modeling Tools
- 17 Calibration Methods and Tools
- 18 Sustainability Assessment of Pavement Systems
- 23 Climate Change, Extreme Weather Events, and the Highway System
- 24 Benefits of a Bigger Geotechnical Toolbox: Case Histories
- 29 Analytical Travel Forecasting Approaches for Project Level Planning and Design
- 30 SHRP 2 Tuesdays: Techniques to Fingerprint Construction Materials in the Field

October

- 2 Maintenance and Operations Resilience: Improving System Management and Performance During Adverse and Extreme Weather Events
- 8 Planning and Design Considerations for Precast Concrete Pavement Implementation
- 9 Long-Term Performance and Life-Cycle Costs of Stormwater Best Management Practices
- 14 Engineering Properties and Field Performance of Warm-Mix Asphalt
- 16 Successful Peer Practices for Comprehensive Training Resources
- 20 Panel Fabrication and Installation Considerations for Precast Concrete Pavement Implementation
- 22 Practical Structural Health Monitoring for Bridge Owners
- 23 Applying Scenario Methods to Transportation Planning and Policy
- 27 Effects of Warm Mix Asphalt on Plant Energy and Emissions and Worker Exposures to Respirable Fumes
- 29 Performance of Warm-Mix Asphalt Technologies: Stage I—Moisture Susceptibility

November

- 6 Obtaining Return on Investment from Structural Health Monitoring
- 12 Summary of Recent Stormwater Research Funded by the National Cooperative Highway Research Program
- 17 Implementation of International Roughness Index-Based Smoothness Specifications for Bridges and Approaches: Lessons Learned
- 19 Long-Term Performance of Epoxy Adhesive Anchor Systems

December

- 4 Practical Techniques for Successfully Communicating Technical Topics
- 9 Facility Planning Tools to Create Alternative Growth and Development Scenarios
- 10 Tool Demonstrations for Airport Terminal Planning and Design
- 15 Data Business Planning: Applying the American Association of State Highway and Transportation Officials' Data Principles
- 16 Tracking Public Perceptions Related to Data Privacy
- 17 Strategies to Mitigate the Impacts of Chloride Roadway Deicers on the Natural Environment

TRB Publications (January 1, 2014–December 31, 2014)

Transportation Research Records

- 2400 Public-Sector Aviation: Graduate Research Award Papers, 2012–2013
- 2401 Geomaterials 2014
- 2402 Truck and Bus Safety; Roundabouts 2014
- 2403 Environment and Sustainability 2014
- 2404 Operational Effects of Geometrics and Access Management 2014
- 2405 Travel Survey Methods
- 2406 Structures 2014, Volume 1
- 2407 Structures 2014, Volume 2
- 2408 Construction 2014
- 2409 Marine Transportation, Terminal Operations, and International Trade 2014
- 2410 Freight Systems 2014, Volume 1: Planning, Modeling, and Logistics
- 2411 Freight Systems 2014, Volume 2: Urban Freight, Hazardous Materials, and Trucking
- 2412 Travel Behavior 2014, Volume 1
- 2413 Travel Behavior 2014, Volume 2
- 2414 Research and Education 2014
- 2415 Transit 2014, Volume 1
- 2416 Transit 2014, Volume 2: Carsharing, Taxis, and Automated Transport
- 2417 Transit 2014, Volume 3
- 2418 Transit 2014, Volume 4
- 2419 Transit 2014, Volume 5
- 2420 Performance Measurement and Strategic Management
- 2421 Traffic Flow Theory and Characteristics 2014, Volume 1
- 2422 Traffic Flow Theory and Characteristics 2014, Volume 2
- 2423 Intelligent Transportation Systems 2014, Volume 1
- 2424 Intelligent Transportation Systems 2014, Volume 2: Connected Vehicles and Cooperative Systems
- 2425 Traffic Law Enforcement; Occupant Protection; Alcohol 2014
- 2426 Marine Environment, Marine Safety, and Human Factors 2014
- 2427 Air Quality 2014, Volume 1
- 2428 Air Quality 2014, Volume 2
- 2429 Travel Demand Forecasting 2014, Volume 1
- 2430 Travel Demand Forecasting 2014, Volume 2
- 2431 Maintenance and Preservation 2014
- 2432 Safety Data, Analysis, and Evaluation 2014
- 2433 Geology and Properties of Earth Materials 2014
- 2434 Human Performance, User Information, and Simulation 2014
- 2435 Highway Safety Performance 2014
- 2436 Highway Design 2014, Volume 1
- 2437 Highway Design 2014, Volume 2
- 2438 Traffic Signal Systems 2014, Volume 1
- 2439 Traffic Signal Systems 2014, Volume 2
- 2440 Maintenance Services, Transportation Weather, and Winter Maintenance
- 2441 Concrete Materials 2014
- 2442 Urban and Traffic Data Systems 2014, Volume 1
- 2443 Urban and Traffic Data Systems 2014, Volume 2
- 2444 Asphalt Materials and Mixtures 2014, Volume 1
- 2445 Asphalt Materials and Mixtures 2014, Volume 2
- 2446 Asphalt Materials and Mixtures 2014, Volume 3
- 2447 Asphalt Materials and Mixtures 2014, Volume 4
- 2448 Railroads 2014
- 2449 Aviation 2014
- 2450 Revenue, Finance, Pricing, and Economics
- 2451 Developing Countries 2014
- 2452 Socioeconomic, Health, and Human Factors
- 2453 Planning 2014
- 2454 Energy, Climate Change, and Alternative Fuels 2014
- 2455 Pavement Management 2014, Volume 1
- 2456 Pavement Management 2014, Volume 2
- 2457 Pavement Management 2014, Volume 3
- 2458 Visibility; Work Zone Traffic Controls; Highway–Rail Grade Crossings 2014
- 2459 Critical Transportation Infrastructure, Emergency Evacuation, and Logistics of Recovery
- 2460 Data Systems and Asset Management

- 2461 Highway Capacity and Quality of Service 2014
- 2462 Soil Mechanics 2014
- 2463 Traffic Control Devices 2014
- 2464 Pedestrians 2014
- 2465 Safety Management; School Transportation; Young Drivers 2014
- 2466 Network Modeling 2014, Volume 1
- 2467 Network Modeling 2014, Volume 2
- 2468 Bicycles and Motorcycles 2014
- 2469 Demand Management, Parking, Taxis, and Accessible Transportation and Mobility
- 2470 Freeway Operations; Regional Systems Management and Operations; Managed Lanes 2014

Special Reports¹

- 312 Transportation Investments in Response to Economic Downturns
- 313 Framing Surface Transportation Research for the Nation's Future
- 314 The Federal Aviation Administration's Approach for Determining Future Air Traffic Controller Staffing Needs

Conference Proceedings¹

- 51 Transport Research Implementation

Conference Proceedings on the Web (online)

- 13 Access to International Transportation Research Information
- 14 Sustainable Energy and Transportation Strategies, Research, and Data
- 15 Making Progress: Transportation Planners and Programmers Turn Ideas into Reality

Letter Reports (online)

- Long-Term Pavement Performance Committee Letter Report, January 2, 2014
- Long-Term Bridge Performance Committee Letter Report, January 27, 2014
- Research and Technology Coordinating Committee Letter Report, March 24, 2014
- Review of U.S. Department of Transportation Truck Size and Weight Study: First Report—Review of Desk Scans, March 31, 2014
- Long-Term Pavement Performance Committee Letter Report, August 13, 2014

Transportation Research E-Circulars (online)

- 182 Progress Toward Performance-Graded Emulsified Asphalt Specifications
- 183 Monitoring Bicyclist and Pedestrian Travel and Behavior
- 184 Critical Issues in Aviation and the Environment 2014
- 185 The Future of TransXML: Workshop Summary
- 186 Enhancing the Durability of Asphalt Pavements: Papers from a Workshop
- 187 Developing Freight Fluidity Performance Measures
- 188 Application of Reclaimed Asphalt Pavement and Recycled Asphalt Shingles in Hot-Mix Asphalt: National and International Perspectives on Current Practice
- 189 Application of Asphalt Mix Performance-Based Specifications
- 190 Innovative Applications of the *Highway Capacity Manual 2010*
- 191 Aligning Data Systems to Communicate with Decision Makers: A Peer Exchange

TR News

- Nos. 290–295

Online Newsletters

- Intercity Rail Passenger Systems, No. 22
- TRB Transportation Research E-Newsletter

Airport Cooperation Research Program (ACRP) Reports²

- 101 Best Practices Manual for Working in or near Airport Movement Areas (with CD-150)
- 102 Guidance for Estimating Airport Construction Emissions (with CD-142)
- 103 Guidebook for Integrating National Incident Management Systems (NIMS) for Personnel and Resources at Airports
- 104 Defining and Measuring Aircraft Delay and Airport Capacity Thresholds
- 105 Guidelines for Ensuring Longevity in Airport Sound Insulation Programs
- 106 Being Prepared for Irregular Operations (IROPS): A Business-Planning and Decision-Making Approach (with CD-144)

NCHRP Syntheses of Highway Practice³

- 452 State Department of Transportation Fleet Replacement Management Practices
- 453 State Bridge Load Posting Processes and Practices
- 454 Response to Extreme Weather Impacts on Transportation Systems
- 455 Alternative Technical Concepts for Contract Delivery Methods
- 456 Nonnuclear Methods for Compaction Control of Unbound Materials
- 457 Implementation of the AASHTO *Mechanistic-Empirical Pavement Design Guide* and Software
- 458 Roadway Safety Data Interoperability Between Local and State Agencies
- 459 Using the Economic Value Created by Transportation to Fund Transportation
- 460 Sharing Operations Data Among Agencies
- 461 Accelerating Implementation of Transportation Research Results
- 462 Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way
- 463 Pavement Patching Practices
- 464 Thin Asphalt Concrete Overlays
- 465 Permanent Signs Mounted on Median Barriers
- 466 Alliance Contracting: Evolving Alternative Project Delivery

NCHRP Research Results Digests³

- 387 Alternative Delivery Methods for Winter Maintenance Operations
- 388 Precision Estimates of AASHTO T 201, AASHTO T 202, and AASHTO T 49
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